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Contents

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1 Scope

The present document specifies requirements for support of Radio Resource Management for the FDD and TDD modes of Evolved UTRA. These requirements include requirements on measurements in UTRAN and the UE as well as requirements on node dynamical behaviour and interaction, in terms of delay and response characteristics.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode"

[2] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".

[3] 3GPP TS 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures"

[4] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements"

[5] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception"

[6] 3GPP TS 25.302: "Services provided by the Physical Layer".

[7] 3GPP TS 25.331: "RRC Protocol Specification".

[8] 3GPP TS 45.008: "Radio subsystem link control".

[9] 3GPP TS 45.005: "Radio transmission and reception".

[10] 3GPP TS 45.010: "Radio subsystem synchronization".

[11] 3GPP2 C.S0024-B: "cdma2000 High Rate Packet Data Air Interface Specification".

[12] 3GPP2 C.S0002-D: "Physical Layer Standard for cdma2000 Spread Spectrum Systems - Release A".

[13] 3GPP2 C.S0033-B: "Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal".

[14] 3GPP2 C.S0011-C: "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations".

[15] 3GPP2 C.S0005-D: Upper Layer (Layer 3) Signaling Specification for cdma2000 Spread Spectrum Systems

[16] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation”

[17] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification".

[18] 3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".

[19] 3GPP TS 25.123: "Requirements for Support of Radio Resource Management (TDD)".

[20] 3GPP TS 25.214: "Physical layer procedures (FDD)".

[21] 3GPP TS 36. 212 "Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding".

[22] 3GPP TS 36.302: "Evolved Universal Terrestrial Radio Access (E-UTRA); Services provided by the physical layer".

[23] 3GPP TS 36.521-3: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management conformance testing".

[24] 3GPP TS 36.355: "Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP)".

[25] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2"

[26] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[27] 3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2"

[28] 3GPP TS 36.423: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)".

[29] 3GPP TS 25.101: "UE Radio transmission and reception (FDD)".

[30] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception".

[31] 3GPP TS 36.306: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities".

[32] IEEE Standard 802.11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications.

[33] 3GPP TS 23.303: "Technical Specification Group Services and System Aspects; Proximity-based services (ProSe); Stage 2".

[34] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [26] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [26].

Any Cell Selection state: as defined in TS 36.304 [1]

Asynchronous Dual Connectivity: As defined in TS 36.331 [2].

Carrier aggregation: aggregation of two or more component carriers in order to support wider transmission bandwidths TS 36.104 [30].

CEMode A Applicability: In this version of this specification the requirements for CEMode A shall apply provided the UE category M1 is configured with CEMode A, SCH Ês/Iot ≥ -6 dB and CRS Ês/Iot ≥ -6 dB. The CEMode A and the number of repetition levels for different physical channels are defined in [3].

CEMode B Applicability: In this version of this specification the requirements for CEMode B shall apply provided the UE category M1 is configured with CEMode B, SCH Ês/Iot ≥ -15 dB and CRS Ês/Iot ≥ -15 dB. The CEMode B and the number of repetition levels for different physical channels are defined in [3].

Dual Connectivity: As defined in TS 36.331 [2].

Enhanced coverage Applicability: In this version of this specification the requirements for enhanced coverage in idle mode shall apply provided the UE category M1 is with the radio condition that SCH Ês/Iot ≥ -15 dB and CRS Ês/Iot ≥ -15 dB.

Extended IDLE-mode DRX: extended DRX cycles in IDLE mode as specified in TS 24.008 [34], where one extended DRX cycle is a time period between two first paging occasions within two consecutive PTWs.

Extended CONNECTED-mode DRX: extended DRX cycles in CONNECTED mode as specified in TS 36.331 [2].

High operating band: an operating band with a higher downlink frequency with respect to another, low, operating band.

Inter-band carrier aggregation: carrier aggregation of component carriers in different operating bands TS 36.104 [30].

Intra-band contiguous carrier aggregation: contiguous carriers aggregated in the same operating band TS 36.104 [30].

Intra-band non-contiguous carrier aggregation: non-contiguous carriers aggregated in the same operating band TS 36.104 [30].

IDC autonomous denial subframes: The maximum number of uplink subframes in which the UE is allowed not to transmit E-UTRAN signals when configured with IDC autonomous denial (TS 36.331 [2]).

IDC autonomous denial validity: It is the period over which the autonomous denial subframes are counted (TS 36.331 [2]).

IDC solution: This refers to DRX or IDC autonomous denial configured by eNodeB in response to receiving InDeviceCoexIndication from the UE (TS 36.331 [2]).

Low operating band: an operating band with a lower downlink frequency with respect to another, high, operating band.

Master Cell Group: As defined in TS 36.331 [2].

Master eNB: As defined in TS 36.300 [25].**MBSFN ABS:** ABS configured in MBSFN-configurable subframe.

Non-MBSFN ABS: ABS configured in any downlink subframe.

Normal coverage Applicability: In this version of this specification the requirements for normal coverage in idle mode shall apply provided the UE category M1 is with the radio condition that SCH Ês/Iot ≥ -6 dB and CRS Ês/Iot ≥ -6 dB. **Normal Performance Group:** For UE which supports Increased UE carrier monitoring UTRA or E-UTRA the group of inter-frequency carriers or inter-RAT carriers is divided into two groups. The group which has a better delay performance compared to the other group is refered to as the normal performance group

Paging Time Window: As defined in TS 24.008 [34].

Primary Cell: As defined in TS 36.331 [2].

ProSe Direct Communication: As defined in TS 23.303 [33]

ProSe Direct Discovery: As defined in TS 23.303 [33]

Primary SCell: As defined in TS 36.331 [2].

Primary Secondary Timing Advance Group: Timing Advance Group containing the PSCell.

Primary Timing Advance Group: Timing Advance Group containing the PCell.

Reduced Performance Group: For UE which supports Increased UE carrier monitoring UTRA or E-UTRA the group of inter-frequency carriers or inter-RAT carriers is divided into two groups. The group which has worse delay performance compared to the other group is refered to as the reduced performance group

Secondary Cell: As defined in TS 36.331 [2].

Secondary eNB: As defined in TS 36.300 [25].

Serving Cell: As defined in TS 36.331 [2].

Secondary Cell Group: As defined in TS 36.331 [2].

Secondary Timing Advance Group: As defined in TS 36.331 [2].

Synchronous Dual Connectivity: As defined in TS 36.331 [2].

TDD-FDD carrier aggregation: Carrier aggregation of component carriers in E-UTRA TDD and E-UTRA FDD operating bands TS 36.104 [30].

Timing Advance Group: As defined in TS 36.331 [2].

UE category M1 applicability: In this version of this specification the requirements for UE category M1 are derived assuming: DL Category M1 and Uplink Category M1, operation in any LTE system bandwidth but with a channel bandwidth of 1.4 MHz and transmission bandwidth of 6 PRBs in downlink and uplink, and a single antenna receiver. DL UE category M1 and UL UE category M1 are defined in [31],

WLAN RSSI: As defined in TS36.214 [4].

x_RA: x-to-RS EPRE ratio for the channel or physical signal x in all transmitted OFDM symbols not containing RS.

x_RB: x-to-RS EPRE ratio for the channel or physical signal x in all transmitted OFDM symbols containing RS.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

[…]	Values included in square bracket must be considered for further studies, because it means that a decision about that value was not taken.
$BW_{Channel}$	Channel bandwidth, defined in TS 36.101 subclause 3.2
CPICH_Ec	Average energy per PN chip for the CPICH
CPICH_Ec/Io	The ratio of the received energy per PN chip for the CPICH to the total received power spectral density at the UE antenna connector.
Ec	Average energy per PN chip.
Ês	Received energy per RE (power normalized to the subcarrier spacing) during the useful part of the symbol, i.e. excluding the cyclic prefix, at the UE antenna connector
Io	The total received power density, including signal and interference, as measured at the UE antenna connector.
Ioc	The power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized to the chip rate) of a band limited noise source (simulating interference from cells, which are not defined in a test procedure) as measured at the UE antenna connector.
Iot	The received power spectral density of the total noise and interference for a certain RE (power integrated over the RE and normalized to the subcarrier spacing) as measured at the UE antenna connector
N_{oc}	The power spectral density of a white noise source (average power per RE normalised to the subcarrier spacing), simulating interference from cells that are not defined in a test procedure, as measured at the UE antenna connector
N_{PRS}	Number of consecutive downlink positioning subframes as defined in clause 6.10.4.3 in TS 36.211
n_{PRB}	Physical Resource Block number as defined in clause 3.1 in TS 36.211.
N_{TA}	Timing offset between uplink and downlink radio frames at the UE, as defined in clause 3.1 in TS 36.211.

$N_{\text{TA offset}}$	Fixed timing advance offset, as defined in clause 3.1 in TS 36.211.
P_{CMAX}	Configured UE transmitted power as defined in clause 6.2.5 in TS 36.101.
$P_{\text{CMAX},c}$	Configured UE transmitted power on a serving cell *c* as defined in clause 6.2.5A in TS 36.101.
PRP	Received (linear) average power of the resource elements that carry E-UTRA PRS, measured at the UE antenna connector.
S	Cell Selection Criterion defined in TS 36.304, subclause 5.2.3.2 for E-UTRAN
SCH_Ec/Ior	The ratio of the transmit energy per PN chip of the SCH to the total transmit power spectral density at the UTRA Node B antenna connector
SCH_RP	Received (linear) average power of the resource elements that carry E-UTRA synchronisation signal, measured at the UE antenna connector
Srxlev	Cell selection RX level, defined in TS 36.304, subclause 5.2.3.2
Squal	Cell selection quality, defined in TS 36.304, subclause 5.2.3.2
Sintersearch	Defined in TS 25.304, subclause 5.2.6.1.5
Sintrasearch	Defined in TS 25.304, subclause 5.2.6.1.5 for UTRAN and in TS 36.304 , subclause 5.2.4.7 for E-UTRAN
Snonintrasearch	Defined in TS 36.304 , subclause 5.2.4.7
SsearchRAT	Defined in TS 25.304, subclause 5.2.6.1.5
$\text{Thresh}_{\text{x, high}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Thresh}_{\text{x, low}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Thresh}_{\text{serving, low}}$	Defined in TS 36.304 , subclause 5.2.4.7
T_{PRS}	Cell-specific positioning subframe configuration period as defined in clause 6.10.4.3 in TS 36.211
$\text{T}_{\text{RE-ESTABLISH-REQ}}$	The RRC Re-establishment delay requirement, the time between the moment when erroneous CRCs are applied, to when the UE starts to send preambles on the PRACH.
Treselection	Defined in TS 25.304, subclause 5.2.6.1.5
$\text{Treselection}_{\text{RAT}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Treselection}_{\text{EUTRA}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Treselection}_{\text{UTRA}}$	Defined in TS 36.304 , subclause 5.2.4.7
$\text{Treselection}_{\text{GERA}}$	Defined in TS 36.304 , subclause 5.2.4.7
T_{S}	Basic time unit, defined in TS 36.211, clause 4

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [26] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [26].

1x RTT	CDMA2000 1x Radio Transmission Technology
ABS	Almost Blank Subframe
ARQ	Automatic Repeat Request
AP	Access Point
AWGN	Additive White Gaussian Noise
BCCH	Broadcast Control Channel
BCH	Broadcast Channel
CA	Carrier Aggregation
CC	Component Carrier
CCCH SDU	Common Control Channel SDU
CE	Coverage Enhancement
CGI	Cell Global Identifier
CPICH	Common Pilot Channel
CPICH Ec/No	CPICH Received energy per chip divided by the power density in the band
CRS	Cell-specific Reference Signals
C-RNTI	Cell RNTI
CSI	Channel-State Information
CSI-RS	CSI Reference Signal
DC	Dual Connectivity
DCCH	Dedicated Control Channel
DL	Downlink
DMTC	Discovery signal Measurement Timing Configuration

DRX	Discontinuous Reception
DTCH	Dedicated Traffic Channel
DUT	Device Under Test
E-CID	Enhanced Cell-ID (positioning method)
ECGI	Evolved CGI
eDRX_IDLE	Extended IDLE-mode DRX
eDRX_CONN	Extended CONNECTED-mode DRX
eNB	E-UTRAN NodeB
E-SMLC	Enhanced Serving Mobile Location Centre
E-UTRA	Evolved UTRA
E-UTRAN	Evolved UTRAN
FDD	Frequency Division Duplex
GERAN	GSM EDGE Radio Access Network
GSM	Global System for Mobile communication
HARQ	Hybrid Automatic Repeat Request
HD-FDD	Half-Duplex FDD
HO	Handover
HRPD	High Rate Packet Data
IDC	In-Device Coexistence
IEEE	Institute of Electrical and Electronics Engineers
LPP	LTE Positioning Protocol
LWA	LTE-WLAN Aggregation
MAC	Medium Access Control
MCG	Master Cell Group
MeNB	Master eNB
MBSFN	Multimedia Broadcast multicast service Single Frequency Network
MBSFN ABS	MBSFN Almost Blank Subframe
MDT	Minimization of Drive Tests
MGRP	Measurement Gap Repetition Period
MIB	Master Information Block
OCNG	OFDMA Channel Noise Generator
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
OTDOA	Observed Time Difference of Arrival
PBCH	Physical Broadcast Channel
P-CCPCH	Primary Common Control Physical Channel
PCell	Primary Cell
PCFICH	Physical Control Format Indicator CHannel
PDCCH	Physical Downlink Control CHannel
PDSCH	Physical Downlink Shared CHannel
PHICH	Physical Hybrid-ARQ Indicator CHannel
PLMN	Public Land Mobile Network
PMCH	Physical Multicast Channel
PRACH	Physical Random Access CHannel
ProSe	Proximity-based Services
PRS	Positioning Reference Signal
PSBCH	Physical Sidelink Broadcast CHannel
PSCCH	Physical Sidelink Control Channel
PSCell	Primary SCell
PSS	Primary Synchronization SignalPSSCH Physical Sidelink Shared CHannel
psTAG	Primary Secondary Timing Advance Group
pTAG	Primary Timing Advance Group
PTW	Paging Time Window
PUCCH	Physical Uplink Control CHannel
PUSCH	Physical Uplink Shared Channel
RS-SINR	Reference Signal Signal to Noise and Interference RatioRSCP Received Signal Code Power
RSRP	Reference Signal Received Power
RSRQ	Reference Signal Received Quality
RSSI	Received Signal Strength Indicator
RSTD	Reference Signal Time Difference
QAM	Quadrature Amplitude Modulation
RACH	Random Access Channel

RAT	Radio Access Technology
RNC	Radio Network Controller
RNTI	Radio Network Temporary Identifier
RRC	Radio Resource Control
RRM	Radio Resource Management
SCE	Small Cell Enhancement
SCH	Synchronization Channel
SCell	Secondary Cell
SCG	Secondary Cell GroupSDU Service Data Unit
SeNB	Secondary eNB
SFN	System Frame Number
SI	System Information
SIB	System Information Block
SLSS	SideLink Synchronization Sequence
SON	Self Optimized Network
SRS	Sounding Reference Signal
SSS	Secondary Synchronization Signal
SSTD	SFN and subframe time difference
sTAG	Secondary Timing Advance Group
TAG	Timing Advance Group
TDD	Time Division Duplex
TP	Transmission Point
TTI	Transmission Time Interval
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
UTRA	Universal Terrestrial Radio Access
UTRAN	Universal Terrestrial Radio Access Network
WLAN	Wireless Local Area Network
WB-RSRQ	Wide Bandwith RSRQ

3.4 Test tolerances

The requirements given in the present document make no allowance for measurement uncertainty. The test specification 36.521-3 [23] defines the test tolerances. These test tolerances are individually calculated for each test. The test tolerances are then added to the limits in this specification to create test limits. The measurement results are compared against the test limits as defined by the shared risk principle.

Shared Risk is defined in [ETR 273 Part 1 sub-part 2 clause 6.5].

3.5 Additional notation

3.5.1 Groups of bands

The intention with the band grouping below is to increase the readability of the specification.

Table 3.5.1-1: E-UTRA band groups

Group	E-UTRA FDD		E-UTRA TDD		E-UTRA Frame Structure 3	
	Band group notation	Operating bands	Band group notation	Operating bands	Band group notation	Operating bands
A	FDD_A	1, 4, 6, 10, 11, 18, 19, 21, 23, 24, 32 Note 4, 67 Note 6	TDD_A	33, 34, 35, 36, 37, 38, 39, 40, 45	FS3_A	-
B	FDD_B	65, 66 Note 5	TDD_B	-	FS3_B	-
C	FDD_C	9, 30	TDD_C	42, 43	FS3_C	-
D	FDD_D	28	TDD_D	-	FS3_D	-
E	FDD_E	2, 5, 7, 27	TDD_E	41, 44	FS3_E	-
F	FDD_F	26 Note 3	TDD_F	-	FS3_F	-
G	FDD_G	3, 8, 12, 13, 14, 17, 20, 22, 29 Note 2	TDD_G	-	FS3_G	46
H	FDD_H	25	TDD_H	-	FS3_H	-
I	FDD_I	-	TDD_I	-	FS3_I	-
J	FDD_J	-	TDD_J	-	FS3_J	-
K	FDD_K	-	TDD_K	-	FS3_K	-
L	FDD_L	-	TDD_L	-	FS3_L	-
M	FDD_M	-	TDD_M	-	FS3_M	-
N	FDD_N	31	TDD_N	-	FS3_N	-

NOTE 1: The bands within the same group have the same Io conditions in a corresponding requirement in this specification.
NOTE 2: Band 29 is used only for E-UTRA carrier aggregation with other E-UTRA bands.
NOTE 3: The minimum Io condition for Band 26 is reduced by 0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 4: Band 32 is used only for E-UTRA carrier aggregation with other E-UTRA bands.
NOTE 5: The 2180 - 2200 MHz part of Band 66 is used only for E-UTRA carrier aggregation with other E-UTRA bands.
NOTE 6: Band 67 is used only for E-UTRA carrier aggregation with other E-UTRA bands.

3.6 General

3.6.1 Applicability of requirements in this specification version

- The requirements for TDD-FDD carrier aggregation are specified for two downlink and one uplink component carriers. The requirements are specified for both cases when the PCell belongs to TDD or FDD.

- All the requirements for intra-band contiguous and non-contiguous CA apply under the assumption of the same uplink-downlink and special subframe configurations [16] in the PCell and SCell.

- All the requirements for inter-band CA apply for the same uplink-downlink and special subframe configurations [16] in the PCell and SCell. Different uplink-downlink and special subframe configurations [16] in the PCell and SCell are supported for inter-band CA for UEs which:

  - do not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331 [2], and

  - are compliant to the requirements specified in TS 36.101 for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx.

- All the inter-frequency requirements and requirements for measurements on deactivated carrier apply for the same uplink-downlink and special subframe configurations [16] in the PCell and SCell. Different uplink-downlink and special subframe configurations [16] in the PCell and SCell are supported for inter-frequency for UEs which:

  - do not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331 [2], and are compliant to the requirements specified in TS 36.101 for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx.

- Requirements for E-UTRA carrier aggregation are applicable for the CA capable UE which has been configured with at least one downlink SCell, but:

- up to four downlink CCs and up to two uplink CCs for intra-band contiguous carrier aggregation, or
- up to four downlink CCs and one uplink CCs for inter-band carrier aggregation, or
- up to two downlink/uplink CCs intra-band contiguous and one downlink/uplink inter-band carrier aggregation, or
- up to two downlink CCs intra-band contiguous and one downlink inter-band and up to two uplink CCs for inter-band carrier aggregation, or
- up to two downlink CCs intra-band non-contiguous and one downlink inter-band and up to two uplink CCs for inter-band carrier aggregation, or
- up to three downlink CCs intra-band contiguous and one downlink intra-band non-contiguous and up to two uplink CCs intra-band contiguous for carrier aggregation, or
- two sub-blocks intra-band non-contiguous with two downlink CCs intra-band contiguous per sub-blocks and up to two uplink CCs intra-band contiguous for carrier aggregation, or
- two downlink CCs intra-band contiguous and three down link CCs inter-band and one uplink CC for carrier aggregation, or
- two downlink CCs intra-band contiguous and two downlink CCs intra-band contiguous and one downlink CC inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs and up to two uplink CCs for intra-band non-contiguous carrier aggregation, or
- up to two downlink CCs and up to two uplink CCs for inter-band carrier aggregation, or
- up to two downlink CCs intra-band contiguous and one downlink inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs intra-band non-contiguous and one downlink inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs and one uplink CC for intra-band non-contiguous carrier aggregation.

- Requirements for E-UTRA carrier aggregation for discovery signal measurements are applicable for CA capable UE which has been configured with at least one downlink SCell, but:
  - up to four downlink CCs and up to two uplink CCs for intra-band contiguous carrier aggregation, or
  - up to four downlink CCs and up to one uplink CCs for inter-band carrier aggregation, or
  - up to two downlink/uplink CCs intra-band contiguous and one downlink/uplink inter-band carrier aggregation, or
  - up to two downlink CCs intra-band contiguous and one downlink inter-band and up to two uplink CCs for inter-band carrier aggregation, or
  - up to two downlink CCs intra-band non-contiguous and one downlink inter-band and up to two uplink CCs for inter-band carrier aggregation, or
  - up to three downlink CCs intra-band contiguous and one downlink intra-band non-contiguous and up to two uplink CCs intra-band contiguous for carrier aggregation, or
  - two sub-blocks intra-band non-contiguous with two downlink CCs intra-band contiguous per sub-blocks and up to two uplink CCs intra-band contiguous for carrier aggregation, or
  - two downlink CCs intra-band contiguous and three down link CCs inter-band and one uplink CC for carrier aggregation, or
  - two downlink CCs intra-band contiguous and two downlink CCs intra-band contiguous and one downlink CC inter-band and one uplink CC for carrier aggregation, or
  - up to two downlink CCs and up to two uplink CCs for intra-band non-contiguous carrier aggregation, or

- up to two downlink CCs and up to two uplink CCs for inter-band carrier aggregation, or
- up to two downlink CCs intra-band contiguous and one downlink inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs intra-band non-contiguous and one downlink inter-band and one uplink CC for carrier aggregation, or
- up to two downlink CCs and one uplink CC for intra-band non-contiguous carrier aggregation.

- Requirements for E-UTRA carrier aggregation, where the PCell is FDD PCell or TDD PCell and the downlink SCell(s) follow the frame structure type 3 [16], are applicable for the CA capable UE, which is supporting band combinations according to 36.101 [5] and which has been configured with at least one downlink SCell but:
    - up to five downlink CCs and one uplink CCs for inter-band carrier aggregation.
- The requirements for UE configured with eDRX_CONN cycle do not apply for CA requirements and dual connectivity requirements.
- The requirements for a UE category 0 are derived assuming UE category 0 [31] and a single antenna receiver.
- Requirements for E-UTRA ProSe Direct Discovery and E-UTRA ProSe Direct Communication are applicable for ProSe operation on either the uplink frequency of PCC, or SCC, or a non-serving carrier, but:
    - with ProSe operation limited to one carrier on a given subframe.

4 E-UTRAN RRC_IDLE state mobility

4.1 Cell Selection

After a UE has switched on and a PLMN has been selected, the Cell selection process takes place, as described in TS36.304. This process allows the UE to select a suitable cell where to camp on in order to access available services. In this process the UE can use stored information (*Stored information cell selection*) or not (*Initial cell selection*).

4.2 Cell Re-selection

4.2.1 Introduction

The cell reselection procedure allows the UE to select a more suitable cell and camp on it.

When the UE is in either *Camped Normally* state or *Camped on Any Cell* state on a cell, the UE shall attempt to detect, synchronise, and monitor intra-frequency, inter-frequency and inter-RAT cells indicated by the serving cell. For intra-frequency and inter-frequency cells the serving cell may not provide explicit neighbour list but carrier frequency information and bandwidth information only. UE measurement activity is also controlled by measurement rules defined in TS36.304, allowing the UE to limit its measurement activity.

If the UE is of category M1 and in normal coverage, it shall attempt to detect, synchronise, and monitor intra-frequency cells indicated by the serving cell according to the requirements in section 4.2.2, except that UE is not required to perform RSRQ measurement. The UE category M1 and normal coverage applicability of the requirements is defined in Section 3.1.

If the UE is in enhanced coverage as defined in section 3.1, the requirements in section 4.2.2.11 apply.

4.2.2 Requirements

The UE shall search every layer of higher priority at least every $T_{higher\_priority\_search}$ = (60 * N_{layers}) seconds when the UE is not configured with eDRX_IDLE cycle, and at least every $T_{higher\_priority\_search}$ = MAX(60 * N_{layers}, one eDRX_IDLE cycle) when UE is configured with eDRX_IDLE cycle, where N_{layers} is the total number of configured higher priority E-UTRA, UTRA FDD, UTRA TDD, CDMA2000 1x and HRPD carrier frequencies and is additionally increased by one if one or more groups of GSM frequencies is configured as a higher priority.

In the requirements of Section 4.2.2 for the UE capable of CA, the applicable exceptions for side conditions are specified in Annex B, Section B.4.2.

For a UE which supports increased carrier monitoring E-UTRA or increased carrier monitoring UTRA, the reselection performance for different carriers may be configured by higher layers to be either normal or reduced. The following definitions are used in the requirements:

$K_{carrier}$: Total number of interfrequency carriers in the neighbour cell list

$K_{carrier,normal} = K_{carrier} - K_{carrier,reduced}$: Number of interfrequency carriers to be monitored in the normal performance group

$K_{carrier,normal,FDD}$: Number of interfrequency FDD carriers to be monitored in the normal performance group

$K_{carrier,normal,TDD}$: Number of interfrequency TDD carriers to be monitored in the normal performance group

$K_{carrier,reduced}$: Number of interfrequency carriers to be monitored in the reduced performance group

$N_{UTRA\_carrier}$: Total number of configured UTRA FDD carriers in the neighbour cell list

$N_{UTRA\_carrier,normal} = N_{UTRA\_carrier} - N_{UTRA\_carrier,reduced}$: Number of UTRA FDD carriers to be monitored in the normal performance group

$N_{UTRA\_carrier,reduced}$: Number of UTRA FDD carriers to be monitored in the reduced performance group

$N_{UTRA\_carrier\_TDD}$: Total number of configured UTRA TDD carriers in the neighbour cell list

$N_{UTRA\_carrier\_TDD,normal} = N_{UTRA\_carrier\_TDD} - N_{UTRA\_carrier\_TDD,reduced}$: Number of UTRA TDD carriers to be monitored in the normal performance grop

$N_{UTRA\_carrier\_TDD,reduced}$: Number of UTRA TDD carriers to be monitored in the reduced performance group

The minimum performance requirements for a UE which supports Increased UE carrier monitoring E-UTRA [2, 31] are calculated as defined in section 4.2.2.4 provided that $K_{carrier,normal} \leq 3$ for a UE capable of either FDD E-UTRA carrier monitoring or TDD E-UTRA carrier monitoring or $K_{carrier,normal} \leq 6$ for a UE capable of both FDD and TDD E-UTRA carrier monitoring provided $K_{carrier,normal,FDD} \leq 3$ and $K_{carrier,normal,TDD} \leq 3$ and the minimum performance requirements for a UE which supports Increased UE carrier monitoring UTRA [2, 31] are calculated as defined in section 4.2.2.5 provided that $N_{UTRA\_carrier\_normal} \leq 3$ and $N_{UTRA\_carrier\_TDD,normal} \leq 3$. In case the limits for the number of normal performance carriers is exceeded considering the broadcast neighbour cell list and the bands supported by the UE, the UE which supports Increased UE carrier monitoring E-UTRA shall measure at least 3 interfrequency carriers with normal performance and the UE which supports Increased UE carrier monitoring UTRA shall measure at least 3 UTRA carriers with normal performance. For a UE capable of monitoring E-UTRAN FDD and TDD carriers, in case the limits for the number of normal performance carriers is exceeded considering the broadcast neighbour cell list and the bands supported by the UE, the UE shall measure at least 3 FDD and 3 TDD E-UTRAN interfrequency carriers with normal performance. Additionally, reduced performance requirements shall be met for carriers for which the *Reduced measurement performance* IE is indicated, up to the UE measurement capability in section 4.2.2.9a.The minimum performance requirements for a UE which does not support Increased UE carrier monitoring E-UTRA [2,31] are calculated assuming all E-UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e. $K_{carrier,normal} = K_{carrier}$ and $K_{carrier,reduced}=0$. The minimum performance requirements for a UE which does not support Increased UE carrier monitoring UTRA [2,31] are calculated assuming all UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e. $N_{UTRA\_carrier,normal} = N_{UTRA\_carrier}$, $N_{UTRA\_carrier\_TDD,normal} = N_{UTRA\_carrier\_TDD}$ and $N_{UTRA\_carrier,reduced} = 0$ and $N_{UTRA\_carrier\_TDD,reduced} = 0$. No reduced performance carrier requirement applies to a UE not supporting Increased UE carrier monitoring E-UTRA or UTRA [2, 31]. Capabilities for number of carriers to monitor for a UE which does not support Increased carrier monitoring E-UTRA or Increased carrier monitoring UTRA are specified in section 4.2.2.9

4.2.2.1 Measurement and evaluation of serving cell

The UE shall measure the RSRP and RSRQ level of the serving cell and evaluate the cell selection criterion S defined in [1] for the serving cell at least every DRX cycle.

The UE shall filter the RSRP and RSRQ measurements of the serving cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by, at least DRX cycle/2.

If the UE is not configured with eDRX_IDLE cycle and has evaluated according to Table 4.2.2.1-1 in N_{serv} consecutive DRX cycles that the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated by the serving cell, regardless of the measurement rules currently limiting UE measurement activities. If the UE is configured with eDRX_IDLE cycle and has evaluated according to Table 4.2.2.1-2 in N_{serv} consecutive DRX cycles within a single PTW that the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated by the serving cell, regardless of the measurement rules currently limiting UE measurement activities.

If the UE in RRC_IDLE has not found any new suitable cell based on searches and measurements using the intra-frequency, inter-frequency and inter-RAT information indicated in the system information during the time T, the UE shall initiate cell selection procedures for the selected PLMN as defined in [1], where T=10 s if the UE is not configured with eDRX_IDLE cycle, and T=MAX(10 s, one eDRX_IDLE cycle) if the UE is configured with eDRX_IDLE cycle.

Table 4.2.2.1-1: N_{serv}

DRX cycle length [s]	N_{serv} [number of DRX cycles]
0.32	4
0.64	4
1.28	2
2.56	2

Table 4.2.2.1-2: N_{serv} for UE configured with eDRX_IDLE cycle

eDRX_IDLE cycle length [s]	DRX cycle length [s]	PTW length [s]	N_{serv} [number of DRX cycles]
5.12 ≤ eDRX_IDLE cycle length ≤ 2621.44	0.32	≥1	2
	0.64	≥2	2
	1.28	≥3	2
	2.56	≥6	2
NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs. NOTE 2: The eDRX_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].			

For any requirement in this section, when the UE transitions between any two states when being configured with eDRX_IDLE, being configured with eDRX_IDLE cycle, changing eDRX_IDLE cycle length, or changing PTW configuration, the UE shall meet the transition requirement, which is the less stringent requirement of the two requirements corresponding to the first state and the second state, during the transition time interval which is the time corresponding to the transition requirement. After the transition time interval, the UE has to meet the requirement corresponding to the second state.

4.2.2.2 Void

4.2.2.3 Measurements of intra-frequency E-UTRAN cells

The UE shall be able to identify new intra-frequency cells and perform RSRP and RSRQ measurements of identified intra-frequency cells without an explicit intra-frequency neighbour list containing physical layer cell identities.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the reselection criteria defined in TS36.304 within $T_{detect,EUTRAN\_Intra}$ when that Treselection= 0 . An intra frequency cell is considered to be detectable according to RSRP, RSRP Ês/Iot, SCH_RP and SCH Ês/Iot defined in Annex B.1.1 for a corresponding Band.

The UE shall measure RSRP and RSRQ at least every $T_{measure,EUTRAN\_Intra}$ for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP and RSRQ measurements of each measured intra-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN\_Intra}/2$

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an intra-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met reselection criterion defined [1] within $T_{evaluate,E-UTRAN\_intra}$ when $T_{reselection} = 0$, provided that the cell is at least 3dB better ranked. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and non-serving intra-frequency cells.

If $T_{reselection}$ timer has a non zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the $T_{reselection}$ time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

For UE not configured with eDRX_IDLE cycle, $T_{detect,EUTRAN\_Intra}$, $T_{measure,EUTRAN\_Intra}$ and $T_{evaluate, E-UTRAN\_intra}$ are specified in Table 4.2.2.3-1. For UE configured with eDRX_IDLE cycle, $T_{detect,EUTRAN\_Intra}$, $T_{measure,EUTRAN\_Intra}$ and $T_{evaluate, E-UTRAN\_intra}$ are specified in Table 4.2.2.3-2, where the requirements apply provided that the serving cell is configured with eDRX_IDLE and is the same in all PTWs during any of $T_{detect,EUTRAN\_Intra}$, $T_{measure,EUTRAN\_Intra}$ and $T_{evaluate, E-UTRAN\_intra}$ when multiple PTWs are used.

Table 4.2.2.3-1 : $T_{detect,EUTRAN\_Intra}$, $T_{measure,EUTRAN\_Intra}$ and $T_{evaluate, E-UTRAN\_intra}$

DRX cycle length [s]	$T_{detect,EUTRAN\_Intra}$ [s] (number of DRX cycles)	$T_{measure,EUTRAN\_Intra}$ [s] (number of DRX cycles)	$T_{evaluate,E-UTRAN\_intra}$ [s] (number of DRX cycles)
0.32	11.52 (36)	1.28 (4)	5.12 (16)
0.64	17.92 (28)	1.28 (2)	5.12 (8)
1.28	32(25)	1.28 (1)	6.4 (5)
2.56	58.88 (23)	2.56 (1)	7.68 (3)

Table 4.2.2.3-2: $T_{detect,EUTRAN\_Intra}$, $T_{measure,EUTRAN\_Intra}$ and $T_{evaluate,E-UTRAN\_intra}$ for UE configured with eDRX_IDLE cycle

eDRX_IDLE cycle length [s]	DRX cycle length [s]	PTW length [s]	$T_{detect,EUTRAN\_Intra}$ [s] (number of DRX cycles)	$T_{measure,EUTRAN\_Intra}$ [s] (number of DRX cycles)	$T_{evaluate,E-UTRAN\_intra}$ [s] (number of DRX cycles)
5.12 ≤ eDRX_IDLE cycle length ≤ 2621.44	0.32	≥1	$eDRX\_cycle\_length \times \left\lceil \frac{23}{\lceil PTW/DRX\_cycle\_length \rceil} \right\rceil$ (23)	0.32 (1)	0.64 (2)
	0.64	≥2		0.64 (1)	1.28 (2)
	1.28	≥3		1.28 (1)	2.56 (2)
	2.56	≥6		2.56 (1)	5.12 (2)
NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs. NOTE 2: The eDRX_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].					

For any requirement in this section, when the UE transitions between any two states when being configured with eDRX_IDLE, being configured with eDRX_IDLE cycle, changing eDRX_IDLE cycle length, or changing PTW configuration, the UE shall meet the transition requirement, which is the less stringent requirement of the two requirements corresponding to the first state and the second state, during the transition time interval which is the time corresponding to the transition requirement. After the transition time interval, the UE has to meet the requirement corresponding to the second state.

4.2.2.4 Measurements of inter-frequency E-UTRAN cells

The UE shall be able to identify new inter-frequency cells and perform RSRP or RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If Srxlev > $S_{nonIntraSearchP}$ and Squal > $S_{nonIntraSearchQ}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is described in clause 4.2.2.

If Srxlev ≤ $S_{nonIntraSearchP}$ or Squal ≤ $S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below.

If the UE is not configured with eDRX_IDLE cycle or configured with an eDRX_IDLE cycle not longer than 20.48 s, the UE shall be able to evaluate whether a newly detectable inter-frequency cell in normal performance group meets the reselection criteria defined in TS36.304 within $K_{carrier,normal}$ * $T_{detect,EUTRAN\_Inter}$, and able to evaluate whether a newly detectable inter-frequency cell in reduced performance group meets the reselection criteria defined in TS36.304 within 6 * $K_{carrier,reduced}$ * $T_{detect,EUTRAN\_Inter}$ if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, the UE shall be able to evaluate whether a newly detectable inter-frequency cell in normal performance group meets the reselection criteria defined in TS36.304 within $K_{carrier,normal}$ * $T_{detect,EUTRAN\_Inter}$, and when Srxlev < 3 dB or Squal < 3 dB able to evaluate whether a newly detectable inter-frequency cell in reduced performance group meets the reselection criteria defined in TS36.304 within 6 * $K_{carrier,reduced}$ * $T_{detect,EUTRAN\_Inter}$ if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. An inter-frequency cell is considered to be detectable according to RSRP, RSRP Ês/Iot, SCH_RP and SCH Ês/Iot defined in Annex B.1.2 for a corresponding Band.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,E-UTRAN\_Inter}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

If the UE is configured with eDRX_IDLE cycle not longer than 20.48 s, the UE shall measure RSRP or RSRQ at least every $K_{carrier,normal}$ * $T_{measure,EUTRAN\_Inter}$ for identified lower or equal priority inter-frequency cells in normal performance group, and at least every 6 * $K_{carrier,reduced}$ * $T_{measure,EUTRAN\_Inter}$ for identified lower or equal priority inter-frequency cells in reduced performance group. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, the UE shall measure RSRP or RSRQ at least every $K_{carrier,normal}$ * $T_{measure,EUTRAN\_Inter}$ for identified lower or equal priority inter-frequency cells in normal performance group, and when Srxlev < 3 dB or Squal < 3 dB at least every 6 * $K_{carrier,reduced}$ * $T_{measure,EUTRAN\_Inter}$ for identified lower or equal priority inter-frequency cells in reduced performance group. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP or RSRQ measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN\_Inter}/2$.

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

If the UE is configured with eDRX_IDLE cycle not longer than 20.48 s, for an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell in normal performance group has met reselection criterion defined TS 36.304 within $K_{carrier,normal}$ * $T_{evaluate,E-UTRAN\_Inter}$, and capable of evaluating that the inter-frequency cell in reduced performance group has met reselection criterion defined TS 36.304 within 6 * $K_{carrier,reduced}$ * $T_{evaluate,E-UTRAN\_Inter}$, when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, for an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell in normal performance group has met reselection criterion defined TS 36.304 within $K_{carrier,normal}$ * $T_{evaluate,E-UTRAN\_Inter}$, and when Srxlev < 3 dB or Squal < 3 dB capable of evaluating that the inter-frequency cell in reduced performance group has met reselection criterion defined TS 36.304 within 6 * $K_{carrier,reduced}$ * $T_{evaluate,E-UTRAN\_Inter}$, when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If $T_{reselection}$ timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the $T_{reselection}$ time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

For UE not configured with eDRX_IDLE cycle, $T_{detect,EUTRAN\_Inter}$, $T_{measure,EUTRAN\_Inter}$ and $T_{evaluate,\ E\text{-}UTRAN\_inter}$ are specified in Table 4.2.2.4-1. For UE configured with eDRX_IDLE cycle, $T_{detect,EUTRAN\_Inter}$, $T_{measure,EUTRAN\_Inter}$ and $T_{evaluate,\ E\text{-}UTRAN\_inter}$ are specified in Table 4.2.2.4-2, where the requirements apply provided that the serving cell is configured with eDRX_IDLE and is the same in all PTWs during any of $T_{detect,EUTRAN\_Inter}$, $T_{measure,EUTRAN\_Inter}$ and $T_{evaluate,\ E\text{-}UTRAN\_inter}$ when multiple PTWs are used.

Table 4.2.2.4-1 : $T_{detect,EUTRAN\_Inter}$, $T_{measure,EUTRAN\_Inter}$ and $T_{evaluate,E\text{-}UTRAN\_Inter}$

DRX cycle length [s]	$T_{detect,EUTRAN\_Inter}$ [s] (number of DRX cycles)	$T_{measure,EUTRAN\_Inter}$ [s] (number of DRX cycles)	$T_{evaluate,E\text{-}UTRAN\_Inter}$ [s] (number of DRX cycles)
0.32	11.52 (36)	1.28 (4)	5.12 (16)
0.64	17.92 (28)	1.28 (2)	5.12 (8)
1.28	32(25)	1.28 (1)	6.4 (5)
2.56	58.88 (23)	2.56 (1)	7.68 (3)

Table 4.2.2.4-2: $T_{detect,EUTRAN\_Inter}$, $T_{measure,EUTRAN\_Inter}$ and $T_{evaluate,\ E\text{-}UTRAN\_inter}$ for UE configured with eDRX_IDLE cycle

eDRX_IDLE cycle length [s]	DRX cycle length [s]	PTW length [s]	$T_{detect,EUTRAN\_Inter}$ [s] (number of DRX cycles)	$T_{measure,EUTRAN\_Inter}$ [s] (number of DRX cycles)	$T_{evaluate,E\text{-}UTRAN\_inter}$ [s] (number of DRX cycles)
5.12 ≤ eDRX_IDLE cycle length ≤ 2621.44	0.32	≥1	$eDRX\_cycle\_length \times \left\lceil \frac{23}{\lceil PTW / DRX\_cycle\_length \rceil} \right\rceil$ (23)	0.32 (1)	0.64 (2)
	0.64	≥2		0.64 (1)	1.28 (2)
	1.28	≥3		1.28 (1)	2.56 (2)
	2.56	≥6		2.56 (1)	5.12 (2)
NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs. NOTE 2: The eDRX_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].					

For higher priority cells, a UE may optionally use a shorter value for $T_{measureE\text{-}UTRA\_Inter}$,which shall not be less than Max(0.64 s, one DRX cycle).

For any requirement in this section, when the UE transitions between any two states when being configured with eDRX_IDLE, being configured with eDRX_IDLE cycle, changing eDRX_IDLE cycle length, or changing PTW configuration, the UE shall meet the transition requirement, which is the less stringent requirement of the two requirements corresponding to the first state and the second state, during the transition time interval which is the time corresponding to the transition requirement. After the transition time interval, the UE has to meet the requirement corresponding to the second state.

4.2.2.5 Measurements of inter-RAT cells

If Srxlev > $S_{nonIntraSearchP}$ and Squal > $S_{nonIntraSearchQ}$ then the UE shall search for inter-RAT layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is described in clause 4.2.2

If Srxlev ≤ $S_{nonIntraSearchP}$ or Squal ≤ $S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-RAT layers of higher, lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

For any requirement in this section, when the UE transitions between any two states when being configured with eDRX_IDLE, being configured with eDRX_IDLE cycle, changing eDRX_IDLE cycle length, or changing PTW configuration, the UE shall meet the transition requirement, which is the less stringent requirement of the two requirements corresponding to the first state and the second state, during the transition time interval which is the time corresponding to the transition requirement. After the transition time interval, the UE has to meet the requirement corresponding to the second state.

4.2.2.5.1 Measurements of UTRAN FDD cells

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure CPICH Ec/Io and CPICH RSCP of detected UTRA FDD cells in the neighbour frequency list at the minimum measurement rate specified in this section. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the UE is not configured with eDRX_IDLE cycle or configured with eDRX_IDLE cycle not longer than 20.48 s, the UE shall evaluate whether newly detectable UTRA FDD cells in normal performance group have met the reselection criteria in TS 36.304 within time $N_{UTRA\_carrier,normal}$ * $T_{detectUTRA\_FDD}$, and evaluate whether newly detectable UTRA FDD cells in reduced performance group have met the reselection criteria in TS 36.304 within time 6 * $N_{UTRA\_carrier,reduced}$ * $T_{detectUTRA\_FDD}$ when Srxlev $\leq$ $S_{nonIntraSearchP}$ or Squal $\leq$ $S_{nonIntraSearchQ}$ when $Treselection_{RAT}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB for reselections based on RSCP, or a margin of at least 3dB for reselections based on Ec/Io. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, the UE shall evaluate whether newly detectable UTRA FDD cells in normal performance group have met the reselection criteria in TS 36.304 within time ($N_{UTRA\_carrier,normal}$) * $T_{detectUTRA\_FDD}$, and when Srxlev < 3 dB or Squal < 3 dB evaluate whether newly detectable UTRA FDD cells in reduced performance group have met the reselection criteria in TS 36.304 within time 6 * $N_{UTRA\_carrier,reduced}$ * $T_{detectUTRA\_FDD}$ when Srxlev $\leq$ $S_{nonIntraSearchP}$ or Squal $\leq$ $S_{nonIntraSearchQ}$ when $Treselection_{RAT}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB for reselections based on RSCP, or a margin of at least 3dB for reselections based on Ec/Io.

If the UE is not configured with eDRX_IDLE cycle or configured with eDRX_IDLE cycle not longer than 20.48 s, cells which have been detected shall be measured at least every $N_{UTRA\_carrier,normal}$ * $T_{measureUTRA\_FDD}$ for the cells in normal performance group, and at least every 6 * $N_{UTRA\_carrier,reduced}$ * $T_{measureUTRA\_FDD}$ for the cells in reduced performance group when Srxlev $\leq$ $S_{nonIntraSearchP}$ or Squal $\leq$ $S_{nonIntraSearchQ}$. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, cells which have been detected shall be measured at least every ($N_{UTRA\_carrier,normal}$) * $T_{measureUTRA\_FDD}$ for the cells in normal performance group, and when Srxlev < 3 dB or Squal < 3 dB at least every 6 * $N_{UTRA\_carrier,reduced}$ * $T_{measureUTRA\_FDD}$ for the cells in reduced performance group when Srxlev $\leq$ $S_{nonIntraSearchP}$ or Squal $\leq$ $S_{nonIntraSearchQ}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measure,UTRA\_FDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell.

If the UE is not configured with eDRX_IDLE cycle or configured with eDRX_IDLE cycle not longer than 20.48 s, for a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met reselection criterion defined in TS 36.304 [1] within $N_{UTRA\_carrier,normal}$ * $T_{evaluateUTRA\_FDD}$ if the cell is in normal performance group and within 6 * $N_{UTRA\_carrier,reduced}$ * $T_{evaluateUTRA\_FDD}$ if the cell is in reduced performance group when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB for reselections based on RSCP, or a margin of at least 3dB for reselections based on Ec/Io. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, for a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met reselection criterion defined in TS 36.304 [1] within ($N_{UTRA\_carrier,normal}$) * $T_{evaluateUTRA\_FDD}$ if the cell is in normal performance group and when Srxlev < 3 dB or Squal < 3 dB within 6 * $N_{UTRA\_carrier,reduced}$ * $T_{evaluateUTRA\_FDD}$ if the cell is in reduced performance group when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB for reselections based on RSCP, or a margin of at least 3dB for reselections based on Ec/Io.

If $T_{reselection}$ timer has a non zero value and the UTRA FDD cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this UTRA FDD cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

For UE not configured with eDRX_IDLE cycle, $T_{detectUTRA\_FDD,}$ $T_{measureUTRA\_FDD}$ and $T_{evaluateUTRA\_FDD}$ are specified in Table 4.2.2.5.1-1. For UE configured with eDRX_IDLE cycle, $T_{detectUTRA\_FDD,}$ $T_{measureUTRA\_FDD}$ and $T_{evaluateUTRA\_FDD}$ are specified in Table 4.2.2.5.1-2, where the requirements apply provided that the serving cell is configured with eDRX_IDLE and is the same in all PTWs during any of $T_{detectUTRA\_FDD,}$ $T_{measureUTRA\_FDD}$ and $T_{evaluateUTRA\_FDD}$ when multiple PTWs are used.

Table 4.2.2.5.1-1: $T_{detectUTRA\_FDD}$, $T_{measureUTRA\_FDD}$, and $T_{evaluateUTRA\_FDD}$

DRX cycle length [s]	$T_{detectUTRA\_FDD}$ [s]	$T_{measureUTRA\_FDD}$ [s] (number of DRX cycles)	$T_{evaluateUTRA\_FDD}$ [s] (number of DRX cycles)
0.32	30	5.12 (16)	15.36 (48)
0.64		5.12 (8)	15.36 (24)
1.28		6.4(5)	19.2 (15)
2.56	60	7.68 (3)	23.04 (9)

Table 4.2.2.5.1-2: $T_{detectUTRA\_FDD}$, $T_{measureUTRA\_FDD}$ and $T_{evaluateUTRA\_FDD}$ for UE configured with eDRX_IDLE cycle

eDRX_IDLE cycle length [s]	DRX cycle length [s]	PTW length [s]	$T_{detectUTRA\_FDD}$ [s] (number of DRX cycles)	$T_{measureUTRA\_FDD}$ [s] (number of DRX cycles)	$T_{evaluateUTRA\_FDD}$ [s] (number of DRX cycles)
5.12 ≤ eDRX_IDLE cycle length ≤ 2621.44	0.32	≥1	Note 3 (23)	0.96 (3)	Note 3 (9)
	0.64	≥2		1.92 (3)	Note 3 (9)
	1.28	≥4		3.84 (3)	Note 3 (9)
	2.56	≥8		7.68 (3)	Note 3 (9)

NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs.
NOTE 2: The eDRX_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].
NOTE 3: The time is calculated depending on the number N of DRX cycles as follows:

$$eDRX\_cycle\_length \times \left\lceil \frac{N}{\lceil PTW / DRX\_cycle\_length \rceil} \right\rceil$$

For higher priority cells, a UE may optionally use a shorter value for $\mathbf{T_{measureUTRA\_FDD}}$, which shall not be less than Max(0.64 s, one DRX cycle).

4.2.2.5.2 Measurements of UTRAN TDD cells

When the measurement rules indicate that UTRA TDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA TDD cells in the neighbour frequency list at the minimum measurement rate specified in this section. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA TDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period. If the UE is not configured with eDRX_IDLE cycle, P-CCPCH RSCP of UTRAN TDD cells shall not be filtered over a longer period than that specified in table 4.2.2.5.2-1. If the UE is configured with eDRX_IDLE cycle, P-CCPCH RSCP of UTRAN TDD cells shall not be filtered over a longer period than that specified in table 4.2.2.5.2-2.

If the UE is not configured with eDRX_IDLE cycle or configured with eDRX_IDLE cycle not longer than 20.48 s, the UE shall evaluate whether newly detectable UTRA TDD cells in normal performance group have met the reselection criteria in TS 36.304 within time $N_{UTRA\_carrier\_TDD,normal}$ * $T_{detectUTRA\_TDD}$, and evaluate whether newly detectable UTRA TDD cells in reduced performance group have met the reselection criteria in TS 36.304 within time 6 * $N_{UTRA\_carrier\_TDD,reduced}$ * $T_{detectUTRA\_TDD}$ when Srxlev ≤ $S_{nonIntraSearchP}$ or Squal ≤ $S_{nonIntraSearchQ}$ when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, the UE shall evaluate whether newly detectable UTRA TDD cells in normal performance group have met the reselection criteria in TS 36.304 within time ($N_{UTRA\_carrier\_TDD,normal}$) * $T_{detectUTRA\_TDD}$, and when Srxlev < 3 dB or Squal < 3 dB evaluate whether newly detectable UTRA TDD cells in reduced performance group have met the reselection criteria in TS 36.304 within time 6 * $N_{UTRA\_carrier\_TDD,reduced}$ * $T_{detectUTRA\_TDD}$ when Srxlev ≤ $S_{nonIntraSearchP}$ or Squal ≤ $S_{nonIntraSearchQ}$ when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB.

If the UE is not configured with eDRX_IDLE cycle or configured with eDRX_IDLE cycle not longer than 20.48 s, cells which have been detected shall be measured at least every $N_{UTRA\_carrier\_TDD,normal}$ * $T_{measureUTRA\_TDD}$ for the cells in normal performance group, and at least every 6 * $N_{UTRA\_carrier\_TDD,reduced}$ * $T_{measureUTRA\_TDD}$ for the cells in reduced performance group, when Srxlev ≤ $S_{nonIntraSearchP}$ or Squal ≤ $S_{nonIntraSearchQ}$. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, cells which have been detected shall be measured at least every ($N_{UTRA\_carrier\_TDD,normal}$) * $T_{measureUTRA\_TDD}$ for the cells in normal performance group, and when Srxlev < 3 dB or Squal < 3 dB at least every 6 * $N_{UTRA\_carrier\_TDD,reduced}$ * $T_{measureUTRA\_TDD}$ for the cells in reduced performance group, when Srxlev ≤ $S_{nonIntraSearchP}$ or Squal ≤ $S_{nonIntraSearchQ}$.

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every $T_{measure,UTRA\_TDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell.

If the UE is not configured with eDRX_IDLE cycle or configured with eDRX_IDLE cycle not longer than 20.48 s, for a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met reselection criterion defined in [1] within $N_{UTRA\_carrier\_TDD,normal}$ *$T_{evaluateUTRA\_TDD}$ if the cell is in normal performance group and within 6 * $N_{UTRA\_carrier\_TDD,reduced}$ * $T_{evaluateUTRA\_TDD}$ if the cell is in reduced performance group when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB. If the UE is configured with eDRX_IDLE cycle longer than 20.48 s, for a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met reselection criterion defined in [1] within $N_{UTRA\_carrier\_TDD,normal}$ *$T_{evaluateUTRA\_TDD}$ if the cell is in normal performance group and when Srxlev < 3 dB or Squal < 3 dB within 6 * $N_{UTRA\_carrier\_TDD,reduced}$ * $T_{evaluateUTRA\_TDD}$ if the cell is in reduced performance group when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 6dB.

If $T_{reselection}$ timer has a non zero value and the UTRA TDD cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this UTRA TDD cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

For UE not configured with eDRX_IDLE cycle, $T_{detectUTRA\_TDD,}$ $T_{measureUTRA\_TDD}$ and $T_{evaluateUTRA\_TDD}$ are specified in Table 4.2.2.5.2-1. For UE configured with eDRX_IDLE cycle, $T_{detectUTRA\_TDD,}$ $T_{measureUTRA\_TDD}$ and $T_{evaluateUTRA\_TDD}$ are specified in Table 4.2.2.5.2-2, where the requirements apply provided that the serving cell is configured with eDRX_IDLE and is the same in all PTWs during any of $T_{detectUTRA\_TDD,}$ $T_{measureUTRA\_TDD}$ and $T_{evaluateUTRA\_TDD}$ when multiple PTWs are used.

Table 4.2.2.5.2-1: $T_{detectUTRA\_TDD}$, $T_{measureUTRA\_TDD}$ and $T_{evaluateUTRA\_TDD}$

DRX cycle length [s]	$T_{detectUTRA\_TDD}$ [s]	$T_{measureUTRA\_TDD}$ [s] (number of DRX cycles)	$T_{evaluateUTRA\_TDD}$ [s] (number of DRX cycles)
0.32	30	5.12 (16)	15.36 (48)
0.64		5.12 (8)	15.36 (24)
1.28		6.4(5)	19.2 (15)
2.56	60	7.68 (3)	23.04 (9)

Table 4.2.2.5.2-2: $T_{detectUTRA\_TDD,}$ $T_{measureUTRA\_TDD}$ and $T_{evaluateUTRA\_TDD}$ for UE configured with eDRX_IDLE cycle

eDRX_IDLE cycle length [s]	DRX cycle length [s]	PTW length [s]	$T_{detectUTRA\_TDD}$ [s] (number of DRX cycles)	$T_{measureUTRA\_TDD}$ [s] (number of DRX cycles)	$T_{evaluateUTRA\_TDD}$ [s] (number of DRX cycles)
5.12 ≤ eDRX_IDLE cycle length ≤ 2621.44	0.32	≥1	Note 3 (23)	0.96 (3)	Note 3 (9)
	0.64	≥2		1.92 (3)	Note 3 (9)
	1.28	≥4		3.84 (3)	Note 3 (9)
	2.56	≥8		7.68 (3)	Note 3 (9)
NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs. NOTE 2: The eDRX_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34]. NOTE 3: The time is calculated depending on the number N of DRX cycles as follows: $eDRX\_cycle\_length \times \left\lceil \frac{N}{\lceil PTW / DRX\_cycle\_length \rceil} \right\rceil$					

For higher priority cells, a UE may optionally use a shorter value for **$T_{measureUTRA\_TDD}$**, which shall not be less than Max(0.64 s, one DRX cycle).

4.2.2.5.3 Measurements of GSM cells

When the measurement rules defined in [1] indicate that E-UTRAN inter-frequencies or inter-RAT frequency cells are to be measured, the UE shall measure the signal level of the GSM BCCH carriers if the GSM BCCH carriers are indicated in the measurement control system information of the serving cell. GSM BCCH carriers of lower priority than the serving cell shall be measured at least every $T_{measure,GSM}$.

When higher priority GSM BCCH carriers are found by the higher priority search, they shall be measured at least every $T_{measure,GSM,}$ and the UE shall decode the BSIC of the GSM BCCH carrier. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection, or to continuously verify the BSIC of the GSM BCCH carrier every 30s. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell.

The UE shall maintain a running average of 4 measurements for each GSM BCCH carrier. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

If continuous GSM measurements are required by the measurement rules in [1], the UE shall attempt to verify the BSIC at least every 30 seconds for each of the 4 strongest GSM BCCH carriers. If a change of BSIC is detected for one GSM cell then that GSM BCCH carrier shall be treated as a new GSM neighbour cell. If the UE detects on a BCCH carrier a BSIC which is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform BSIC re-confirmation for that cell.

The UE shall not consider the GSM BCCH carrier in cell reselection, if the UE cannot demodulate the BSIC of that GSM BCCH carrier. Additionally, the UE shall not consider a GSM neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

If $T_{reselection}$ timer has a non zero value and the GSM cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this GSM cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

For UE not configured with eDRX_IDLE cycle, $T_{measure,GSM}$ is specified in Table 4.2.2.5.3-1. For UE configured with eDRX_IDLE cycle, $T_{measure,GSM}$ is specified in Table 4.2.2.5.3-2, where the requirements apply provided that the serving cell is configured with eDRX_IDLE and is the same in all PTWs during $T_{measure,GSM}$ when multiple PTWs are used.

Table 4.2.2.5.3-1: $T_{measure,GSM,}$

DRX cycle length [s]	$T_{measure,GSM}$ [s] (number of DRX cycles)
0.32	5.12 (16)
0.64	5.12 (8)
1.28	6.4(5)
2.56	7.68 (3)

Table 4.2.2.5.3-2: $T_{measure,GSM}$ for UE configured with eDRX_IDLE cycle

eDRX_IDLE cycle length [s]	DRX cycle length [s]	PTW length [s]	$T_{measure,GSM}$ [s] (number of DRX cycles)
5.12 ≤ eDRX_IDLE cycle length ≤ 2621.44	0.32	≥1	0.96 (3)
	0.64	≥2	1.92 (3)
	1.28	≥4	3.84 (3)
	2.56	≥8	7.68 (3)
NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs. NOTE 2: The eDRX_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].			

4.2.2.5.4 Measurements of HRPD cells

In order to perform measurement and cell reselection to HRPD cell, the UE shall acquire the timing of HRPD cells.

When the measurement rules indicate that HRPD cells are to be measured, the UE shall measure CDMA2000 HRPD Pilot Strength of HRPD cells in the neighbour cell list at the minimum measurement rate specified in this section.

The parameter 'Number of HRPD Neighbor Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all HRPD cells in the neighbour cell list.

When the E-UTRA serving cell fulfils Srxlev > $S_{nonIntraSearchP}$ and Squal > $S_{nonIntraSearchQ}$, the UE shall search for CDMA2000 HRPD layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is defined in clause 4.2.2.

For CDMA2000 HRPD cells which have been detected, the UE shall measure CDMA2000 HRPD Pilot Strength at least every (Number of HRPD Neighbor Frequency)*$T_{measureHRPD}$, when the E-UTRA serving cell Srxlev ≤ $S_{nonIntraSearchP}$ or Squal ≤ $S_{nonIntraSearchQ}$.

The UE shall be capable of evaluating that the CDMA2000 HRPD cell has met cell reselection criterion defined in [1] within $T_{evaluateHRPD}$.

For UE not configured with eDRX_IDLE cycle, Table 4.2.2.5.4-1 gives values of $T_{measureHRPD}$ and $T_{evaluateHRPD}$. For UE configured with eDRX_IDLE cycle, $T_{measureHRPD}$ and $T_{evaluateHRPD}$ are specified in Table 4.2.2.5.4-2, where the requirements apply provided that the serving cell is configured with eDRX_IDLE and is the same in all PTWs during any of $T_{measureHRPD}$ and $T_{evaluateHRPD}$ when multiple PTWs are used.

Table 4.2.2.5.4-1: $T_{measureHRPD}$ and $T_{evaluateHRPD}$

DRX cycle length [s]	$T_{measureHRPD}$ [s] (number of DRX cycles)	$T_{evaluateHRPD}$ [s] (number of DRX cycles)
0.32	5.12 (16)	15.36 (48)
0.64	5.12 (8)	15.36 (24)
1.28	6.4 (5)	19.2 (15)
2.56	7.68 (3)	23.04 (9)

Table 4.2.2.5.4-2: $T_{measureHRPD}$ and $T_{evaluateHRPD}$ for UE configured with eDRX_IDLE cycle

eDRX_IDLE cycle length [s]	DRX cycle length [s]	PTW length [s]	$T_{measureHRPD}$ [s] (number of DRX cycles)	$T_{evaluateHRPD}$ [s] (number of DRX cycles)
5.12 ≤ eDRX_IDLE cycle length ≤ 2621.44	0.32	≥1	0.96 (3)	Note 3 (9)
	0.64	≥2	1.92 (3)	Note 3 (9)
	1.28	≥4	3.84 (3)	Note 3 (9)
	2.56	≥8	7.68 (3)	Note 3 (9)

NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs.
NOTE 2: The eDRX_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].
NOTE 3: The time is calculated depending on the number N of DRX cycles as follows:

$$eDRX\_cycle\_length \times \left\lceil \frac{N}{\lceil PTW / DRX\_cycle\_length \rceil} \right\rceil$$

If $T_{reselection}$ timer has a non zero value and the CDMA2000 HRPD cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this CDMA2000 HRPD cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

4.2.2.5.5 Measurements of cdma2000 1X

In order to perform measurement and cell reselection to cdma2000 1X cell, the UE shall acquire the timing of cdma2000 1X cells.

When the measurement rules indicate that cdma2000 1X cells are to be measured, the UE shall measure cdma2000 1x RTT Pilot Strength of cdma2000 1X cells in the neighbour cell list at the minimum measurement rate specified in this section.

The parameter 'Number of CDMA2000 1X Neighbor Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all cdma2000 1X cells in the neighbour cell list.

When the E-UTRA serving cell fulfils Srxlev > $S_{nonIntraSearchP}$ and Squal > $S_{nonIntraSearchQ}$, the UE shall search for cdma2000 1X layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is defined in clause 4.2.2.

For CDMA2000 1X cells which have been detected, the UE shall measure CDMA2000 1xRTT Pilot Strength at least every (Number of CDMA2000 1X Neighbor Frequency)*$T_{measureCDMA2000\_1X}$, when the E-UTRA serving cell Srxlev ≤ $S_{nonIntraSearchP}$ or Squal ≤ $S_{nonIntraSearchQ}$. The UE shall be capable of evaluating that the cdma2000 1X cell has met cell reselection criterion defined in [1] within $T_{evaluateCDMA2000\_1X}$.

For UE not configured with eDRX_IDLE cycle, Table 4.2.2.5.5-1 gives values of $T_{measureCDMA2000\_1X}$ and $T_{evaluateCDMA2000\_1X}$. For UE configured with eDRX_IDLE cycle, $T_{measureCDMA2000\_1X}$ and $T_{evaluateCDMA2000\_1X}$ are specified in Table 4.2.2.5.5-2 where the requirements apply provided that the serving cell is configured with eDRX_IDLE and is the same in all PTWs during any of $T_{measureCDMA2000\_1X}$ and $T_{evaluateCDMA2000\_1X}$ when multiple PTWs are used.

Table 4.2.2.5.5-1: $T_{measureCDMA2000\ 1X}$ and $T_{evaluateCDMA2000\ 1X}$

DRX cycle length [s]	$T_{measureCDMA2000\_1X}$ [s] (number of DRX cycles)	$T_{evaluateCDMA2000\_1X}$ [s] (number of DRX cycles)
0.32	5.12 (16)	15.36 (48)
0.64	5.12 (8)	15.36 (24)
1.28	6.4 (5)	19.2 (15)
2.56	7.68 (3)	23.04 (9)

Table 4.2.2.5.5-2: $T_{measureCDMA2000\_1X}$ and $T_{evaluateCDMA2000\_1X}$ for UE configured with eDRX_IDLE cycle

<table>
<tr><th>eDRX_IDLE cycle length [s]</th><th>DRX cycle length [s]</th><th>PTW length [s]</th><th>$T_{measureCDMA2000\_1X}$ [s] (number of DRX cycles)</th><th>$T_{evaluateCDMA2000\_1X}$ [s] (number of DRX cycles)</th></tr>
<tr><td rowspan="4">5.12 ≤ eDRX_IDLE cycle length ≤ 2621.44</td><td>0.32</td><td>≥1</td><td>0.96 (3)</td><td>Note 3 (9)</td></tr>
<tr><td>0.64</td><td>≥2</td><td>1.92 (3)</td><td>Note 3 (9)</td></tr>
<tr><td>1.28</td><td>≥4</td><td>3.84 (3)</td><td>Note 3 (9)</td></tr>
<tr><td>2.56</td><td>≥8</td><td>7.68 (3)</td><td>Note 3 (9)</td></tr>
<tr><td colspan="5">NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs.
NOTE 2: The eDRX_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].
NOTE 3: The time is calculated depending on the number N of DRX cycles as follows:
$eDRX\_cycle\_length \times \left\lceil \frac{N}{\lceil PTW / DRX\_cycle\_length \rceil} \right\rceil$</td></tr>
</table>

If $T_{reselection}$ timer has a non zero value and the CDMA2000 1X cell is satisfied with the reselection criteria which are defined in [1], the UE shall evaluate this CDMA2000 1X cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

4.2.2.6 Evaluation of cell re-selection criteria

The UE shall evaluate the intra-frequency, inter-frequency and inter-RAT cell reselection criteria defined in [1] at least every DRX cycle. When a non zero value of $T_{reselection}$ is used, the UE shall only perform reselection on an evaluation which occurs simultaneously to, or later than the expiry of the $T_{reselection}$ timer.

For UE configured with eDRX_IDLE cycle, the cell reselection criteria shall be evaluated within at least every DRX cycle within the PTW.

4.2.2.7 Maximum interruption in paging reception

UE shall perform the cell re-selection with minimum interruption in monitoring downlink channels for paging reception. When the UE is configured with eDRX_IDLE cycle, the UE shall not miss any paging in a PTW provided the paging is sent in at least [2] DRX cycles before the end of that PTW.

At intra-frequency and inter-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target intra-frequency and inter-frequency cell for paging reception. The interruption time shall not exceed $T_{SI\text{-}EUTRA}$ + 50 ms.

At inter-RAT cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels for paging reception of the target inter-RAT cell. For E-UTRAN to UTRA cell re-selection the interruption time must not exceed $T_{SI\text{-}UTRA}$ + 50 ms. For E-UTRAN to GSM cell re-selection the interruption time must not exceed T_{BCCH} + 50 ms.

$T_{SI\text{-}EUTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [2] for a E-UTRAN cell.

$T_{SI\text{-}UTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in [7] for a UTRAN cell.

T_{BCCH} is the maximum time allowed to read BCCH data from a GSM cell defined in [8].

These requirements assume sufficient radio conditions, so that decoding of system information can be made without errors and does not take into account cell re-selection failure.

At cell re-selection to HRPD, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable of starting to monitor downlink channels for paging reception of the target HRPD cell. For HRPD cell re-selection the interruption time must not exceed $T_{SI\text{-}HRPD}$ + 50 ms.

$T_{SI\text{-}HRPD}$ is the time required for receiving all the relevant system information data according to the reception procedure and the upper layer (Layer 3) procedure delay of system information blocks defined in [11] in for HRPD cell.

At cell re-selection to cdma2000 1X, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable of starting to monitor downlink channels for paging reception of the target cdma2000 1X cell. For cdma2000 1X cell re-selection the interruption time must not exceed $T_{SI\text{-}cdma2000\_1X}$ + 50 ms.

$T_{SI\text{-}cdma2000\_1X}$ is the time required for receiving all the relevant system information data according to the reception procedure and the upper layer (Layer 3) procedure delay of system information blocks defined in [15] for cdma2000 1X cell.

For any requirement in this section, when the UE transitions between any two states when being configured with eDRX_IDLE, being configured with eDRX_IDLE cycle, changing eDRX_IDLE cycle length, or changing PTW configuration, the UE shall meet the transition requirement, which is the less stringent requirement of the two requirements corresponding to the first state and the second state, during the transition time interval which is the time corresponding to the transition requirement. After the transition time interval, the UE has to meet the requirement corresponding to the second state.

4.2.2.8 void

4.2.2.9 UE measurement capability

For idle mode cell re-selection purposes, the UE shall be capable of monitoring at least:

- Intra-frequency carrier, and
- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 3 TDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 3 FDD UTRA carriers, and
- Depending on UE capability, 3 TDD UTRA carriers, and
- Depending on UE capability, 32 GSM carriers, and
- Depending on UE capability, 3 cdma2000 1x carriers, and
- Depending on UE capability, 3 HRPD carriers.

In addition to the requirements defined above, a UE supporting E-UTRA measurements in RRC_IDLE state shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells), cdma2000 1x and HRPD layers.

4.2.2.9a UE measurement capability (Increased UE carrier monitoring)

UE which support Increased UE carrier monitoring E-UTRA according to the capabilities in [2,31] shall be capable of monitoring at least

- Depending on UE capability, 8 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 8 TDD E-UTRA inter-frequency carriers

UE which support increased UE carrier monitoring UTRA according to the capabilities in [2,31] shall additionally be capable of monitoring at least

- Depending on UE capability, 6 FDD UTRA carriers, and
- Depending on UE capability, 7 TDD UTRA carriers, and

In addition to the requirements defined above, a UE supporting E-UTRA measurements in RRC_IDLE state and supporting Increased UE carrier monitoring E-UTRA or increased UE carrier monitoring UTRA according to the capabilities in [2,31] shall be capable of monitoring a total of at least 13 carrier frequency layers, which includes serving layer, comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells), cdma2000 1x and HRPD layers.

The requirements in this section apply for UE regardless of their capability to support eDRX_IDLE.

4.2.2.10 Reselection to CSG cells

Note: Requirements in this clause are minimum requirements defined to ensure the testability of autonomous CSG search. Further information on autonomous search times in practical deployments is available in [25].

Reselection from non CSG to CSG cells may be performed using UE autonomous search as defined in [1] when at least one CSG ID is included in the UE's CSG whitelist. The requirements in this clause are valid for reselection to CSG cells previously visited by the UE when the radio configuration parameters, including the carrier frequency and physical cell identity of the CSG cell, non CSG cell and other neighbour cells are unchanged from the most recent previous visit.

NOTE: According to [1], the UE autonomous search function, per UE implementation, determines when and/or where to search for allowed CSG cells.

4.2.2.10.1 Reselection from a non CSG to an inter-frequency CSG cell

The UE shall perform search and reselection to an allowed inter-frequency CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 4.2.2.10.1-1. There is no need for statistical testing of this requirement.

Table 4.2.2.10.1-1: Parameters for CSG inter-frequency reselection

Parameter	Unit	Cell 1	Cell 2
EARFCN Note1		Channel 1	Channel 2
CSG indicator		False	True
Physical cell identity Note1		1	2
CSG identity		Not sent	Sent (Already stored in UE whitelist from previous visit)
Propagation conditions		Static, non multipath	
CSG cell previously visited by UE		Yes	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	*dB*		
SSS_RA	*dB*		
PCFICH_RB	*dB*		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
Qrxlevmin	dBm	-140	-140
N_{oc}	dBm/15 kHz	Off	
RSRP Note2	dBm/15 KHz	-110	-110
Note 1: For this requirement to be applicable, the EARFCN and physical cell identity for cell 1 and cell 2 shall be unchanged from when the CSG cell was visited previously Note 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE			

4.2.2.10.2 Reselection from a non CSG to an inter-RAT UTRAN FDD CSG cell

The UE shall perform search and reselection to an allowed inter-RAT UTRAN FDD CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 4.2.2.10.2-1. There is no need for statistical testing of this requirement.

Table 4.2.2.10.2-1: Parameters for CSG inter-RAT UTRAN FDD reselection

Parameter	Unit	Cell 1	Cell 2
EARFCN Note1		Channel 1	N/A
UARFCN Note1		N/A	Channel 2
CSG indicator		False	True
Physical cell identity Note1		1	N/A
Primary scrambling code Note1		N/A	Scrambling code 2
CSG identity		Not sent	Sent (Already stored in UE whitelist from previous visit)
Propagation conditions		Static, non multipath	
CSG cell previously visited by UE		Yes	
PBCH_RA	dB	0	N/A
PBCH_RB	dB		
PSS_RA	*dB*		
SSS_RA	*dB*		
PCFICH_RB	*dB*		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	Off	
RSRP Note2	dBm/15 KHz	-110	
CPICH_RSCP Note2	dBm	N/A	-100
CPICH_Ec/Ior	dB		-10
PCCPCH_Ec/Ior	dB		-12
SCCPCH_Ec/Ior	dB		-12
AICH_Ec/Ior	dB		-15
SCH_Ec/Ior	dB		-15
PICH_Ec/Ior	dB		-15
I_{oc}	dBm/3.84 MHz		Off
Note 1: For this requirement to be applicable, the EARFCN and physical cell identity for cell 1 and the UARFCN and scrambling code for cell 2 shall be unchanged from when the CSG cell was visited previously Note 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE			

4.2.2.11 Measurement and evaluation requirements for UE in enhanced coverage

4.2.2.11.1 Measurement and evaluation of serving cell

The requirements in this subclause apply if UE is in the enhanced coverage area of the serving cell. The UE category M1 and enhanced coverge applicability of the requirements is defined in section 3.1. The UE is considered to be in enhanced coverage area of serving cell according to RSRP, RSRP Ês/Iot, SCH_RP and SCH Ês/Iot of the serving cell defined in Annex B.1.3 for a corresponding Band.

The UE shall measure the RSRP level of the serving cell and evaluate the cell selection criterion S defined in [1] for the serving cell at least every DRX cycle.

The UE shall filter the RSRP measurements of the serving cell using at least [4] measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by, at least DRX cycle/2.

If the UE has evaluated in N_{serv_EC} consecutive DRX cycles that the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated by the serving cell, regardless of the measurement rules currently limiting UE measurement activities.

If the UE in RRC_IDLE has not found any new suitable cell based on searches and measurements using the intra-frequency, inter-frequency and inter-RAT information indicated in the system information for [20] s, the UE shall initiate cell selection procedures for the selected PLMN as defined in [1].

Table 4.2.2.11.1-1: N_{serv_EC}

DRX cycle length [s]	N_{serv_EC} [number of DRX cycles]
0.32	[8]
0.64	[8]
1.28	[4]
2.56	[4]

4.2.2.11.2 Measurement and evaluation of intra-frequency E-UTRAN cells

The requirements in this subclause apply if UE is in the enhanced coverage area of the neighbor cell. The UE category M1 and enhanced coverge applicability of the requirements is defined in section 3.1.The UE is considered to be in enhanced coverage area of neighbor cell according to RSRP, RSRP Ês/Iot, SCH_RP and SCH Ês/Iot of the neighbor cell defined in Annex B.1.3 for a corresponding Band.

The UE shall be able to identify new intra-frequency cells and perform RSRP measurements of identified intra-frequency cells without an explicit intra-frequency neighbour list containing physical layer cell identities. The UE shall not cause any interruption to the paging reception and acquisition of SI while performing measurement on serving or any neighbor cells.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the reselection criteria defined in TS36.304 within $T_{detect,EUTRAN\_Intra\_EC}$ when that Treselection= 0 .

The UE shall measure RSRP at least every $T_{measure,EUTRAN\_Intra\_EC}$ for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP measurements of each measured intra-frequency cell using at least [4] measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN\_Intra\_EC}/2$.

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an intra-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met reselection criterion defined [1] within $T_{evaluate,E\text{-}UTRAN\_intra\_EC}$ when $T_{reselection} = 0$ as specified in Table 4.2.2.11.2-1 provided that the cell is at least 3dB better ranked and additional conditions Table 4.2.2.11.2-2 are met.. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and non-serving intra-frequency cells.

If $T_{reselection}$ timer has a non zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the $T_{reselection}$ time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

Table 4.2.2.11.2-1 : $T_{detect,EUTRAN\_Intra\_EC}$, $T_{measure,EUTRAN\_Intra\_EC}$ and $T_{evaluate,\ E\text{-}UTRAN\_intra\_EC}$

DRX cycle length [s]	$T_{detect,EUTRAN\_Intra\_EC}$ [s] (number of DRX cycles)	$T_{measure,EUTRAN\_Intra\_EC}$ [s] (number of DRX cycles)	$T_{evaluate,E\text{-}UTRAN\_intra\_EC}$ [s] (number of DRX cycles)
0.32	330.24 (1032)	1.28 (4)	10.24 (32)
0.64	330.24 (516)	1.28 (2)	10.24 (16)
1.28	524.8 (410)	1.28 (1)	12.8 (10)
2.56	1039.36 (406)	2.56 (1)	15.36 (6)

Table 4.2.2.11.2-2: Conditions on SCH Ês/Iot of identified and of the neighbour cell

SCH Ês/Iot of already identified cell including serving cell: Q1	Neighbouring cell SCH Ês/Iot: Q2	$T_{detect,EUTRAN\_Intra,\ ca\ tM1}$ (s)
-15≤Q1<-6	-15≤ Q2 < -6	As defined in Table Table 4.2.2.11.2-1
-15≤Q1<-6	Q2≥-6	Requirements in 4.2.2 apply
Q1≥ -6	Q2≥-6	Requirements in 4.2.2 apply

4.3 Minimization of Drive Tests (MDT)

UE supporting minimisation of drive tests in RRC_IDLE shall be capable of:

- logging measurements in RRC_IDLE, reporting the logged measurements and meeting requirements in this clause;
- logging of RRC connection establishment failure, reporting the logged failure and meeting requirements in this clause;
- logging of radio link failure and handover failure, reporting the logged failure and meeting requirements in this clause.

4.3.1 Introduction

The logged MDT requirements consist of measurement requirements as specified in clause 4.3.2 and relative time stamp accuracy requirements as specified in clause 4.3.3. Both sets of requirements are applicable for intra-frequency, inter-frequency and inter-RAT cases in RRC_IDLE state. The MDT procedures are described in [27].

For RRC connection establishment failure logging and reporting, the MDT requirements consist of requirements for measurements performed and logged in RRC_IDLE state specified in clause 4.3.2 and relative time stamp accuracy requirement for RRC connection establishment failure log reporting as specified in clause 4.3.4.

4.3.2 Measurements

The requirements specified in this clause apply for the measurements (GSM carrier RSSI, UTRA CPICH RSCP, UTRA CPICH Ec/Io, P-CCPCH RSCP for UTRA 1.28 TDD, E-UTRA RSRP, E-UTRA RSRQ, MBSFN RSRP, MBSFN RSRQ, and MCH BLER) performed and logged by the UE for MDT in RRC_IDLE. The requirements apply for the measurements included in logged MDT reports and RRC connection establishment failure reports.

4.3.2.1 Requirements

The measurement values that are used to meet

- serving cell and reselection requirements as specified in sections 4.2.2.1, 4.2.2.3, 4.2.2.4, 4.2.2.5,
- MBSFN measurement requirements as specified in section 4.4,

shall also apply to values logged for MDT measurements in RRC_IDLE state.

4.3.3 Relative Time Stamp Accuracy

The relative time stamp for a logged measurement is defined as the time from the moment the MDT configuration was received at the UE until the measurement was logged, see TS 36.331 [2].

4.3.3.1 Requirements

The accuracy of the relative time stamping is such that the drift of the time stamping shall be not more than ± 2 seconds per hour.

4.3.4 Relative Time Stamp Accuracy for RRC Connection Establishment Failure Log Reporting

Relative time stamp for RRC connection establishment failure log reporting is defined as the time elapsed from the last RRC connection establishment failure to the time when the log is included in the report TS 36.331 [2]. The UE shall report the RRC connection establishment failure log, while meeting the accuracy requirement specified in clause 4.3.4.1.

4.3.4.1 Requirements

The accuracy of the relative time stamping for RRC connection establishment failure log reporting is such that the drift of the time stamping shall not be larger than ± 0.72 seconds per hour and ± 10 seconds over 48 hours. The relative time stamp accuracy requirements shall apply provided that:

- no power off or detach occurs after the RRC connection establishment failure had been detected and until the log is time-stamped.

NOTE: This requirement does not need to be tested.

4.3.5 Relative Time Stamp Accuracy for Radio Link Failure and Handover Failure Log Reporting

The UE shall report the radio link and handover failure log, while meeting the accuracy requirements specified in this section.

4.3.5.1 Requirements for *timeSinceFailure*

Relative time stamp accuracy requirements for *timeSinceFailure* reported for MDT in a radio link failure or handover failure log are specified in this clause. *timeSinceFailure* determines the time elapsed from the last radio link failure or handover failure in E-UTRA to the time when the log is included in the report TS 36.331 [2].

The accuracy of the relative time stamping for *timeSinceFailure* is such that the drift of the time stamping shall not be larger than ± 0.72 seconds per hour and ± 10 seconds over 48 hours. These relative time stamp accuracy requirements shall apply provided that:

- no power off or detach occurs after the RLF or handover failure had been detected and until the log is time-stamped.

4.4 MBSFN Measurements

4.4.1 Introduction

The requirements specified in Section 4.4 apply for MBSFN measurements (MBSFN RSRP, MBSFN RSRQ, and MCH BLER defined in [4]), which are performed in RRC_IDLE state and logged for MDT by UEs which are MBMS-capable and also indicate their MBSFN measurement logging capability [2].

UE shall measure MBSFN RSRP, MBSFN RSRQ and MCH BLER only in subframes and on carriers where UE is decoding PMCH. The requirements are specified for any carrier where PMCH is received by UE. The requirements specified in this section apply for any carrier frequency with configured MBSFN subframes with PMCH, which may be the same as or different from any serving unicast carrier.

The UE receiving PMCH on any non-serving carrier and performing MBSFN measurements shall not cause interruptions on any serving carrier in the subframes with paging and non-MBSFN multicast transmissions such as system information.

4.4.2 MBSFN RSRP measurements

For UE in RRC_IDLE, the physical layer shall be capable of performing the MBSFN RSRP measurement [4] within the MBSFN RSRP measurement period and log the measurement, while meeting the MBSFN RSRP measurement accuracy requirements specified in section 9.8.2. The MBSFN RSRP measurement logging shall be according to the MBSFN RSRP measurement report mapping specified in Section 9.8.2.2.

The MBSFN RSRP measurement period is defined as MAX(640 ms, period during which the UE decodes [5, Section 10] 5 subframes containing PMCH transmissions).

The same requirement applies for UE configured with DRX or eDRX_IDLE.

4.4.3 MBSFN RSRQ measurements

For UE in RRC_IDLE, the physical layer shall be capable of performing the MBSFN RSRQ measurement [4] within the MBSFN RSRP measurement period and report the measurement, while meeting the MBSFN RSRQ measurement accuracy requirements specified in section 9.8.3. The MBSFN RSRQ measurement logging shall be according to the MBSFN RSRQ measurement report mapping specified in Section 9.8.3.2.

The MBSFN RSRQ measurement period is defined as MAX(640 ms, period during which the UE decodes [5, Section 10] 5 subframes containing PMCH transmissions).

The same requirement applies for UE configured with DRX or eDRX_IDLE.

4.4.4 MCH BLER measurements

The UE physical layer shall be capable of performing and logging the MCH BLER measurement [4] within the MCH BLER measurement period.

The MCH BLER measurement period is equal to the MBSFN logging interval configured by higher layers [2].

The MCH BLER logging shall be according to the MCH BLER measurement report mapping specified in Section 9.8.4.

The same requirement applies for UE configured with DRX or eDRX_IDLE.

4.5 Proximity-based Services

4.5.1 Introduction

This section contains the requirements for the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery in RRC_IDLE state.

4.5.2 Requirements

When a UE in RRC_IDLE state is participating in transmissions and/or reception for ProSe Direct Discovery and/or ProSe Direct Communication, the UE shall meet all the requirements of Section 4.

Note: The UE may need to interrupt ProSe operation in order to meet the requirements of Section 4.

4.5.2.1 Interruptions with ProSe Direct Discovery

A UE capable of ProSe direct discovery in RRC_IDLE state shall not cause any interruption for the reception of paging and system information:

- while switching reception between ProSe Direct Discovery and a serving cell, or
- when receiving ProSe direct discovery signals or
- while switching receiver chain ON/OFF for ProSe Direct Discovery reception if the UE has a dedicated receiver chain for ProSe Direct Discovery

4.5.2.2 Interruptions with ProSe Direct Communication

A UE capable of ProSe direct communication in RRC_IDLE state shall not cause any interruption for the reception of paging and system information:

- while switching reception between ProSe Direct Communication and a serving cell, or
- when receiving ProSe direct communication signals, or
- while switching receiver chain ON/OFF for ProSe Direct Communications reception.

4.5.2.3 Initiation/Cease of SLSS transmissions with ProSe Direct Discovery

The requirements in this subclause are applicable to a UE capable of ProSe Direct Discovery and SLSS transmission and reception.

The requirements apply when the conditions for SLSS transmissions specified in [2] are met; *networkControlledSyncTx* is not configured; and *syncTxThreshIC* is included in *SystemInformationBlockType19*. The UE shall be capable of measuring the RSRP of the cell used to transmit Prose Direct Discovery announcements and evaluate to initiate/cease SLSS transmissions within $T_{evaluate,SLSS}$ as specified in Table 4.5.2.3-1.

Table 4.5.2.3-1: $T_{evaluate,SLSS}$ with ProSe Direct Discovery

DRX cycle length [s]	$T_{evaluate,SLSS}$ [s] (number of DRX cycles)
0.32	1.92 (6)
0.64	3.84 (6)
1.28	7.68 (6)
2.56	15.36 (6)

For the cell used to transmit ProSe Direct Discovery announcements:

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band are fulfilled.

4.5.2.4 Initiation/Cease of SLSS transmissions with ProSe Direct Communication

The requirements in this subclause are applicable to a UE capable of ProSe Direct Communication.

The requirements apply when the conditions for SLSS transmissions specified in [2] are met; *networkControlledSyncTx* is not configured; and *syncTxThreshIC* is included in *SystemInformationBlockType18*. The UE shall be capable of measuring the RSRP of the cell used to transmit ProSe Direct Communication and evaluate to initiate/cease SLSS transmissions within $T_{evaluate,SLSS}$ as specified in Table 4.5.2.4-1.

Table 4.5.2.4-1: $T_{evaluate,SLSS}$ with ProSe Direct Communication

DRX cycle length [s]	$T_{evaluate,SLSS}$ [s] (number of DRX cycles)
0.32	1.92 (6)
0.64	3.84 (6)
1.28	7.68 (6)
2.56	15.36 (6)

For the cell used to transmit ProSe Direct Communication:

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 for a corresponding Band are fulfilled,

- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band are fulfilled.

5 E-UTRAN RRC_CONNECTED state mobility

Note 1: For the performance requirements specified hereafter, the state when no DRX is used is defined as follows:

- DRX and eDRX_CONN parameters are not configured; or
- DRX or eDRX_CONN parameters are configured and
  - drx-InactivityTimer is running; or
  - drx-RetransmissionTimer is running; or
  - mac-ContentionResolutionTimer is running; or
  - a Scheduling Request sent on PUCCH is pending; or
  - an uplink grant for a pending HARQ retransmission can occur and there is data in the corresponding HARQ buffer; or
  - a PDCCH indicating a new transmission addressed to the C-RNTI of the UE has not been received after successful reception of a Random Access Response for the explicitly signaled preamble (only applicable to UEs in RRC_CONNECTED).

Otherwise

- It is the state when DRX is used.

Note 2: Unless otherwise stated, the requirements in sections 5.1, 5.2.2.2, 5.2.2.3, 5.2.2.4, 5.3 and 5.4 are also applicable when a UE is configured with Scell(s) or PSCell.

5.1 E-UTRAN Handover

5.1.1 Introduction

5.1.2 Requirements

5.1.2.1 E-UTRAN FDD – FDD

The requirements in this clause are applicable to both intra-frequency and inter-frequency handovers.

5.1.2.1.1 Handover delay

Procedure delays for all procedures that can command a handover are specified in TS 36.331 [2].

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

$D_{handover}$ equals the maximum RRC procedure delay to be defined in clause 11.2 in TS 36.331 [2] plus the interruption time stated in clause 5.1.2.1.2.

5.1.2.1.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then T_{search} = 0 ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then T_{search} = 80 ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 8.1.2.2.1 for intra-frequency handover and Clause 8.1.2.3.1 for inter-frequency handover.

5.2.2.2 E-UTRAN FDD – TDD

The requirements in this clause are applicable to handover from FDD to TDD. The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 5.2.2.4 apply for this section.

5.2.2.2.1 (Void)

5.2.2.2.2 (Void)

5.2.2.3 E-UTRAN TDD – FDD

The requirements in this clause are applicable to handover from TDD to FDD. The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 5.1.2.1 apply for this section.

5.2.2.3.1 (Void)

5.2.2.3.2 (Void)

5.2.2.4 E-UTRAN TDD – TDD

The requirements in this clause are applicable to both intra-frequency and inter-frequency handovers.

5.2.2.4.1 Handover delay

Procedure delays for all procedures that can command a handover are specified in TS 36.331 [2].

When the UE receives a RRC message implying handover, the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

$D_{handover}$ equals the maximum RRC procedure delay to be defined in clause 11.2 in TS 36.331 [2] plus the interruption time stated in clause 5. 2.2.4.2.

5.2.2.4.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where

T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then T_{search} = 0 ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then T_{search} = 80 ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 8.1.2.2.2 for intra-frequency handover and Clause 8.1.2.3.4 for inter-frequency handover.

5.2.2.5 E-UTRAN HD – FDD

The requirements in this clause are applicable to intra-frequency handovers.

5.2.2.5.1 Handover delay

Procedure delays for all procedures that can command a handover are specified in TS 36.331 [2].

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

$D_{handover}$ equals the maximum RRC procedure delay to be defined in clause 11.2 in TS 36.331 [2] plus the interruption time stated in clause 5.1.2.1.2.

5.2.2.5.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then T_{search} = 0 ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then T_{search} = 80 ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 8.1.2.2.1 for intra-frequency handover.

5.3 Handover to other RATs

5.3.1 E-UTRAN - UTRAN FDD Handover

5.3.1.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to UTRAN FDD is to change the radio access mode from E-UTRAN to UTRAN FDD. The handover procedure is initiated from E-UTRAN with a RRC message that implies a hard handover as described in TS 36.331 [2].

5.3.1.1.1 Handover delay

When the UE receives a RRC message implying handover to UTRAN the UE shall be ready to start the transmission of the new UTRA uplink DPCCH within $D_{handover}$ seconds from the end of the last E-UTRAN TTI containing the RRC MOBILITY FROM E-UTRA command.

where:

- $D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in clause 5.3.1.1.2.

5.3.1.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCCH in UTRAN FDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The target cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell is known the interruption time shall be less than $T_{interrupt1}$

$$T_{interrupt1} = T_{IU}+T_{sync}+50+ 10*F_{max} + T_{MC} \text{ ms}$$

If the target cell is unknown the interruption time shall be less than $T_{interrupt2}$

$$T_{interrupt2} = T_{IU}+T_{sync}+150 + 10*F_{max} + T_{MC} \text{ ms}$$

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. Performance requirements for E-UTRA to UTRA soft handover are not specified. When UE is connected to an E-UTRA cell, UTRA SFN timing measurements are not reported. This implies that the timing of the DPCH of the UTRA target cells in the active set cannot be configured by UTRAN to guarantee that all target cells fall within the UE reception window of T_0 +/- 148 chips.

Where:

T_{IU} is the interruption uncertainty when changing the timing from the E-UTRAN to the new UTRAN cell. T_{IU} can be up to one UTRA frame (10 ms).

F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH on the UTRA target cell. If HS-PDSCH is configured in the UTRA target cell, F_{max} is 4 radio frames.

T_{sync} is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 [20], clause 4.3.1.2. In case higher layers indicate the usage of a post-verification period T_{sync}=0 ms. Otherwise T_{sync}=40 ms.

T_{MC} T_{MC} is 0ms if a single UTRA cell is configured as the handover target, otherwise 20ms if handover to UTRA with 1, 2 or 3 UTRA carriers with secondary HS-PDSCH is configured.

The phase reference is the primary CPICH.

The requirements in this clause assume that N312 has the smallest possible value i.e. only one insync is required.

5.3.2 E-UTRAN - UTRAN TDD Handover

5.3.2.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to UTRAN TDD is to change the radio access mode from E-UTRAN to UTRAN TDD. The handover procedure is initiated from E-UTRAN with a RRC message that implies a hard handover as described in TS 36.331 [2].

5.3.2.2 Requirements

The requirements in this clause shall apply to UE supporting E-UTRAN and UTRAN TDD.

5.3.2.2.1 Handover delay

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover the UE shall be ready to start the transmission of the SYNC-UL within $D_{handover}$ seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

- $D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in clause 5.3.2.2.

5.3.2.2.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the SYNC-UL in UTRAN TDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell has been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt1}$

$$T_{interrupt1}= T_{offset}+T_{UL}+30*F_{SFN}+20 \text{ ms}$$

If the target cell has not been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt2}$

$$T_{interrupt2}= T_{offset}+T_{UL}+30*F_{SFN}+180 \text{ ms}$$

Where:

T_{offset} Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel

T_{UL} Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell

F_{SFN} Equal to 1 if SFN decoding is required and equal to 0 otherwise

The interruption time requirements for an unknown target cell shall apply only if the signal quality of the unknown target cell is sufficient for successful synchronisation with one attempt.

5.3.3 E-UTRAN - GSM Handover

5.3.3.1 Introduction

The purpose of inter-RAT handover from E-UTRAN to GSM is to transfer a connection between the UE and E-UTRAN to GSM. The handover procedure is initiated from E-UTRAN with a RRC message (MOBILITY FROM E-UTRA). The procedure is described in in TS 36.331 [2].

5.3.3.2 Requirements

The requirements in this clause shall apply to UE supporting E-UTRAN and GSM.

The requirements given below in Tables 5.3.3.2.1-1 and 5.3.3.2.2-1 for the case where the UE has not synchronised to the GSM cell before receiving the RRC MOBILITY FROM E-UTRA command are valid when the signal quality of the GSM cell is sufficient for successful synchronisation with one attempt. If the UE is unable to synchronise to the GSM cell on the first attempt, it shall continue to search for synchronisation information for up to 800 ms duration. If after 800 ms the UE has not synchronised to the GSM cell it shall follow the handover failure procedure specified in TS 36.331 [2].

5.3.3.2.1 Handover delay

When the UE receives a RRC MOBILITY FROM E-UTRA command the UE shall be ready to transmit (as specified in [10]) on the channel of the new RAT within the value in table 5.3.3.2.1-1 from the end of the last TTI containing the RRC command. The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay.

Table 5.3.3.2.1-1: E-UTRAN/GSM handover - handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the RRC MOBILITY FROM E-UTRA COMMAND is received	90
The UE has not synchronised to the GSM cell before the RRC MOBILITY FROM E-UTRA COMMAND is received	190

5.3.3.2.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink channel in GSM, excluding the RRC procedure delay. The interruption time depends on whether the UE has synchronized to the target GSM cell or not and shall be less than the value specified in table 5.3.3.2.2-1.

Table 5.3.3.2.2-1: E-UTRAN/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the RRC MOBILITY FROM E-UTRA COMMAND is received	40
The UE has not synchronised to the GSM cell before the RRC MOBILITY FROM E-UTRA COMMAND is received	140

5.4 Handover to Non-3GPP RATs

5.4.1 E-UTRAN – HRPD Handover

5.4.1.1 Introduction

The handover procedure from E-UTRAN to HRPD is initiated when E-UTRAN sends handover command to the UE through dedicated RRC signalling.

5.4.1.1.1 Handover delay

The handover delay ($D_{handover}$) is defined as the sum of the RRC procedure delay, which is 50 ms and the interruption time specified in clause 5.4.1.1.2.

When the UE receives a RRC message implying handover to HRPD, the UE shall be ready to start the transmission of the new reverse control channel in HRPD within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

5.4.1.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in HRPD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

An HRPD cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 6.6 of [13], the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O \text{ ms}$$

Where:

T_{IU}	It is the interruption uncertainty when changing the timing from the E-UTRAN to the new HRPD cell. T_{IU} can be up to one HRPD frame (26.66 ms).
SW_K	is $SW_K = \left\lceil \frac{srch\_win\_k}{60} \right\rceil$ where srch_win_k is the number of HRPD chips indicated by the search window for known target HRPD cells in the message
SW_O	is $SW_O = \left\lceil \frac{srch\_win\_o}{60} \right\rceil$ where srch_win_o is the number of HRPD chips indicated by the search window for unknown target HRPD cells in the message
KC	It is the number of known target HRPD cells in the message, and
OC	It is the number of unknown target HRPD cells in the message.

Note: An additional delay in the interruption time may occur due to the reverse link silence interval [11], which is specific to HRPD.

5.4.2 E-UTRAN – cdma2000 1X Handover

5.4.2.1 Introduction

The handover procedure from E-UTRAN to cdma2000 1X is initiated when E-UTRAN sends handover command to the UE through dedicated RRC signalling.

5.4.2.1.1 Handover delay

The handover delay ($D_{handover}$) is defined as the sum of the RRC procedure delay, which is 130 ms and the interruption time specified in clause 5.4.2.1.2.

When the UE receives a RRC message implying handover to cdma2000 1X, the UE shall be ready to start the transmission of the new reverse control channel in cdma2000 1X within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

5.4.2.1.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in cdma2000 1X, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

A cdma2000 1X cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 4.2.1 of [14], the interruption time shall be less than $T_{interrupt}$:

$$T_{interrupt} = T_{IU} + 140 + 10*KC*SW_K + 10*OC*SW_O \text{ ms}$$

Where:

T_{IU} It is the interruption uncertainty when changing the timing from the E-UTRAN to the new cdma2000 1X cell. T_{IU} can be up to one cdma2000 1X frame (20 ms).

SW_K is $SW_K = \left\lceil \frac{srch\_win\_k}{300} \right\rceil$ where srch_win_k is the number of cdma2000 1x chips indicated by the search window for known target cdma2000 1x cells in the message

SW_O is $SW_O = \left\lceil \frac{srch\_win\_o}{300} \right\rceil$ where srch_win_o is the number of cdma2000 1x chips indicated by the search window for unknown target cdma2000 1x cells in the message

KC It is the number of known target cdma2000 1X cells in the message, and

OC It is the number of unknown target cdma2000 1X cells in the message.

6 RRC Connection Mobility Control

6.1 RRC Re-establishment

The requirements in this clause are applicable to both E-UTRAN FDD and TDD.

6.1.1 Introduction

RRC connection re-establishment is initiated when a UE in RRC connected mode looses RRC connection due to any of these reasons: radio link failure, handover failure or radio link problem. The RRC es-tablishment procedure is specified in clause 5.3.7 in TS 36.331 [2].

6.1.2 Requirements

In RRC connected mode the UE shall be capable of sending *RRCConnectionReestablishmentRequest* message within $T_{re\text{-}establish\_delay}$ seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ($T_{re\text{-}establish\_delay}$) shall be less than:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}$$

T_{UL_grant}: It is the time required to acquire and process uplink grant from the target PCell. The uplink grant is required to transmit *RRCConnectionReestablishmentRequest* message.

The UE re-establishment delay ($T_{UE\_re-establish\_delay}$) is specified in clause 6.1.2.1.

6.1.2.1 UE Re-establishment delay requirement

The UE re-establishment delay ($T_{UE\_re-establish\_delay}$) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in clause 5.3.7 in TS 36.331 [2] is detected by the UE to the time when the UE sends PRACH to the target PCell. The UE re-establishment delay ($T_{UE\_re-establish\_delay}$) requirement shall be less than:

$$T_{UE\text{-}re\text{-}establish\_delay} = 50 \text{ ms} + N_{freq} {*}Tsearch + T_{SI} + T_{PRACH}$$

T_{search}: It is the time required by the UE to search the target PCell.

T_{search} = It is 100 ms if the target PCell is known by the UE; the target PCell is known if it has been measured by the UE in the last 5 seconds.

T_{search} = It is 800 ms if the target PCell is unknown by the UE; the target PCell is unknown if it has not been measured by the UE in the last 5 seconds.

T_{SI} = It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [2] for the target PCell.

T_{PRACH} = The additional delay caused by the random access procedure; it will be at least 10 ms due to random access occasion and there might be additional delay due to ramping procedure.

N_{freq}: It is the total number of E-UTRA frequencies to be monitored for RRC re-establishment; N_{freq} = 1 if the target PCell is known.

There is no requirement if the target cell does not contain the UE context.

6.2 Random Access

6.2.1 Introduction

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is specified in clause 6 of TS 36.213[3] and the control of the RACH transmission is specified in clause 5.1 of TS 36.321[17]. Contention based random access procedures can only be carried out on PCell and PSCell, while non-contention based random access procedures can be carried out on PCell, one or two activated SCell(s), and PSCell.

6.2.2 Requirements

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula defined in TS 36.213[3] and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as specified in table 6.3.5.1.1-1 of TS 36.101[5]. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of 36.101[5].

The UE shall indicate a Random Access problem to upper layers if the maximum number of preamble transmission counter has been reached for the random access procedure on PCell or PSCell as specified in clause 5.1.4 in TS 36.321 [17].

The UE shall stop preamble transmission if maximum number of preamble transmission counter has been reached for the random access procedure on an activated Scell as specified in clause 5.1.4 in TS 36.321 [17].

6.2.2.1 Contention based random access

6.2.2.1.1 Correct behaviour when receiving Random Access Response reception

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

6.2.2.1.2 Correct behaviour when not receiving Random Access Response reception

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window defined in clause 5.1.4 TS 36.321.

6.2.2.1.3 Correct behaviour when receiving a NACK on msg3

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3.

6.2.2.1.4 Void

6.2.2.1.5 Correct behaviour when receiving a message over Temporary C-RNTI

The UE shall send ACK if the Contention Resolution is successful.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

6.2.2.1.6 Correct behaviour when contention Resolution timer expires

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

6.2.2.2 Non-Contention based random access

6.2.2.2.1 Correct behaviour when receiving Random Access Response

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

6.2.2.2.2 Correct behaviour when not receiving Random Access Response

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

6.2.3 Requirements for Cat-M1 UEs

In addition to the requirements defined in 6.2.1 and 6.2.2, a Cat-M1 UE shall also execute the random access procedure defined in clause 5.1 in TS 36.321 [17] using the PRACH configuration contained in *PRACH-ConfigSIB* in TS 36.331 [2]

- Determines the enhanced coverage level based on the RSRP measurement and the configured criterion (*RSRP-ThresholdsPrach* [2]) as defined in section 5.1.1, TS 36,321 [17],

- Selects PRACH resources [2] configured for the corresponding enhanced coverage level as determined in the previous step and;
- Transmits or re- transmits PRACH preamble using the selected PRACH resources and PRACH configuration.

6.3 RRC Connection Release with Redirection

6.3.1 Introduction

RRC connection release with redirection is initiated by the UE upon receiving the "*RRCConnectionRelease*" message from the E-UTRAN, TS 36.331 [2]. The RRC connection release with redirection procedure is specified in clause 5.3.8 in TS 36.331 [2].

The requirements in this clause are applicable to both E-UTRAN FDD and TDD.

6.3.2 Requirements

6.3.2.1 RRC connection release with redirection to UTRAN FDD

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN FDD cell within $T_{connection\_release\_redirect\_UTRA\ FDD}$.

The time delay ($T_{connection\_release\_redirect\_UTRA\ FDD}$) is the time between the end of the last TTI containing the RRC command, "*RRCConnectionRelease*" (TS 36.331 [2]) on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA FDD cell. The time delay ($T_{connection\_release\_redirect\_UTRA\ FDD}$) shall be less than:

$$T_{connection\_release\_redirect\_UTRA\ FDD} = T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ FDD} + T_{SI\text{-}UTRA\ FDD} + T_{RA}$$

The target UTRA FDD cell shall be considered detectable when:

- CPICH Ec/Io $\geq$ -15 dB,
- SCH_Ec/Io $\geq$ -15 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

$T_{RRC\_procedure\_delay}$: It is the RRC procedure for processing the received message "*RRCConnectionRelease*". It shall be less than 110 ms.

$T_{identify\text{-}UTRA\ FDD}$: It is the time to identify the target UTRA FDD cell. It shall be less than 500 ms.

$T_{SI\text{-}UTRA\ FDD}$: It is the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released.

T_{RA}: It is the delay caused due to the random access procedure when sending random access to the target UTRA FDD cell.

6.3.2.2 RRC connection release with redirection to GERAN

The UE shall be capable of performing the RRC connection release with redirection to the target GERAN cell within $T_{connection\_release\_redirect\_GERAN}$.

The time delay ($T_{connection\_release\_redirect\_GERAN}$) is the time between the end of the last TTI containing the RRC command, "*RRCConnectionRelease*" (TS 36.331 [2]) on the E-UTRAN PDSCH and the time the UE starts to send random access to the target GERAN cell. The time delay ($T_{connection\_release\_redirect\_GERAN}$) shall be less than:

$$T_{connection\_release\_redirect\_\ GERAN} = T_{RRC\_procedure\_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$$

The target GERAN cell shall be considered detectable when the UE receives the GERAN cell at levels down to 10 dB + the reference sensitivity level or reference interference levels as specified in [9].

$T_{RRC\_procedure\_delay}$: It is the RRC procedure for processing the received message "*RRCConnectionRelease*". It shall be less than 110 ms.

$T_{identify\text{-}UTRA\ GERAN}$: It is the time to identify the BSIC of the target GERAN cell. It shall be less than 1 second.

$T_{SI\text{-}UTRA\ GERAN}$: It is the time required for acquiring all the relevant system information of the target GERAN cell. This time depends upon whether the UE is provided with the relevant system information of the target GERAN cell or not by the E-UTRAN before the RRC connection is released.

T_{RA}: It is the delay caused due to the random access procedure when sending random access burst to the target GERAN cell.

6.3.2.3 RRC connection release with redirection to UTRAN TDD

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN TDD cell within $T_{connection\_release\_redirect\_UTRA\ TDD}$.

The time delay ($T_{connection\_release\_redirect\_UTRA\ TDD}$) is the time between the end of the last TTI containing the RRC command, "*RRCConnectionRelease*" (TS 36.331 [2]) on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA TDD cell. The time delay ($T_{connection\_release\_redirect\_UTRA\ TDD}$) shall be less than:

$$T_{connection\_release\_redirect\_UTRA\ TDD} = T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ TDD} * N_{redirect\text{-}UTRA\ TDD} + T_{SI\text{-}UTRA\ TDD} + T_{RA}$$

The target UTRA TDD cell shall be considered detectable when:

- P-CCPCH Ec/Io $\geq$ -6 dB,
- DwPCH_Ec/Io $\geq$ -1 dB.

$T_{RRC\_procedure\_delay}$: It is the RRC procedure for processing the received message "*RRCConnectionRelease*". It shall be less than 110 ms.

$T_{identify\text{-}UTRA\ TDD}$: It is the time to identify the target UTRA TDD cell. It shall be less than 500 ms.

$T_{SI\text{-}UTRA\ TDD}$: It is the time required for acquiring all the relevant system information of the target UTRA TDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA TDD cell or not by the E-UTRAN before the RRC connection is released.

T_{RA}: It is the delay caused due to the random access procedure when sending random access to the target UTRA TDD cell.

$N_{redirect\text{-}UTRA\ TDD}$: It is the total number of target UTRA TDD frequencies included in RedirectedCarrierInfo in "*RRCConnectionRelease*" message. It can be up to 4 UTRA TDD frequencies.

6.4 CSG Proximity Indication for E-UTRAN and UTRAN

6.4.1 Introduction

The requirements defined in this section are applicable to a UE supporting and configured with CSG proximity indication and are valid when a UE is entering the proximity of one or more CSG member cell(s) or leaving the proximity of all CSG member cell(s) on a UTRA or E-UTRA frequency as specified in [2].

The detection of CSG proximity is based on a UE autonomous search function.

6.4.2 Requirements

The UE shall initiate transmission of the ProximityIndication message with "entering" according to [2] within [6] minutes after entering the proximity of one or more CSG member cell(s) on a UTRA or E-UTRA frequency.

The UE shall initiate transmission of the ProximityIndication message with "leaving" according to [2] within [6] minutes after leaving the proximity of all CSG member cell(s) on a UTRA or E-UTRA frequency.

There is no need for statistical testing of this requirement.

NOTE: Entering the proximity of one or more CSG member cell(s) means that the UE is near a cell whose CSG ID is in the UE's CSG whitelist (as determined based on autonomous search procedures). Leaving the proximity of one or more CSG member cell(s) means that the UE is no longer near any cell whose CSG ID is in the UE's CSG whitelist.

7 Timing and signalling characteristics

7.1 UE transmit timing

7.1.1 Introduction

The UE shall have capability to follow the frame timing change of the connected eNode B. The uplink frame transmission takes place $(N_{\mathrm{TA}} + N_{\mathrm{TA\ offset}}) \times T_{\mathrm{s}}$ before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell. The UE shall be configured with a pTAG containing the PCell. The pTAG may also contain up to four SCells, if configured. The UE capable of supporting multiple timing advances [2] may also be configured with one or two serving cells with uplink in one or two sTAG and pTAG.

The other downlink SCell(s), if configured, will be contained in either the pTAG or the sTAG(s). In pTAG, UE shall use the PCell as the reference cell for deriving the UE transmit timing for cells in the pTAG. When the UE capable of supporting multiple timing advance [2] is configured with one or two sTAG(s), the UE shall use an activated SCell from the sTAG for deriving the UE transmit timing for cells in the sTAG. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements. The requirements in clause 7 apply to all TAGs.

The UE capable of supporting dual connectivity shall be configured with one pTAG and may also be configured with one psTAG. The pTAG shall contain the PCell and may also contain one SCell, if configured. The psTAG shall contain the PSCell and may also contain one SCell, if configured. In pTAG, UE shall use the PCell as the reference cell for deriving the UE transmit timing for pTAG, and in psTAG, UE shall use the PSCell as the reference cell for deriving the UE transmit timing for psTAG. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements. The requirements in clause 7 apply to both TAGs.

7.1.2 Requirements

The UE initial transmission timing error shall be less than or equal to $\pm T_e$ where the timing error limit value T_e is specified in Table 7.1.2-1. This requirement applies when it is the first transmission in a DRX or eDRX_CONN cycle for PUCCH, PUSCH and SRS or it is the PRACH transmission. The reference point for the UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus $(N_{\mathrm{TA\_Ref}} + N_{\mathrm{TA\ offset}}) \times T_{\mathrm{s}}$. The downlink timing is defined as the time when the first detected path (in time) of the corresponding downlink frame is received from the reference cell. $N_{\mathrm{TA\_Ref}}$ for PRACH is defined as 0. $(N_{\mathrm{TA\_Ref}} + N_{\mathrm{TA\ offset}})$ (in T_s units) for other channels is the difference between UE transmission timing and the Downlink timing immediately after when the last timing advance in clause 7.3 was applied. $N_{\mathrm{TA\_Ref}}$ for other channels is not changed until next timing advance is received.

Table 7.1.2-1: T_e Timing Error Limit

Downlink Bandwidth (MHz)	$T_{e\_}$
1.4	$24*T_S$
≥3	$12*T_S$
Note: T_S is the basic timing unit defined in TS 36.211	

When it is not the first transmission in a DRX or eDRX_CONN cycle or there is no DRX or no eDRX_CONN cycle, and when it is the transmission for PUCCH, PUSCH and SRS transmission, the UE shall be capable of changing the transmission timing according to the received downlink frame of the reference cell except when the timing advance in clause 7.3 is applied. The UE is required to adjust its timing to within $\pm T_e$ in a TAG when,

- changing the downlink SCell for deriving the UE transmit timing for cells in the sTAG configured with one or two uplinks,
- in this TAG the transmission timing error between the UE and the reference timing exceeds ±Te,
- configured with a pTAG and one or two sTAG, the transmission timing difference between TAGs does not exceed the maximum transmission timing difference (i.e., 32.47us) after such adjustment.

If the transmission timing difference after such adjustment is bigger than the maximum transmission timing difference (i.e., 32.47us) UE may stop adjustment in this TAG. The reference timing shall be $(N_{\mathrm{TA\_Ref}} + N_{\mathrm{TA\,offset}}) \times T_s$ before the downlink timing of the reference cell. All adjustments made to the UE uplink timing under the above mentioned scenarios shall follow these rules:

1) The maximum amount of the magnitude of the timing change in one adjustment shall be T_q seconds.
2) The minimum aggregate adjustment rate shall be $7*T_S$ per second.
3) The maximum aggregate adjustment rate shall be T_q per 200ms.

where the maximum autonomous time adjustment step T_q is specified in Table 7.1.2-2.

Table 7.1.2-2: T_q Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T_q
1.4	$17.5*T_S$
3	$9.5*T_S$
5	$5.5*T_S$
≥10	$3.5*T_S$
Note: T_S is the basic timing unit defined in TS 36.211	

7.2 UE timer accuracy

7.2.1 Introduction

UE timers are used in different protocol entities to control the UE behaviour.

7.2.2 Requirements

For UE timers specified in TS 36.331 [2], UE shall comply with the timer accuracies according to Table 7.2.2-1.

The requirements are only related to the actual timing measurements internally in the UE. They do not include the following:

- Inaccuracy in the start and stop conditions of a timer (e.g. UE reaction time to detect that start and stop conditions of a timer is fulfilled), or
- Inaccuracies due to restrictions in observability of start and stop conditions of a UE timer (e.g. TTI alignment when UE sends messages at timer expiry).

Table 7.2.2-1

Timer value [s]	Accuracy
timer value < 4	± 0.1s
timer value ≥ 4	± 2.5%

7.3 Timing Advance

7.3.1 Introduction

The timing advance is initiated from E-UTRAN with MAC message that implies and adjustment of the timing advance, see TS 36.321 [17] clause 5.2.

7.3.2 Requirements

7.3.2.1 Timing Advance adjustment delay

UE shall adjust the timing of its uplink transmission timing at sub-frame n+6 for a timing advance command received in sub-frame n.

7.3.2.2 Timing Advance adjustment accuracy

The UE shall adjust the timing of its transmissions with a relative accuracy better than or equal to ±4* T_S seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command is expressed in multiples of 16* T_S and is relative to the current uplink timing.

7.4 Cell phase synchronization accuracy (TDD)

7.4.1 Definition

Cell phase synchronization accuracy is defined as the maximum absolute deviation in frame start timing between any pair of cells on the same frequency that have overlapping coverage areas.

7.4.2 Minimum requirements

For Wide Area BS, the cell phase synchronization accuracy measured at BS antenna connectors shall be better than the requirement specified in table 7.4.2-1. If a cell's coverage area overlaps with another cell with different cell radius then the cell phase synchronization accuracy corresponding to the larger of the two cell sizes applies to the overlapping cells with different radii.

Table 7.4.2-1 Cell phase synchronization requirement for wide area BS (TDD)

Cell Type	Cell Radius	Requirement
Small cell	≤ 3 km	≤ 3 µs
Large cell	> 3 km	≤ 10 µs

For Home BS, the cell phase synchronization accuracy measured at BS antenna connectors shall be better than the requirement specified in table 7.4.2-2.

Table 7.4.2-2 Cell phase synchronization requirement for Home BS (TDD)

Source Cell Type	Propagation Distance	Requirement
Small cell	≤ 500 m	≤ 3 µs
Large cell	> 500 m	≤1.33 + $T_{propagation}$ µs

Note 1: $T_{propagation}$ is the propagation delay between the Home BS and the cell selected as the network listening synchronization source. In terms of the network listening synchronization source selection, the best accurate synchronization source to GNSS should be selected.

Note 2: If the Home BS obtains synchronization without using network listening, the small cell requirement applies.

7.5 Synchronization Requirements for E-UTRAN to 1xRTT and HRPD Handovers

7.5.1 Introduction

This clause contains the synchronization requirements for eNodeB capable of supporting E-UTRAN to CDMA 1xRTT and HRPD handovers. To facilitate E-UTRAN to CDMA 1xRTT and HRPD handovers, the CDMA System Time reference needs to be provided to the UE in order for the UE to report the pilot PN phases of the target 1xRTT or HRPD cells. This is achieved through the SIB8 message broadcasted by the serving eNodeB:

If the eNodeB is synchronized to the GPS time and the LTE system frame is aligned with the start of CDMA System Time, then the size of CDMA System Time information is 39 bits and the unit is 10 ms based on a 1.2288 Mcps chip rate.

If the eNodeB is not synchronized to the GPS time or if the eNodeB is synchronized to the GPS time but its LTE system frame not aligned with the start of CDMA System time, then the size of CDMA System Time information is 49 bits and the unit is 8 CDMA chips based on 1.2288 Mcps chip rate.

The CDMA system time reference provided by the serving eNodeB has to be within a certain level of accuracy in order to facilitate accurate reporting of the pilot PN phases of the target 1xRTT or HRPD cells and enable reliable handover to the 1xRTT or HRPD networks.

7.5.2 eNodeB Synchronization Requirements

7.5.2.1 Synchronized E-UTRAN

The eNodeB shall be synchronized to the GPS time. With external source of CDMA System Time disconnected, the eNodeB shall maintain the timing accuracy within ±10 μs of CDMA System Time for a period of not less than 8 hours.

The timing deviation between the SFN boundary at or immediately after the ending boundary of the SI-window in which *SystemInformationBlockType8* is transmitted and the broadcasted CDMA System Time shall be within 10 μs.

7.5.2.2 Non-Synchronized E-UTRAN

The timing deviation between the SFN boundary at or immediately after the end of the boundary of the SI-window in which *SystemInformationBlockType8* is transmitted and the broadcasted CDMA System Time shall be within 10 μs. With external source of CDMA System Time disconnected the SFN boundary at or immediately after the broadcasted CDMA System Time in the SIB8 message shall maintain the timing accuracy within ±10 μs of CDMA System Time for a period of not less than 8 hours.

7.6 Radio Link Monitoring

7.6.1 Introduction

The UE shall monitor the downlink link quality based on the cell-specific reference signal in order to detect the downlink radio link quality of the PCell and PSCell as specified in [3].

The UE shall estimate the downlink radio link quality and compare it to the thresholds Q_{out} and Q_{in} for the purpose of monitoring downlink radio link quality of the PCell and PSCell.

The threshold Q_{out} is defined as the level at which the downlink radio link cannot be reliably received and shall correspond to 10% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.6.1-1.

The threshold Q_{in} is defined as the level at which the downlink radio link quality can be significantly more reliably received than at Q_{out} and shall correspond to 2% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.6.1-2.

When higher-layer signalling indicates certain subframes for restricted radio link monitoring, the radio link quality shall be monitored as specified in [3].

The requirements in sections 7.6.2.1, 7.6.2.2 and 7.6.2.3 shall also apply when a time domain measurement resource restriction pattern for performing radio link monitoring measurements is configured by higher layers (TS 36.331 [2]), with or without CRS assistance information, provided that also the following additional condition is fulfilled:

> The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the radio link monitoring measurements,
>
> When the CRS assistance information is provided, the transmission bandwidth [30] in all intra-frequency cells in the CRS assistance information [2] is the same or larger than the transmission bandwidth of the PCell for which radio link monitoring is performed.

When the CRS assistance information is provided, the requirements in Section 7.6 shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the cell for which radio link monitoring is performed.

NOTE: If the UE is not provided with the CRS assistance information (TS 36.331 [2]) or the CRS assistance data is not valid throughout the entire evaluation period, then similar Release 8 and 9 requirements apply for time domain measurements restriction under colliding CRS with ABS configured in non-MBSFN subframes.

Table 7.6.1-1 PDCCH/PCFICH transmission parameters for out-of-sync

Attribute	Value
DCI format	1A
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz 3; 3 MHz ≤ Bandwidth ≤ 10 MHz 4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4; Bandwidth = 1.4 MHz 8; Bandwidth ≥ 3 MHz
Ratio of PDCCH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell or PSCell. 1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell or PSCell.
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell or PSCell. 1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell or PSCell.
Note 1: DCI format 1A is defined in clause 5.3.3.1.3 in TS 36.212 [21]. Note 2: A hypothetical PCFICH transmission corresponding to the number of control symbols shall be assumed.	

Table 7.6.1-2 PDCCH/PCFICH transmission parameters for in-sync

Attribute	Value
DCI format	1C
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz 3; 3 MHz ≤ Bandwidth ≤ 10 MHz 4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4
Ratio of PDCCH RE energy to average RS RE energy	0 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell or PSCell. -3 dB; when two or four antenna ports are used for cell-specific reference signal transmission by the PCell or PSCell.
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell or PSCell. 1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell or PSCell.
Note 1: DCI format 1C is defined in clause 5.3.3.1.4 in TS 36.212 [21]. Note 2: A hypothetical PCFICH transmission corresponding to the number of control symbols shall be assumed.	

7.6.2 Requirements

7.6.2.1 Minimum requirement when no DRX is used

When the downlink radio link quality of the PCell or PSCell estimated over the last 200 ms period becomes worse than the threshold Q_{out}, Layer 1 of the UE shall send an out-of-sync indication for the PCell or PSCell to the higher layers within 200 ms Q_{out} evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell or PSCell estimated over the last 100 ms period becomes better than the threshold Q_{in}, Layer 1 of the UE shall send an in-sync indication for the PCell or PSCell to the higher layers within 100 ms Q_{in} evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

When the UE creates autonomous gaps for identification the CGI of an E-UTRA intra-frequency cell or an E-UTRA inter-frequency cell and when higher-layer signalling indicates certain subframes for restricted radio link monitoring, the UE shall also perform radio link monitoring. In this case, the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out}$) is 200 ms, and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in}$) is 100 ms [Note 1].

Note 1: This RLM requirement does not need to be tested.

The out-of-sync and in-sync evaluations of the PCell or PSCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least 10 ms.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer and the transmitter power of PSCell if configured shall be turned off within 40 ms after expiry of T313 timer as specified in clause 5.3.11 in TS 36.331 [2].

7.6.2.2 Minimum requirement when DRX is used

When DRX is used the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out\_DRX}$) and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in\_DRX}$) specified in Table 7.6.2.2-1 will be used.

When higher-layer signalling indicates certain subframes for restricted radio link monitoring, the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out\_DRX}$) and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in\_DRX}$) specified in Table 7.6.2.2-2 will be used.

When eDRX_CONN cycle is used, the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out\_DRX}$) and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in\_DRX}$) specified in Table 7.6.2.2-3 will be used.

When the UE creates autonomous gaps for identification the CGI of an E-UTRA intra-frequency cell or an E-UTRA inter-frequency cell and when higher-layer signalling indicates certain subframes for restricted radio link monitoring, the UE shall also perform radio link monitoring. In this case, the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out\_DRX}$) and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in\_DRX}$) specified in Table 7.6.2.2-2 will be used [Note 1].

Note 1: This RLM requirement does not need to be tested.

When the downlink radio link quality of the PCell or PSCell estimated over the last $T_{Evaluate\_}Q_{out\_DRX}$ [s] period becomes worse than the threshold Q_{out}, Layer 1 of the UE shall send out-of-sync indication for the PCell or PSCell to the higher layers within $T_{Evaluate\_}Q_{out\_DRX}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell or PSCell estimated over the last $T_{Evaluate\_}Q_{in\_DRX}$ [s] period becomes better than the threshold Q_{in}, Layer 1 of the UE shall send in-sync indications for the PCell or PSCell to the higher layers within $T_{Evaluate\_}Q_{in\_DRX}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell or PSCell shall be performed as specified in clause 4.2.1 in [3]. When DRX is used, two successive indications from Layer 1 shall be separated by at least max(10 ms, DRX_cycle_length). When the UE is configured with dual connectivity, then two successive indications from Layer 1 shall be separated by at least max(10 ms, MCG_DRX_cycle_length) for PCell and by at least max(10 ms, SCG_DRX_cycle_length) for PSCell. When eDRX_CONN is used, two successive indications from Layer 1 shall be separated by at least max(10 ms, eDRX_CONN cycle length).

Upon start of T310 timer or T313 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link of PCell or PSCell for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer or T313 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer and the transmitter power of PSCell if configured shall be turned off within 40 ms after expiry of T313 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.6.2.2-1: Q_{out} and Q_{in} Evaluation Period in DRX

DRX cycle length (s)	$T_{Evaluate\_Qout\_DRX}$ and $T_{Evaluate\_Qin\_DRX}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in clause 7.6.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note 1 (20)
0.04 < DRX cycle ≤ 0. 64	Note 1 (10)
0.64 < DRX cycle ≤ 2.56	Note 1 (5)
Note 1: Evaluation period length in time depends on the length of the DRX cycle in use Note 2: MCG's DRX configuration is applied for PCell RLM evaluation and SCG's DRX configuration is applied for PSCell RLM evaluation	

Table 7.6.2.2-2: Q_{out} and Q_{in} Evaluation Period in DRX when higher-layer signalling restricted measurement resource

DRX cycle length (s)	$T_{Evaluate\_Qout\_DRX}$ and $T_{Evaluate\_Qin\_DRX}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in clause 7.6.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note 1 (40)
0.04 < DRX cycle ≤ 0. 16	Note 1 (20)
0. 16 < DRX cycle ≤ 0.64	Note 1 (10)
0.64 < DRX cycle ≤ 2.56	Note 1 (5)
Note 1: Evaluation period length in time depends on the length of the DRX cycle in use Note 2: MCG's DRX configuration is applied for PCell RLM evaluation and SCG's DRX configuration is applied for PSCell RLM evaluation	

Table 7.6.2.2-3: Q_{out} and Q_{in} Evaluation Period when eDRX_CONN cycle is configured

eDRX_CONN cycle length [s]	$T_{Evaluate\_Qout\_DRX}$ and $T_{Evaluate\_Qin\_DRX}$ [s] (eDRX_CONN cycles)
2.56 < eDRX_CONN cycle ≤ 10.24	Note (5)
Note: Evaluation period length in time depends on the length of the eDRX_CONN cycle in use	

7.6.2.3 Minimum requirement at transitions

When the UE transitions between any two of DRX, eDRX_CONN and non-DRX or when DRX or eDRX_CONN cycle periodicity changes, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the PCell and PSCell.

7.6.2.4 Minimum requirement during SI Acquisition with autonomous gaps

For E-UTRAN FDD-UTRAN FDD measurements with autonomous gaps, for identification of the CGI of a UTRA FDD cell (clause 8.1.2.4.17), the UE shall also perform radio link monitoring. In this case the out-of sync and in-sync evaluation periods can be longer than those defined in sections 7.6.2.1-7.6.2.3.

For E-UTRAN TDD-UTRAN FDD measurements with autonomous gaps, for identification of the CGI of a UTRA FDD cell (clause 8.1.2.4.18), the UE shall also perform radio link monitoring. In this case the out-of sync and in-sync evaluation periods can be longer than those defined in sections 7.6.2.1-7.6.2.3.

7.6.2.5 Minimum requirement under IDC Interference

When the UE is provided with IDC solution, the UE shall also perform radio link monitoring and meet the corresponding requirements in clause 7.6.2.

7.7 SCell Activation and Deactivation Delay for E-UTRA Carrier Aggregation

7.7.1 Introduction

This section defines requirements for the delay within which the UE shall be able to activate a deactivated SCell and deactive an activated SCell in E-UTRA carrier aggregation. The requirements are applicable to an E-UTRA carrier aggregation capable UE which has been configured with up to four downlink SCells.

If multiple downlink SCells are activated or deactivated in the same MAC control element as defined in [17], the requirements shall apply to each of the SCells in the MAC control element.

7.7.2 SCell Activation Delay Requirement for Deactivated SCell

The requirements in this section shall apply for the UE configured with one downlink SCell. The requirements in this section are applicable for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

The delay within which the UE shall be able to activate the deactivated SCell depends upon the specified conditions.

Upon receiving SCell activation command in subframe *n*, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command as specified in [17] for the SCell being activated no later than in subframe *n*+24 provided the following conditions are met for the SCell:

- During the period equal to max(5 measCycleSCell, 5 DRX cycles) before the reception of the SCell activation command:
    - the UE has sent a valid measurement report for the SCell being activated and
    - the SCell being activated remains detectable according to the cell identification conditions specified in section 8.3.3.2,
- SCell being activated also remains detectable during the SCell activation delay according to the cell identification conditions specified in section 8.3.3.2.

Otherwise upon receiving the SCell activation command in subframe *n*, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command as specified in [17] for the SCell being activated no later than in subframe *n*+34 provided the SCell can be successfully detected on the first attempt.

If there is no reference signal received for the CSI measurement over the delay corresponding to the minimum requirements specified above, then the UE shall report corresponding valid CSI for the activated SCell on the next available uplink reporting resource after receiving the reference signal.

If there are no uplink resources for reporting the valid CSI in subframe *n*+24 or *n*+34 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

The valid CSI is based on the UE measurement and corresponds to any CQI value specified in [3] with the exception of CQI index = 0 (out of range) provided:

- the conditions in section 7.7 are met over the entire SCell activation delay and
- the conditions for CQI reporting defined in Section 7.2.3 of [3] are met.

In addition to CSI reporting defined above, UE shall also apply other actions related to the activation command specified in [17] for an SCell at the first opportunities for the corresponding actions once the SCell is activated.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n+9* when PCell belongs to E-UTRA FDD.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n+11* when PCell belongs to E-UTRA TDD.

Starting from the subframe specified in section 4.3 of [3] and until the UE has completed the SCell activation, the UE shall report CQI index = 0 (out of range) if the UE has available uplink resources to report CQI for the SCell.

7.7.3 SCell Deactivation Delay Requirement for Activated SCell

The requirements in this section shall apply for the UE configured with one downlink SCell. The requirements in this section are applicable for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

Upon receiving SCell deactivation command or upon expiry of the *sCellDeactivationTimer* in subframe *n*, the UE shall accomplish the deactivation actions specified in [17] for the SCell being deactivated no later than in subframe *n+8*.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n*+9 when PCell belongs to E-UTRA FDD.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n+11* when PCell belongs to E-UTRA TDD.

7.7.4 SCell Activation Delay Requirement for Deactivated SCell with Muliple Downlnk SCells

The requirements in this section shall apply for the UE configured with up to four downlink SCells. The requirements in this section are applicable for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

While activating a SCell if the UE does not receive any command to activate, deactivate, configure or deconfigure any other SCell during the SCell activation delay then the UE shall meet the SCell activation delay requirements specified in section 7.7.2.

While activating a SCell if any other SCell is activated, deactivated, configured or deconfigured by the UE then the UE shall meet the SCell activation delay requirements ($T_{activate\_total}$) according to the following expression:

$$T_{activate\_total} = T_{activate\_basic} + 5 \times \sum_{i=1}^{N-1} K_i$$

Where:

$T_{activate\_total}$ is the total time to activate a SCell and is expressed in subframes.

$T_{activate\_basic}$ is the SCell activation delay specified in section 7.7.2;

K_i ($0 \leq K_i \leq [3]$) is the number of times the other i^{th} SCell is activated, deactivated, configured or deconfigured while the SCell is being activated.

N ($2 \leq N \leq 4$) is the maximum number of SCells supported by the UE.

While activating a SCell:

- The interruption on the PCell and/or on the activated SCell due to the SCell activation specified in section 7.8.2 shall not occur before subframe *n*+5 and not occur after subframe *n*+11 if:
  - the PCell and/or the activated SCell being interrupted and the SCell being activated belong to E-UTRA TDD, or
  - the activated SCell being interrupted and the SCell being activated belong to E-UTRA FDD and the PCell belongs to E-UTRA TDD.
- Otherwise, the interruption on PCell and/or on the activated SCell due to the SCell activation specified in section 7.8.2 shall not occur before subframe *n*+5 and not occur after subframe *n*+9.

Starting from the subframe specified in section 4.3 of [3] and until the UE has completed the SCell activation, the UE shall report CQI index = 0 (out of range) if the UE has available uplink resources to report CQI for an SCell.

7.7.5 SCell Deactivation Delay Requirement for Activated SCell with Multiple Downlink SCells

The requirements in this section shall apply for the UE configured with up to four downlink SCells. The requirements in this section are applicable for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

The UE shall deactivate a SCell and meet the SCell deactivation delay requirements specified in section 7.7.3 regardless of whether any other SCell is activated, deactivated, configured or deconfigured or not by the UE during the SCell deactivation delay.

While deactivating a SCell:

- The interruption on the PCell and/or on the activated SCell due to the SCell deactivation specified in section 7.8.2 shall not occur before subframe *n*+5 and not occur after subframe *n*+11 if:
    - the PCell and/or the activated SCell being interrupted and the SCell being deactivated belong to E-UTRA TDD or
    - the activated SCell being interrupted and the SCell being deactivated belong to E-UTRA FDD and the PCell belongs to E-UTRA TDD.
- Otherwise, the interruption on PCell and/or the activated SCell due to the SCell deactivation specified in section 7.8.2 shall not occur before subframe *n*+5 and not occur after subframe *n*+9.

7.7.6 SCell Activation Delay Requirement for Deactivated PUCCH SCell

The requirements in this section shall apply for the UE configured with one downlink SCell and when PUCCH is configured for the SCell being activated.

If the UE has a valid TA for transmitting on an SCell then the UE shall be able to transmit valid CSI report and apply actions related to the SCell activation command as specified in [17] for the SCell being activated on the PUCCH SCell no later than in subframe n+$T_{activate\_basic}$:

Where:

- A TA is considered to be valid provided that the *TimeAlignmentTimer* [2] assocated with the TAG containing the PUCCH SCell is running.
- $T_{activate\_basic}$ is the SCell activation delay as defined in section 7.7.2.

If the UE does not have a valid TA for transmitting on an SCell then the UE shall be capable to perform downlink actions related to the SCell activation command as specified in [17] for the SCell being activated on the PUCCH SCell no later than in subframe n+$T_{activate\_basic}$ and shall be capable to perform uplink actions related to the SCell activation command as specified in [17] for the SCell being activated on the PUCCH SCell no later than in subframe n+$T_{delay\_PUCCH\ SCell}$ and shall transmit valid CSI report for the SCell being activated on the PUCCH SCell no later than in subframe n+$T_{delay\_PUCCH\ SCell}$, where:

$$T_{delay\_PUCCH\ SCell} = T_{activate\_basic} + T_1 + T_2 + T_3$$

Where:

- T_1 is the delay uncertainty in acquiring the first available PRACH occasion in the PUCCH SCell. T1 is up to 25 subframes and the actual value of T_1 shall depend upon the PRACH configuration used in the PUCCH SCell.
- T_2 is the delay for obtaining a valid TA command for the sTAG to which the SCell configured with PUCCH belongs. T_2 is up to 13 subframes.
- T_3 is the delay for applying the received TA for upling transmission. T_3 is 6 subframes.

The above delay requirement ($T_{delay\_PUCCH\ SCell}$) shall apply provided that:

- The UE has received a PDCCH order to initiate RA procedure on the PUCCH SCell within $T_{activate\_basic}$ otherwise additional delay to activate the SCell is expected; and

- The RA on PUCCH SCell is not interrupted by the RA on PCell otherwise additional delay to activate the SCell is expected.

The interruption on the PCell specified in section 7.8.2 shall meed all applicable requirements in clause 7.7.2.

7.7.7 SCell Activation Delay Requirement for Deactivated PUCCH SCell with Multiple SCells

The requirements in this section shall apply for the UE configured with up to four downlink SCells and when PUCCH is configured for the SCell being activated.

If the UE has a valid TA for transmitting on a PUCCH SCell then the UE shall be able to transmit valid CSI report and apply actions related to the SCell activation command as specified in [17] for the SCell being activated on the PUCCH SCell no later than in subframe $n+ T_{activate\_total}$:

Where:

- A TA is considered to be valid provided that the *TimeAlignmentTimer* [2] assocated with the TAG containing the PUCCH SCell is running.

- $T_{activate\_total}$ is the SCell activation delay as defined in section 7.7.4.

If the UE does not have a valid TA for transmitting on an SCell then the UE shall be capable to perform downlink actions related to the SCell activation command as specified in [17] for the SCell being activated on the PUCCH SCell no later than in subframe $n+T_{activate\_basic}$ and shall be capable to perform uplink actions related to the SCell activation command as specified in [17] for the SCell being activated on the PUCCH SCell no later than in subframe $n+T_{delay\_PUCCH\_multiple\_SCells}$ and shall transmit valid CSI report for the SCell being activated on the PUCCH SCell no later than in subframe $n+T_{delay\_PUCCH\_multiple\_SCells}$, where:

$$T_{delay\_PUCCH\ multiple\_SCells} = T_{activate\_total} + T_1 + T_2 + T_3$$

Where:

- T_1, T_2 and T_3 are defined in section 7.7.6

The above delay requirement ($T_{delay\_PUCCH\ \_multiple\_SCells}$) shall apply provided that:

- The UE has received a PDCCH order to initiate RA procedure on the PUCCH SCell within $T_{activate\_basic}$ otherwise additional delay to activate the SCell is expected; and

- The RA on PUCCH SCell is not interrupted by the RA on PCell otherwise additional delay to activate the SCell is expected.

The interruption on the PCell and/or on the activated SCell specified in section 7.8.2 shall meed all applicable requirements in clause 7.7.4.

7.7.8 SCell Deactivation Delay Requirement for Activated PUCCH SCell

The requirements in this section shall apply for the UE configured with one downlink SCell and when PUCCH is configured for the SCell being activated.

The UE shall deactivate a SCell configured with PUCCH and meet the SCell deactivation delay requirements specified in section 7.7.3.

The interruption on the PCell specified in section 7.8.2 shall meed all applicable requirements in clause 7.7.3.

7.7.9 SCell Deactivation Delay Requirement for Activated PUCCH SCell with Multiple SCells

The requirements in this section shall apply for the UE configured with up to four downlink SCells and when PUCCH is configured for the SCell being deactivated.

The UE shall deactivate a SCell configured with PUCCH and meet the SCell deactivation delay requirements specified in section 7.7.5.

The interruption on the PCell and/or on the activated SCell specified in section 7.8.2 shall meed all applicable requirements in clause 7.7.5.

7.7.10 SCell Activation Delay Requirement for Deactivated SCell under Frame Structure 3

The requirements in this section shall apply for E-UTRA carrier aggregation of one FDD PCell or one TDD PCell and one SCell following the frame structure type 3 [16].

The delay within which the UE shall be able to activate the deactivated SCell depends upon the specified conditions.

Upon receiving SCell activation command in subframe *n*, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command as specified in [17] for the SCell being activated no later than in subframe $n+T_{activate\_basic\_FS3}$, provided the following conditions are met for the SCell:

- During the period equal to max(5 measCycleSCell, 5 DRX cycles) before the reception of the SCell activation command:
  - the UE has sent a valid measurement report for the SCell being activated and
  - the SCell being activated remains detectable according to the cell identification conditions specified in section 8.3.3.2,
- SCell being activated also remains detectable during the SCell activation delay according to the cell identification conditions specified in section 8.3.3.2.

$T_{activate\_basic\_FS3}$ = 16 ms + $T_{DMTC\_duration}$ + $(L+2) * T_{DMTC\_periodicity}$, where

$T_{DMTC\_duration}$ =6 ms is the DMTC duration [2],

$T_{DMTC\_periodicity}$ is the periodicity of the DMTC [2],

Otherwise upon receiving the SCell activation command in subframe *n*, the UE shall be capable to transmit a valid CSI report and apply actions related to the activation command as specified in [17] for the SCell being activated no later than in subframe $n+T_{activate\_basic\_FS3}$, provided the SCell can be successfully detected on the first attempt. In this case, Tactivate_basic_FS3 is defined as follows.

$T_{activate\_basic\_FS3}$ = 16 ms + $T_{DMTC\_duration}$ + $(L+3) * T_{DMTC\_periodicity}$, where

$T_{DMTC\_duration}$ =6 ms is the DMTC duration [2],

$T_{DMTC\_periodicity}$ is the periodicity of the DMTC [2],

L is the number of times the discovery signal occasion is not available at the UE during the SCell activation time.

If there is no reference signal received for the CSI measurement over the delay corresponding to the minimum requirements specified above, then the UE shall report corresponding valid CSI for the activated SCell on the next available uplink reporting resource after receiving the reference signal.

If there are no uplink resources for reporting the valid CSI in subframe $n+ T_{activate\_basic\_FS3}$ then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

The valid CSI is based on the UE measurement and corresponds to any CQI value specified in [3] with the exception of CQI index = 0 (out of range) provided:

- the conditions in section 7.7 are met over the entire SCell activation delay and
- the conditions for CQI reporting defined in Section 7.2.3 of [3] are met.

In addition to CSI reporting defined above, UE shall also apply other actions related to the activation command specified in [17] for an SCell at the first opportunities for the corresponding actions once the SCell is activated.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n+9* when PCell belongs to E-UTRA FDD.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n+11* when PCell belongs to E-UTRA TDD.

Starting from the subframe specified in Section 4.3 of [3] and until the UE has completed the SCell activation, the UE shall send CSI with CQI index = 0 (out of range) if the UE has available uplink resources to report for the SCell.

7.7.11 SCell Deactivation Delay Requirement for Activated SCell under Frame Structure 3

The requirements in this section shall apply for the UE configured with one downlink SCell. The requirements in this section shall apply for E-UTRA carrier aggregation of one FDD PCell or one TDD PCell and the SCell following the frame structure type 3 [16].

Upon receiving SCell deactivation command or upon expiry of the *sCellDeactivationTimer* in subframe *n*, the UE shall accomplish the deactivation actions specified in [17] for the SCell being deactivated no later than in subframe *n+8*.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n*+9 when PCell belongs to E-UTRA FDD.

The PCell interruption specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n+11* when PCell belongs to E-UTRA TDD.

7.7.12 SCell Activation Delay Requirement for Deactivated SCell with Multiple Downlink SCells under Frame Structure 3

The requirements in this section shall apply for the UE configured with two or three downlink SCells. The requirements in this section shall apply for E-UTRA carrier aggregation of one FDD PCell or one TDD PCell and all the SCells following the frame structure type 3 [16].

While activating a SCell, if any other SCell is activated, deactivated, configured or deconfigured by the UE, the UE shall meet the SCell activation delay requirements ($T_{activate\_total\_FS3}$) according to the following expression:

$$T_{activate\_total\_FS3} = T_{activate\_basic\_FS3} + T_{DMTC\_periodicity} \times \sum_{i=1}^{N-1} K_i$$

where

$T_{activate\_total\_FS3}$ is the total time to activate a SCell and is expressed in subframes,

$T_{activate\_basic\_FS3\_}$ is the SCell activation delay for the SCell, as specified in section 7.7.10,

$T_{DMTC\_periodicity}$ is the periodicity of the DMTC [2],

K_i ($0 \le K_i \le$ [3]) is the number of times the other i^{th} SCell is activated, deactivated, configured or deconfigured while the SCell is being activated,

N (2≤N≤3) is the maximum number of SCells supported by the UE.

While activating a SCell:

- The interruption on the PCell and/or on the activated SCell specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n*+9 when PCell belongs to E-UTRA FDD.
- The interruption on the PCell and/or on the activated SCell specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n+11* when PCell belongs to E-UTRA TDD.

Starting from the subframe specified in section 4.3 of [3] and until the UE has completed the SCell activation, the UE shall send CSI with CQI index = 0 (out of range) if the UE has available uplink resources to report for the SCell being activated.

7.7.13 SCell Deactivation Delay Requirement for Activated SCell with Multiple Downlink SCells under Frame Structure 3

The requirements in this section shall apply for the UE configured with two or three downlink SCells. The requirements in this section shall apply for E-UTRA carrier aggregation of one FDD PCell or one TDD PCell and all the SCells following the frame structure type 3 [16].

The UE shall deactivate a SCell and meet the SCell deactivation delay requirements specified in section 7.7.11 regardless of whether any other SCell is activated, deactivated, configured or deconfigured or not by the UE during the SCell deactivation delay.

While deactivating a SCell:

- The interruption on the PCell and/or on the activated SCell specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n*+9 when PCell belongs to E-UTRA FDD.

- The interruption on the PCell and/or on the activated SCell specified in section 7.8.2 shall not occur before subframe n+5 and not occur after subframe *n+11* when PCell belongs to E-UTRA TDD.

7.8 Interruptions with Carrier Aggregation

7.8.1 Introduction

This section contains the requirements related to the interruptions on PCell and activated SCell if configured, when up to four SCells are configured, deconfigured, activated or deactivated. The respective requirements in Section 7.8 shall apply for:

- E-UTRA FDD CA,
- E-UTRA TDD CA,
- E-UTRA TDD-FDD CA,
- inter-band CA where PCell is FDD or TDD and all the SCells are following the frame structure type 3 [16].

Note: interruptions at SCell addition/release, activation/deactivation and during measurements on SCC may not be required by all UEs.

Editor's Note: The interruptions shall not interrupt RRC signalling or ACK/NACKs related to RRC reconfiguration procedure [2] for SCell addition/release or MAC control signalling [17] for SCell activation/deactivation command. How to specify this is FFS.

7.8.2 Requirements

7.8.2.1 Interruptions at SCell addition/release for intra-band CA

When an intra-band SCell is added or released as defined in [2] the UE is allowed an interruption of up to 5 subframes on PCell during the RRC reconfiguration procedure [2]. This interruption is for both uplink and downlink of PCell.

7.8.2.2 Interruptions at SCell addition/release for inter-band CA

When an inter-band SCell is added or released as defined in [2] the UE that requires interruption is allowed an interruption of up to 1 subframe on PCell during the RRC reconfiguration procedure [2]. This interruption is for both uplink and downlink of PCell.

7.8.2.3 Interruptions at SCell activation/deactivation for intra-band CA

When an intra-band SCell is activated or deactivated as defined in [17] the UE is allowed an interruption of up to 5 subframes on PCell during the activation/deactivation delay defined in Section 7.7. This interruption is for both uplink and downlink of PCell.

7.8.2.4 Interruptions at SCell activation/deactivation for inter-band CA

When an inter-band SCell is activated or deactivated as defined in [17] the UE that requires interruption is allowed an interruption of up to 1 subframe on PCell during the activation/deactivation delay defined in Section 7.7. This interruption is for both uplink and downlink of PCell.

7.8.2.5 Interruptions during measurements on SCC for intra-band CA

PCell interruptions due to measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer.

If indicated by the network using IE *allowInterruptions* [2], PCell interruptions due to measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2].

Each interruption shall not exceed 5 subframes.

7.8.2.6 Interruptions during measurements on SCC for inter-band CA

PCell interruptions due to measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer.

If indicated by the network using IE *allowInterruptions* [2], PCell interruptions due to measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2].

Each interruption shall not exceed 1 subframe.

7.8.2.7 Interruptions at SCell addition/release with multiple downlink SCells

When any number of SCells between one and four is added or released using the same *RRCConnectionReconfiguration* message as defined in [2], the UE is allowed an interruption on PCell and on any activated SCell during the RRC reconfiguration procedure as follows:

- an interruption on PCell:
  - of up to 1 subframe, if the PCell is not in the same band as any of the SCells being added or released, or
  - of up to 5 subframes, if the PCell is in the same band as any of the SCells being added or released;
- an interruption on any activated SCell:
  - of up to 1 subframe, if the activated SCell is not in the same band as any of the SCells being added or released, or
  - of up to 5 subframes, if the activated SCell is in the same band as any of the SCells being added or released.

7.8.2.8 Interruptions at SCell activation/deactivation with multiple downlink SCells

When any number of SCells between one and four is activated or deactivated using the same MAC control element as defined in [17], the UE is allowed an interruption on PCell and on any activated SCell during the SCell activation/deactivation procedure [17] as follows:

- an interruption on PCell:
  - of up to 1 subframe, if the PCell is not in the same band as any of the SCells being activated or deactivated, or
  - of up to 5 subframes, if the PCell is in the same band as any of the SCells being activated or deactivated;
- an interruption on any activated SCell:
  - of up to 1 subframe, if the activated SCell is not in the same band as any of the SCells being activated or deactivated, or

- of up to 5 subframes, if the activated SCell is in the same band as any of the SCells being activated or deactivated.

7.8.2.9 Interruptions during measurements on SCC with multiple downlink SCells

If one SCell is deactivated, the UE is allowed due to measurements on the SCC with deactivated SCell:

- an interruption on PCell with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] for the deactivated SCell is 640 ms or longer.
- an interruption on PCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the deactivated SCell if indicated by the network using IE *allowInterruptions* [2],

  Each interruption shall not exceed:

  - 1 subframes if the PCell is not in the same band as the deactivated SCell
  - 5 subframes if the PCell is in the same band as the deactivated SCell

- an interruption on any activated SCell with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] for the deactivated SCell is 640 ms or longer .
- an interruption on any activated SCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the deactivated SCell if indicated by the network using IE *allowInterruptions* [2].

  Each interruption shall not exceed:

  - 1 subframes if the activated SCell is not in the same band as the deactivated SCell
  - 5 subframes if the activated SCell is in the same band as the deactivated SCell

If two, three, or four SCells are deactivated, the UE is allowed due to measurements on the SCCs with deactivated SCells:

- an interruption on PCell with up to 0.5% probability of missed ACK/NACK when any of the configured *measCycleSCell* [2] for the deactivated SCells is 640 ms or longer.
- an interruption on PCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the deactivated SCells if indicated by the network using IE *allowInterruptions* [2].
- an interruption on an activated SCell with up to 0.5% probability of missed ACK/NACK when any of the configured *measCycleSCell* [2] for the deactivated SCells is 640 ms or longer.
- an interruption on an activated SCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the deactivated SCells if indicated by the network using IE *allowInterruptions* [2].

  Each interruption on the PCell shall not exceed:

  - 1 subframes if the PCell is not in the same band as any of the deactivated SCells
  - 5 subframes if the PCell is in the same band as any of the deactivated SCells

  Each interruption on the activated Cell shall not exceed:

  - 1 subframe if the activated SCell is not in the same band as any of the deactivated SCells
  - 5 subframes if the the activated SCell is in the same band as any of the deactivated SCells

7.8.2.10 Interruptions at overlapping addition/release/activation/deactivation of SCells

If a UE is commanded by the network to sequentially add/release/activate/deactivate SCells, and a new procedure of addition/release/activation/deactivation of SCell(s) takes place before the completion of previous procedure of addition/release/activation/deactivation of SCell(s), the interruptions on PCell due to sequential addition/release/activation/deactivation of SCells shall not exceed the sum of the allowed interruptions on the PCell caused by each of the addition/release/activation/deactivation procedures, and the interruptions on already activated SCell due to sequential addition/release/activation/deactivation of SCells shall not exceed the sum of the allowed interruptions on the SCell caused by each of the addition/release/activation/deactivation procedures, as defined in above sections.

7.8.2.11 Interruptions during RSSI measurements on one SCC under Frame Structure 3

The requirements in this section apply for inter-band CA where PCell belongs to FDD or TDD and all the configured SCells belong to the frame structure type 3 [16], and the UE is configured with one SCell.

PCell interruptions due to RSSI measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when any of the configured *rmtc-Period* [2] and *measCycleSCell* [2] is 640 ms or longer.

Each allowed interruption on the PCell shall not exceed 1 subframe.

7.8.2.12 Interruptions during RSSI measurements on multiple SCCs under Frame Structure 3

The requirements in this section apply for inter-band CA where PCell belongs to FDD or TDD and all the configured SCells belong to the frame structure type 3 [16], and the UE is configured with up to four SCells.

If one SCell is deactivated,

- the UE is allowed due to RSSI measurements on the SCC with deactivated SCell:

  - an interruption on PCell with up to 0.5% probability of missed ACK/NACK when any of the configured *rmtc-Period* [2] and the configured *measCycleSCell* [2] for the deactivated SCell is 640 ms or longer,

  - an interruption on any activated SCell with up to 0.5% probability of missed ACK/NACK when any of the configured *rmtc-Period* [2] and the configured *measCycleSCell* [2] for the deactivated SCell is 640 ms or longer.

- no interruption is allowed if both of the configured *rmtc-Period* [2] and the configured *measCycleSCell* [2] for the deactivated SCell are below 640 ms.

If two, three, or four SCells are deactivated,

- the UE is allowed due to RSSI measurements on the SCCs with deactivated SCells:

  - an interruption on PCell with up to 0.5% probability of missed ACK/NACK when:

    any of the configured *rmtc-Period* [2] and the configured *measCycleSCell* [2] for the deactivated SCells is 640 ms or longer, or

    RSSI windows with the length of *measDuration* [2] for at least some of the SCCs with the deactivated SCells within their respective *rmtc-Period* [2] are not within [20] ms;

  - an interruption on an activated SCell with up to 0.5% probability of missed ACK/NACK when:

    any of the configured *rmtc-Period* [2] and the configured and the configured *measCycleSCell* [2] for the deactivated SCells is 640 ms or longer, or

    RSSI windows with the length of *measDuration* [2] for at least some of the SCCs with the deactivated SCells within their respective *rmtc-Period* [2] are not within [20] ms.

- no interruption is allowed if both of the configured *rmtc-Period* [2] and the configured *measCycleSCell* [2] for the deactivated SCell are below 640 ms and RSSI windows with the length of *measDuration* [2] for all the SCCs with the deactivated SCells within their respective *rmtc-Period* [2] are within [20] ms.

Each allowed interruption shall not exceed:

- 1 subframe on the PCell, and
- 5 subframes on the activated SCell.

7.9 Maximum Transmission Timing Difference in Carrier Aggregation

7.9.1 Introduction

A UE shall be capable of handling a relative received time difference between the PCell and SCell to be aggregated in inter-band CA and intra-band non-contiguous CA.

7.9.2 Minimum Requirements for Interband Carrier Aggregation

The UE shall be capable of handling at least a relative received time difference between the signals received from the PCell and the SCell at the UE receiver of up to 30.26 µs when one SCell is configured.

When two, three, or four SCells are configured, the UE shall be capable of handling at least a relative propagation delay difference between the signals received from any pair of the serving cells (PCell and the SCells) at the UE receiver of up to 30.26 µs.

The UE shall be capable of handling a maximum uplink transmission timing difference between the pTAG and the sTAG of at least 32.47µs provided that the UE is:

- configured with inter-band CA and
- configured with the pTAG and the sTAG,

A UE configured with pTAG and sTAG may stop transmitting on the SCell if after timing adjusting due to received TA command the uplink transmission timing difference between PCell and SCell exceeds the maximum value the UE can handle as specified above.

The UE shall be capable of handling a maximum uplink transmission timing difference between the pTAG and any of the two sTAGs or between the two sTAGs of at least 32.47µs provided that the UE is:

- configured with inter-band CA and
- configured with the two sTAGs,

A UE configured with two sTAGs may stop transmitting on the SCell if after timing adjusting due to received TA command the uplink transmission timing difference between SCell in one sTAG and SCell in other sTAG exceeds the maximum value the UE can handle as specified above.

7.9.3 Minimum Requirements for Intraband non-contiguous Carrier Aggregation

The UE shall be capable of handling at least a relative received time difference between the signals received from the PCell and the SCell at the UE receiver of up to 30.26 µs.

The UE shall be capable of handling a maximum uplink transmission timing difference between the pTAG and the sTAG of at least 32.47µs provided that the UE is:

- configured with intra-band non-contiguous CA and
- configured with the pTAG and the sTAG,

A UE configured with pTAG and sTAG may stop transmitting on the SCell if after timing adjusting due to received TA command the uplink transmission timing difference between PCell and SCell exceeds the maximum value the UE can handle as specified above.

7.9.4 Minimum Requirements for Inter-Band Carrier Aggregation under Frame Structure 3

The requirements in this section shall apply for E-UTRA inter-band carrier aggregation of one FDD PCell or one TDD PCell and the SCell(s) following the frame structure type 3 [16].

The UE shall be capable of handling at least a relative received time difference between the signals received from the PCell and the SCell at the UE receiver of up to 30.26 μs when one SCell is configured.

When two or three SCells are configured, the UE shall be capable of handling at least a relative propagation delay difference between the signals received from any pair of the serving cells (PCell and the SCells) at the UE receiver of up to 30.26 μs.

7.10 Interruptions with RSTD Measurements with Carrier Aggregation

7.10.1 Introduction

This section contains the requirements related to the interruptions on PCell and activated SCell if configured, when performing RSTD measurements on cells belonging to at least one SCC with deactivated SCell.

Note: Interruptions during RSTD measurements on PCell and activated SCell if configured may not be required by all UEs.

7.10.2 Requirements

When common DRX is used, no interruption is allowed for all carrier aggregation configurations while the On Duration timer is running.

The interruption requirement considers only missed ACK/NACK due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

7.10.2.1 Interruptions during RSTD measurements on SCC for intra-band CA with one downlink SCell

PCell interruptions due to RSTD measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the the PRS periodicity T_{PRS} is 640 ms or longer. Each interruption shall not exceed 5 subframes.

7.10.2.2 Interruptions during RSTD measurements on SCC for inter-band CA with one downlink SCell

PCell interruptions due to RSTD measurements on SCC when the SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the PRS periodicity T_{PRS} is 640 ms or longer. Each interruption shall not exceed 1 subframe.

7.10.2.3 Interruptions during RSTD measurements on SCC with multiple downlink SCells

If one SCell is activated and the other SCell is deactivated, then due to RSTD measurements on the SCC with deactivated SCell the UE is allowed:

- an interruption on PCell with up to 0.5% probability of missed ACK/NACK when when the PRS periodicity T_{PRS} is 640 ms or longer. Each interruption shall not exceed:
    - 1 subframe if the PCell is not in the same band as the deactivated SCell
    - 5 subframes if the PCell is in the same band as the deactivated SCell
- an interruption on the activated SCell with up to 0.5% probability of missed ACK/NACK when the PRS periodicity T_{PRS} is 640 ms or longer. Each interruption shall not exceed:

  - ○ 1 subframe if the activated SCell is not in the same band as the deactivated SCell
  - ○ 5 subframes if the activated SCell is in the same band as the deactivated SCell

If both SCells are deactivated, then due to RSTD measurements on one or both SCCs with deactivated SCells the UE is allowed:

- an interruption on PCell with up to 1.0% probability of missed ACK/NACK when the configure PRS periodicity T_{PRS} is 640 ms or longer in any of the SCCs. Each interruption shall not exceed:
  - ○ 1 subframe if the PCell is not in the same band as any of the deactivated SCells
  - ○ 5 subframes if the PCell is in the same band as any of the deactivated SCells

7.10.2.4 Interruptions at overlapping RSTD and inter-frequency measurements

If the UE is configured for RSTD measurements on cells belonging to a SCC with deactivated SCell(s) and also with a *measCycleSCell* for performing E-UTRA carrier aggregation measurements as defined in Section 8.3 on the same SCC as configured for the RSTD measurements, then the total allowed interruption on the active serving cell(s) is the maximum of the interruption due to E-UTRA carrier aggregation measurements specified in Section 7. 8 and the interruption due to the RSTD measurements on SCC specified in this Section.

7.11 Radio Link Monitoring for UE Category 0

7.11.1 Introduction

The UE category 0 applicability of the requirements for performing radio link monitoring in subclause 7.11 is defined in Section 3.6.1.

The UE shall monitor the downlink link quality based on the cell-specific reference signal in order to detect the downlink radio link quality of the PCell as specified in [3].

The UE shall estimate the downlink radio link quality and compare it to the thresholds Q_{out_Cat0} and Q_{in_Cat0} for the purpose of monitoring downlink radio link quality of the PCell.

The threshold Q_{out_Cat0} is defined as the level at which the downlink radio link cannot be reliably received and shall correspond to 10% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.11.1-1.

The threshold Q_{in_Cat0} is defined as the level at which the downlink radio link quality can be significantly more reliably received than at Q_{out_Cat0} and shall correspond to 2% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.11.1-2.

Table 7.11.1-1 PDCCH/PCFICH transmission parameters for out-of-sync for UE category 0

Attribute	Value
DCI format	1A
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz 3; 3 MHz ≤ Bandwidth < 10 MHz 4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4; Bandwidth = 1.4 MHz 8; Bandwidth ≥ 3 MHz
Ratio of PDCCH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell. 4 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell.
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell. 1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell.
Note 1: DCI format 1A is defined in clause 5.3.3.1.3 in TS 36.212 [21]. Note 2: A hypothetical PCFICH transmission corresponding to the number of control symbols shall be assumed.	

Table 7.11.1-2 PDCCH/PCFICH transmission parameters for in-sync for UE category 0

Attribute	Value
DCI format	1C
Number of control OFDM symbols	2; Bandwidth ≥ 10 MHz 3; 3 MHz ≤ Bandwidth < 10 MHz 4; Bandwidth = 1.4 MHz
Aggregation level (CCE)	4
Ratio of PDCCH RE energy to average RS RE energy	1 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell. 1 dB; when two or four antenna ports are used for cell-specific reference signal transmission by the PCell.
Ratio of PCFICH RE energy to average RS RE energy	4 dB; when single antenna port is used for cell-specific reference signal transmission by the PCell. 1 dB: when two or four antenna ports are used for cell-specific reference signal transmission by the PCell.
Note 1: DCI format 1C is defined in clause 5.3.3.1.4 in TS 36.212 [21]. Note 2: A hypothetical PCFICH transmission corresponding to the number of control symbols shall be assumed.	

7.11.2 Requirements for FD-FDD and TDD

7.11.2.1 Minimum requirement when no DRX is used

When the downlink radio link quality of the PCell estimated over the last 200 ms period becomes worse than the threshold Q_{out_Cat0}, Layer 1 of the UE shall send an out-of-sync indication for the PCell to the higher layers within 200ms Q_{out_Cat0} evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last 100 ms period becomes better than the threshold Q_{in_Cat0}, Layer 1 of the UE shall send an in-sync indication for the PCell to the higher layers within 100 ms Q_{in_Cat0} evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least 10ms.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

7.11.2.2 Minimum requirement when DRX is used

When DRX is used for FD-FDD and TDD category 0 UEs, the Q_{out_Cat0} evaluation period ($T_{Evaluate\_}Q_{out\_DRX\_Cat0}$) and the Q_{in_Cat0} evaluation period ($T_{Evaluate\_}Q_{in\_DRX\_Cat0}$) specified in Table 7.11.2.2-1 will be used.

When eDRX_CONN is used for FD-FDD and TDD category 0 UEs, the Q_{out_Cat0} evaluation period ($T_{Evaluate\_}Q_{out\_DRX\_Cat0}$) and the Q_{in_Cat0} evaluation period ($T_{Evaluate\_}Q_{in\_DRX\_Cat0}$) specified in Table 7.11.2.2-2 will be used.

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{out\_DRX\_Cat0}$ [s] period becomes worse than the threshold Q_{out_Cat0}, Layer 1 of the UE shall send out-of-sync indication for the PCell to the higher layers within $T_{Evaluate\_}Q_{out\_DRX\_Cat0}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{in\_DRX\_Cat0}$ [s] period becomes better than the threshold Q_{in_Cat0}, Layer 1 of the UE shall send in-sync indications for the PCell to the higher layers within $T_{Evaluate\_}Q_{in\_DRX\_Cat0}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. When DRX is used, two successive indications from Layer 1 shall be separated by at least max(10ms, DRX_cycle_length). When eDRX_CONN is used, two successive indications from Layer 1 shall be separated by at least max(10ms, eDRX_CONN cycle length).

Upon start of T310 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.11.2.2-1: Q_{out} and Q_{in} Evaluation Period in DRX for FD-FDD and TDD UE category 0

DRX cycle length (s)	$T_{Evaluate\_}Q_{out\_DRX\_Cat0}$ and $T_{Evaluate\_}Q_{in\_DRX\_Cat0}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in clause 7.11.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note (20)
0.04 < DRX cycle ≤ 0. 64	Note (10)
0.64 < DRX cycle ≤ 2.56	Note (5)
Note: Evaluation period length in time depends on the length of the DRX cycle in use	

Table 7.11.2.2-2: Q_{out} and Q_{in} Evaluation Period for FD-FDD and TDD UE category 0 when eDRX_CONN cycle is used

eDRX_CONN cycle length [s]	$T_{Evaluate\_}Q_{out\_DRX\_Cat0}$ and $T_{Evaluate\_}Q_{in\_DRX\_Cat0}$ [s] (eDRX_CONN cycles)
2.56 < eDRX_CONN cycle ≤ 10.24	Note (5)
Note: Evaluation period length in time depends on the length of the eDRX_CONN cycle in use	

7.11.2.3 Minimum requirement at transitions

When the UE transitions between any two of DRX, eDRX_CONN, and non-DRX or when DRX or eDRX_CONN cycle periodicity changes, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the PCell.

7.11.3 Requirements for HD-FDD

7.11.3.1 Minimum requirement when no DRX is used

The HD-FDD category 0 UE shall meet all applicable requirements specified in clause 7.11.2.1 under the following conditions

- at least 1 DL subframe per radio frame of PCell is available at the UE during Q_{in_Cat0} and Q_{out_Cat0} evaluation periods.

7.11.3.2 Minimum requirement when DRX is used

When DRX is used for HD-FDD category 0 UEs, the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out\_DRX\_Cat0}$) and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in\_DRX\_Cat0}$) specified in Table 7.11.3.2-1 will be used.

When eDRX_CONN is used for HD-FDD category 0 UEs, the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out\_DRX\_Cat0}$) and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in\_DRX\_Cat0}$) specified in Table 7.11.3.2-2 will be used.

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{out\_DRX\_Cat0}$ [s] period becomes worse than the threshold Q_{out_Cat0}, Layer 1 of the UE shall send out-of-sync indication for the PCell to the higher layers within $T_{Evaluate\_}Q_{out\_DRX\_Cat0}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{in\_DRX\_Cat0}$ [s] period becomes better than the threshold Q_{in_Cat0}, Layer 1 of the UE shall send in-sync indications for the PCell to the higher layers within $T_{Evaluate\_}Q_{in\_DRX\_Cat0}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. When DRX is used, two successive indications from Layer 1 shall be separated by at least max(10ms, DRX_cycle_length). When eDRX_CONN is used, two successive indications from Layer 1 shall be separated by at least max(10ms, eDRX_CONN cycle length).

Upon start of T310 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.11.3.2-1: Q_{out} and Q_{in} Evaluation Period in DRX for HD-FDD UE category 0

DRX cycle length (s)	$T_{Evaluate\_}Q_{out\_DRX}$ and $T_{Evaluate\_}Q_{in\_DRX}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in clause 7.11.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note (40)
0.04 < DRX cycle ≤ 0. 16	Note (20)
0. 16 < DRX cycle ≤ 0.64	Note (10)
0.64 < DRX cycle ≤ 2.56	Note (5)
Note: Evaluation period length in time depends on the length of the DRX cycle in use	

Table 7.11.3.2-2: Q_{out} and Q_{in} Evaluation Period for HD-FDD UE category 0 when eDRX_CONN cycle is used

eDRX_CONN cycle length [s]	$T_{Evaluate\_}Q_{out\_DRX}$ and $T_{Evaluate\_}Q_{in\_DRX}$ [s] (eDRX_CONN cycles)
2.56 < eDRX_CONN cycle ≤ 10.24	Note (5)
Note: Evaluation period length in time depends on the length of the eDRX_CONN cycle in use	

7.11.3.3 Minimum requirement at transitions

The minimum requirements at transitions defined in clause 7.11.2.3 also apply for this section under the following conditions:

at least 1 DL subframe per radio frame of PCell is available at the UE during Q_{in_Cat0} and Q_{out_Cat0} evaluation periods.

7.12 Interruptions with Dual Connectivity

7.12.1 Introduction

This section contains the requirements related to the interruptions on PCell, PSCell, and SCell, when

PSCell is added or released, or

transitions between active and non-active during DRX, or

transitions from non-DRX to DRX, or

SCell in either MCG or SCG is added or released, or

SCell in either MCG or SCG is activated or deactivated, or

measurements on SCC with deactivated SCell in either MCG or SCG.

The requirements shall apply for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD dual connectivity.

7.12.2 Requirements

7.12.2.1 Interruptions at PSCell addition/release

When a PSCell is added or released as defined in [2] the UE is allowed an interruption of up to 1 subframe on PCell and the activated SCell in MCG if configured during the RRC reconfiguration procedure [2] in synchronous dual connectivity. This interruption is for both uplink and downlink of PCell.

The UE is allowed an interruption of up to 2 subframes on PCell and the activated SCell in MCG if configured during the RRC reconfiguration procedure [2] in asynchronous dual connectivity. This interruption is for both uplink and downlink of PCell.

7.12.2.2 Interruptions at transitions between active and non-active during DRX

When PCell is in non-DRX and PSCell is in DRX, interruptions on PCell and the activated SCell in MCG if configured due to transitions from active to non-active and from non-active to active during PSCell DRX are allowed with up to 1% probability of missed ACK/NACK when the configured PSCell DRX cycle is less than 640 ms, and 0.625% probability of missed ACK/NACK is allowed when the configured PSCell DRX cycle is 640 ms or longer. Each interruption shall not exceed 1 subframe.

When PSCell is in non-DRX and PCell is in DRX, interruptions on PSCell on the activated SCell in SCG if configured due to transitions from active to non-active and from non-active to active during PCell DRX are allowed with up to 1 % probability of missed ACK/NACK when the configured PCell DRX cycle is less than 640 ms, and 0.625% probability of missed ACK/NACK is allowed when the configured PCell DRX cycle is 640 ms or longer. Each interruption shall not exceed 1 subframe.

When both PCell and PSCell are in DRX, no interruption is allowed.

7.12.2.3 Interruptions at transitions from non-DRX to DRX

Interruption on PCell and the activated SCell in MCG if configured due to PSCell transitions from non-DRX to DRX when PCell is in non-DRX shall not exceed 1subframe.

Interruption on PSCell and the activated SCell in SCG if configured due to PCell transitions from non-DRX to DRX when PSCell is in non-DRX shall not exceed 1subframe.

7.12.2.4 Interruptions at SCell addition/release

The requirements in this clause shall apply for the UE configured with PSCell.

In synchronous dual connectivity, when one SCell is added or released as defined in [2]:

- an interruption on PCell shall meet requirements in clause 7.8.2.7,
- an interruption on PSCell shall meet requirements in clause 7.8.2.7, where the term PCell in clause 7.8.2.7 shall be deemed to be replaced with PSCell.

In asynchronous dual connectivity, when one SCell belonging to MCG is added or released as defined in [2]:

- an interruption on PCell shall meet requirements in clause 7.8.2.7,
- an interruption on PSCell shall meet requirements in clause 7.8.2.7 except for the number of subframe, where the term PCell in clause 7.8.2.7 shall be deemed to be replaced with PSCell. The UE is allowed an interruption on PSCell of up to 2 subframes.

In asynchronous dual connectivity, when one SCell belonging to SCG is added or released as defined in [2]:

- an interruption on PCell shall meet requirements in clause 7.8.2.7 except for the number of subframe. The UE is allowed an interruption on PCell of up to 2 subframes.
- an interruption on PSCell shall meet requirements in clause 7.8.2.7, where the term PCell in clause 7.8.2.7 shall be deemed to be replaced with PSCell.

7.12.2.5 Interruptions at SCell activation/deactivation

The requirements in this clause shall apply for the UE configured with PSCell and one SCell.

In synchronous dual connectivity, when one SCell is activated or deactivated as defined in [17]:

- an interruption on PCell shall meet requirements in clause 7.8.2.8,
- an interruption on PSCell shall meet requirements in clause 7.8.2.8, where the term PCell in clause 7.8.2.8 shall be deemed to be replaced with PSCell.

In asynchronous dual connectivity, when one SCell belonging to MCG is activated or deactivated as defined in [17]:

- an interruption on PCell shall meet requirements in clause 7.8.2.8,
- an interruption on PSCell shall meet requirements in clause 7.8.2.8 except for the number of subframe, where the term PCell in clause 7.8.2.8 shall be deemed to be replaced with PSCell. The UE is allowed an interruption on PSCell of up to 2 subframes.

In asynchronous dual connectivity, when one SCell belonging to SCG is activated or deactivated as defined in [17]:

- an interruption on PCell shall meet requirements in clause 7.8.2.8 except for the number of subframe. The UE is allowed an interruption on PCell of up to 2 subframes,
- an interruption on PSCell shall meet requirements in clause 7.8.2.8, where the term PCell in clause 7.8.2.8 shall be deemed to be replaced with PSCell.

7.12.2.6 Interruptions during measurements on SCC

The requirements in this clause shall apply for the UE configured with PSCell and one SCell.

In synchronous dual connectivity, when one SCell is deactivated, the UE is allowed due to measurements on the SCC with the deactivated SCell:

- an interruption on PCell shall meet requirements in clause 7.8.2.9,
- an interruption on PSCell shall meet requirements in clause 7.8.2.9, where the term PCell in clause 7.8.2.8 shall be deemed to be replaced with PSCell.

In asynchronous dual connectivity, when one SCell belonging to MCG is deactivated, the UE is allowed due to measurements on the SCC with the deactivated SCell:

- an interruption on PCell shall meet requirements in clause 7.8.2.9,
- an interruption on PSCell shall meet requirements in clause 7.8.2.9 except for the number of subframe, where the term PCell in clause 7.8.2.9 shall be deemed to be replaced with PSCell. The UE is allowed an interruption on PSCell of up to 2 subframes.

In asynchronous dual connectivity, when one SCell belonging to SCG is deactivated, the UE is allowed due to measurements on the SCC with the deactivated SCell:

- an interruption on PCell shall meet requirements in clause 7.8.2.9 except for the number of subframe. The UE is allowed an interruption on PCell of up to 2 subframes
- an interruption on PSCell shall meet requirements in clause 7.8.2.9, where the term PCell in clause 7.8.2.9 shall be deemed to be replaced with PSCell.

7.13 Cell phase synchronization accuracy (Synchronized mode of dual connectivity)

7.13.1 Definition

Cell phase synchronization accuracy is defined as the maximum absolute timing mismatch between subframes which are transmitted by MeNB and SeNB and are scheduled for the same UE. The cell phase synchronization accuracy is defined only for synchronized mode of dual connectivity operation.

7.13.2 Minimum requirements

The cell phase synchronization accuracy shall not exceed the sum of absolute timing accuracy values declared by the manufacturer(s) for each BS. The cell phase synchronization accuracy requirement is optional.

NOTE: The sum of absolute timing accuracy values in synchronized mode of dual connectivity is assumed to be related to MRTD according to the following inequality:

$$T_{CPSA}+T_{RPTD} \leq \text{MRTD at the UE}$$

Where:

T_{CPSA} is the sum of absolute timing accuracy values declared by the manufacturer(s).

T_{RPTD} is the absolute propagation time difference between MeNB and SeNB, which serve the same UE.

MRTD is the Maximum Received Timing Difference at the UE. MRTD is equal to 33 μs.

7.14 PSCell Addition and Release Delay for E-UTRA Dual Connectivity

7.14.1 Introduction

This section defines requirements for the delay within which the UE shall be able to configure a PSCell in E-UTRA dual connectivity. The requirements are applicable to an E-UTRA dual connectivity capable UE. The requirements shall apply for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD dual connectivity.

7.14.2 PSCell Addition Delay Requirement

The requirements in this section shall apply for the UE configured with only PCell.

Upon receiving PSCell addition in subframe *n*, the UE shall be capable to transmit PRACH preamble towards PSCell no later than in subframe $n+ T_{config\_PSCell}$:

Where:

$T_{config\_PSCell} = 20ms + T_{activation\_time} + 50ms + T_{PCell\_DU} + T_{PSCell\_DU}$

$T_{activation\_time}$ is the PSCell activation delay. If the PSCell is known, then $T_{activation\_time}$ is 20ms. If the PSCell is unknown, then $T_{activation\_time}$ is 30ms provided the PSCell can be successfully detected on the first attempt.

T_{PCell_DU} is the delay uncertainty due to PCell PRACH preamble transmission. T_{PCell_DU} is up to 20ms if PSCell activation is interrupted by a PCell PRACH preamble transmission, otherwise it is 0.

T_{PSCell_DU} is the delay uncertainty in acquiring the first available PRACH occasion in the PSCell. T_{PSCell_DU} is up to 30ms.

PSCell is known if it has been meeting the following conditions:

During the last [5] seconds before the reception of the PSCell configuration command:

- the UE has sent a valid measurement report for the PSCell being configured and
- the PSCell being configured remains detectable according to the cell identification conditions specified in section 8.8,

- PSCell being configured also remains detectable during the PSCell configuration delay according to the cell identification conditions specified in section 8.8.

otherwise it is unknown.The PCell interruption specified in section 7.12 is allowed only during the RRC reconfiguration procedure [2].

7.14.3 PSCell Release Delay Requirement

The requirements in this section shall apply for a UE configured with PCell and one PSCell.

Upon receiving PSCell release in subframe *n*, the UE shall accomplish the release actions specified in [2] no later than in subframe *n*+20.

The PCell interruption specified in section 7.12 is allowed only during the RRC reconfiguration procedure [2].

7.15 Maximum Receive Timing Difference in Dual Connectivity

7.15.1 Introduction

A UE shall be capable of handling a relative receive timing difference between subframe timing boundaries of the PCell and PSCell to be aggregated for E-UTRA FDD-FDD, E-UTRA-TDD-TDD, E-UTRA TDD-FDD dual connectivity.

7.15.2 Minimum Requirements for Inter-band Dual Connectivity

The UE shall be capable of handling at least a relative receive timing difference between the subframe timing of the signals received from a cell belonging to the MCG and a cell belonging to the SCG at the UE receiver of up to 33 µs provided the UE indicates that it is capable of synchronous dual connectivity [2]. The requirements for synchronous dual connectivity are only applicable for TDD-TDD, FDD-FDD, and TDD-FDD inter-band dual connectivity.

The UE shall be capable of handling at least a relative receive timing difference between the subframe timing of the signals received from a cell belonging to the MCG and a cell belonging to the SCG at the UE receiver of up of 500 µs provided the UE indicates that it is capable of asynchronous dual connectivity [2]. The requirements for asynchronous dual connectivity are only applicable for FDD-FDD inter-band dual connectivity.

The UE shall be capable of handling a relative receive timing difference between the subframe timing of the signals received from any pair of the serving cells belonging to the same cell group according to the requirements in clause 7.9.2.

7.16 Proximity-based Services

7.16.1 Introduction

The requirements in this clause are applicable for UE performing transmissions and/or reception for ProSe Direct Discovery and/or ProSe Direct Communication in both RRC_IDLE and RRC_CONNECTED state.

7.16.2 Requirements

7.16.2.1 ProSe UE transmission timing

For ProSe transmission of sidelink channels and signals, UE shall have the capability to follow the timing change of the reference synchronization source.

7.16.2.1.1 Serving cell or PCell as timing reference

The requirements in this subclause are applicable when the reference timing used for ProSe transmissions is the serving cell (RRC_IDLE) or PCell (RRC_CONNECTED). The sidelink transmissions takes place $(N_{\text{TA,SL}} + N_{\text{TA offset}}) \cdot T_{\text{s}}$ before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell, where $N_{\text{TA offset}}$ is specified in Section 8.1 of [16]. The value of $N_{\text{TA,SL}}$ differs between sidelink channels and signals, and is either $N_{\text{TA, SL}} = N_{\text{TA}}$ or $N_{\text{TA, SL}} = 0$ as specified in Section 9.9 of [16].

7.16.2.1.1.1 Requirements when $N_{TA,SL} = 0$

For ProSe transmission of sidelink channels and signals employing $N_{\text{TA, SL}} = 0$, the requirements in Section 7.1 as specified for PRACH transmissions shall apply.

7.16.2.1.1.2 Requirements when $N_{TA,SL} = N_{TA}$

For ProSe transmission of sidelink channels and signals while employing $N_{\text{TA, SL}} = N_{\text{TA}}$, the requirements in Section 7.1 as specified for PUSCH shall apply.

When it is the first sidelink transmission in a DRX cycle, the requirements in Section 7.1 as specified for the first PUSCH transmission in a DRX cycle shall apply. The reference point for the UE initial transmit timing control requirement shall be $(N_{\text{TA, SL\_ref}} + N_{\text{TA offset}}) \cdot T_{\text{s}}$ seconds before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell. $(N_{\text{TA, SL\_ref}} + N_{\text{TA offset}})$ (in T_s units) for sidelink transmissions is the difference between UE transmission timing and the downlink timing immediately after when the last timing advance in Section 7.3 was applied.

When it is not the first sidelink transmission in a DRX cycle or there is no DRX cycle, the requirements as specified in Section 7.1 for PUSCH transmissions when the PUSCH transmission is not the first transmissions in a DRX cycle shall apply.

7.16.2.1.2 SCell or non-serving cell as timing reference

The requirements in this subclause are applicable when the reference timing used for ProSe transmissions is either a SCell (RRC_CONNECTED) or a non-serving cell selected on a non-serving ProSe carrier (RRC_IDLE or RRC_CONNECTED).

The transmission timing requirements are as specified in subclause 7.16.2.1.1, with reference cell as either the SCell or the selected non-serving cell.

7.16.3 Interruptions with ProSe

This section contains the requirements related to the interruptions on PCell and activated SCell(s) due ProSe Direct Discovery and ProSe Direct Communication. When ProSe is on a serving cell frequency, then the requirements in this subclause are applicable only to ProSe on E-UTRA FDD bands. When ProSe is on non-serving frequency, then the requirements are applicable to ProSe on both E-UTRA FDD and TDD bands.

When a UE capable of ProSe Direct Communication and/or ProSe Direct Discovery is configured with DRX and DRX is in use, interruptions specified in this section are not allowed while the *onDurationTimer*[17] is running.

7.16.3.1 Interruptions at ProSe Direct Discovery configuration

A UE capable of ProSe Direct Discovery may indicate its interest (initiation or termination) in ProSe Direct Discovery to the connected eNodeB using IE *SidelinkUEInformation* [2].

The UE is allowed an interruption of up to 1 subframe on PCell and on any activated SCell during the RRC reconfiguration procedure that includes the ProSe Direct Discovery configuration message *sl-DiscConfig* [2] (setup and release). This interruption is for both uplink and downlink of PCell and activated SCell(s).

7.16.3.2 Interruptions at ProSe Direct Communication configuration

A UE capable of ProSe Direct Communication may indicate its interest (initiation or termination) in ProSe Direct Communication to the connected eNodeB using IE *SidelinkUEInformation* [2].

The UE is allowed an interruption of up to 1 subframe on PCell and on any activated SCell during the RRC reconfiguration procedure that includes the ProSe Direct Communication configuration message *sl-CommConfig* [2] (setup and release). This interruption is for both uplink and downlink of PCell and activated SCell(s).

7.16.3.3 Interruptions during ProSe Direct Discovery

When ProSe Direct Discovery operation is on a serving cell (PCell/SCell) and when no request for transmission and/or reception gaps are signalled by the ProSe UE, the UE is allowed an interruption of up to 1 subframe that is *N* subframes before and after a UL subframe configured for ProSe Direct Discovery by a serving eNodeB. For discovery period less than 320ms, the allowed interruptions are additionally limited up to 0.625%.

The value of *N* is *ceil(w1 /* 1ms*)* subframes when the parameter *discSyncWindow*[2] is configured with value *w1* in the sidelink synchronization resource configuration associated with the ProSe Direct Discovery subframe.

The value of *N* is 1 subframe otherwise.

When ProSe Direct Discovery is on a non-serving carrier, and when no request for transmission and/or reception gaps is signalled by the UE, interruptions to serving cell(s) is allowed with up to $min\left(0.5\%, \frac{6}{discPeriod(ms)} \times 100\%\right)$ probability of missed ACK/NACK.

The interruptions are for both uplink and downlink of PCell on any activated SCell. The interruption for the ProSe UE may occur:

- while switching a receiver chain ON/OFF for ProSe Direct Discovery if the UE has a dedicated receiver chain for discovery, and/or
- while switching a transmitter chain ON/OFF for ProSe Direct Discovery transmissions on a non-serving carrier, and if the UE has a dedicated transmitted chain for discovery.

7.16.3.4 Interruptions during ProSe Direct Discovery with discovery gaps

When ProSe Direct Discovery is either on a serving cell (PCell/SCell) or a non-serving frequency, and when discovery reception and/or transmission gaps are configured by the serving cell, then only the following interruptions to the PCell and any activated SCell(s) are allowed:

- Uplink interruption is allowed on a subframe configured as downlink reception gap (using *discRxGapConfig*) if either the subframe immediately preceding or immediately following that subframe is not configured as reception gap; and,
- If ProSe Direct Discovery is on a non-serving FDD carrier and that carrier is used for ProSe synchronization, then uplink interruption is additionally allowed on 1 subframe in a discovery period. The interrupted subframe(s) shall be within the subframes configured as reception gap using *discRxGapConfig*; and,
- If ProSe Direct Discovery transmissions are on carrier that is not configured for uplink, then UE is allowed to additionally interrupt the serving cell(s) on up to 2 subframes for each discovery/SLSS transmission configured in a discovery period. The interrupted subframe(s) shall be within the subframes configured as transmission gaps using *discTxGapConfig*.

NOTE: The request and grant of discovery gaps is left up to UE and eNodeB implementations, respectively. When ProSe Direct Discovery is on a non-serving carrier and that carrier is used for ProSe synchronization, then the UE requested / eNodeB configured gaps may depend if inter-frequency measurements are additionally configured for that non-serving frequency.

7.16.3.5 Interruptions during ProSe Direct Communication

When ProSe Direct Communication is on a non-serving carrier and the PCell is not broadcasting SIB18, then interruptions to serving cell(s) is allowed with up to 0.5% probability of missed ACK/NACK.

The interruptions are for both uplink and downlink of PCell on any activated SCell.

7.16.4 Cell reselection for ProSe Direct Discovery on non-serving frequency

The requirements in this subclause apply when ProSe Direct Discovery transmissions are configured on a non-serving carrier and that non-serving carrier is used for downlink synchronziation and measurements for ProSe Direct Discovery transmission, and provided the parameters required for cell selection / reselection are provided by the serving cell using *discCellSelectionInfo*.

NOTE: The requirements do not apply if the UE is required to acquire the cell selection/reselection parameters that are broadcast from the concerned cell for evaluation.

If the UE signals request for transmission and/or reception gaps, then the requirements apply if the gaps are configured as requested by the UE.

7.16.4.1 Measurement and evaluation of selected cell

The UE shall measure the RSRP and RSRQ level of the selected reference cell on the non-serving carrier used for ProSe Direct Discovery synchronization and evaluate the cell selection criterion S defined in [1] for the selected cell at least every discovery period.

The UE shall filter the RSRP and RSRQ measurements of the selected cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by, at least discPeriod / 2.

7.16.4.2 Measurement of intra-frequency E-UTRAN cells

The UE shall be able to identify new intra-frequency cells on the non-serving carrier used for ProSe Direct Discovery transmission and perform RSRP and RSRQ measurements of identified intra-frequency cells.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the reselection criteria defined in TS36.304 [1, 11.4] within $T_{detect,EUTRAN\_ProSe\_Intra}$ when $T_{reselection}$ = 0 (within *discCellSelectionInfo*). An intra frequency cell is considered to be detectable according to RSRP, RSRP Ês/Iot, SCH_RP and SCH Ês/Iot defined in Annex B.1.1 for a corresponding Band.

The UE shall measure RSRP and RSRQ at least every $T_{measure,EUTRAN\_ProSe\_Intra}$ (see table 7.16.4.2-1) for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP and RSRQ measurements of each measured intra-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN\_ProSe\_Intra}/2$

For an intra-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met reselection criterion defined [1] within $T_{evaluate,E-UTRAN\_ProSe\_Intra}$ when $T_{reselection}$ = 0 (within *discCellSelectionInfo*) as specified in table 7.16.4.2-1 provided that the cell is at least 3dB better ranked. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both the non-serving cell that is currently selected and the non-serving cell being reselected to for ProSe Direct Discovery synchronization.

If $T_{reselection}$ timer (within *discCellSelectionInfo*) has a non-zero value and the intra-frequency cell being reselected to is better ranked than the currently selected reference cell, the UE shall evaluate this intra-frequency cell for the $T_{reselection}$ time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

Table 7.16.4.2-1: $T_{detect,EUTRAN\_ProSe\_Intra}$, $T_{measure,EUTRAN\_ProSe\_Intra}$ and $T_{evaluate, E-UTRAN\_ProSe\_Intra}$

Discovery Period [s]	$T_{detect,EUTRAN\_ProSe\_Intra}$ (number of discovery periods)	$T_{measure,EUTRAN\_ProSe\_Intra}$ (number of discovery periods)	$T_{evaluate,E-UTRAN\_ProSe\_Intra}$ (number of discovery periods)
Discovery Period≤0.32	Note 1 (36)	Note 1 (4)	Note 1 (16)
0.32<Discovery Period≤0.64	Note 1 (28)	Note 1 (2)	Note 1 (8)
0.64<Discovery Period≤1.28	Note 1 (25)	Note 1 (1)	Note 1 (5)
1.28<Discovery Period≤10.24	Note 1 (23)	Note 1 (1)	Note 1 (3)
NOTE 1: Time depends upon the configured Discovery period.			

7.16.5 Selection / Reselection of ProSe relay UE

This subclause contains the requirements related to selection and reselection of ProSe relay UE if the serving frequency is used for ProSe Direct Communication via a ProSe relay UE.

For a remote UE configured by upper layer for relay operation, when the RSRP measurement of the serving cell (RRC_IDLE) or the PCell (RRC_CONNECTED) is below *threshHigh* (within *remoteUE-Config*), the remote UE shall search for candidate relay UEs for selection and/or reselection every discovery period.

If the remote UE has a selected sidelink relay UE, then the remote UE shall measure the SD-RSRP of the selected relay once in every four discovery periods and evaluate if it meets the relay selection criterion as defined in [TS 36.331, 5.10.11.4].

The remote UE shall measure SD-RSRP of the candidate relay UEs every $T_{measure,\ ProSe\_Relay\_Intra}$ for intra-frequency relay UEs that are detected and measured according to the measurement rules.

For an intra-frequency relay UEs that are detected, but that has not been selected or reselected to, the remote UE shall be capable of evaluating that the intra-frequency relay UE has met selection or reselection criterion defined in [2, 5.10.11.4] within $T_{evaluate,ProSe\_Relay\_Intra}$ as specified in table 7.16.5-1.

The minimum requirements are required to meet when the selected and candidate relay UEs are transmitting relay discovery message every discovery period.

Table 7.16.5-1: $T_{measure, ProSe\_Relay\_Intra}$ and $T_{evaluate, ProSe\_Relay\_intra}$

Discovery Period [s]	$T_{measure,ProSe\_Relay\_Intra}$ [s] (number of discovery periods)	$T_{evaluate, ProSe\_Relay\_intra}$ [s] (number of discovery periods)
0.04≤Discovery period≤10.24	Note 1 (4)	Note 1 (16)
NOTE 1: Time depends upon the configured Discovery period.		

7.17 Maximum Transmission Timing Difference in Dual Connectivity

7.17.1 Introduction

A UE shall be capable of handling a relative transmission timing difference between subframe timing boundaries of the PCell and PSCell to be aggregated for E-UTRA FDD-FDD, E-UTRA-TDD-TDD, E-UTRA TDD-FDD dual connectivity.

7.17.2 Minimum Requirements for maximum transmission timing difference Inter-band Dual Connectivity

The UE shall be capable of handling a maximum uplink transmission timing difference between PCell and PSCell of at least 35.21 µs provided the UE indicates that it is capable of synchronous dual connectivity [2]. The requirements for synchronous dual connectivity are only applicable for TDD-TDD, FDD-FDD, and TDD-FDD inter-band dual connectivity.

The UE shall be capable of handling a maximum uplink transmission timing difference between PCell and PSCell of at least 500 µs provided the UE indicates that it is capable of asynchronous dual connectivity [2]. The requirements for asynchronous dual connectivity are only applicable for FDD-FDD and inter-band dual connectivity.

If the UE is configured with higher layer parameter powerControlMode<1>, then the UE may stop transmission on the PSCell if the UL transmission timing difference exceeds 35.21µs. If a UE supports both synchronous and asynchronous dual connectivity and if the UE is configured with higher layer parameter powerControlMode<2>, then the UE needs to constitute new subframes pair if the UL transmission timing difference exceeds 500µs.7.18 SCell Activation and Deactivation Delay for E-UTRA Dual Connectivity

7.18.1 Introduction

This section defines requirements for the delay within which the UE shall be able to activate a deactivated SCell and deactive an activated SCell in E-UTRA dual connectivity. The requirements are applicable to an E-UTRA dual connectivity capable UE which has been configured with one SCell in either MCG or SCG and PSCell. In case where the SCell belongs to SCG, the term PCell in clause 7.7 shall be replaced with PSCell. The requirements shall apply for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD dual connectivity.

7.18.2 SCell Activation Delay Requirement for Deactivated SCell

The requirements in this clause shall apply for a UE configured with PSCell and one SCell.

The SCell activation delay shall meet the requirements in clause 7.7.2.

7.18.3 SCell Deactivation Delay Requirement for Activated SCell

The requirements in this clause shall apply for a UE configured with PSCell and one SCell.

The SCell deactivation delay shall meet the requirements in clause 7.7.3.

7.19 Radio Link Monitoring for UE Category M1

7.19.1 Introduction

The UE category M1 applicability of the requirements for performing radio link monitoring in subclause 7.19 is defined in Section 3.1.

The UE shall monitor the downlink link quality based on the cell-specific reference signal in order to detect the downlink radio link quality of the PCell as specified in [3].

7.19.2 Requirements for FD-FDD and TDD CE mode A

The requirements defined in this subclause 7.19.2 for performing radio link monitoring are applicable for UE category M1 defined in Section 3.1.

The UE shall estimate the downlink radio link quality and compare it to the thresholds $Q_{out\_Cat\ M1}$ and $Q_{in\_Cat\ M1}$ for the purpose of monitoring downlink radio link quality of the PCell.

The threshold $Q_{out\_Cat\ M1}$ is defined as the level at which the downlink radio link cannot be reliably received and shall correspond to 10% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.19.2-1.

The threshold $Q_{in\_Cat\ M1}$ is defined as the level at which the downlink radio link quality can be significantly more reliably received than at $Q_{out\_Cat\ M1}$ and shall correspond to 2% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.19.2-1.

Table 7.19.2-1 M-PDCCH transmission parameters for out-of-sync and in-sync for UE category M1 with CE mode A

Attribute	Out-of-sync	In-sync
DCI format	6-1A	6-1A
Starting OFDM symbols	2; Bandwidth >= 10MHz 3; 3MHz <= Bandwidth < 10MHz 4; Bandwidth = 1.4MHz	2; Bandwidth >= 10MHz 3; 3MHz <= Bandwidth < 10MHz 4; Bandwidth = 1.4MHz
Maximum M-PDCCH repetition level	R Note1	R/2 Note1
Aggregation level (ECCE)	[24]	[8]
M-PDCCH Transmission type	Distributed	Distributed
NOTE 1: R is a configurable parameter defined in 36.331 and R>1.		

7.19.2.1 Minimum requirement when no DRX is used

When the downlink radio link quality of the PCell estimated over the last 400 ms period becomes worse than the threshold Q_{out_CatM1}, Layer 1 of the UE shall send an out-of-sync indication for the PCell to the higher layers within 400 ms Q_{out_CatM1} evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last 200 ms period becomes better than the threshold Q_{in_CatM1}, Layer 1 of the UE shall send an in-sync indication for the PCell to the higher layers within 200 ms Q_{in_CatM1} evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least 10ms.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

7.19.2.2 Minimum requirement when DRX is used

When DRX is used for FD-FDD and TDD UE category M1 UEs, the Q_{out_CatM1} evaluation period ($T_{Evaluate\_}Q_{out\_DRX\_CatM1}$) and the Q_{in_CatM1} evaluation period ($T_{Evaluate\_}Q_{in\_DRX\_CatM1}$) is specified in Table 7.19.2.2-1 will be used.

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ [s] period becomes worse than the threshold Q_{out_CatM1}, Layer 1 of the UE shall send out-of-sync indication for the PCell to the higher layers within $T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ [s] period becomes better than the threshold Q_{in_CatM1}, Layer 1 of the UE shall send in-sync indications for the PCell to the higher layers within $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX_cycle_length).

Upon start of T310 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.19.2.2-1: Q_{out} and Q_{in} Evaluation Period in DRX for FD-FDD and TDD UE category M1

DRX cycle length (s)	$T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ and $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in clause 7.19.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note (20)
0.04 < DRX cycle ≤ 0. 64	Note (10)
0.64 < DRX cycle ≤ 2.56	Note (5)
NOTE: Evaluation period length in time depends on the length of the DRX cycle in use	

7.19.2.3 Minimum requirement at transitions

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX_cycle_length).

When the UE transitions between DRX and non-DRX or when DRX cycle periodicity changes, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the PCell.

7.19.3 Requirements for HD-FDD with CE mode A

The requirements defined in this subclause 7.19.3 for performing radio link monitoring are applicable for UE category M1 defined in Section 3.1.

7.19.3.1 Minimum requirement when no DRX is used

The HD-FDD category M1 with CE mode A UE shall meet all applicable requirements specified in clause 7.19.2.1 under the following conditions

- at least 1 DL subframe per radio frame of PCell is available at the UE during Q_{in_CatM1} and Q_{out_CatM1} evaluation periods.

7.19.3.2 Minimum requirement when DRX is used

When DRX is used for HD-FDD category M1 with CE mode A UEs, the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out\_DRX\_CatM1}$) and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in\_DRX\_CatM1}$) specified in Table 7.19.3.2-1 will be used.

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ [s] period becomes worse than the threshold Q_{out_CatM1}, Layer 1 of the UE shall send out-of-sync indication for the PCell to the higher layers within $T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ [s] period becomes better than the threshold Q_{in_CatM1}, Layer 1 of the UE shall send in-sync indications for the PCell to the higher layers within $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX_cycle_length).

Upon start of T310 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.19.3.2-1: Q_{out} and Q_{in} Evaluation Period in DRX for HD-FDD UE category M1 with CE mode A

DRX cycle length (s)	$T_{Evaluate\_}Q_{out\_DRX\_M1}$ and $T_{Evaluate\_}Q_{in\_DRX\_M1}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in clause 7.19.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note (40)
0.04 < DRX cycle ≤ 0. 16	Note (20)
0. 16 < DRX cycle ≤ 0.64	Note (10)
0.64 < DRX cycle ≤ 2.56	Note (5)
Note: Evaluation period length in time depends on the length of the DRX cycle in use	

7.19.3.3 Minimum requirement at transitions

The minimum requirements at transitions defined in clause 7.19.2.3 also apply for this section under the following conditions:

- at least 1 DL subframe per radio frame of PCell is available at the UE during Q_{in_CatM1} and Q_{out_CatM1} evaluation periods.

7.19.4 Requirements for FD-FDD and TDD with CE mode B

The requirements defined in this subclause 7.19.4 for performing radio link monitoring are applicable for UE category M1 defined in Section 3.1.

The UE shall estimate the downlink radio link quality and compare it to the thresholds $Q_{out\_Cat\ M1}$ and $Q_{in\_Cat\ M1}$ for the purpose of monitoring downlink radio link quality of the PCell.

The threshold $Q_{out\_Cat\ M1}$ is defined as the level at which the downlink radio link cannot be reliably received and shall correspond to 10% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.19.4-1.

The threshold $Q_{in\_Cat\ M1}$ is defined as the level at which the downlink radio link quality can be significantly more reliably received than at $Q_{out\_Cat\ M1}$ and shall correspond to 2% block error rate of a hypothetical PDCCH transmission taking into account the PCFICH errors with transmission parameters specified in Table 7.19.4-1.

Table 7.19.4-1 M-PDCCH transmission parameters for out-of-sync and in-sync for UE category M1 with CE mode B

Attribute	Out-of-sync	In-sync
DCI format	6-1B	6-1B
Starting OFDM symbols	2; Bandwidth >= 10MHz 3; 3MHz <= Bandwidth < 10MHz 4; Bandwidth = 1.4MHz	2; Bandwidth >= 10MHz 3; 3MHz <= Bandwidth < 10MHz 4; Bandwidth = 1.4MHz
Maximum M-PDCCH repetition level	R^{Note1}	$R/2^{Note1}$
Aggregation level (ECCE)	[24]	[24]
M-PDCCH Transmission type	Distributed	Distributed
NOTE 1: R is a configurable parameter defined in 36.331 and R>1. NOTE 2: L∈ {24, [16], [8]}. The numers in the squarebrackets are to be confirmed.		

7.19.4.1 Minimum requirement when no DRX is used

When the downlink radio link quality of the PCell estimated over the last 4000 ms period becomes worse than the threshold Q_{out_CatM1}, Layer 1 of the UE shall send an out-of-sync indication for the PCell to the higher layers within 4000 ms Q_{out_CatM1} evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last 2000 ms period becomes better than the threshold Q_{in_CatM1}, Layer 1 of the UE shall send an in-sync indication for the PCell to the higher layers within 2000 ms Q_{in_CatM1} evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least 10ms.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

7.19.4.2 Minimum requirement when DRX is used

When DRX is used for FD-FDD and TDD UE category M1 UEs, the Q_{out_CatM1} evaluation period ($T_{Evaluate\_}Q_{out\_DRX\_CatM1}$) and the Q_{in_CatM1} evaluation period ($T_{Evaluate\_}Q_{in\_DRX\_CatM1}$) is specified in Table 7.19.4.2-1 will be used.

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ [s] period becomes worse than the threshold Q_{out_CatM1}, Layer 1 of the UE shall send out-of-sync indication for the PCell to the higher layers within $T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ [s] period becomes better than the threshold Q_{in_CatM1}, Layer 1 of the UE shall send in-sync indications for the PCell to the higher layers within $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX_cycle_length).

Upon start of T310 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.19.4.2-1: Q_{out} and Q_{in} Evaluation Period in DRX for FD-FDD and TDD UE category M1

DRX cycle length (s)	$T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ and $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in clause 7.19.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note (20)
0.04 < DRX cycle ≤ 0. 64	Note (10)
0.64 < DRX cycle ≤ 2.56	Note (5)
NOTE: Evaluation period length in time depends on the length of the DRX cycle in use	

7.19.2.4 Minimum requirement at transitions

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX_cycle_length).

When the UE transitions between DRX and non-DRX or when DRX cycle periodicity changes, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the PCell.

7.19.5 Requirements for HD-FDD with CE mode B

The requirements defined in this subclause 7.19.5 for performing radio link monitoring are applicable for UE category M1 defined in Section 3.1.

7.19.5.1 Minimum requirement when no DRX is used

The HD-FDD category M1 with CE mode B UE shall meet all applicable requirements specified in clause 7.19.4.1 under the following conditions

- at least 1 DL subframe per radio frame of PCell is available at the UE during Q_{in_CatM1} and Q_{out_CatM1} evaluation periods.

7.19.5.2 Minimum requirement when DRX is used

When DRX is used for HD-FDD category M1 with CE mode B UEs, the Q_{out} evaluation period ($T_{Evaluate\_}Q_{out\_DRX\_CatM1}$) and the Q_{in} evaluation period ($T_{Evaluate\_}Q_{in\_DRX\_CatM1}$) specified in Table 7.19.5.2-1 will be used.

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ [s] period becomes worse than the threshold Q_{out_CatM1}, Layer 1 of the UE shall send out-of-sync indication for the PCell to the higher layers within $T_{Evaluate\_}Q_{out\_DRX\_CatM1}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [2].

When the downlink radio link quality of the PCell estimated over the last $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ [s] period becomes better than the threshold Q_{in_CatM1}, Layer 1 of the UE shall send in-sync indications for the PCell to the higher layers within $T_{Evaluate\_}Q_{in\_DRX\_CatM1}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [2].

The out-of-sync and in-sync evaluations of the PCell shall be performed as specified in clause 4.2.1 in [3]. Two successive indications from Layer 1 shall be separated by at least max(10ms, DRX_cycle_length).

Upon start of T310 timer as specified in clause 5.3.11 in TS 36.331 [2], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE shall be turned off within 40 ms after expiry of T310 timer as specified in clause 5.3.11 in TS 36.331 [2].

Table 7.19.5.2-1: Q_{out} and Q_{in} Evaluation Period in DRX for HD-FDD UE category M1 with CE mode B

DRX cycle length (s)	$T_{Evaluate\_Qout\_DRX\_M1}$ and $T_{Evaluate\_Qin\_DRX\_M1}$ (s) (DRX cycles)
≤ 0.01	Non-DRX requirements in clause 7.19.2.1 are applicable.
0.01 < DRX cycle ≤0.04	Note (40)
0.04 < DRX cycle ≤ 0. 16	Note (20)
0. 16 < DRX cycle ≤ 0.64	Note (10)
0.64 < DRX cycle ≤ 2.56	Note (5)
NOTE: Evaluation period length in time depends on the length of the DRX cycle in use	

7.19.5.3 Minimum requirement at transitions

The minimum requirements at transitions defined in clause 7.19.2.3 also apply for this section under the following conditions:

at least 1 DL subframe per radio frame of PCell is available at the UE during Q_{in_CatM1} and Q_{out_CatM1} evaluation periods.8 UE Measurements Procedures in RRC_CONNECTED State

8.1 General Measurement Requirements

8.1.1 Introduction

This clause contains requirements on the UE regarding measurement reporting in RRC_CONNECTED state. The requirements are split in E-UTRA intra frequency, E-UTRA inter frequency, Inter-RAT UTRA FDD, UTRA TDD and GSM measurements. These measurements may be used by the E-UTRAN, e.g. for handover decisions. The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracies are specified in clause 9. Control of measurement reporting is specified in TS 36.331 [2].

When the UE is provided with IDC solution, the UE shall also perform RRM measurements and meet the corresponding requirements in clause 8.

In the requirements of Section 8.1 for the UE capable of CA and the UE configured with up to four SCells, the applicable exceptions for side conditions are specified in Annex B, Sections B.4.2 and B.4.3, respectively.

In the requirements of Section 8.1 for the UE capable of DC and the UE configured with one PSCell, the applicable exceptions for side conditions are specified in Annex B, Sections B.4.2 and B.4.3, respectively.

The requirements in Section 9 are applicable for a UE performing measurements according to Section 8.1.

8.1.2 Requirements

8.1.2.1 UE measurement capability

If the UE requires measurement gaps to identify and measure inter-frequency and/or inter-RAT cells, in order for the requirements in the following subsections to apply the E-UTRAN must provide a single measurement gap pattern with constant gap duration for concurrent monitoring of all frequency layers and RATs.

During the measurement gaps the UE:

- shall not transmit any data

- is not expected to tune its receiver on any of the E-UTRAN carrier frequencies of PCell and any SCell.
- is not expected to tune its receiver on any of the E-UTRAN carrier frequencies of PCell, PSCell, and SCell.

If the UE supporting dual connectivity is configured with PSCell, during the total interruption time as shown in Figure 8.1.2.1-1, the UE shall not transmit and receive any data in SCG.

In the uplink subframe occurring immediately after the measurement gap,

- if the following conditions are met then it is up to UE implementation whether or not the UE can transmit data:
  - all the serving cells belong to E-UTRAN TDD;
  - if the subframe occurring immediately before the measurement gap is an uplink subframe.
- Otherwise the UE shall not transmit any data.

In determining the above UE behaviour in the uplink subframe occurring immediately after the measurement gap the UE shall treat a special subframe as an uplink subframe if the special subframe occurs immediately before the measurement gap, Inter-frequency and inter-RAT measurement requirements within this clause rely on the UE being configured with one measurement gap pattern unless the UE has signaled that it is capable of conducting such measurements without gaps. UEs shall only support those measurement gap patterns listed in Table 8.1.2.1-1 that are relevant to its measurement capabilities.

ProSe capable UE is allowed to perform ProSe transmissions during the measurement gaps that are not used for measurements if the requirements specified in section 8 for inter-frequency and inter-RAT measurements are fulfilled.

Table 8.1.2.1-1: Gap Pattern Configurations supported by the UE

Gap Pattern Id	MeasurementGap Length (MGL, ms)	Measurement Gap Repetition Period (MGRP, ms)	Minimum available time for inter-frequency and inter-RAT measurements during 480ms period (Tinter1, ms)	Measurement Purpose
0	6	40	60	Inter-Frequency E-UTRAN FDD and TDD, UTRAN FDD, GERAN, LCR TDD, HRPD, CDMA2000 1x
1	6	80	30	Inter-Frequency E-UTRAN FDD and TDD, UTRAN FDD, GERAN, LCR TDD, HRPD, CDMA2000 1x

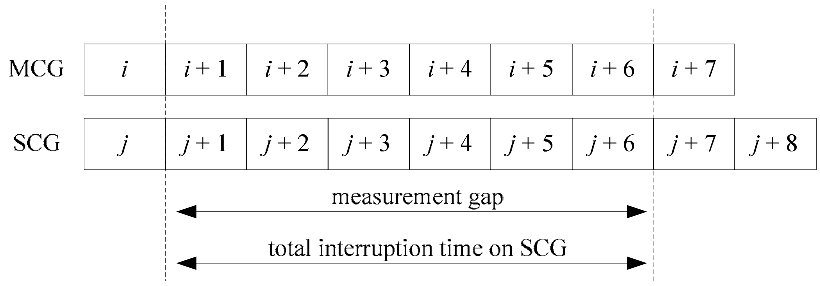
NOTE 1: When inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, only Gap Pattern 0 can be used. For defining the inter-frequency and inter-RAT requirements T_{inter1}=30ms shall be assumed.

NOTE 2: A measurement gap starts at the end of the latest subframe occurring immediately before the measurement gap among MCG serving cells subframes.

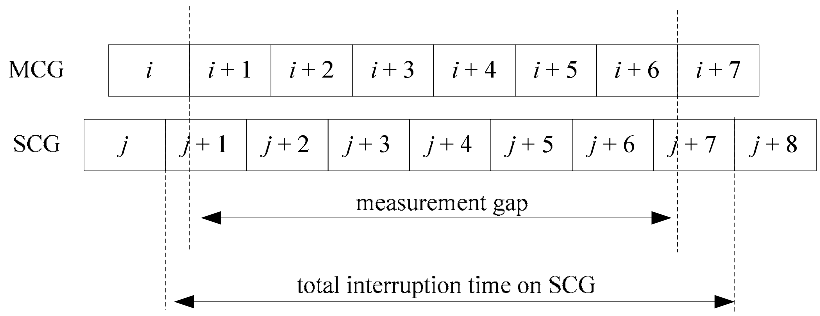
NOTE 3: MGL is the time from start of tuning to end of retuning, which is aligned between MCG and SCG.

NOTE 4: The total interruption time on SCG is 6 subframes for synchronous dual connectivity, and the total interruption time on SCG is 7 subframes for asyncrhonous dual connectivity. As shown in Figure 8.1.2.1-1, MCG subframes from i+1 to i+6 are included in total interruption time together with SCG subframes from j+1 to j+6 for synchronous dual connectivity and j+1 to j+7 for asyncrhonous dual connectivity.

NOTE 5: For asynchronous dual connectivity as shown in Figure 8.1.2.1-1 (b), subframe j is regarded as the subframe occurring immediately before the measurement gap for SCG, similarly, subframe j+8 is regarded as the subframe occurring immediately after the measurement gap for SCG.



(a) measurement GAP for synchronous dual connectivity



(b) measurement GAP for asynchronous dual connectivity

Figure 8.1.2.1-1: Measurement GAP and total interruption time on MCG and SCG

A UE that is capable of identifying and measuring inter-frequency and/or inter-RAT cells without gaps shall follow requirements as if Gap Pattern Id #0 had been used and the minimum available time Tinter1 of 60 ms shall be assumed for the corresponding requirements.

If the UE supporting E-UTRA carrier aggregation when configured with up to four SCCs is performing measurements on cells on PCC, inter-frequency measurements, or inter-RAT measurements, and interruption occurs on PCell or any activated SCell or both due to measurements performed on cells on an SCC with a deactivated SCell according to section 8.3, then the UE shall meet the requirements specified for each measurement in Section 8 and Section 9.

If the UE supporting E-UTRA dual connectivity when configured with a PSCell is performing measurements on cells on PCC, inter-frequency measurements, or inter-RAT measurements, then the UE shall meet the requirements specified for each measurement in Section 8 and Section 9.

A UE which indicate support for Increased UE carrier monitoring E-UTRA according to the capabilities in [2, 31] and which is capable of identifying and measuring inter-frequency and/or inter-RAT cells without gaps, shall be able to monitor maximum number of layers as defined in 8.1.2.1.1.1a, and apply the *MeasScaleFactor* [2] defining the relaxation to the requirements for the configured carriers according to section 8.1.2.1.1a.

8.1.2.1.1 Monitoring of multiple layers using gaps

When monitoring of multiple inter-frequency E-UTRAN and inter-RAT (UTRAN, GSM) using gaps (or without using gaps provided the UE supports such capability) is configured, the UE shall be capable of performing one measurement of the configured measurement type (RSRP, RSRQ, RSTD, UTRAN TDD P-CCPCH RSCP, UTRAN FDD CPICH measurements, GSM carrier RSSI, etc.) of detected cells on all the layers

The effective total number of frequencies excluding the frequencies of the PCell, SCells, and PSCell being monitored is N_{freq}, which is defined as:

$N_{freq} = N_{freq,\ E\text{-}UTRA} + N_{freq,\ UTRA} + M_{gsm} + N_{freq,\ cdma2000} + N_{freq,\ HRPD}$

where

$N_{freq,\ E\text{-}UTRA}$ is the number of E-UTRA carriers being monitored (FDD and TDD)

$N_{freq,\ UTRA}$ is the number of UTRA carriers being monitored (FDD and TDD)

M_{GSM} is an integer which is a function of the number of GSM carriers on which measurements are being performed. M_{GSM} is equal to 0 if no GSM carrier is being monitored. For a MGRP of 40 ms, M_{GSM} is equal to 1 if cells on up to 32 GSM carriers are being measured. For a MGRP of 80 ms, M_{GSM} is equal to ceil($N_{carriers,GSM}$ /20) where $N_{carriers,GSM}$ is the number of GSM carriers on which cells are being measured.

$N_{freq,\ cdma2000}$ is the number of cdma2000 1x carriers being monitored.

$N_{freq,\ HRPD}$ is the number of HRPD carriers being monitored.8.1.2.1.1.1 Maximum allowed layers for multiple monitoring

The UE shall be capable of monitoring at least per RAT group:

- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 1 FDD E-UTRA inter-frequency carrier for RSTD measurements, and
- Depending on UE capability, 3 TDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 1 TDD E-UTRA inter-frequency carrier for RSTD measurements, and
- Depending on UE capability, 3 FDD UTRA carriers, and
- Depending on UE capability, 3 TDD UTRA carriers, and
- Depending on UE capability, 32 GSM carriers (one GSM layer corresponds to 32 carriers), and
- Depending on UE capability, 5 cdma2000 1x carriers, and
- Depending on UE capability, 5 HRPD carriers

In addition to the requirements defined above, the UE shall be capable of monitoring a total of at least 7 effective carrier frequency layers comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 carriers), cdma2000 1x and HRPD layers.

8.1.2.1.1.1a Maximum allowed layers for multiple monitoring (Increased UE carrier monitoring)

UE which indicate support for Increased UE carrier monitoring E-UTRA according to the capabilities in [2,31] shall be capable of monitoring at least

- Depending on UE capability, 8 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 8 TDD E-UTRA inter-frequency carriers

UE which indicate support for increased UE carrier monitoring UTRA according to the capabilities in [2,31] shall be capable of monitoring at least

- Depending on UE capability, 6 FDD UTRA carriers, and
- Depending on UE capability, 7 TDD UTRA carriers, and

In addition to the requirements defined above, the UE which indicate support for Increased UE carrier monitoring E-UTRA or increased UE carrier monitoring UTRA according to the capabilities in [2,31]shall be capable of monitoring a total of at least 12 carrier frequency layers comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 carriers), cdma2000 1x and HRPD layers

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring E-UTRA [2,31] are calculated assuming all E-UTRA carriers which the UE is required to monitor, are having normal performance, i.e. $N_{freq,\ E\text{-}UTRA,reduced}$ =0. The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring UTRA [2,31] are calculated assuming all UTRA carriers which the UE is required to monitor, are having normal performance, i.e. $N_{freq,\ UTRA,reduced}$ =0. Capabilities for number of carriers to monitor for UE which do not support increased carrier monitoring E-UTRA or increased carrier monitoring UTRA are specified in section 8.1.2.1.1.1. A UE which do not indicate support for Increased UE carrier monitoring E-UTRA or UTRAN [2,31] does not have any reduced performance carrier requirements and K_n=1.

8.1.2.1.1a Monitoring of multiple layers using gaps (Increased UE carrier monitoring)

For UE which support increased carrier monitoring E-UTRA or increased carrier monitoring UTRA, the measurement performance for different carriers may be configured by higher layers to be either normal or reduced performance. A measurement scaling factor, *MeasScaleFactor [2]*, defining the relaxation to be applied to the requirements for carriers measured with reduced measurement performance is signalled by higher layers and has the possible settings shown in table 8.1.2.1.1-1.

Table 8.1.2.1.1-1: Measurement Scaling factor Configurations supported by the UE

	MeasScaleFactor information element settting	K_n	K_r
sf-EUTRA-cf1	8	8/7	8
sf-EUTRA-cf2	16	16/15	16

If no reduced performance group carrier is configured, the UE shall consider all carriers to have normal performance

If no *MeasScaleFactor* is configured, a UE indicating support for increased carrier monitoring E-UTRA or increased carrier monitoring UTRA shall monitor at least the number of carriers specified in section 8.1.2.1.1.1 and is not required to monitor the increased number of carriers specified in section 8.1.2.1.1.1a.

The following definitions are used in the performance requirements:

$N_{freq} = N_{freq,n} + N_{freq,r}$

Where:

$N_{freq,n} = N_{freq,\ E\text{-}UTRA,normal} + N_{freq,\ UTRA,\ normal} + M_{gsm} + N_{freq,\ cdma2000} + N_{freq,\ HRPD}$: Total number of interfrequency carriers to be monitored with normal measurement performance

$N_{freq,r} = N_{freq,\ E\text{-}UTRA,reduced} + N_{freq,\ UTRA,\ reduced}$: Total number of interfrequency carriers to be monitored with reduced measurement performance

Where :

$N_{freq,\ E\text{-}UTRA,normal}$: Number of interfrequency carriers to be monitored with normal performance

$N_{freq,\ E\text{-}UTRA,normal,FDD}$: Number of interfrequency FDD carriers to be monitored with normal performance

$N_{freq,\ E\text{-}UTRA,normal,TDD}$: Number of interfrequency TDD carriers to be monitored with normal performance

$N_{freq,\ E\text{-}UTRA,reduced}$: Number of interfrequency carriers to be monitored with reduced performance

$N_{freq,\ UTRA,normal}$: Number of UTRA carriers (FDD and TDD) to be monitored with normal performance

$N_{freq,\ E\text{-}UTRA,normal,FDD}$: Number of interfrequency FDD carriers to be monitored with normal performance

$N_{freq,\ E\text{-}UTRA,normal,TDD}$: Number of interfrequency TDD carriers to be monitored with normal performance

$N_{freq,\ UTRA,reduced}$: Number of UTRA carriers (FDD and TDD) to be monitored with reduced performance

For interfrequency carriers, if $N_{freq,\ E\text{-}UTRA,reduced}$ is not equal to zero then K_n and K_r are as shown in table 8.1.2.1.1-1. Otherwise K_n=1 and all interfrequency layers have normal performance.

For UTRAN carriers, if $N_{freq,\ UTRA,reduced}$ is not equal to zero then K_n and K_r are as shown in table 8.1.2.1.1-1. Otherwise K_n=1 and all UTRA frequency layers have normal performance.

The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring E-UTRA [2, 31] are calculated as defined in sections 8.1.2.3.1 and 8.1.2.3.2 provided that $N_{freq,\ E\text{-}UTRA,normal} \leq 3$ for a UE capable of either FDD E-UTRA carrier monitoring or TDD E-UTRA carrier monitoring or $N_{freq,\ E\text{-}UTRA,normal} \leq 6$ for a UE capable of both FDD and TDD E-UTRA carrier monitoring provided $N_{freq, E\text{-}UTRA,normal,FDD} \leq 3$ E-UTRA carriers and $N_{freq, E\text{-}UTRA,normal,TDD} \leq 3$ TDD E-UTRA carriers or if $N_{freq,n=} N_{freq}$. The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring UTRA [2, 31] are calculated as defined in sections 8.1.2.4.1, 8.1.2.4.3, 8.1.2.4.7 and 8.1.2.4.13 provided that $N_{freq, UTRA,normal} \leq 3$ for UE capable of either FDD UTRA carrier monitoring or TDD UTRA carrier monitoring or $N_{freq, UTRA,normal} \leq 6$ for a UE capable of both FDD and TDD UTRA carrier monitoring provided $N_{freq, UTRA,normal,FDD} \leq 3$ FDD UTRA carriers and $N_{freq, UTRA,normal,TDD} \leq 3$ TDD UTRA carriers or if $N_{freq,n=} N_{freq}$. Capabilities for number of carriers to monitor for a UE which supports Increased carrier monitoring E-UTRA or Increased carrier monitoring UTRA are specified in section 8.1.2.1.1.1a.

8.1.2.2 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency cells and perform RSRP, RSRQ, and RS-SINR measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

8.1.2.2.1 E-UTRAN FDD intra frequency measurements

8.1.2.2.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within

$$T_{identify\ intra} = T_{basic\_identify\_E\text{-}UTRA\_FDD,\ intra} \cdot \frac{T_{Measurement\_Period,\ Intra}}{T_{Intra}} \quad ms$$

where

$T_{basic\_identify\_E\text{-}UTRA\_FDD,\ intra}$ is 800 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- RS-SINR related side conditions given in Section 9.1.17.2.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP, RSRQ, and RS-SINR measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ is defined in the following equation. If the UE has identified more than $Y_{measurement\ intra}$ cells, the UE shall perform measurements of at least 8 identified intra- frequency cells but the reporting rate of RSRP, RSRQ, and RS-SINR measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{measurement\ intra} = Floor\left\{ X_{basic\ measurement\ FDD} \cdot \frac{T_{Intra}}{T_{Measurement\_Period,\ Intra}} \right\} \text{cells}$$

where

$X_{\text{basic measurement FDD}}$ = 8 (cells),

$T_{\text{Measurement\_Period, Intra}}$ = 200 ms is the measurement period for intra frequency RSRP, RSRQ, and RS-SINR measurements.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.2.1 and 9.1.2.2, the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1, and RS-SINR measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.17.2.1.

8.1.2.2.1.1.1 Measurement Reporting Requirements

8.1.2.2.1.1.1.1 Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

8.1.2.2.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.2.1.1.1.3.

8.1.2.2.1.1.1.3 Event Triggered Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resoureces for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify intra}}$ defined in Clause 8.1.2.2.1.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra}}$ defined in clause 8.1.2.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period, Intra}}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.2.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{\text{identify\_intra}}$ as shown in table 8.1.2.2.1.2-1. When eDRX_CONN is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{\text{identify\_intra}}$ as shown in table 8.1.2.2.1.2-1A.

Table 8.1.2.2.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra}$ (s) (DRX cycles)
≤0.04	0.8 (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.1.2.2.1.2-1A: Requirement to identify a newly detectable FDD intra-frequency cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_intra}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note(20)
Note: Time depends upon the eDRX_CONN cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- RS-SINR related side conditions given in Section 9.1.17.2.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band.

When DRX is used in the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra}$ as shown in table 8.1.2.2.1.2-2. When eDRX_CONN is used in the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra}$ as shown in table 8.1.2.2.1.2-3. The UE shall be capable of performing RSRP, RSRQ, and RS-SINR measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra}$.

Table 8.1.2.2.1.2-2: Requirement to measure FDD intrafrequency cells

DRX cycle length (s)	$T_{measure\_intra}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.1.2.2.1.2-3: Requirement to measure FDD intra-frequency cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_intra}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (5)
Note: Time depends upon the eDRX_CONN cycle in use	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.2.1 and 9.1.2.2, the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1, and RS-SINR measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.17.2.1.

8.1.2.2.1.2.1 Measurement Reporting Requirements

8.1.2.2.1.2.1.1 Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

8.1.2.2.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.2.1.2.1.3.

8.1.2.2.1.2.1.3 Event Triggered Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra}$ defined in Clause 8.1.2.2.1.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in clause 8.1.2.2.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.2.2 E-UTRAN TDD intra frequency measurements

8.1.2.2.2.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within

$$T_{\text{identify intra}} = T_{\text{basic identify } E-UTRA\_\text{TDD, intra}} \cdot \frac{T_{\text{Measurement Period, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{basic\_identify\_E-UTRA\_TDD,\ intra}$ is 800 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- RS-SINR related side conditions given in Section 9.1.17.2.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP, RSRQ, and RS-SINR measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ is defined in the following equation. If the UE has identified more than $Y_{measurement\ intra}$ cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP, RSRQ, and RS-SINR measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{measurement\ \ intra} = Floor\left\{ X_{basic\ measurement\ TDD} \cdot \frac{T_{Intra}}{T_{Measurement\_Period,\ Intra}} \right\} \text{cells}$$

where

$X_{basic\ measurement\ TDD}$ = 8 (cells),

$T_{Measurement\_Period\ Intra}$ = 200 ms is the measurement period for intra frequency RSRP, RSRQ, and RS-SINR measurements.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.2.1 and 9.1.2.2, the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1, and RS-SINR measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.17.2.1.

8.1.2.2.2.1.1 Measurement Reporting Requirements

8.1.2.2.2.1.1.1 Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

8.1.2.2.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.2.2.1.1.3.

8.1.2.2.2.1.1.3 Event Triggered Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\ intra}$ defined in Clause 8.1.2.2.2.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in clause 8.1.2.2.2.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.2.2.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{identify\_intra}$ as shown in table 8.1.2.2.2.2-1. When eDRX_CONN is in use, the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{identify\_intra}$ as shown in table 8.1.2.2.2.2-1A.

Table 8.1.2.2.2.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra}$ (s) (DRX cycles)
≤0.04	0.8 (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.1.2.2.2.2-1A: Requirement to identify a newly detectable TDD intra-frequency cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_intra}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note(20)
Note: Time depends upon the eDRX_CONN cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.2.1 and 9.1.2.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Clause 9.1.5.1 are fulfilled for a corresponding Band,
- RS-SINR related side conditions given in Clause 9.1.17.2.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band.

When DRX is in use in the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra}$ as shown in table 8.1.2.2.2.2-2. When eDRX_CONN is in use in the RRC_CONNECTED state, the measurement period for intra frequency measurements is $T_{measure\_intra}$ as shown in table 8.1.2.2.2.2-3. The UE shall be capable of performing RSRP, RSRQ, and RS-SINR measurements for 8 identified intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra}$.

Table 8.1.2.2.2.2-2: Requirement to measure TDD intra frequency cells

DRX cycle length (s)	$T_{measure\_intra}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use. Note2: Time depends upon the DRX cycle in use.	

Table 8.1.2.2.2.2-3: Requirement to measure TDD intra-frequency cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_intra}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (5)
Note: Time depends upon the eDRX_CONN cycle in use.	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.2.1 and 9.1.2.2, the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1, and the RS-SINR measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.17.2.1.

8.1.2.2.2.2.1 Measurement Reporting Requirements

8.1.2.2.2.2.1.1 Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

8.1.2.2.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.2.2.2.1.3.

8.1.2.2.2.2.1.3 Event Triggered Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, 9.1.5.1, and 9.1.17.2.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra}$ defined in Clause 8.1.2.2.2.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in clause 8.1.2.2.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.2.3 E-UTRAN FDD intra frequency measurements with autonomous gaps

8.1.2.2.3.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose ‘reportCGI’. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of ‘reportCGI’, regardless of whether DRX or eDRX_CONN is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI,\, intra} = T_{basic\_identify\_CGI,\, intra} \quad ms$$

Where

$T_{basic\_identify\_CGI,\, intra}$ = 150 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI,.intra}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

Within the time, $T_{identify\_CGI,\, intra}\ ms$, over which the UE identifies the new CGI of E-UTRA cell, the UE shall transmit at least 60 ACK/NACKs on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX and no eDRX_CONN cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

8.1.2.2.3.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. In case eDRX_CONN is used, the ECGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.2.4 E-UTRAN TDD intra frequency measurements with autonomous gaps

8.1.2.2.4.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1 messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX or eDRX_CONN is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$\mathrm{T}_{\mathrm{identify\_CGI,intra}} = \mathrm{T}_{\mathrm{basic\_identify\_CGI,intra}} \quad ms$$

Where

$T_{basic\_identify\_CGI,\ intra}$ = 150 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable when the following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI,\ intra}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

Within the time, $\mathrm{T}_{\mathrm{identify\_CGI,intra}}\ ms$, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs stated in Table 8.1.2.2.4.1-1 on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX and no eDRX_CONN cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.1.2.2.4.1-1: Requirement on minimum number of ACK/NACKs to transmit during $T_{basic\_identify\_CGI,\ intra}$.

UL/DL configuration	Minimum number of transmitted ACK/NACKs
0 (Note 1)	18
1	35
2	43
3	36
4	39
5	42
6	30
Note 1: When a UE is configured with EIMTA-*MainConfigServCell* via RRC signalling [2] only this requirement shall apply.	

8.1.2.2.4.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. In case eDRX_CONN is used, the ECGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.3 E-UTRAN inter frequency measurements

The UE shall be able to identify new inter-frequency cells and perform RSRP, RSRQ, and RS-SINR measurements of identified inter-frequency cells if carrier frequency information is provided by the PCell, even if no explicit neighbour list with physical layer cell identities is provided.

8.1.2.3.1 E-UTRAN FDD – FDD inter frequency measurements

8.1.2.3.1.1 E-UTRAN FDD – FDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new FDD inter-frequency within $T_{\text{Identify\_Inter}}$ according to the following expression:

$$\mathrm{T}_{\text{Identify\_Inter}} = \mathrm{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathrm{T}_{\text{Inter1}}} \cdot N_{freq,n} \cdot K_n \quad ms \text{ (normal performance) and}$$

$$\mathrm{T}_{\text{Identify\_Inter}} = \mathrm{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathrm{T}_{\text{Inter1}}} \cdot N_{freq,r} \cdot K_r \quad ms \text{ (reduced performance)}$$

Where:

$T_{\text{Basic\_Identify\_Inter}}$ = 480 ms. It is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new FDD inter-frequency cell is defined.

$N_{\text{freq,n}}$ $N_{\text{freq,r}}$ K_n and K_r are defined in clause 8.1.2.1.1 and T_{inter1} is defined in clause 8.1.2.1

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP$|_{\text{dBm}}$ and RSRP Ês/Iot according to Annex B.2.3 for a corresponding Band,
- other RSRP related side conditions given in Sections 9.1.3.1 and 9.1.3.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled for a corresponding Band,
- RS-SINR related side conditions given in Sections 9.1.17.3.1 and 9.1.17.3.2 are fulfilled for a corresponding Band,
- SCH_RP$|_{\text{dBm}}$ and SCH Ês/Iot according to Annex B.2.3 for a corresponding Band.

When measurement gaps are scheduled for FDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP, RSRQ, and RS-SINR measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively, with measurement period given by table 8.1.2.3.1.1-1.

Table 8.1.2.3.1.1-1: Measurement period and measurement bandwidth

Configuration	Physical Layer Measurement period: $T_{\text{Measurement\_Period \_Inter\_FDD}}$ [ms] (normal performance)	Physical Layer Measurement period: $T_{\text{Measurement\_Period \_Inter\_FDD}}$ [ms] (reduced performance)	Measurement bandwidth [RB]
0	480 x K_n x $N_{\text{freq,n}}$	480 x K_r x $N_{\text{freq,r}}$	6
1 (Note)	240 x K_n x $N_{\text{freq,n}}$	240 x K_r x $N_{\text{freq,r}}$	50
Note: This configuration is optional			

The UE shall be capable of performing RSRP, RSRQ, and RS-SINR measurements of at least 4 inter-frequency cells per FDD inter-frequency for up to 3 FDD inter-frequencies or 8 FDD interfrequencies if the UE supports Increased UE carrier monitoring E-UTRA and the UE physical layer shall be capable of reporting RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period defined in Table 8.1.2.3.1.1-1.

8.1.2.3.1.1.1 Measurement Reporting Requirements

8.1.2.3.1.1.1.1 Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

8.1.2.3.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.1.1.1.3.

8.1.2.3.1.1.1.3 Event Triggered Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\ -inter}$ defined in clause 8.1.2.3.1.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_inter}$ defined in clause 8.1.2.3.1.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_Inter\_FDD}$ defined in clause 8.1.2.3.1.1 provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.3.1.2 E-UTRAN FDD – FDD inter frequency measurements when DRX is used

When DRX or eDRX_CONN is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN FDD inter frequency cell within $T_{identify\_inter}$. When DRX is in use, $T_{identify\_inter}$ is as defined in Table 8.1.2.3.1.2-1, and when eDRX_CONN is in use, $T_{identify\_inter}$ is as defined in Table 8.1.2.3.1.2-1A.

Table 8.1.2.3.1.2-1: Requirement to identify a newly detectable FDD interfrequency cell

DRX cycle length (s)	$T_{identify\_inter}$ (s) (DRX cycles), normal performance		$T_{identify\_inter}$ (s) (DRX cycles), reduced performance	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.16	Non DRX Requirements in clause 8.1.2.3.1.1 are applicable	Non DRX Requirements in clause 8.1.2.3.1.1 are applicable	Non DRX Requirements in clause 8.1.2.3.1.1 are applicable	Non DRX Requirements in clause 8.1.2.3.1.1 are applicable
0.256	$5.12*K_n*N_{freq,n}$ $(20*K_n*N_{freq,n})$	$7.68*K_n *N_{freq,n}$ $(30*K_n *N_{freq,n})$	$5.12*K_r*N_{freq,r}$ $(20*K_r*N_{freq,r})$	$7.68*K_r *N_{freq,r}$ $(30*K_r *N_{freq,r})$
0.32	$6.4*K_n *N_{freq,n}$ $(20*K_n *N_{freq,n})$	$7.68*K_n *N_{freq,nl}$ $(24*K_n *N_{freq,n})$	$6.4*K_r *N_{freq,r}$ $(20*K_r *N_{freq,r})$	$7.68*K_r *N_{freq,r}$ $(24*K_r *N_{freq,r})$
0.32< DRX-cycle≤2.56	Note $(20*K_n *N_{freq,n})$	Note $(20*K_n *N_{freq,n})$	Note $(20*K_r *N_{freq,r})$	Note $(20*K_r *N_{freq,r})$
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.3.1.2-1A: Requirement to identify a newly detectable FDD inter-frequency cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_inter}$ (s) (eDRX_CONN cycles), normal performance		$T_{identify\_inter}$ (s) (eDRX_CONN cycles), reduced performance	
	Gap period = 40 ms	**Gap period = 80 ms**	**Gap period = 40 ms**	**Gap period = 80 ms**
2.56< eDRX_CONN cycle≤10.24	Note $(20*K_n *N_{freq,n})$	Note $(20*K_n *N_{freq,n})$	Note $(20*K_r *N_{freq,r})$	Note $(20*K_r *N_{freq,r})$
Note: Time depends upon the eDRX_CONN cycle in use				

A cell shall be considered detectable provided following conditions are fulfilled:

- $RSRP|_{dBm}$ and RSRP Ês/Iot according to Annex B.2.3 for a corresponding Band,
- other RSRP related side conditions given in Clause 9.1.3.1 and 9.1.3.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled for a corresponding Band,
- RS-SINR related side conditions given in Sections 9.1.17.3.1 and 9.1.17.3.2 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ SCH Ês/Iot according to Annex B.2.3 for a corresponding Band.

When DRX or eDRX_CONN is in use, the UE shall be capable of performing RSRP, RSRQ, and RS-SINR measurements of at least 4 inter-frequency cells per FDD inter-frequency and the UE physical layer shall be capable of reporting RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period $T_{measure\_inter}$, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps. When DRX is used, $T_{measure\_inter}$ is as defined in Table 8.1.2.3.1.2-2, and when eDRX_CONN is in use, $T_{measure\_inter}$ is as defined in Table 8.1.2.3.1.2-3.

Table 8.1.2.3.1.2-2: Requirement to measure FDD interfrequency cells

DRX cycle length (s)	$T_{measure\_inter}$ (s) (DRX cycles) (normal performance)	$T_{measure\_inter}$ (s) (DRX cycles) (reduced performance)
≤0.08	Non DRX Requirements in clause 8.1.2.3.1.1 are applicable	Non DRX Requirements in clause 8.1.2.3.1.1 are applicable
0.08<DRX-cycle≤2.56	Note ($5*K_n*N_{freq,n}$)	Note ($5*K_r*N_{freq,r}$)
Note: Time depends upon the DRX cycle in use		

Table 8.1.2.3.1.2-3: Requirement to measure FDD inter-frequency cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_inter}$ (s) (eDRX_CONN cycles) (normal performance)	$T_{measure\_inter}$ (s) (eDRX_CONN cycles) (reduced performance)
2.56<eDRX_CONN cycle≤10.24	Note ($5*K_n*N_{freq,n}$)	Note ($5*K_r*N_{freq,r}$)
Note: Time depends upon the eDRX_CONN cycle in use		

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.3.1 and 9.1.3.2, the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.6.1 and 9.1.6.2, and the RS-SINR measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.17.3.1 and 9.1.17.3.2.

8.1.2.3.1.2.1 Measurement Reporting Requirements

8.1.2.3.1.2.1.1 Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

8.1.2.3.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.1.2.1.3.

8.1.2.3.1.2.1.3 Event Triggered Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_inter}$ defined in clause 8.1.2.3.1.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_inter}$ defined in clause 8.1.2.3.1.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{measure\_inter}$ defined in clause 8.1.2.3.1.2 provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.3.2 E-UTRAN TDD – TDD inter frequency measurements

8.1.2.3.2.1 E-UTRAN TDD – TDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new TDD inter-frequency within $T_{Identify\_Inter}$ according to the following expression:

- When configuration 0 or configuration 1 in Table 8.1.2.3.2.1-1 is applied,

$$\mathrm{T}_{\mathrm{Identify\_Inter}} = \mathrm{T}_{\mathrm{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathrm{T}_{\mathrm{Inter1}}} \cdot N_{freq} \quad ms,$$

- When configuration 2 or configuration 3 in Table 8.1.2.3.2.1-1 is applied,

$$\mathrm{T}_{\mathrm{Identify\_Inter}} = \mathrm{T}_{\mathrm{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathrm{T}_{\mathrm{Inter1}}} \cdot N_{freq} + 240 \cdot N_{freq} \quad ms,.$$

$T_{Basic\_Identify\_Inter}$ = 480 ms. It is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new TDD inter-frequency cell is defined.

N_{freq} is defined in clause 8.1.2.1.1 and T_{inter1} is defined in clause 8.1.2.1

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP$|_{dBm}$ and RSRP Ês/Iot according to Annex B.2.3 for a corresponding Band,
- other RSRP related side conditions given in Clause 9.1.3.1 and 9.1.3.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled for a corresponding Band,
- RS-SINR related side conditions given in Sections 9.1.17.3.1 and 9.1.17.3.2 are fulfilled for a corresponding Band,
- SCH_RP$|_{dBm}$ and SCH Ês/Iot according to Annex B.2.3 for a corresponding Band.

When measurement gaps are scheduled for TDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP, RSRQ, and RS-SINR measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively, with measurement period ($T_{Measurement\_Period\_TDD\_Inter}$) given by table 8.1.2.3.2.1-1:

Table 8.1.2.3.2.1-1: $T_{Measurement\_Period\_TDD\_Inter}$ for different configurations

Configuration	Measurement bandwidth [RB]	Number of UL/DL sub-frames per half frame (5 ms)		DwPTS		$T_{Measurement\_Period\_TDD\_Inter}$ [ms] (normal performance)	$T_{Measurement\_Period\_TDD\_Inter}$ [ms] (reduced performance)
		DL	UL	Normal CP	Extended CP		

0	6	2	2	$19760 \cdot T_s$	$20480 \cdot T_s$	480 x K_n x $N_{freq,n}$	480 x K_r x $N_{freq,r}$
1 (Note 1)	50	2	2	$19760 \cdot T_s$	$20480 \cdot T_s$	240 x K_n x $N_{freq,n}$	240 x K_r x $N_{freq,r}$
2	6	1	3	$19760 \cdot T_s$	$20480 \cdot T_s$	720 x K_n x $N_{freq,n}$	720 x K_r x $N_{freq,r}$
3 (Note 1)	50	1	3	$19760 \cdot T_s$	$20480 \cdot T_s$	480 x K_n x $N_{freq,n}$	480 x K_r x $N_{freq,r}$
Note 1: This configuration is optional Note 2: T_s is defined in TS 36.211 [16] Note 3: N/A.							

The UE shall be capable of performing RSRP, RSRQ, RS-SINR measurements of at least 4 inter-frequency cells per TDD inter-frequency and the UE physical layer shall be capable of reporting RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period $T_{Measurement\_Period\_TDD\_Inter}$.

8.1.2.3.2.1.1 Measurement Reporting Requirements

8.1.2.3.2.1.1.1 Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

8.1.2.3.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.2.1.1.3.

8.1.2.3.2.1.1.3 Event Triggered Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{Identify\_Inter}$ defined in clause 8.1.2.3.2.1. When L3 filtering is used or IDC autonomous denial or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{Identify\_Inter}$ defined in clause 8.1.2.3.2.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_TDD\_Inter}$ defined in clause 8.1.2.3.2.1 provided the timing to that cell has not changed more than ± 50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.3.2.2 E-UTRAN TDD – TDD inter frequency measurements when DRX is used

When DRX or eDRX_CONN is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN TDD inter frequency cell within $T_{identify\_inter}$. When DRX is in use, $T_{identify\_inter}$ is as defined in Table 8.1.2.3.2.2-1, and when eDRX_CONN is in use $T_{identify\_inter}$ is as defined in Table 8.1.2.3.2.2-1A.

Table 8.1.2.3.2.2-1: Requirement to identify a newly detectable TDD interfrequency cell

DRX cycle length (s)	$T_{identify\_inter}$ (s) (DRX cycles) (normal performance)		$T_{identify\_inter}$ (s) (DRX cycles) (reduced performance)	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.16	Non DRX Requirements in clause 8.1.2.3.2.1 are applicable	Non DRX Requirements in clause 8.1.2.3.2.1 are applicable	Non DRX Requirements in clause 8.1.2.3.2.1 are applicable	Non DRX Requirements in clause 8.1.2.3.2.1 are applicable
0.256	$5.12*K_n*N_{freq,n}$ $(20*K_n *N_{freq,n})$	$7.68*K_n *N_{freq,n}$ $(30*K_n *N_{freq,n})$	$5.12*K_r*N_{freq,r}$ $(20*K_r *N_{freq,r})$	$7.68*K_r *N_{freq,r}$ $(30*K_r *N_{freq,r})$
0.32	$6.4*K_n *N_{freq,n}$ $(20*K_n *N_{freq,n})$	$7.68*K_n *N_{freq,n}$ $(24*K_n *N_{freq,n})$	$6.4*K_r *N_{freq,r}$ $(20*K_r *N_{freq,r})$	$7.68*K_r *N_{freq,r}$ $(24*K_r *N_{freq,r})$
0.32<DRX-cycle≤2.56	Note $(20*K_n *N_{freq,n})$	Note $(20*K_n *N_{freq,n})$	Note $(20*K_r *N_{freq,r})$	Note $(20*K_r *N_{freq,r})$
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.3.2.2-1A: Requirement to identify a newly detectable TDD inter-frequency cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_inter}$ (s) (eDRX_CONN cycles) (normal performance)		$T_{identify\_inter}$ (s) (eDRX_CONN cycles) (reduced performance)	
	Gap period = 40 ms	**Gap period = 80 ms**	**Gap period = 40 ms**	**Gap period = 80 ms**
2.56<eDRX_CONN cycle ≤10.24	Note $(20*K_n *N_{freq,n})$	Note $(20*K_n *N_{freq,n})$	Note $(20*K_r *N_{freq,r})$	Note $(20*K_r *N_{freq,r})$
Note: Time depends upon the eDRX_CONN cycle in use				

A cell shall be considered detectable provided following conditions are fulfilled:

- $RSRP|_{dBm}$ and RSRP Ês/Iot according to Annex B.2.3 for a corresponding Band,
- other RSRP related side conditions given in Clause 9.1.3.1 and 9.1.3.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled for a corresponding Band,
- RS-SINR related side conditions given in Sections 9.1.17.3.1 and 9.1.17.3.2 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.3 for a corresponding Band.

When DRX or eDRX_CONN is in use, the UE shall be capable of performing RSRP, RSRQ, and RS-SINR measurements of at least 4 inter-frequency cells per TDD inter-frequency for up to 3 TDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period $T_{measure\_inter}$, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps. When DRX is in use, $T_{measure\_inter}$ is as defined in Table 8.1.2.3.2.2-2, and when eDRX_CONN is in use, $T_{measure\_inter}$ is as defined in Table 8.1.2.3.2.2-3.

Table 8.1.2.3.2.2-2: Requirement to measure TDD interfrequency cells

DRX cycle length (s)	$T_{measure\_inter}$ (s) (DRX cycles) (normal requirement)	$T_{measure\_inter}$ (s) (DRX cycles) (reduced requirement)
≤0.08	Non DRX Requirements in clause 8.1.2.3.2.1 are applicable	Non DRX Requirements in clause 8.1.2.3.2.1 are applicable
0.128	When configuration 2 non DRX Requirements in clause 8.1.2.3.2.1 are applicable, Otherwise Note ($5*K_n*N_{freq,n}$)	When configuration 2 non DRX Requirements in clause 8.1.2.3.2.1 are applicable, Otherwise Note ($5*K_r*N_{freq,r}$)
0.128<DRX-cycle≤2.56	Note ($5*K_n*N_{freq,n}$)	Note ($5*K_r*N_{freq,r}$)
Note: Time depends upon the DRX cycle in use		

Table 8.1.2.3.2.2-3: Requirement to measure TDD inter-frequency cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_inter}$ (s) (eDRX_CONN cycles) (normal requirement)	$T_{measure\_inter}$ (s) (eDRX_CONN cycles) (reduced requirement)
2.56<eDRX_CONN cycle ≤10.24	Note ($5*K_n*N_{freq,n}$)	Note ($5*K_r*N_{freq,r}$)
Note: Time depends upon the eDRX_CONN cycle in use		

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.3.1 and 9.1.3.2, the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.6.1 and 9.1.6.2, and the RS-SINR measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.17.3.1 and 9.1.17.3.2.

8.1.2.3.2.2.1 Measurement Reporting Requirements

8.1.2.3.2.2.1.1 Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

8.1.2.3.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.2.2.1.3.

8.1.2.3.2.2.1.3 Event Triggered Reporting

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in clause 9.1.3.1, 9.1.3.2, 9.1.6.1, 9.1.6.2, 9.1.17.3.1 and 9.1.17.3.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{Identify\_Inter}$ defined in Clause 8.1.2.3.2.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{Identify\_Inter}$ in clause 8.1.2.3.2.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{measure\_inter}$ in clause 8.1.2.3.2.2 provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.3.3 E-UTRAN TDD – FDD inter frequency measurements

8.1.2.3.3.1 E-UTRAN TDD – FDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.1.2.3.1.1 also apply for this section.

8.1.2.3.3.2 E-UTRAN TDD – FDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

When DRX or eDRX_CONN cycle is used, the requirements in clause 8.1.2.3.1.2 shall also apply for this section.

8.1.2.3.4 E-UTRAN FDD – TDD inter frequency measurements

8.1.2.3.4.1 E-UTRAN FDD – TDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.1.2.3.2.1 also apply for this section.

8.1.2.3.4.2 E-UTRAN FDD – TDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

When DRX or eDRX_CONN cycle is used, the requirements in clause 8.1.2.3.2.2 shall also apply for this section.

8.1.2.3.5 E-UTRAN FDD-FDD inter frequency measurements with autonomous gaps

8.1.2.3.5.1 Identification of a new CGI of E-UTRA FDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose of ‘reportCGI’. The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of ‘reportCGI’, regardless of whether DRX or eDRX_CONN is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$\mathrm{T}_{\text{identify\_CGI, inter}} = \mathrm{T}_{\text{basic\_identify\_CGI, inter}} \quad ms$$

Where

$T_{basic\_identify\_CGI,\ inter}$ = 150 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.3 for a corresponding Band.

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI,inter}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

Within the time, $T_{identify\_CGI,\,intra}$ ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall transmit at least 60 ACK/NACKs on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX and no eDRX_CONN cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

8.1.2.3.5.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. In case eDRX_CONN is used, the ECGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.3.6 E-UTRAN TDD-FDD inter frequency measurements using autonomous gaps

The requirements in this clause shall apply to UE supporting FDD and TDD.

8.1.2.3.6.1 Identification of a new CGI of E-UTRA FDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose of 'reportCGI'. The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX or eDRX_CONN is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI,\,inter} = T_{basic\_identify\_CGI,\,inter} \quad ms$$

Where

$T_{basic\_identify\_CGI,\,inter}$ = 150 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.4 for a corresponding Band.

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI,inter}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

Within the time, $T_{identify\_CGI, inter}$ ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs stated in Table 8.1.2.3.6.1-1 on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX and no eDRX_CONN cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.1.2.3.6.1-1: Requirement on minimum number of ACK/NACKs to transmit during $T_{basic\_identify\_CGI, inter}$.

TDD UL/DL configuration for serving cell	Minimum number of transmitted ACK/NACKs
0 (Note 1)	18
1	30
Note 1: When a UE is configured with *EIMTA-MainConfigServCell* via RRC signalling [2] only this requirement shall apply. Note 2: The requirement for other TDD UL/DL configuration is TBD.	

8.1.2.3.6.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. In case eDRX_CONN is used, the ECGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.3.7 E-UTRAN TDD-TDD inter frequency measurements with autonomous gaps

8.1.2.3.7.1 Identification of a new CGI of E-UTRA TDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose of 'reportCGI'. The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX or eDRX_CONN is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI, inter} = T_{basic\_identify\_CGI, inter} \quad ms$$

Where

$T_{basic\_identify\_CGI, inter}$ = 150 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.4 for a corresponding Band.

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI,inter}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

Within the time, $T_{identify\_CGI,inter}$ ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs stated in Table 8.1.2.3.7.1-1 on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX and no eDRX_CONN cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.1.2.3.7.1-1: Requirement on minimum number of ACK/NACKs to transmit during $T_{basic\_identify\_CGI, inter}$.

TDD UL/DL configuration for serving cell	Minimum number of transmitted ACK/NACKs
0 (Note 1)	18
1	30
Note 1: When a UE is configured with *EIMTA-MainConfigServCell* via RRC signalling [2] only this requirement shall apply cell. Note 2: The requirement for other TDD UL/DL configuration is TBD.	

8.1.2.3.7.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. In case eDRX_CONN is used, the ECGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.3.8 E-UTRAN FDD-TDD inter frequency measurements using autonomous gaps

The requirements in this clause shall apply to UE supporting FDD and TDD.

8.1.2.3.8.1 Identification of a new CGI of E-UTRA TDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose of ‘reportCGI’. The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of ‘reportCGI’, regardless of whether DRX or eDRX_CONN is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI,inter} = T_{basic\_identify\_CGI,inter} \quad ms$$

Where

> $T_{basic\_identify\_CGI, inter}$ = 150 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,

- SCH_RP and SCH Ês/Iot according to Annex B.2.4 for a corresponding Band.

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [5].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI,inter}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

Within the time, $T_{identify\_CGI,inter}$ ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall have more than 60 ACK/NACKs transmitted on PCell or each of activated SCell(s), provided that:

- there is continuous DL data allocation,
- no DRX and no eDRX_CONN cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

8.1.2.3.8.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. In case eDRX_CONN is used, the ECGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.4 Inter RAT measurements

8.1.2.4.1 E-UTRAN FDD – UTRAN FDD measurements

8.1.2.4.1.1 E-UTRAN FDD – UTRAN FDD measurements when no DRX is used

8.1.2.4.1.1.1 Identification of a new UTRA FDD cell

When explicit neighbour list is provided and no DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify,\ UTRA\_FDD} = T_{basic\_identify\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} \cdot K_n \cdot N_{freq,n} \quad ms \text{ (normal performance)},$$

and

$$T_{identify,\ UTRA\_FDD} = T_{basic\_identify\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} \cdot K_r \cdot N_{freq,r} \quad ms \text{ (reduced performance)}$$

A cell shall be considered detectable when

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.4.1.1.1a Enhanced UTRA FDD cell identification requirements

When explicit neighbour list is provided and no DRX is used or when DRX cycle length ≤ 40 ms, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the monitored set within $T_{identify,\ enhanced\_UTRA\_FDD}$:

$$T_{identify,\ enhanced\_UTRA\_FDD} = (T_{basic\_identify\_enhanced\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} + 480)\ K_n N_{freq,n} \quad ms \text{ (normal performance)}$$

and

$$T_{identify,\ enhanced\_UTRA\_FDD} = (T_{basic\_identify\_enhanced\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} + 480)\ K_r N_{freq,r} \quad ms \text{ (reduced performance)}$$

A cell shall be considered detectable when:

- CPICH Ec/Io $\geq$ -15 dB,
- SCH_Ec/Io $\geq$ -15 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.4.1.1.2 UE UTRA FDD CPICH measurement capability

When measurement gaps are scheduled for UTRA FDD inter RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in Clause 9.2 with measurement period given by

$$T_{measurement\_UTRA\_FDD} = Max\left\{T_{Measurement\_Period\ UTRA\_FDD}, T_{basic\_measurement\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} \cdot K_n \cdot N_{freq,n}\right\} ms \text{ (normal performance)},$$

and

$$T_{measurement\_UTRA\_FDD} = Max\left\{T_{Measurement\_Period\ UTRA\_FDD}, T_{basic\_measurement\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} \cdot K_r \cdot N_{freq,r}\right\} ms \text{ (reduced performance)}$$

The UE shall be capable of performing UTRA FDD CPICH measurements for $X_{basic\ measurementUTRA\_FDD}$ inter-frequency cells per FDD frequency and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_\ UTRA\_FDD}$.

$X_{basic\ measurement\ UTRA\_FDD} = 6$

$T_{Measurement\_Period\ UTRA\_FDD}$ = 480 ms. The period used for calculating the measurement period $T_{measurement\_UTRA\_FDD}$ for UTRA FDD CPICH measurements.

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms. This is the time period used in the inter RAT equation in clause 8.1.2.4.1.1.1 where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

$T_{basic\_identify\_enhanced\_UTRA\_FDD}$ = 60 ms. This is the time period used in the inter RAT equation in clause 8.1.2.4.1.1.1a where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

$T_{basic\_measurement\_UTRA\_FDD}$ = 50 ms. This is the time period used in the equation for defining the measurement period for inter RAT CPICH measurements.

$N_{freq,\ n}$, $N_{freq,r}$,K_n and K_r are defined in clause 8.1.2.1.1 and T_{inter1} is defined in clause 8.1.2.1

8.1.2.4.1.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

8.1.2.4.1.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify,\ UTRA\_FDD}$ defined in Clause 8.1.2.4.1.1.1 for the minimum requirements or $T_{identify,\ enhanced\_UTRA\_FDD}$ defined in Clause 8.1.2.4.1.1.1a for the enhanced requirements When L3 filtering is used or IDC autonomous denial or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify,\ UTRA\_FDD}$ defined in clause 8.1.2.4.1.1.1 for the minimum requirements or $T_{identify,\ enhanced\_UTRA\_FDD}$ defined in Clause 8.1.2.4.1.1.1a for the enhanced requirements and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{measurement\_UTRA\_FDD}$ defined in clause 8.1.2.4.1.1.2 provided the timing to that cell has not changed more than ± 32 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.4.1.1.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.1.1.4.

8.1.2.4.1.2 E-UTRAN FDD – UTRAN FDD measurements when DRX is used

When explicit neighbour list is provided and DRX or eDRX_CONN is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the neighbour cell list within $T_{identify,UTRA\_FDD}$. When DRX is used, $T_{identify,UTRA\_FDD}$ is as defined in table 8.1.2.4.1.2-1, and when eDRX_CONN is used, $T_{identify,UTRA\_FDD}$ is as defined in table 8.1.2.4.1.2-1A.

Table 8.1.2.4.1.2-1: Requirement to identify a newly detectable UTRA FDD cell

DRX cycle length (s)	$T_{identify\_UTRA\_FDD}$ (s) (DRX cycles) normal requirement		$T_{identify\_UTRA\_FDD}$ (s) (DRX cycles) reduced requirement	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.04	Non DRX Requirements in clause 8.1.2.4.1.1 are applicable	Non DRX Requirements in clause 8.1.2.4.1.1 are applicable	Non DRX Requirements in clause 8.1.2.4.1.1 are applicable	Non DRX Requirements in clause 8.1.2.4.1.1 are applicable
0.064	2.56*K_n* $N_{freq,n}$ (40* $Nf_{freq,n}$)	4.8* K_n* $N_{freq,n}$ (75* K_n* $N_{freq,n}$)	2.56*K_r* $N_{freq,r}$ (40* K_r* $Nf_{freq,r}$)	4.8* K_r* $N_{freq,r}$(75* K_r* $N_{freq,r}$)
0.08	3.2* K_n* $N_{freq,n}$ (40* K_n* $N_{freq,n}$)	4.8* K_n* $N_{freq,n}$ (60* K_n* $N_{freq,n}$)	3.2* K_r* $N_{freq,r}$ (40* K_r* $N_{freq,r}$)	4.8* K_r* $N_{freq,r}$ (60* K_r* $N_{freq,r}$)
0.128	3.2* K_n* $N_{freq,n}$ (25* K_n* Nfreq)	4.8* K_n* $N_{freq,n}$ (37.5* K_n* $N_{freq,n}$)	3.2* K_r* $N_{freq,n}$ (25* K_r* $N_{freq,r}$)	4.8* K_r* $N_{freq,r}$ (37.5* K_r* $N_{freq,r}$)
0.16	3.2* K_n* $N_{freq,n}$ (20* K_n* $N_{freq,n}$)	4.8* K_n* $N_{freq,n}$ (30* K_n* $N_{freq,n}$)	3.2* K_r* $N_{freq,n}$ (20* K_r* $N_{freq,r}$)	4.8* K_r* $N_{freq,r}$ (30* K_r* $N_{freq,r}$)
0.16<DRX-cycle≤2.56	Note (20* K_n* $N_{freq,n}$)	Note (20* K_n* $N_{freq,n}$)	Note (20* K_r* $N_{freq,r}$)	Note (20* K_r* $N_{freq,r}$)
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.4.1.2-1A: Requirement to identify a newly detectable UTRA FDD cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_UTRA\_FDD}$ (s) (eDRX_CONN cycles) normal requirement		$T_{identify\_UTRA\_FDD}$ (s) (eDRX_CONN cycles) reduced requirement	
	Gap period = 40 ms	**Gap period = 80 ms**	**Gap period = 40 ms**	**Gap period = 80 ms**
2.56<eDRX_CONN cycle≤10.24	Note (20* K_n* $N_{freq,n}$)	Note (20* K_n* $N_{freq,n}$)	Note (20* K_r* $N_{freq,r}$)	Note (20* K_r* $N_{freq,r}$)
Note: Time depends upon the eDRX_CONN cycle in use				

A cell shall be considered detectable provided following conditions are fulfilled: A cell shall be considered detectable when

- CPICH Ec/Io ≥ -20 dB,
- SCH_Ec/Io ≥ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

When DRX or eDRX_CONN is used, the UE shall be capable of performing RSCP and Ec/Io measurements of at least 6 UTRA cells per UTRA FDD carrier for up to 3 UTRA FDD carriers and the UE physical layer shall be capable of reporting RSCP and Ec/Io measurements to higher layers within the measurement period $T_{measure\_ UTRA\_FDD}$, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps. UE supporting Increased UE carrier monitoring UTRA shall be capable of performing RSCP and Ec/Io measurements of at least 6 UTRA cells per UTRA FDD carrier for up to 6 UTRA FDD carriers with maximum of 80 cells consisting of at most 32 cells per frequency layer in the neighbour cell list. When DRX is used, $T_{measure\_ UTRA\_FDD}$ is defined in Table 8.1.2.3.1.2-2, and when eDRX_CONN cycle is used, $T_{measure\_ UTRA\_FDD}$ is defined in Table 8.1.2.3.1.2-3.

Table 8.1.2.4.1.2-2: Requirement to measure UTRA FDD cells

DRX cycle length (s)	$T_{measure\_UTRA\_FDD}$ (s) (DRX cycles) normal requirement		$T_{measure\_UTRA\_FDD}$ (s) (DRX cycles) normal requirement	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.04	Non DRX Requirements in clause 8.1.2.4.1.1 are applicable	Non DRX Requirements in clause 8.1.2.4.1.1 are applicable	Non DRX Requirements in clause 8.1.2.4.1.1 are applicable	Non DRX Requirements in clause 8.1.2.4.1.1 are applicable
0.064	$0.48*K_n*N_{freq,n}$ ($7.5*K_n*N_{freq,n}$)	$0.8*K_n*N_{freq,n}$ ($12.5*K_n*N_{freq,n}$)	$0.48*K_r*N_{freq,r}$ ($7.5*K_r*N_{freq,r}$)	$0.8*K_r*N_{freq,r}$ ($12.5*K_r*N_{freq,r}$)
0.08	$0.48*K_n*N_{freq,n}$ ($6*K_n*N_{freq,n}$)	$0.8*K_n*N_{freq,n}$ ($10*N_{freq,n}$)	$0.48*K_r*N_{freq,r}$ ($6*K_r*N_{freq,r}$)	$0.8*K_r*N_{freq,r}$ ($10*K_r*N_{freq,r}$)
0.128	$0.64*K_n*N_{freq,n}$ ($5*K_n*N_{freq,n}$)	$0.8*K_n*N_{freq,n}$ ($6.25*N_{freq,n}$)	$0.64*K_r*N_{freq,r}$ ($5*K_r*N_{freq,r}$)	$0.8*K_r*N_{freq,r}$ ($6.25*N_{freq,r}$)
0.128<DRX-cycle≤2.56	Note ($5*K_n*N_{freq,n}$)	Note ($5*K_n*N_{freq,n}$)	Note ($5*K_r*N_{freq,r}$)	Note ($5*K_r*N_{freq,r}$)
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.4.1.2-3: Requirement to measure UTRA FDD cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_UTRA\_FDD}$ (s) (eDRX_CONN cycles) normal requirement		$T_{measure\_UTRA\_FDD}$ (s) (eDRX_CONN cycles) normal requirement	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
2.56<eDRX_CONN cycle≤10.24	Note ($5*K_n*N_{freq,n}$)	Note ($5*K_n*N_{freq,n}$)	Note ($5*K_r*N_{freq,r}$)	Note ($5*K_r*N_{freq,r}$)
Note: Time depends upon the eDRX_CONN cycle in use				

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.4.1.2.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

8.1.2.4.1.2.2 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify,UTRA\_FDD}$ defined in Clause 8.1.2.4.1.2. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify,\ UTRA\_FDD}$ defined in clause 8.1.2.4.1.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{measurement\_UTRA\_FDD}$ defined in clause 8.1.2.4.1.2 provided the timing to that cell has not changed more than ± 32 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.4.1.2.3 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.1.2.2.

8.1.2.4.2 E-UTRAN TDD – UTRAN FDD measurements

The requirements in clause 8.1.2.4.1 also apply for this section.

8.1.2.4.2.1 E-UTRAN TDD – UTRAN FDD measurements when no DRX is used

8.1.2.4.2.2 E-UTRAN TDD – UTRAN FDD measurements when DRX is used

8.1.2.4.3 E-UTRAN TDD – UTRAN TDD measurements

8.1.2.4.3.1 E-UTRAN TDD – UTRAN TDD measurements when no DRX is used

8.1.2.4.3.1.1 Identification of a new UTRA TDD cell

When explicit neighbour list is provided and no DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the monitored set within

$$\mathrm{T}_{\text{identify, UTRA\_TDD}} = Max\left\{5000, \mathrm{T}_{\text{basic identify UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} \cdot K_n \cdot N_{freq,n}\right\} ms \text{ (normal performance),}$$

and

$$\mathrm{T}_{\text{identify, UTRA\_TDD}} = Max\left\{5000, \mathrm{T}_{\text{basic identify UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} \cdot K_r \cdot N_{freq,r}\right\} ms \text{ (reduced performance)}$$

A cell shall be considered detectable when

- P-CCPCH Ec/Io ≥ -8 dB,
- DwPCH_Ec/Io ≥ -5 dB.

When L3 filtering is used an additional delay can be expected.

8.1.2.4.3.1.1a Enhanced UTRA TDD cell identification requirements

When explicit neighbour list is provided and no DRX is used or when DRX cycle length ≤ 40 ms, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the monitored set within $\mathrm{T}_{\text{identify, enhanced\_UTRA\_TDD}}$:

$$\mathrm{T}_{\text{identify, enhanced\_UTRA\_TDD}} = (\mathrm{T}_{\text{basic\_identify\_enhanced\_UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} + 480) \cdot K_n \cdot N_{freq,n} \quad ms \text{ (normal performance),}$$

and

$$\mathrm{T}_{\text{identify, enhanced\_UTRA\_TDD}} = (\mathrm{T}_{\text{basic\_identify\_enhanced\_UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} + 480) \cdot K_r \cdot N_{freq,r} \quad ms \text{ (reduced performance)}$$

A cell shall be considered detectable when:

- P-CCPCH_Ec/Io ≥ -6 dB,

- DwPCH_Ec/Io $\geq$ -1 dB

When L3 filtering is used an additional delay can be expected.

8.1.2.4.3.1.2 UE UTRA TDD P-CCPCH RSCP measurement capability

When measurement gaps are scheduled for UTRA TDD inter RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in Clause 9.3 with measurement period given by

$$T_{\text{measurement UTRA\_TDD}} = Max\left\{T_{\text{Measurement\_Period UTRA\_TDD}}, T_{\text{basic measurement UTRA\_TDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot K_n \cdot N_{freq,n}\right\} ms \text{ (normal performance)}$$

$$T_{\text{measurement UTRA\_TDD}} = Max\left\{T_{\text{Measurement\_Period UTRA\_TDD}}, T_{\text{basic measurement UTRA\_TDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot K_r \cdot N_{freq,r}\right\} ms \text{ (reduced performance)}$$

The UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements for $X_{\text{basic measurementUTRA\_TDD}}$ inter-frequency cells per TDD frequency of the monitored set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{\text{Measurement\_ UTRA\_TDD.}}$

$X_{\text{basic measurementUTRA\_TDD}} = 6$

$T_{\text{Measurement\_Period UTRA\_TDD}}$ = 480 ms is the period used for calculating the measurement period $T_{\text{measurement\_UTRA\_TDD}}$ for UTRA TDD P-CCPCH RSCP measurements.

$T_{\text{basic\_identify\_UTRA\_TDD}}$ = 800 ms is the time period used in the inter RAT equation in clause 8.1.2.4.3.1.1 where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

$T_{\text{basic\_identify\_enhanced\_UTRA\_TDD}}$ = 80 ms is the time period used in the inter RAT equation in clause 8.1.2.4.3.1.1a where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

$T_{\text{basic\_measurement\_UTRA\_TDD}}$ = 50 ms is the time period used in the equation for defining the measurement period for inter RAT P-CCPCH RSCP measurements.

$N_{freq,n}$, $N_{freq,r}$, K_n and K_r are defined in clause 8.1.2.1.1 and T_{inter1} is defined in clause 8.1.2.1

8.1.2.4.3.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

8.1.2.4.3.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify, UTRA\_TDD}}$ defined in Clause 8.1.2.4.3.1.1 for the minimum requirements or $T_{\text{identify, enhanced\_UTRA\_TDD}}$ defined in Clause 8.1.2.4.3.1.1a for the enhanced requirements. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify, UTRA\_TDD}$ defined in clause 8.1.2.4.3.1.1 for the minimum requirements and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{measurement\_UTRA\_TDD}$ defined in clause 8.1.2.4.3.1.2 provided the timing to that cell has not changed more than ± 10 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.4.3.1.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.3.1.4.

8.1.2.4.3.2 E-UTRAN TDD – UTRAN TDD measurements when DRX is used

When explicit neighbour list is provided and DRX or eDRX_CONN is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable cell belonging to the neighbour cell list within $T_{identify,UTRA\_TDD}$. When DRX is used, $T_{identify,UTRA\_TDD}$ is as defined in table 8.1.2.4.3.2-1, and when eDRX_CONN is used, $T_{identify,UTRA\_TDD}$ is as defined in table 8.1.2.4.3.2-1A.

Table 8.1.2.4.3.2-1: Requirement to identify a newly detectable UTRA TDD cell

DRX cycle length (s)	$T_{identify\_UTRA\_TDD}$ (s) (DRX cycles) (normal requirement)		$T_{identify\_UTRA\_TDD}$ (s) (DRX cycles) (reduced requirement)	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.32	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable
0.32<DRX-cycle≤0.512	Note ($20*K_n*N_{freq,n}$)	Note ($25*K_n*N_{freq,n}$)	Note ($20*K_r*N_{freq,r}$)	Note ($25*K_r*N_{freq,r}$)
0.512<DRX-cycle≤2.56	Note ($20*K_n*N_{freq,n}$)	Note ($20*K_n*N_{freq,n}$)	Note ($20*K_r*N_{freq,r}$)	Note ($20*K_r*N_{freq,r}$)
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.4.3.2-1A: Requirement to identify a newly detectable UTRA TDD cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_UTRA\_TDD}$ (s) (eDRX_CONN cycles) (normal requirement)		$T_{identify\_UTRA\_TDD}$ (s) (eDRX_CONN cycles) (reduced requirement)	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
2.56<eDRX_CONN cycle ≤10.24	Note ($20*K_n*N_{freq,n}$)	Note ($20*K_n*N_{freq,n}$)	Note ($20*K_r*N_{freq,r}$)	Note ($20*K_r*N_{freq,r}$)
Note: Time depends upon the eDRX_CONN cycle in use				

A cell shall be considered detectable provided following conditions are fulfilled: A cell shall be considered detectable when

- P-CCPCH Ec/Io ≥ -8 dB,
- DwPCH_Ec/Io ≥ -5 dB.

When L3 filtering is used an additional delay can be expected.

When DRX or eDRX_CONN is in use, the UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements of at least 6 UTRA cells per UTRA TDD carrier for up to 3 UTRA TDD carriers and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period $T_{measure\_UTRA\_TDD}$, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps. UE supporting Increased UE carrier monitoring UTRA shall be capable of performing UTRA TDD P-CCPCH RSCP measurements of at least 6 UTRA cells per UTRA TDD carrier for up to 7 UTRA TDD carriers with maximum of 80 cells consisting of at most 32 cells per frequency layer in the neighbour cell list. When DRX is used, $T_{measure\_UTRA\_TDD}$ is as defined in Table 8.1.2.4.3.2-2, and when eDRX_CONN is used, $T_{measure\_UTRA\_TDD}$ is as defined in Table 8.1.2.4.3.2-3.

Table 8.1.2.4.3.2-2: Requirement to measure UTRA TDD cells

DRX cycle length (s)	$T_{measure\_UTRA\_TDD}$ (s) (DRX cycles) (normal requirement)		$T_{measure\_UTRA\_TDD}$ (s) (DRX cycles) (reduced requirement)	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.04	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable
0.064	$0.48*K_n*N_{freq,n}$ ($7.5*K_n *N_{freq,n}$)	$0.8*K_n *N_{freq,n}$ ($12.5*K_n *N_{freq,n}$)	$0.48* K_r* N_{freq,r}$ ($7.5* K_r* N_{freq,r}$)	$0.8* K_r* N_{freq,r}$ ($12.5* K_r* N_{freq,r}$)
0.08	$0.48*K_n *N_{freq,n}$ ($6*K_n *N_{freq,n}$)	$0.8*K_n *N_{freq,n}$ ($10*K_n *N_{freq,n}$)	$0.48* K_r* N_{freq,r}$ ($6* K_r* N_{freq,r}$)	$0.8* K_r* N_{freq,r}$ ($10* K_r* N_{freq,r}$)
0.128	$0.64*K_n *N_{freq,n}$ ($5*K_n *N_{freq,n}$)	$0.8*K_n *N_{freq,n}$ ($6.25*K_n *N_{freq,n}$)	$0.64* K_r* N_{freq,r}$ ($5* K_r* N_{freq,r}$)	$0.8* K_r* N_{freq,r}$ ($6.25* N_{freq,r}$)
0.128<DRX-cycle≤2.56	Note ($5*K_n *N_{freq,n}$)	Note ($5*K_n *N_{freq,n}$)	Note ($5* K_r* N_{freq,r}$)	Note ($5* K_r* N_{freq,r}$)
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.4.3.2-3: Requirement to measure UTRA TDD cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_UTRA\_TDD}$ (s) (eDRX_CONN cycles) (normal requirement)		$T_{measure\_UTRA\_TDD}$ (s) (eDRX_CONN cycles) (reduced requirement)	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
2.56<eDRX_CONN cycle≤10.24	Note ($5*K_n *N_{freq,n}$)	Note ($5*K_n *N_{freq,n}$)	Note ($5* K_r* N_{freq,r}$)	Note ($5* K_r* N_{freq,r}$)
Note: Time depends upon the eDRX_CONN cycle in use				

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.

8.1.2.4.3.2.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

8.1.2.4.3.2.2 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify, UTRA\_TDD}$ defined in Clause 8.1.2.4.3.2 When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify, UTRA\_TDD}$ defined in clause 8.1.2.4.3.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{measurement\_UTRA\_TDD}$ defined in clause 8.1.2.4.3.2 provided the timing to that cell has not changed more than ± 10 chips while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.4.3.2.3 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.3.2.2.

8.1.2.4.4 E-UTRAN FDD – UTRAN TDD measurements

The requirements in clause 8.1.2.4.3 also apply for this section.

8.1.2.4.5 E-UTRAN FDD – GSM measurements

8.1.2.4.5.1 E-UTRAN FDD – GSM measurements when no DRX is used

The requirements in this clause apply only to UE supporting E-UTRAN FDD and GSM.

Measurements on GSM cells can be requested with BSIC verified.

In RRC_CONNECTED state when a supported measurement gap pattern sequence according to Table 8.1.2.1-1 is configured by E-UTRAN, or the UE supports capability of conducting such measurements without gaps, the UE shall continuously measure GSM cells, search for new GSM cells given in the monitored set and re-confirm the BSIC for already detected cells.

8.1.2.4.5.1.1 GSM carrier RSSI

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in clause 8.1.2.1. A UE supporting GSM measurements shall measure minimum number of 10 GSM carrier RSSI measurement samples ($N_{GSM\ carrier\ RSSI}$) per measurement gap. In RRC_CONNECTED state the measurement period, $T_{Measurement\ Period,\ GSM}$, for the GSM carrier RSSI measurement is K_n*$N_{freq,n}$ *480 ms. The parameters $N_{freq,n}$ and K_n are defined in clause 8.1.2.1.1.

The UE shall meet the measurement accuracy requirements stated for RXLEV in [8], when the given measurement time allows the UE to take at least 3 GSM carrier RSSI samples per GSM carrier in the monitored set during the measurement period.

In case the UE is not able to acquire the required number of samples per GSM carrier during one measurement period, the UE shall measure as many GSM carriers as possible during that measurement period using at least 3 samples per GSM carrier. The GSM carriers that were not measured during that measurement period shall be measured in the following measurement periods.

8.1.2.4.5.1.2 BSIC verification

Measurements on a GSM cell can be requested with BSIC verified. The UE shall be able to report the GSM cells with BSIC verified for those cells where the verification of BSIC has been successful.

The procedure for BSIC verification on a GSM cell can be divided into the following two tasks:

- **Initial BSIC identification:** Includes searching for the BSIC and decoding the BSIC for the first time when there is no knowledge about the relative timing between the E-UTRAN FDD and GSM cells. The UE shall trigger the initial BSIC identification within the available measurement gap pattern sequence. The requirements for BSIC re-confirmation can be found in clause 8.1.2.4.5.1.2.1.

- **BSIC re-confirmation:** Tracking and decoding the BSIC of a GSM cell after initial BSIC identification is performed. The UE shall trigger the BSIC re-confirmation within the available measurement gap pattern. The requirements for BSIC re-confirmation can be found in clause 8.1.2.4.5.1.2.2.

If the network requests measurements on a GSM cell the UE shall behave as follows:

- The UE shall perform GSM carrier RSSI measurements according to clause 8.1.2.4.5.1 when a measurement gap pattern sequence is activated, or the UE supports capability of conducting such measurements without gaps.

The UE shall perform measurement reporting as defined in TS 36.331 [2].

- The UE shall perform BSIC identification. The UE shall use the most recently available GSM carrier RSSI measurement results for arranging GSM cells in signal strength order for performing BSIC identification.
- The UE shall perform BSIC re-confirmation on all the GSM cells that have been successfully identified.
- The UE shall perform all configured event evaluation for event-triggered reporting after the BSIC has been verified for a GSM cell. The UE shall use the most recently available GSM carrier RSSI measurement results in event evaluation and event-triggered reporting.
- Event-triggered and periodic reports shall be triggered according to TS 36.331 [2].

The BSIC of a GSM cell is considered to be "verified" if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification). Once a GSM cell has been identified the BSIC shall be re-confirmed at least once every $8*T_{re\text{-}confirm,GSM}$ seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified". If a measurement gap pattern sequence is deactivated by the network after BSIC has been identified or verified, the UE shall consider the BSIC as non-verified.

$T_{identify,GSM}$ indicates the maximum time allowed for the UE to decode the unknown BSIC of the GSM cell in one GSM BCCH carrier in the initial BSIC identification procedure.

$T_{re\text{-}confirm,GSM}$ indicates the maximum time allowed for the re-confirmation of the BSIC of one GSM cell in the BSIC re-confirmation procedure.

The UE shall be able to decode a BSIC within a measurement gap when the time difference between the middle of the received GSM synchronisation burst at the UE and the middle of the effective measurement gap is within the limits specified in table 8.1.2.4.5.1.2-1.

Table 8.1.2.4.5.1.2-1: The gap length and maximum time difference for BSIC verification

Gap length [ms]	Maximum time difference [µs]
6	± 2350 µs

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in [9].

8.1.2.4.5.1.2.1 Initial BSIC identification

This measurement shall be based on the measurement gaps used for Initial BSIC identification as described in clause 8.1.2.4.5.1.2.

The UE shall continuously attempt to decode the BSIC of SCH on the BCCH carrier of the 8 strongest BCCH carriers of the GSM cells indicated in the Inter-RAT cell info list. The UE shall give priority for BSIC decoding attempts in decreasing signal strength order to BCCH carriers with unknown BSIC. The strongest BCCH carrier is defined as the BCCH carrier having the highest measured GSM carrier RSSI value.

If the BSIC of the GSM BCCH carrier has been successfully decoded the UE shall immediately continue BSIC identification with the next GSM BCCH carrier, in signal strength order, with unknown BSIC. The GSM cell for which the BSIC has been successfully identified shall be moved to the BSIC re-confirmation procedure.

If the UE has not successfully decoded the BSIC of the GSM BCCH carrier within $T_{identify,GSM}$ ms, the UE shall abort the BSIC identification attempts for that GSM BCCH carrier. The UE shall continue to try to perform BSIC identification of the next GSM BCCH carrier in signal strength order. The GSM BCCH carrier for which the BSIC identification failed shall not be re-considered for BSIC identification until BSIC identification attempts have been made for all the rest of the 8 strongest GSM BCCH carriers in the monitored set with unknown BSIC.

$T_{identify,GSM}$ values are given for a set of reference gap patterns in table 8.1.2.4.5.1.2.1-1. The requirements in the table represent the time required to guarantee at least two attempts to decode the BSIC for one GSM BCCH carrier. If inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, then $T_{identify,GSM}$ shall be based on the 80ms gap configuration.

Table 8.1.2.4.5.1.2.1-1

ceil($N_{freq,n}$ * K_n – M_{gsm})	$T_{identify,gsm}$(ms)		$T_{reconfirm,gsm}$(ms)	
	40ms gap configuration (ID 0)	80ms gap configuration (ID 1)	40ms gap configuration (ID 0)	80ms gap configuration (ID 1)
0	2160	5280	1920	5040
1	5280	21760	5040	17280
2	5280	31680	5040	29280
3	19440	No requirement	13320	No requirement
4	31680	No requirement	29280	No requirement
5	31680	No requirement	29280	No requirement

8.1.2.4.5.1.2.2 BSIC re-confirmation

The UE shall maintain the timing information of up to 8 identified GSM cells. Initial timing information is obtained from the initial BSIC identification. The timing information shall be updated every time the BSIC is decoded.

For each measurement gap used for GSM BSIC reconfirmation as described in clause 8.1.2.4.5.1.2, the UE shall attempt to decode the BSIC falling within the measurement gap according to table 8.1.2.4.5.1.2.1-1. If more than one BSIC can be decoded within the same measurement gap, priority shall be given to the least recently decoded BSIC. If inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, then $T_{re-confirm,GSM}$ shall be based on the 80ms gap configuration.

If the UE fails to decode the BSIC after two successive attempts or if the UE has not been able to re-confirm the BSIC for a GSM cell within $T_{re-confirm,GSM}$ seconds, the UE shall abort the BSIC re-confirmation attempts for that GSM cell. The GSM cell shall be treated as a new GSM cell with unidentified BSIC and the GSM cell shall be moved to the initial BSIC identification procedure, see clause 8.1.2.4.5.1.2.1.

8.1.2.4.5.1.2a Enhanced BSIC verification

In addition to the BSIC verification requirements in clause 8.1.2.4.5.1.2, when the UE receives the GSM cell at levels down to 10 dB + the reference sensitivity level or reference interference levels as specified in [9] the BSIC identification requirement in table 8.1.2.4.5.1.2a-1 applies. The BSIC verification requirements in table 8.1.2.4.5.1.2a-1 shall apply when no DRX is used or when DRX cycle length ≤ 40 ms.

Table 8.1.2.4.5.1.2a-1

ceil($N_{freq,n}$ * K_n – M_{gsm})	$T_{enhanced\_identify,gsm}$(ms)		$T_{enhanced\_reconfirm,gsm}$(ms)	
	40ms gap configuration (ID 0)	40ms gap configuration when interfrequency RSTD measurement is also configured and the UE requires measurement gaps for performing such measurements	40ms gap configuration (ID 0)	40ms gap configuration when interfrequency RSTD measurement is also configured and the UE requires measurement gaps for performing such measurements
0	1320	2160	1080	1920

8.1.2.4.5.1.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

8.1.2.4.5.1.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH.

The event triggered reporting delay requirement is valid when the UE for each GSM carrier in the monitored set can take the required number of samples during the measurement period $T_{Measurement\ Period,\ GSM}$ (see clause 8.1.2.4.5.1).

The event triggered measurement reporting delay for a GSM cell with verified BSIC , measured without L3 filtering shall be less than $2*T_{Measurement\ Period,\ GSM}$, where $T_{Measurement\ Period,\ GSM}$ is defined in clause 8.1.2.4.5.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.4.5.1.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.5.1.4.

8.1.2.4.5.2 E-UTRAN FDD – GSM measurements when DRX is used

The requirements in this clause apply only to UE supporting E-UTRAN FDD and GSM.

Measurements on GSM cells can be requested with BSIC verified.

In RRC_CONNECTED state when a supported measurement gap pattern sequence according to Table 8.1.2.1-1 is configured by E-UTRAN, or the UE supports capability of conducting such measurements without gaps, the UE shall continuously measure GSM cells, search for new GSM cells given in the monitored set and re-confirm the BSIC for already detected cells. During DRX or eDRX_CONN periods the UE may use other periods of time outside the specified measurement gap patterns. The UE is not required to make measurements of GSM cells during DRX or eDRX_CONN periods if a measurement gap pattern has not been configured, unless the UE supports capability of conducting such measurements without gaps.

8.1.2.4.5.2.1 GSM carrier RSSI

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in clause 8.1.2.1. A UE supporting GSM measurements shall measure minimum number of 10 GSM carrier RSSI measurement samples ($N_{GSM\ carrier\ RSSI}$) per DRX or eDRX_CONN cycle. When DRX is used in RRC_CONNECTED state, the measurement period, $T_{Measurement\ Period,\ GSM}$, for the GSM carrier RSSI measurement is shown in table 8.1.2.4.5.2.1-1. When eDRX_CONN is used in RRC_CONNECTED state, the measurement period, $T_{Measurement\ Period,\ GSM}$, for the GSM carrier RSSI measurement is shown in table 8.1.2.4.5.2.1-2. The parameters $N_{freq,n}$ and K_n are defined in clause 8.1.2.1.1.

Table 8.1.2.4.5.2.1-1: GSM measurement period for large DRX

DRX cycle length (s)	$T_{measure,GSM}$ (s) (DRX cycles)
≤0.064	Non DRX Requirements are applicable
0.064<DRX-cycle≤ 0.08	Note ($6*K_n*N_{freq,n}$)
0.08<DRX-cycle≤ 2.56	Note ($5*K_n*N_{freq,n}$)
Note: Time depends upon the DRX cycle in use	

Table 8.1.2.4.5.2.1-2: GSM measurement period for large DRX when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure,GSM}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note ($5*K_n*N_{freq,n}$)
Note: Time depends upon the eDRX_CONN cycle in use	

The UE shall meet the measurement accuracy requirements stated for RXLEV in [8], when the given measurement time allows the UE to take at least 3 GSM carrier RSSI samples per GSM carrier in the monitored set during the measurement period.

In case the UE is not able to acquire the required number of samples per GSM carrier during one measurement period, the UE shall measure as many GSM carriers as possible during that measurement period using at least 3 samples per GSM carrier. The GSM carriers that were not measured during that measurement period shall be measured in the following measurement periods.

8.1.2.4.5.2.2 BSIC verification

Measurements on a GSM cell can be requested with BSIC verified. The UE shall be able to report the GSM cells with BSIC verified for those cells where the verification of BSIC has been successful.

The procedure for BSIC verification on a GSM cell can be divided into the following two tasks:

- **Initial BSIC identification:** Includes searching for the BSIC and decoding the BSIC for the first time when there is no knowledge about the relative timing between the E-UTRAN FDD and GSM cells.

- **BSIC re-confirmation:** Tracking and decoding the BSIC of a GSM cell after initial BSIC identification is performed. The UE shall trigger the BSIC re-confirmation within the available measurement gap pattern

If the network requests measurements on a GSM cell, the UE shall behave as follows:

- The UE shall perform GSM carrier RSSI measurements according to clause 8.1.2.4.5.2.1 when a measurement gap pattern sequence is activated, or the UE supports capability of conducting such measurements without gaps.

  The UE shall perform measurement reporting as defined in TS 36.331 [2].

- The UE shall perform BSIC identification. The UE shall use the most recently available GSM carrier RSSI measurement results for arranging GSM cells in signal strength order for performing BSIC identification.

- The UE shall perform BSIC re-confirmation on all the GSM cells that have been successfully identified.

- The UE shall perform all configured event evaluation for event-triggered reporting after the BSIC has been verified for a GSM cell. The UE shall use the most recently available GSM carrier RSSI measurement results in event evaluation and event-triggered reporting.
- Event-triggered and periodic reports shall be triggered according to TS 36.331 [2].

The BSIC of a GSM cell is considered to be “verified” if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification). Once a GSM cell has been identified the BSIC shall be re-confirmed at least once every 30 seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified".

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in [9].

8.1.2.4.5.2.2.1 Initial BSIC identification

This measurement shall be made on GSM cells that are requested with BSIC verified.

For DRX cycle length ≤ 40 ms, the initial GSM BSIC identification requirements corresponding to the non DRX requirements as specified in clause 8.1.2.4.5.1.2.1 shall apply.

For DRX cycle length > 40 ms and any eDRX_CONN cycle, the UE shall make at least one attempt every K_n*$N_{freq,n}$ *30s to decode the BSIC of SCH on the BCCH carrier of the 8 strongest BCCH carriers of the GSM cells indicated in the Inter-RAT cell info list. If the UE has not successfully decoded the BSIC of the GSM BCCH carrier within K_n*$N_{freq,n}$ *60 s, the UE shall abort the BSIC identification attempts for that GSM BCCH carrier. The UE shall give priority for BSIC decoding attempts in decreasing signal strength order to BCCH carriers with unknown BSIC. The strongest BCCH carrier is defined as the BCCH carrier having the highest measured GSM carrier RSSI value. The parameters $N_{freq,n}$ and K_n are defined in clause 8.1.2.1.1.

If the BSIC of the GSM BCCH carrier has been successfully decoded the UE shall continue BSIC identification with the next GSM BCCH carrier, in signal strength order, with unknown BSIC. The GSM cell for which the BSIC has been successfully identified shall be moved to the BSIC re-confirmation procedure.

8.1.2.4.5.2.2.2 BSIC re-confirmation

The UE shall maintain the timing information of up to 8 identified GSM cells. Initial timing information is obtained from the initial BSIC identification. The timing information shall be updated every time the BSIC is decoded.

For DRX cycle length ≤ 40 ms, the GSM BSIC re-conformation requirements corresponding to the non DRX requirements as specified in clause 8.1.2.4.5.1.2.2 shall apply.

For DRX cycle length > 40 ms and any eDRX_CONN cycle, at least every K_n*$N_{freq,n}$ *30 seconds, the UE shall attempt to decode the BSIC of each identified GSM cell.If the UE fails to decode the BSIC after two successive attempts or if the UE has not been able to re-confirm the BSIC for a GSM cell within K_n*$N_{freq,n}$ *60 seconds, the UE shall abort the BSIC re-confirmation attempts for that GSM cell. The GSM cell shall be treated as a new GSM cell with unidentified BSIC and the GSM cell shall be moved to the initial BSIC identification procedure, see clause 8.1.2.4.5.2.2.1. The parameters $N_{freq,n}$ and k_n are defined in clause 8.1.2.1.1.

8.1.2.4.5.2.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

8.1.2.4.5.2.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH.

The event triggered reporting delay requirement is valid when the UE for each GSM carrier in the monitored set can take the required number of samples during the measurement period $T_{\text{Measurement Period, GSM}}$ (see clause 8.1.2.4.5.2.1).

The event triggered measurement reporting delay for a GSM cell with verified BSIC , measured without L3 filtering shall be less than 2*$T_{Measurement\ Period,\ GSM}$, where $T_{Measurement\ Period,\ GSM}$ is defined in clause 8.1.2.4.5.2.1. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, an additional delay can be expected.

8.1.2.4.5.2.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.5.2.4.

8.1.2.4.6 E-UTRAN TDD – GSM measurements

The requirements in clause 8.1.2.4.5 also apply for this section.

8.1.2.4.7 E-UTRAN FDD – UTRAN FDD measurements for SON

8.1.2.4.7.1 Identification of a new UTRA FDD cell for SON

No explicit neighbour list is provided to the UE for identifying a UTRA cell for SON. The UE shall identify and report only the strongest cell when requested by the network for the purpose of SON.

8.1.2.4.7.1.1 Requirements when no DRX is used

When no DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new cell within:

$$\mathrm{T}_{\mathrm{identify,\ \ UTRA\_FDD}} = \mathrm{T}_{\mathrm{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{\mathrm{Tinter1}} \cdot K_n N_{freq,n} \quad ms \text{ (normal performance)}$$

and

$$\mathrm{T}_{\mathrm{identify,\ \ UTRA\_FDD}} = \mathrm{T}_{\mathrm{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{\mathrm{Tinter1}} \cdot K_r N_{freq,r} \quad ms \text{ (reduced performance)}$$

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

A cell shall be considered identifiable following conditions are fulfilled:

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA cell for SON within 8*$T_{identify,\ UTRA\_FDD}$ ms, the UE may stop searching UTRA cells for SON.

8.1.2.4.7.1.2 Requirements when DRX is used

When DRX or eDRX_CONN is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new cell within $T_{identify,\ UTRA\_FDD}$. When DRX is used, $T_{identify,\ UTRA\_FDD}$ is as defined in table 8.1.2.4.7.1.2-1, and when eDRX_CONN is used, $T_{identify,\ UTRA\_FDD}$ is as defined in table 8.1.2.4.7.1.2-2.

Table 8.1.2.4.7.1.2-1: Requirement to identify a new UTRA FDD cell for SON

DRX cycle length (s)	$T_{identify, UTRA\_FDD}$ (s) (DRX cycles) (normal requirement)		$T_{identify, UTRA\_FDD}$ (s) (DRX cycles) (reduced requirement)	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
≤0.04	Non DRX Requirements in clause 8.1.2.4.7.1.1are applicable	Non DRX Requirements in clause 8.1.2.4.7.1.1 are applicable	Non DRX Requirements in clause 8.1.2.4.7.1.1are applicable	Non DRX Requirements in clause 8.1.2.4.7.1.1 are applicable
0.04<DRX cycle≤0.08	Note ($45*K_n*N_{freq,n}$)	Note ($95*K_n * N_{freq,n}$)	Note ($45*K_r* N_{freq,r}$)	Note ($95*K_r * N_{freq,r}$)
0.128	$3.84*K_n * N_{freq,n}$ ($30*K_n * N_{freq,n}$)	$8.0*K_n * N_{freq,n}$ ($62.5*K_n * N_{freq,n}$)	$3.84*K_r * N_{freq,r}$ ($30*K_r * N_{freq,r}$)	$8.0*K_r * N_{freq,r}$ ($62.5*K_r * N_{freq,r}$)
0.16	$4.0*K_n * N_{freq,n}$ ($25*K_n * N_{freq,n}$)	$8.0*K_n * N_{freq,n}$ ($50*K_n * N_{freq,n}$)	$4.0*K_r * N_{freq,r}$ ($25*K_r * N_{freq,r}$)	$8.0*K_r * N_{freq,r}$ ($50*K_r * N_{freq,r}$)
0.256	$6.4*K_n * N_{freq,n}$ ($25*K_n * N_{freq,n}$)	$8.96*K_n * N_{freq,n}$ ($35*K_n * N_{freq,n}$)	$6.4*K_r * N_{freq,r}$ ($25*K_r * N_{freq,r}$)	$8.96*K_r * N_{freq,r}$ ($35*K_r * N_{freq,r}$)
0.32	$8*K_n * N_{freq,n}$ ($25*K_n * N_{freq,n}$)	$8.96*K_n * N_{freq,n}$ ($28*K_n * N_{freq,n}$)	$8*K_r * N_{freq,r}$ ($25*K_r * N_{freq,r}$)	$8.96*K_r * N_{freq,r}$ ($28*K_r * N_{freq,r}$)
0.32<DRX cycle≤2.56	Note ($25*K_n * N_{freq,n}$)	Note ($25*K_n * N_{freq,n}$)	Note ($25*K_r * N_{freq,r}$)	Note ($25*K_r * N_{freq,r}$)
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.4.7.1.2-2: Requirement to identify a new UTRA FDD cell for SON when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify, UTRA\_FDD}$ (s) (eDRX_CONN cycles) (normal requirement)		$T_{identify, UTRA\_FDD}$ (s) (eDRX_CONN cycles) (reduced requirement)	
	Gap period = 40 ms	Gap period = 80 ms	Gap period = 40 ms	Gap period = 80 ms
2.56<eDRX_CONN cycle≤10.24	Note ($25*K_n * N_{freq,n}$)	Note ($25*K_n * N_{freq,n}$)	Note ($25*K_r * N_{freq,r}$)	Note ($25*K_r * N_{freq,r}$)
Note: Time depends upon the eDRX_CONN cycle in use				

A cell shall be considered identifiable provided following conditions are fulfilled:

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA cell for SON within $8*T_{identify, UTRA\_FDD}$ seconds, the UE may stop searching UTRA cells for SON; when DRX is used $T_{identify, UTRA\_FDD}$ is defined in table 8.1.2.4.7.1.2-1, and when eDRX_CONN is used $T_{identify, UTRA\_FDD}$ is defined in table 8.1.2.4.7.1.2-2.

8.1.2.4.7.1.3 Reporting Delay

The UE shall not report the physical cell identity of an identifiable cell for SON as long as the reporting criteria are not fulfilled.

The reporting delay is defined as the time between the identification of the strongest cell for SON until the UE starts to transmit its physical cell identity over the Uu interface. This requirement assumes that the reporting of the physical cell identity is not delayed by other RRC signalling on the DCCH. This reporting delay excludes a delay uncertainty resulted when inserting the physical cell identity of the strongest cell for SON to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This reporting delay excludes any delay caused by unavailability of UL resources for UE sending the physical cell identity of the strongest cell for SON.

The reporting delay of the physical cell identity of the strongest cell for SON without L3 filtering shall be less than $T_{identify, UTRA\_FDD}$ defined in clause 8.1.2.4.7.1.1 and in clause 8.1.2.4.7.1.2 for non DRX and DRX or eDRX_CONN cases respectively. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.4.8 E-UTRAN TDD – UTRAN FDD measurements for SON

The requirements in clause 8.1.2.4.7 also apply for this section.

8.1.2.4.9 E-UTRAN FDD – cdma2000 1xRTT measurements

UE shall perform cdma2000 1xRTT measurements according to the procedure defined in [15] on the cdma2000 1xRTT neighbor cells indicated by the serving eNode B. If measurement gaps are required, the UE shall perform cdma2000 1xRTT measurements only during the measurement gaps configured by the serving eNode B.

8.1.2.4.9.1A E-UTRAN FDD – cdma2000 1xRTT measurements when no DRX is used

When measurement gaps are scheduled for CDMA2000 1xRTT inter RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CDMA2000 1xRTT Pilot Strength measurements to higher layers with measurement accuracy as specified in Clause 9.5, corresponding to a 90% measurement success rate, with measurement period given by

$$\mathrm{T}_{\mathrm{measurement\_CDMA2000\_1x}} = \mathrm{T}_{\mathrm{basic\_measurement\_CDMA2000\_1x}} \cdot N_{freq,n} \cdot K_n \cdot S_{gap}$$

where $\mathrm{T}_{\mathrm{basic\_measurement\_CDMA2000\_1x}}$ = 100 ms and the measurement gap specific scale factor S_{gap} is based on the measurement gap pattern in use as defined in Table 8.1.2.4.9.1-1. If inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, then S_{gap} shall be based to the Gap Pattern Id 1.

Table 8.1.2.4.9.1-1: Gap Pattern Specific Scale Factor

Gap Pattern Id	S_{gap}
0	32/3
1	64/3

8.1.2.4.9.1 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.

The measurement reporting delay of each periodic report is defined as the time between the end of the last measurement period and the moment when the UE starts to transmit the measurement report over the Uu interface. This delay shall be less than T_{71m} defined in [15] for each periodic report. This measurement reporting delay excludes a delay which is caused by the unavailability of the uplink resources for the UE to send the measurement report.

8.1.2.4.10 E-UTRAN TDD – cdma2000 1xRTT measurements

The requirements in clause 8.1.2.4.9 also apply for this section.

8.1.2.4.11 E-UTRAN FDD – HRPD measurements

UE shall perform HRPD measurements according to the procedure defined in [11] on the HRPD neighbor cells indicated by the serving eNode B. If measurement gaps are required, the UE shall perform HRPD measurements only during the measurement gaps configured by the serving eNode B.

8.1.2.4.12 E-UTRAN TDD – HRPD measurements

The requirements in clause 8.1.2.4.11 also apply for this section.

8.1.2.4.13 E-UTRAN TDD – UTRAN TDD measurements for SON

8.1.2.4.13.1 Identification of a new UTRA TDD cell for SON

No explicit neighbour list is provided to the UE for identifying a UTRA TDD cell for SON. The UE shall identify and report only the strongest cell when requested by the network for the purpose of SON.

8.1.2.4.13.1.1 Requirements when no DRX is used

When no DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new cell within:

$$T_{\text{identify, UTRA\_TDD}} = T_{\text{basic\_identify\_UTRA\_TDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot K_n \cdot N_{freq,n} \quad ms \text{ (normal performance)}$$

and

$$T_{\text{identify, UTRA\_TDD}} = T_{\text{basic\_identify\_UTRA\_TDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot K_r \cdot N_{freq,r} \quad ms \text{ (reduced performance)}$$

$T_{\text{basic\_identify\_UTRA\_TDD}}$ = 800 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

A cell shall be considered identifiable following conditions are fulfilled:

- P-CCPCH Ec/Io $\geq$ -8 dB,
- DwPCH_Ec/Io $\geq$ -5 dB.

When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA TDD cell for SON within 8*$T_{\text{identify, UTRA\_TDD}}$ ms, the UE may stop searching UTRA TDD cells for SON.

8.1.2.4.13.1.2 Requirements when DRX is used

When DRX or eDRX_CONN is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new cell within $T_{\text{identify, UTRA\_TDD}}$. When DRX is used, $T_{\text{identify, UTRA\_TDD}}$ is as defined in table 8.1.2.4.13.1.2-1, and when eDRX_CONN is used, $T_{\text{identify, UTRA\_TDD}}$ is as defined in table 8.1.2.4.13.1.2-2.

Table 8.1.2.4.13.1.2-1: Requirement to identify a new UTRA TDD cell for SON

DRX cycle length (s)	$T_{\text{identify, UTRA\_TDD}}$ (s) (DRX cycles)		$T_{\text{identify, UTRA\_TDD}}$ (s) (DRX cycles)	$T_{\text{identify, UTRA\_TDD}}$ (s) (DRX cycles)
	Gap period = 40 ms	**Gap period = 80 ms**	**Gap period = 40 ms**	**Gap period = 80 ms**
≤0.16	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable	Non DRX Requirements in clause 8.1.2.4.3.1 are applicable
0.16<DRX cycle≤0.256	Note (25*K_n* $N_{freq,n}$)	Note (50*K_n * $N_{freq,n}$)	Note (25*K_r* $N_{freq,r}$)	Note (50*K_r * $N_{freq,r}$)
0.256<DRX cycle≤0.32	Note (25*K_n * $N_{freq,n}$)	Note (45*K_n * $N_{freq,n}$)	Note (25*K_r * $N_{freq,r}$)	Note (45*K_r * $N_{freq,r}$)
0.32<DRX cycle≤2.56	Note (25*K_n * $N_{freq,n}$)	Note (25*K_n * $N_{freq,n}$)	Note (25*K_r * $N_{freq,r}$)	Note (25*K_r * $N_{freq,r}$)
Note: Time depends upon the DRX cycle in use				

Table 8.1.2.4.13.1.2-2: Requirement to identify a new UTRA TDD cell for SON when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{\text{identify, UTRA\_TDD}}$ (s) (eDRX_CONN cycles)		$T_{\text{identify, UTRA\_TDD}}$ (s) (eDRX_CONN cycles)	
	Gap period = 40 ms	**Gap period = 80 ms**	**Gap period = 40 ms**	**Gap period = 80 ms**
2.56<eDRX_CONN cycle≤10.24	Note (25*K_n * $N_{freq,n}$)	Note (25*K_n * $N_{freq,n}$)	Note (25*K_r * $N_{freq,r}$)	Note (25*K_r * $N_{freq,r}$)
Note: Time depends upon the eDRX_CONN cycle in use				

A cell shall be considered identifiable provided following conditions are fulfilled:

- P-CCPCH Ec/Io $\geq$ -8 dB,
- DwPCH_Ec/Io $\geq$ -5 dB.

When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA TDD cell for SON within 8*$T_{identify,\ UTRA\_TDD}$ seconds, the UE may stop searching UTRA TDD cells for SON; when DRX is used $T_{identify,\ UTRA\_TDD}$ is defined in table 8.1.2.4.13.1.2-1, and when eDRX_CONN is used $T_{identify,\ UTRA\_TDD}$ is defined in table 8.1.2.4.13.1.2-2.

8.1.2.4.13.1.3 Reporting Delay

The UE shall not report the physical cell identity of an identifiable cell for SON as long as the reporting criteria are not fulfilled.

The reporting delay is defined as the time between the identification of the strongest cell for SON until the UE starts to transmit its physical cell identity over the Uu interface. This requirement assumes that the reporting of the physical cell identity is not delayed by other RRC signalling on the DCCH. This reporting delay excludes a delay uncertainty resulted when inserting the physical cell identity of the strongest cell for SON to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This reporting delay excludes any delay caused by unavailability of UL resources for UE sending the physical cell identity of the strongest cell for SON.

The reporting delay of the physical cell identity of the strongest cell for SON without L3 filtering shall be less than $T_{identify,\ UTRA\_TDD}$ defined in clause 8.1.2.4.13.1.1 and in clause 8.1.2.4.13.1.2 for non DRX and DRX and eDRX_CONN cases respectively. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.4.14 E-UTRAN FDD – UTRAN TDD measurements for SON

The requirements in clause 8.1.2.4.13 also apply for this section.

8.1.2.4.15 E-UTRAN FDD – cdma2000 1xRTT measurements for SON ANR

8.1.2.4.15.1 Identification of a new cdma2000 1xRTT cell for SON ANR

No explicit neighbour list is provided to the UE for identifying a cdma2000 1xRTT cell for SON ANR. The UE shall identify and report only the strongest cell when requested by the network for the purpose of SON ANR.

8.1.2.4.15.1.1 Requirement when no DRX is used

When measurement gaps are scheduled for CDMA2000 1xRTT inter RAT measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CDMA2000 1xRTT Pilot Strength measurements to higher layers with measurement accuracy as specified in Clause 9.5, corresponding to a 90% measurement success rate, with measurement period given by

$$T_{measurement\_CDMA2000\_1x} = T_{basic\_measurement\_CDMA2000\_1x} \cdot N_{freq,n} \cdot K_n \cdot S_{gap}$$

where $T_{basic\_measurement\_CDMA2000\_1x}$ = 100 ms and the measurement gap specific scale factor S_{gap} is based on the measurement gap pattern in use as defined in Table 8.1.2.4.15.1.1-1. If inter-frequency RSTD measurements are configured and the UE requires measurement gaps for performing such measurements, then S_{gap} shall be based to the Gap Pattern Id 1.

Table 8.1.2.4.15.1.1-1: Gap Pattern Specific Scale Factor

Gap Pattern Id	S_{gap}
0	32/3
1	64/3

If the UE is unable to identify the CDMA2000 1xRTT cell for SON ANR within [TBD] ms, the UE may stop searching CDMA2000 1xRTT cells for SON ANR.

8.1.2.4.15.1.2 Reporting Delay

The UE shall not report the physical cell identity of an identifiable cell for SON ANR as long as the reporting criteria are not fulfilled.

The reporting delay is defined as the time between the identification of the strongest cell for SON ANR until the UE starts to transmit its physical cell identity over the Uu interface. This delay shall be less than T_{71m} defined in [15]. This measurement reporting delay excludes a delay which is caused by the unavailability of the uplink resources for the UE to send the measurement report.

8.1.2.4.16 E-UTRAN TDD – cdma2000 1xRTT measurements for SON ANR

The requirements in clause 8.1.2.4.15 also apply for this section.

8.1.2.4.17 E-UTRAN FDD-UTRAN FDD measurements with autonomous gaps

The requirements in this clause apply only to UE supporting E-UTRA FDD and UTRA FDD.

8.1.2.4.17.1 Identification of a new CGI of UTRA FDD cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of UTRA FDD cell. The UE shall identify and report the CGI when requested by the network for the purpose of 'reportCGI'. The UE may make autonomous gaps in both downlink reception and uplink transmission for decoding SFN and receiving UTRAN MIB and SIB3 messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX or eDRX_CONN is used or not, the UE shall be able to identify a new CGI of UTRA FDD cell within:

$$T_{\text{identify\_CGI, UTRAN FDD}} = 630 + 40*\text{SIB3\_REP ms}$$

where SIB3_REP is the repetition period at which the UTRAN cell schedules SIB3 blocks in units of frames specified in TS 25.331 [7] , provided that the UTRAN cell has been already identified by the UE.

This requirement is applicable for UTRA FDD target cell configurations where the information required to make the SI report can be determined from the MIB and SIB3 alone, and MIB and SIB3 are not segmented into multiple TTIs. Additionally, for the requirement to be applicable, the reception conditions shall be such that the system frame number of the target UTRA FDD cell, the MIB and SIB3 can each be successfully decoded in no more than four attempts.

According to the reception conditions:

A cell shall be considered identifiable following conditions are fulfilled:

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.The system frame number, the MIB and SIB3 of the target cell shall be considered decodable provided the BCH demodulation requirements are met according to [29].

The requirement for identifying a new CGI of an UTRA FDD cell within $T_{\text{identify\_CGI, UTRAN FDD}}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

8.1.2.4.17.2 CGI Reporting Delay

The CGI reporting delay occurs due to the delay uncertainty when inserting the CGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the CGI reporting may be delayed until the next DRX cycle. In case eDRX is used, the CGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.4.18 E-UTRAN TDD-UTRAN FDD measurements with autonomous gaps

The requirements in this clause apply only to UE supporting E-UTRA TDD and UTRA FDD.

8.1.2.4.18.1 Identification of a new CGI of UTRA FDD cell with autonomous gaps

The requirements in clause 8.1.2.4.17.1 also apply for this section.

8.1.2.4.18.2 CGI Reporting Delay

The requirements in clause 8.1.2.4.17.2 also apply for this section.

8.1.2.4.19 E-UTRAN FDD – WLAN measurements

8.1.2.4.19.1 Introduction

The requirements in this section shall apply for a UE capable of E-UTRA FDD and LTE-WLAN Aggregation [2].

8.1.2.4.19.2 Requirements

8.1.2.4.19.2.1 E-UTRAN FDD – WLAN measurements when no DRX is used

In the RRC_CONNECTED state when no DRX is used the measurement period for WLAN RSSI shall be T_{WLAN_RSSI} as defined in table 8.1.2.4.19.2.1-1.

The value of T_{WLAN_RSSI} depends upon whether the WLAN RSSI measurement is performed on the serving access point (AP) or on a neighbour AP and in case of the neighbour AP whether the neighbour AP is known or unknown to the UE:

- Measurement of known single neighbor AP is time-sensitive and is performed on the AP for which information about the operating channel is known to the UE; and
- \- Measurement of unknown neighbor AP is not time-sensitive and is performed on the AP for which information about the operating channel is not known to the UE.

The UE shall be capable of performing WLAN RSSI measurements for certain minimum number of APs during T_{WLAN_RSSI} as defined in table 8.1.2.4.19.2.1-1 provided that the beacon frame of the measured AP is available at the UE at least once every 102.4 ms. The UE physical layer shall be capable of reporting WLAN RSSI measurements to higher layers with the measurement period of T_{WLAN_RSSI}.

Table 8.1.2.4.19.2.1-1: WLAN RSSI measurement period

WLAN RSSI measurement configuration		T_{WLAN_RSSI} [seconds]
Type of Measurement	**Minimum number of APs measured during T_{WLAN_RSSI}**	
Measurement of serving AP	1	0.5
Measurement of known neighbor AP on a single channel	1	5
Measurement of multiple unknown neighbor APs	3	30

The WLAN RSSI measurement accuracy for all measured access points shall be fulfilled according to the accuracy as specified in the sub-clause 9.7.1.

8.1.2.4.19.2.2 E-UTRAN FDD – WLAN measurements when DRX is used

In the RRC_CONNECTED state when DRX is used the measurement period for WLAN RSSI shall be T_{RSSI_DRX} as defined in table 8.1.2.4.19.2.2-1.

The value of $T_{WLAN\_RSSI\_DRX}$ depends upon whether the WLAN RSSI measurement is performed on the serving access point (AP) or on a neighbour AP and in case of the neighbour AP whether the neighbour AP is known or unknown to the UE:

- Measurement of known single neighbor AP is time-sensitive and is performed on the AP for which information about the operating channel is known to the UE; and
- Measurement of unknown neighbor AP is not time-sensitive and is performed on the AP for which information about the operating channel is not known to the UE

The UE shall be capable of performing WLAN RSSI measurements for certain minimum number of APs during $T_{WLAN\_RSSI\_DRX}$ as defined in table 8.1.2.4.19.2.2-1 provided that the beacon frame of the measured AP is available at the UE at least once every 102.4 ms. The UE physical layer shall be capable of reporting WLAN RSSI measurements to higher layers with the measurement period of $T_{WLAN\_RSSI\_DRX}$.

Table 8.1.2.4.19.2.2-1: Requirement to measure WLAN RSSI in DRX

WLAN RSSI measurement configuration		DRX cycle length (s)	$T_{WLAN\_RSSI\_DRX}$ (s)
Type of Measurement	Minimum number of APs measured during T_{WLAN_RSSI}		
Measurement of serving AP	1	0.002 ≤ DRX-cycle ≤ 0.320	MAX (0.5, 5*L_{DRX})
Measurement of one known neighbor AP on a single channel	1	0.002 ≤ DRX-cycle ≤ 0.320	MAX (5, 25*L_{DRX})
		0.320 < DRX-cycle ≤ 2.56	MAX (5, 20*L_{DRX})
Measurement of 3 unknown neighbor APs	3	0.002 ≤ DRX-cycle ≤ 0.320	MAX (30, 150*L_{DRX})
		0.320 < DRX-cycle ≤ 2.56	MAX (30, 120*L_{DRX})
Note 1: L_{DRX} is the length of DRX cycle in second(s)			

The WLAN RSSI measurement accuracy for all measured access points shall be fulfilled according to the accuracy as specified in the sub-clause 9.7.1.

8.1.2.4.19.2.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in clause 9.7.1.

8.1.2.4.19.2.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in clause 9.7.1.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T_{WLAN_RSSI} when no DRX is used as defined in section 8.1.2.4.19.2.1 and $T_{WLAN\_RSSI\_DRX}$ when DRX is used as defined in section 8.1.2.4.19.2.2. When L3 filtering is used or IDC autonomous denial or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, is configured an additional delay can be expected.

8.1.2.4.19.2.5 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.7.1.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.4.19.2.3.

8.1.2.4.20 E-UTRAN TDD – WLAN measurements

The requirements in this section shall apply for a UE capable of E-UTRA TDD and LTE-WLAN Aggregation [2].

The requirements in clause 8.1.2.4.19 also apply for this section.

8.1.2.5 E-UTRAN OTDOA Intra-Frequency RSTD Measurements

All intra-frequency RSTD measurement requirements specified in Sections 8.1.2.5.1 and 8.1.2.5.2 shall apply without DRX as well as for any DRX and eDRX_CONN cycles specified in TS 36.331 [2].

8.1.2.5.1 E-UTRAN FDD Intra-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure intra-frequency RSTD, specified in TS 36.214 [4], for at least *n*=16 cells, including the reference cell, on the same carrier frequency f1 as that of the reference cell within $\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}}$ ms as given below (see also Figure 8.1.2.5.1-1):

$$\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}} = T_{\mathrm{PRS}} \cdot (M - 1) + \Delta \qquad ms \qquad ,$$

where

$\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}}$ is the total time for detecting and measuring at least *n* cells,

T_{PRS} is the cell-specific positioning subframe configuration period as defined in TS 36.211 [16],

M is the number of PRS positioning occasions as defined in Table 8.1.2.5.1-1, where each PRS positioning occasion comprises of N_{PRS} ($1 \le N_{PRS} \le 6$) consecutive downlink positioning subframes defined in TS 36.211 [16], and

$\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$ ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time.

Table 8.1.2.5.1-1: Number of PRS positioning occasions within $\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}}$

Positioning subframe configuration period T_{PRS}	Number of PRS positioning occasions M	
	f1 Note1	f1 and f2 Note2
160 ms	16	32
>160 ms	8	16
Note 1: When only intra-frequency RSTD measurements are performed over cells belonging to the serving FDD carrier frequency f1. Note 2: When intra-frequency RSTD and inter-frequency RSTD measurements are performed over cells belonging to the serving FDD carrier frequency f1 and one inter-frequency carrier frequency f2, respectively.		

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells *i* out of at least (*n*-1) neighbor cells within $\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}}$ provided:

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{ref} \ge$-6 dB for all Frequency Bands for the reference cell,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{i} \ge$-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{ref}$ and $\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{i}$ conditions apply for all subframes of at least $L = \frac{M}{2}$ PRS positioning occasions,

PRP $1,2|_{\mathrm{dBm}}$ according to Annex B.2.5 for a corresponding Band

$\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}$ is defined as the ratio of the average received energy per PRS RE during the useful part of the symbol to the average received power spectral density of the total noise and interference for this RE, where the ratio is measured over all REs which carry PRS.

The time $\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}}$ starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE as illustrated in Figure 8.1.2.5.1-1.

The RSTD measurement accuracy for all measured neighbor cells *i* shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.1.

If the intra-frequency handover occurs while intra-frequency RSTD measurements are being performed then the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the intra-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ($\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN, HO}}$) shall be according to the following expression:

$$\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN, HO}} = \mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad ms\,,$$

where:

K is the number of times the intra-frequency handover occurs during $\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN, HO}}$.

T_{HO} is the time during which the intra-frequency RSTD measurement may not be possible due to intra-frequency handover; it can be up to 45 ms.

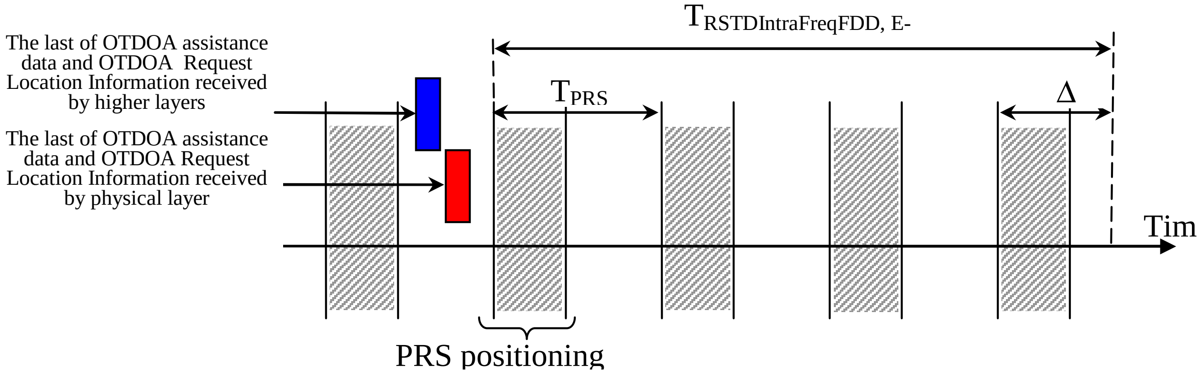


Figure 8.1.2.5.1-1. Illustration of the RSTD reporting time requirement in an FDD system.

Furthermore, due to the intra-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of all the PCells during the RSTD measurement period.

8.1.2.5.1.1 RSTD Measurement Reporting Delay

This requirement assumes that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x $\mathrm{TTI}_{\mathrm{DCCH}}$. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

8.1.2.5.2 E-UTRAN TDD Intra-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure intra-frequency RSTD, specified in TS 36.214 [4], for at least n=16 cells, including the reference cell, on the same carrier frequency f1 as that of the reference cell within $\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}}$ ms as given below:

$$\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}} = T_{\text{PRS}} \cdot (M - 1) + \Delta \qquad ms \qquad ,$$

where

$\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}}$ is the total time for detecting and measuring at least n cells,

T_{PRS} is the cell-specific positioning subframe configuration period as defined in TS 36.211 [16],

M is the number of PRS positioning occasions as defined in Table 8.1.2.5.2-1, where a PRS positioning occasion is as defined in Clause 8.1.2.5.1, and

$\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$ ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time.

Table 8.1.2.5.2-1: Number of PRS positioning occasions within $\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}}$

Positioning subframe configuration period T_{PRS}	Number of PRS positioning occasions M	
	f1 [Note1]	f1 and f2 [Note2]
160 ms	16	32
>160 ms	8	16
Note 1: When only intra-frequency RSTD measurements are performed over cells belonging to the serving TDD carrier frequency f1. Note 2: When intra-frequency RSTD and inter-frequency RSTD measurements are performed over cells belonging to the serving TDD carrier frequency f1 and one inter-frequency carrier frequency f2 respectively.		

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells *i* out of at least (*n*-1) neighbor cells within $\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}}$ provided:

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{ref}$ ≥-6 dB for all Frequency Bands for the reference cell,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{i}$ ≥-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{ref}$ and $\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{i}$ conditions apply for all subframes of at least $L = \frac{M}{2}$ PRS positioning occasions,

PRP $1,2|_{\text{dBm}}$ according to Annex B.2.5 for a corresponding Band

$\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}$ is as defined in Clause 8.1.2.5.1.

The time $\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}}$ starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

The RSTD measurement accuracy for all measured neighbor cells *i* shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.1.

If the intra-frequency handover occurs while intra-frequency RSTD measurements are being performed then the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the intra-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ($\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN, HO}}$) shall be according to the following expression:

$$\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN, HO}} = \mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad ms,$$

where:

K is the number of times the intra-frequency handover occurs during $\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN, HO}}$,

T_{HO} is the time during which the intra-frequency RSTD measurement may not be possible due to intra-frequency handover; it can be up to 45 ms.

Furthermore, due to the intra-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of all the PCells during the RSTD measurement period.

The intra-frequency requirements in this clause (8.1.2.5.2) shall apply for all TDD special subframe configurations specified in TS 36.211 [16] and for the TDD uplink-downlink configurations as specified in Table 8.1.2.5.2-2.

Table 8.1.2.5.2-2: TDD uplink-downlink subframe configurations applicable for TDD intra-frequency requirements

PRS Transmission Bandwidth [RB]	Applicable TDD uplink-downlink configurations
6, 15	1, 2, 3, 4 and 5
25, 50, 75, 100	0, 1, 2, 3, 4, 5 and 6
Note: Uplink-downlink configurations are specified in Table 4.2-2 in TS 36.211 [16].	

8.1.2.5.2.1 RSTD Measurement Reporting Delay

This requirement assumes that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

8.1.2.6 E-UTRAN Inter-Frequency OTDOA Measurements

All inter-frequency RSTD measurement requirements specified in Sections 8.1.2.6.1-8.1.2.6.4 shall apply, provided that

- the UE is capable of inter-frequency RSTD measurements for OTDOA [24], and
- either the measurement gap pattern ID # 0 specified in Clause 8.1.2.1 is used or the UE supports capability of conducting inter-frequency measurements without gaps.

All inter-frequency RSTD measurement requirements specified in Sections 8.1.2.6.1-8.1.2.6.4 shall apply without DRX as well as for any DRX or eDRX_CONN cycles specified in TS 36.331 [2].

8.1.2.6.1 E-UTRAN FDD-FDD Inter-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least *n*=16 cells, including the reference cell, within $\mathrm{T}_{\mathrm{RSTD\ InterFreqFDD,\ E\text{-}UTRAN}}$ ms as given below:

$$\mathrm{T}_{\mathrm{RSTD\ InterFreqFDD,\ E\text{-}UTRAN}} = T_{\mathrm{PRS}} \cdot (M - 1) + \Delta \qquad ms \qquad ,$$

where

$\mathrm{T}_{\mathrm{RSTD\ InterFreqFDD,\ E\text{-}UTRAN}}$ is the total time for detecting and measuring at least *n* cells,

T_{PRS} is the the largest value of the cell-specific positioning subframe configuration period, defined in TS 36.211 [16], among the measured *n* cells including the reference cell,

M is the number of PRS positioning occasions as defined in Table 8.1.2.6.1-1, where a PRS positioning occasion is as defined in clause 8.1.2.5.1,

$\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$ ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time, and

the *n* cells are distributed on up to two carrier frequencies including a serving carrier frequency and one inter-frequency carrier.

Table 8.1.2.6.1-1: Number of PRS positioning occasions within $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$

Positioning subframe configuration period T_{PRS}	Number of PRS positioning occasions M	
	f2 Note1	f1 and f2 Note2
160 ms	16	32
>160 ms	8	16
Note 1: When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the FDD inter-frequency carrier frequency f2. Note 2: When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving FDD carrier frequency f1 and the FDD inter-frequency carrier frequency f2 respectively.		

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells *i* out of at least (*n*-1) neighbor cells within $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$ provided:

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}\right)_{ref}$ ≥-6 dB for all Frequency Bands for the reference cell,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}\right)_{i}$ ≥-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}\right)_{ref}$ and $\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}\right)_{i}$ conditions apply for all subframes of at least $L = \frac{M}{2}$ PRS positioning occasions,

PRP $1,2|_{\text{dBm}}$ according to Annex B.2.6 for a corresponding Band

$\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}$ is as defined in Clause 8.1.2.5.1.

The time $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$ starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

If the inter-frequency handover occurs while inter-frequency RSTD measurements are being performed, and the inter-frequency carrier on which RSTD is measured becomes the new serving carrier frequency after the inter-frequency handover, the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the inter-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ($\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN, HO}}$) shall be according to the following expression:

$$\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN, HO}} = \mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad ms,$$

where:

K is the number of times the inter-frequency handover occurs during $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN, HO}}$,

T_{HO} is the time during which the inter-frequency RSTD measurement may not be possible due to inter-frequency handover; it can be up to 45 ms.

The RSTD measurement accuracy for all measured neighbor cells *i* shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.2.

Furthermore, due to the inter-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCells on whose carriers RSTD measurement is performed during the RSTD measurement period.

8.1.2.6.1.1 RSTD Measurement Reporting Delay

This requirement assumes that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x $\mathrm{TTI}_{\text{DCCH}}$. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

8.1.2.6.2 E-UTRAN TDD-FDD Inter-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least *n*=16 cells, including the reference cell, within $\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN}}$ ms as given below:

$$\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN}} = T_{\text{PRS}} \cdot (M - 1) + \Delta \qquad ms$$,

where

$\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN}}$ is the total time for detecting and measuring at least *n* cells,

T_{PRS} is the largest value of the cell-specific positioning subframe configuration period, defined in TS 36.211 [16], among the measured *n* cells including the reference cell,

M is the number of PRS positioning occasions as defined in Table 8.1.2.6.2-1, where a PRS positioning occasion is as defined in clause 8.1.2.5.1,

$\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$ ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time, and

the *n* cells are distributed on up to two carrier frequencies including a serving carrier frequency and one inter-frequency carrier.

Table 8.1.2.6.2-1: Number of PRS positioning occasions within $\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN}}$

Positioning subframe configuration period T_{PRS}	Number of PRS positioning occasions M	
	f2 [Note1]	f1 and f2 [Note2]
160 ms	16	32
>160 ms	8	16
NOTE 1: When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the FDD inter-frequency carrier frequency f2. NOTE 2: When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving TDD carrier frequency f1 and the FDD inter-frequency carrier frequency f2 respectively.		

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells *i* out of at least (*n*-1) neighbor cells within $\mathrm{T}_{\text{RSTD InterFeqTDDFDD,E-UTRAN}}$, provided:

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{ref}$ ≥-6 dB for all Frequency Bands for the reference cell,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{i}$ ≥-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{ref}$ and $\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{i}$ conditions apply for all subframes of at least $L = \frac{M}{2}$ PRS positioning occasions,

PRP $1,2|_{\text{dBm}}$ according to Annex B.2.6 for a corresponding Band,

$\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}$ is as defined in Clause 8.1.2.5.1.

The time $\mathrm{T}_{\text{RSTD InterFeqTDDFDD,E-UTRAN}}$ starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

If the inter-frequency handover occurs while inter-frequency RSTD measurements are being performed, and the inter-frequency carrier on which RSTD is measured becomes the new serving carrier frequency after the inter-frequency handover, the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the inter-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ($\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN, HO}}$) shall be according to the following expression:

$$\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN, HO}} = \mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad ms,$$

where:

K is the number of times the inter-frequency handover occurs during $\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN, HO}}$,

T_{HO} is the time during which the inter-frequency RSTD measurement may not be possible due to inter-frequency handover; it can be up to 45 ms.

The RSTD measurement accuracy for all measured neighbor cells *i* shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.2.

Furthermore, due to the inter-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCells on whose carriers RSTD measurement is performed during the RSTD measurement period.

The inter-frequency requirements in this clause (8.1.2.6.2) shall apply for all TDD special subframe configurations specified in TS 36.211 [16] and for the TDD uplink-downlink configurations as specified in Table 8.1.2.6.2-2.

Table 8.1.2.6.2-2: TDD uplink-downlink subframe configurations applicable for TDD-FDD inter-frequency requirements

PRS Transmission Bandwidth [RB]	Applicable TDD uplink-downlink configurations
6, 15	1, 2, 3, 4 and 5
25, 50, 75, 100	0, 1, 2, 3, 4, 5 and 6
NOTE: Uplink-downlink configurations are specified in Table 4.2-2 in TS 36.211 [16].	

8.1.2.6.2.1 RSTD Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x $\mathrm{TTI}_{\mathrm{DCCH}}$. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

8.1.2.6.3 E-UTRAN TDD-TDD Inter-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least *n*=16 cells, including the reference cell, within $\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN}}$ ms as given below:

$$\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN}} = T_{\text{PRS}} \cdot (M - 1) + \Delta \qquad ms \quad ,$$

where

$\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN}}$ is the total time for detecting and measuring at least *n* cells,

T_{PRS} is the largest value of the cell-specific positioning subframe configuration period, defined in TS 36.211 [16], among the measured *n* cells including the reference cell,

M is the number of PRS positioning occasions as defined in Table 8.1.2.6.1-1, where a PRS positioning occasion is as defined in clause 8.1.2.5.1,

$\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$ ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time, and

the *n* cells are distributed on up to two carrier frequencies including a serving carrier frequency and one inter-frequency carrier.

Table 8.1.2.6.3-1: Number of PRS positioning occasions within $\text{T}_{\text{RSTD InterFreqTDD, E-UTRAN}}$

Positioning subframe configuration period T_{PRS}	Number of PRS positioning occasions M	
	f2 [Note1]	f1 and f2 [Note2]
160 ms	16	32
>160 ms	8	16
Note 1: When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the TDD inter-frequency carrier frequency f2. Note 2: When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving TDD carrier frequency f1 and the TDD inter-frequency carrier frequency f2 respectively.		

The inter-frequency requirements in this clause (8.1.2.6.3) shall apply for all TDD special subframe configurations specified in TS 36.211 [16] and for the TDD uplink-downlink configurations as specified in Table 8.1.2.6.3-2.

Table 8.1.2.6.3-2: TDD uplink-downlink subframe configurations applicable for inter-frequency requirements

PRS Transmission Bandwidth [RB]	Applicable TDD uplink-downlink configurations
6, 15	3, 4 and 5
25	1, 2, 3, 4, 5 and 6
50, 75, 100	0, 1, 2, 3, 4, 5 and 6
Note 1: Uplink-downlink configurations are specified in Table 4.2-2 in TS 36.211 [16]. Note2: For UEs capable of performing inter-frequency measurements without measurement gaps, TDD uplink-downlink subframe configurations as specified in Table 8.1.2.5.2-2 shall apply.	

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells *i* out of at least (*n*-1) neighbor cells within $\text{T}_{\text{RSTD InterFreqTDD, E-UTRAN}}$ provided:

$\left(\text{PRS}\,\hat{\text{E}}_{\text{s}} / \text{Iot}\right)_{ref}$ ≥-6 dB for all Frequency Bands for the reference cell,

$\left(\text{PRS}\,\hat{\text{E}}_{\text{s}} / \text{Iot}\right)_{i}$ ≥-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\text{PRS}\,\hat{\text{E}}_{\text{s}} / \text{Iot}\right)_{ref}$ and $\left(\text{PRS}\,\hat{\text{E}}_{\text{s}} / \text{Iot}\right)_{i}$ conditions apply for all subframes of at least $L = \frac{M}{2}$ PRS positioning occasions,

PRP 1,2$|_{\text{dBm}}$ according to Annex B.2.6 for a corresponding Band

$\text{PRS}\,\hat{\text{E}}_{\text{s}} / \text{Iot}$ is as defined in Clause 8.1.2.5.1.

The time $\text{T}_{\text{RSTD InterFreqTDD, E-UTRAN}}$ starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

If the inter-frequency handover occurs while inter-frequency RSTD measurements are being performed, and the inter-frequency carrier on which RSTD is measured becomes the new serving carrier frequency after the inter-frequency handover, the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the inter-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ($\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN, HO}}$) shall be according to the following expression:

$$\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN, HO}} = \mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{HO}} \qquad ms,$$

where:

K is the number of times the inter-frequency handover occurs during $\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN, HO}}$,

T_{HO} is the time during which the inter-frequency RSTD measurement may not be possible due to inter-frequency handover; it can be up to 45 ms.

The RSTD measurement accuracy for all measured neighbor cells *i* shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.2.

Furthermore, due to the inter-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCells on whose carriers RSTD measurement is performed during the RSTD measurement period.

8.1.2.6.3.1 RSTD Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

8.1.2.6.4 E-UTRAN FDD-TDD Inter-Frequency OTDOA Measurements

When the physical layer cell identities of neighbour cells together with the OTDOA assistance data are provided, the UE shall be able to detect and measure inter-frequency RSTD, specified in TS 36.214 [4], for at least *n*=16 cells, including the reference cell, within $\mathrm{T}_{\text{RSTD InterFeqFDDTDD,E-UTRAN}}$ ms as given below:

$$\mathrm{T}_{\text{RSTD InterFeqFDDTDD,E-UTRAN}} = T_{\text{PRS}} \cdot (M-1) + \Delta \qquad \text{ms} \qquad ,$$

where

$\mathrm{T}_{\text{RSTD InterFeqFDDTDD,E-UTRAN}}$ is the total time for detecting and measuring at least *n* cells,

T_{PRS} is the largest value of the cell-specific positioning subframe configuration period, defined in TS 36.211 [16], among the measured *n* cells including the reference cell,

M is the number of PRS positioning occasions as defined in Table 8.1.2.6.4-1, where a PRS positioning occasion is as defined in clause 8.1.2.5.1,

$\Delta = 160 \cdot \left\lceil \frac{n}{M} \right\rceil$ ms is the measurement time for a single PRS positioning occasion which includes the sampling time and the processing time, and

the *n* cells are distributed on up to two carrier frequencies including a serving carrier frequency and one inter-frequency carrier.

Table 8.1.2.6.4-1: Number of PRS positioning occasions within $\mathrm{T_{RSTD\ InterFeqFDDTDD,E\text{-}UTRAN}}$

Positioning subframe configuration period T_{PRS}	Number of PRS positioning occasions M	
	f2 Note1	f1 and f2 Note2
160 ms	16	32
>160 ms	8	16
Note 1: When inter-frequency RSTD measurements are performed over the reference cell and neighbour cells, which belong to the TDD inter-frequency carrier frequency f2. Note 2: When inter-frequency RSTD measurements are performed over the reference cell and the neighbour cells, which belong to the serving FDD carrier frequency f1 and the TDD inter-frequency carrier frequency f2 respectively.		

The UE physical layer shall be capable of reporting RSTD for the reference cell and all the neighbor cells *i* out of at least (*n*-1) neighbor cells within $\mathrm{T_{RSTD\ InterFeqFDDTDD,E\text{-}UTRAN}}$, provided:

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}\right)_{ref}$ ≥-6 dB for all Frequency Bands for the reference cell,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}\right)_{i}$ ≥-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}\right)_{ref}$ and $\left(\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}\right)_{i}$ conditions apply for all subframes of at least $L=\dfrac{M}{2}$ PRS positioning occasions,

PRP $1,2|_{\mathrm{dBm}}$ according to Annex B.2.6 for a corresponding Band

$\mathrm{PRS}\ \hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}$ is as defined in Clause 8.1.2.5.1.

The time $\mathrm{T_{RSTD\ InterFeqFDDTDD,E\text{-}UTRAN}}$ starts from the first subframe of the PRS positioning occasion closest in time after both the OTDOA-RequestLocationInformation message and the OTDOA assistance data in the OTDOA-ProvideAssistanceData message as specified in TS 36.355 [24], are delivered to the physical layer of the UE.

If the inter-frequency handover occurs while inter-frequency RSTD measurements are being performed, and the inter-frequency carrier on which RSTD is measured becomes the new serving carrier frequency after the inter-frequency handover, the UE shall complete the ongoing OTDOA measurement session. The UE shall also meet the inter-frequency OTDOA measurement and accuracy requirements. However in this case the RSTD measurement period ($\mathrm{T_{RSTD\ InterFreqFDDTDD,\ E\text{-}UTRAN,\ HO}}$) shall be according to the following expression:

$$\mathrm{T_{RSTD\ InterFreqFDDTDD,\ E\text{-}UTRAN,\ HO}} = \mathrm{T_{RSTD\ InterFreqFDDTDD,\ E\text{-}UTRAN}} + K \times T_{\mathrm{PRS}} + T_{\mathrm{HO}} \qquad ms,$$

where:

K is the number of times the inter-frequency handover occurs during $\mathrm{T_{RSTD\ InterFreqFDDTDD,\ E\text{-}UTRAN,\ HO}}$,

T_{HO} is the time during which the inter-frequency RSTD measurement may not be possible due to inter-frequency handover; it can be up to 45 ms.

The RSTD measurement accuracy for all measured neighbor cells *i* shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.10.2.

Furthermore, due to the inter-frequency handover the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCells on whose carriers RSTD measurement is performed during the RSTD measurement period.

The inter-frequency requirements in this clause (8.1.2.6.4) shall apply for all TDD special subframe configurations specified in TS 36.211 [16] and for the TDD uplink-downlink configurations as specified in Table 8.1.2.6.4-2.

Table 8.1.2.6.4-2: TDD uplink-downlink subframe configurations applicable for inter-frequency requirements

PRS Transmission Bandwidth [RB]	Applicable TDD uplink-downlink configurations
6, 15	3, 4 and 5
25	1, 2, 3, 4, 5 and 6
50, 75, 100	0, 1, 2, 3, 4, 5 and 6
Note 1: Uplink-downlink configurations are specified in Table 4.2-2 in TS 36.211 [16]. Note2: For UEs capable of performing inter-frequency measurements without measurement gaps, TDD uplink-downlink subframe configurations as specified in Table 8.1.2.5.2-2 shall apply.	

8.1.2.6.4.1 RSTD Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

8.1.2.7 E-UTRAN E-CID Measurements

8.1.2.7.1 E-UTRAN FDD UE Rx-Tx Time Difference Measurements

When no DRX is used the physical layer measurement period of the UE Rx-Tx time difference measurement shall be 200 ms.

When DRX is used in RRC_CONNECTED state the physical layer measurement period ($T_{measure\_FDD\_UE\_Rx\_Tx1}$) of the UE Rx-Tx time difference measurement shall be as specified in table 8.1.2.7.1-1. When eDRX_CONN is used in RRC_CONNECTED state, the physical layer measurement period ($T_{measure\_FDD\_UE\_Rx\_Tx1}$) of the UE Rx-Tx time difference measurement shall be as specified in table 8.1.2.7.1-2.

Table 8.1.2.7.1-1: FDD UE Rx-Tx time difference measurement requirement when DRX is used

DRX cycle length (s)	$T_{measure\_FDD\_UE\_Rx\_Tx1}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.1.2.7.1-2: FDD UE Rx-Tx time difference measurement requirement when eDRX_CONN is used

eDRX_CONN cycle length (s)	$T_{measure\_FDD\_UE\_Rx\_Tx1}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (5)
Note: Time depends upon the eDRX_CONN cycle in use	

If the UE is performing UE Rx-Tx time difference measurement while the PCell is changed due to the handover then the UE shall restart the Rx-Tx measurement on the new cell. In this case the UE shall also meet the UE Rx-Tx time difference measurement and accuracy requirements. However the physical layer measurement period of the UE Rx-Tx measurement shall not exceed $T_{measure\_FDD\_UE\_Rx\_Tx3}$ as defined in the following expression:

$$T_{measure\_FDD\_UE\_Rx\_Tx3} = (K+1)*(T_{measure\_FDD\_UE\_Rx\_Tx1}) + K*T_{PCcell\_change\_handover}$$

Where:

K is the number of times the PCell is changed over the measurement period ($T_{measure\_FDD\_UE\_Rx\_Tx3}$),

$T_{PCell\_change\_handover}$ is the time necessary to change the PCell due to handover; it can be up to 45 ms.

If the UE supporting E-UTRA carrier aggregation when configured with the secondary component carrier(s) is performing UE Rx-Tx time difference measurement while the PCell is changed regardless whether the primary component carrier is changed or not then the UE shall restart the Rx-Tx measurement on the new PCell. In this case the UE shall also meet the UE Rx-Tx time difference measurement and accuracy requirements corresponding to the new PCell. However the physical layer measurement period of the UE Rx-Tx measurement shall not exceed $T_{measure\_FDD\_UE\_Rx\_Tx2}$ as defined in the following expression:

$$T_{measure\_FDD\_UE\_Rx\_Tx2} = (N+1)*(T_{measure\_FDD\_UE\_Rx\_Tx1}) + N*T_{PCell\_change\_CA}$$

Where:

N is the number of times the PCell is changed over the measurement period ($T_{measure\_FDD\_UE\_Rx\_Tx2}$),

$T_{PCell\_change\_CA}$ is the time necessary to change the PCell; it can be up to 25 ms.

If IDC autonomous denial is configured then the UE shall also meet the requirements, provided not more than 30 IDC autonomous denial suframes are configured over an IDC autonomous denial validity period of at least 200 ms.

The measurement accuracy for the UE Rx-Tx time difference measurement when DRX or eDRX_CONN is used as well as when no DRX is used shall be as specified in the sub-clause 9.1.9.

8.1.2.7.1.1 UE Rx-Tx Measurement Reporting Delay

This requirement assumes that the measurement report is not delayed by other RRC or LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in sub-clause 9.1.9.

8.1.2.7.2 E-UTRAN TDD UE Rx-Tx Time Difference Measurements

When no DRX is used the physical layer measurement period of the UE Rx-Tx time difference measurement shall be 200 ms.

When DRX is used in RRC_CONNECTED state the physical layer measurement period ($T_{measure\_TDD\_UE\_Rx\_Tx1}$) of the UE Rx-Tx time difference measurement shall be as specified in table 8.1.2.7.2-1. When eDRX_CONN is used in RRC_CONNECTED state the physical layer measurement period ($T_{measure\_TDD\_UE\_Rx\_Tx1}$) of the UE Rx-Tx time difference measurement shall be as specified in table 8.1.2.7.2-2.

Table 8.1.2.7.2-1: TDD UE Rx-Tx time difference measurement requirement when DRX is used

DRX cycle length (s)	$T_{measure\_TDD\_UE\_Rx\_Tx1}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.1.2.7.2-2: TDD UE Rx-Tx time difference measurement requirement when eDRX_CONN is used

eDRX_CONN cycle length (s)	$T_{measure\_TDD\_UE\_Rx\_Tx1}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (5)
Note: Time depends upon the eDRX_CONN cycle in use	

If the UE is performing UE Rx-Tx time difference measurement while the PCell is changed due to the handover then the UE shall restart the Rx-Tx measurement on the new cell. In this case the UE shall also meet the UE Rx-Tx time difference measurement and accuracy requirements. However the physical layer measurement period of the UE Rx-Tx measurement shall not exceed $T_{measure\_TDD\_UE\_Rx\_Tx3}$ as defined in the following expression:

$$T_{measure\_TDD\_UE\_Rx\_Tx3} = (K+1)*(T_{measure\_TDD\_UE\_Rx\_Tx1}) + K*T_{PCell\_change\_handover}$$

Where:

K is the number of times the PCell is changed over the measurement period ($T_{measure\_TDD\_UE\_Rx\_Tx3}$),

$T_{PCell\_change\_handover}$ is the time necessary to change the PCell due to handover; it can be up to 45 ms.

If the UE supporting E-UTRA carrier aggregation when configured with the secondary component carrier(s) is performing UE Rx-Tx time difference measurement while the PCell is changed regardless whether the primary component carrier is changed or not then the UE shall restart the Rx-Tx measurement on the new PCell. In this case the UE shall also meet the UE Rx-Tx time difference measurement and accuracy requirements corresponding to the new PCell. However the physical layer measurement period of the UE Rx-Tx measurement shall not exceed $T_{measure\_TDD\_UE\_Rx\_Tx2}$ as defined in the following expression:

$$T_{measure\_TDD\_UE\_Rx\_Tx2} = (N+1)*(T_{measure\_TDD\_UE\_Rx\_Tx1}) + N*T_{PCell\_change\_CA}$$

Where:

N is the number of times the PCell is changed over the measurement period ($T_{measure\_TDD\_UE\_Rx\_Tx2}$),

$T_{PCell\_change\_CA}$ is the time necessary to change the PCell; it can be up to 25 ms.

If IDC autonomous denial is configured then the UE shall also meet the requirements, provided not more than 30 IDC autonomous denial suframes are configured over an IDC autonomous denial validity period of at least 200 ms.

The measurement accuracy for the UE Rx-Tx time difference measurement when DRX or eDRX_CONN is used as well as when no DRX is used shall be as specified in the sub-clause 9.1.9.

For UE, which does not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331 [2], and is compliant to the requirements for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx specified in TS 36.101 [5], the UE Rx-Tx time difference measurement requirements in Section 8.1.2.7.2 shall apply also with different TDD UL/DL subframe configurations and/or different special subframe configurations used in CCs of different bands, under the following additional conditions:

- UE is not simultaneously scheduled in UL and DL on the different CCs, and
- At least one downlink and one uplink subframes per radio frame are available for the UE Rx-Tx time difference measurement in the measured cell.

8.1.2.7.2.1 UE Rx-Tx Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other RRC or LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in sub-clause 9.1.9.

8.1.2.7.3 E-UTRAN FDD Intra-frequency E-CID RSRP and RSRQ Measurements

8.1.2.7.3.1 Introduction

The requirements in section 8.1.2.7.3 shall apply provided the UE has received ECID-RequestLocationInformation message from E-SMLC via LPP requesting the UE to report E-CID E-UTRAN FDD intra-frequency RSRP and RSRQ measurements [24].

8.1.2.7.3.2 Measurement Requirements

The requirements in section 8.1.2.2.1 and section 8.1.2.8.1 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP and RSRQ are defined in section 8.1.2.7.3.3.

8.1.2.7.3.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.2 and 9.1.5 respectively.

8.1.2.7.4 E-UTRAN TDD Intra-frequency E-CID RSRP and RSRQ Measurements

8.1.2.7.4.1 Introduction

The requirements in section 8.1.2.7.4 shall apply provided the UE has received ECID-RequestLocationInformation message from E-SMLC via LPP requesting the UE to report E-CID E-UTRAN TDD intra-frequency RSRP and RSRQ measurements [24].

8.1.2.7.4.2 Measurement Requirements

The requirements in section 8.1.2.2.2 and section 8.1.2.8.2 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP and RSRQ are defined in section 8.1.2.7.4.3.

8.1.2.7.4.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.2 and 9.1.5 respectively.

8.1.2.8 E-UTRAN intra-frequency measurements under time domain measurement resource restriction

The requirements in sections 8.1.2.8.1 and 8.1.2.8.2 shall apply for cells for which time domain measurement resource restriction patterns for performing E-UTRAN FDD intra-frequency measurements and E-UTRAN TDD intra-frequency measurements, respectively, are configured by higher layers (TS 36.331 [2]), provided that also the following additional conditions are fulfilled:

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the intra-frequency measurements, and

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

For cells which are not configured for measurements in the subframes indicated by the time-domain measurement resource restriction pattern, the corresponding requirements specified in Clause 8.1.2.2 apply.

8.1.2.8.1 E-UTRAN FDD intra-frequency measurements

8.1.2.8.1.1 E-UTRAN intra-frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra-frequency cell within

$$T_{\text{identify\_intra\_eICIC}} = T_{\text{basic\_identify\_E-UTRA\_FDD\_eICIC,intra}} \cdot \frac{T_{\text{Measurement\_Period\_eICIC,Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{basic\_identify\_E-UTRA\_FDD\_eICIC, intra}$ is 1000 ms.

T_{Intra} is the minimum time available for intra-frequency measurements, during the measurement period with an arbitrarily chosen timing. The time is assumed to be available for performing intra-frequency measurements whenever the receiver is guaranteed to be active on the intra-frequency carrier.

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.3 and 9.1.2.4 and RSRQ related side conditions given in Clause 9.1.5.2 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.8 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_eICIC, Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{measurement\_intra\_eICIC}$ cells , where $Y_{measurement\_intra\_eICIC}$ is defined in the following equation. If the UE has identified more than $Y_{measurement\_intra\_eICIC}$ cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{measurement\_intra\_eICIC} = Floor\left\{ X_{basic\_measurement\_FDD\_eICIC} \cdot \frac{T_{Intra}}{T_{Measurement\_Period\_eICIC, Intra}} \right\} \text{ cells}$$

where

$X_{basic\_measurement\_FDD\_eICIC}$ = 8 (cells)

$T_{Measurement\_Period\_eICIC, Intra}$ = 200 ms is the measurement period for intra-frequency RSRP and RSRQ measurements.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

8.1.2.8.1.1.1 Measurement Reporting Requirements

8.1.2.8.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

8.1.2.8.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.1.1.1.3.

8.1.2.8.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_eICIC}$ defined in Clause 8.1.2.8.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_eICIC}$ defined in clause 8.1.2.8.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_eICIC, Intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.8.1.2 E-UTRAN intra-frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\_intra\_eICIC}$ as shown in table 8.1.2.8.1.2-1.

Table 8.1.2.8.1.2-1: Requirement to identify a newly detectable FDD intra-frequency cell

DRX cycle length (s)	$T_{identify\_intra\_eICIC}$ (s) (DRX cycles)
≤0.04	1 (Note1)
0.04<DRX-cycle≤0.08	Note2 (52)
0.128	4.22 (33)
0.128<DRX-cycle≤2.56	Note2 (28)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.3 and 9.1.2.4 and RSRQ related side conditions given in Clause 9.1.5.2 are fulfilled for a corresponding Band,

- SCH_RP and SCH Ês/Iot according to Annex B.2.8 for a corresponding Band.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is $T_{measure\_intra\_eICIC}$ as shown in table 8.1.2.8.1.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_eICIC}$.

Table 8.1.2.8.1.2-2: Requirement to measure FDD intra-frequency cells

DRX cycle length (s)	$T_{measure\_intra\_eICIC}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤0.16	Note2 (7)
0.16<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

8.1.2.8.1.2.1 Measurement Reporting Requirements

8.1.2.8.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

8.1.2.8.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.1.2.1.3.

8.1.2.8.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_eICIC}$ defined in Clause 8.1.2.8.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_eICIC}$ defined in clause 8.1.2.8.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_eICIC}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.8.2 E-UTRAN TDD intra-frequency measurements

8.1.2.8.2.1 E-UTRAN intra-frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra-frequency cell within

$$\mathrm{T}_{\mathrm{identify\_intra\_eICIC}} = \mathrm{T}_{\mathrm{basic\_identify\_E\text{-}UTRA\_TDD\_eICIC,intra}} \cdot \frac{\mathrm{T}_{\mathrm{Measurement\_Period\_eICIC,Intra}}}{\mathrm{T}_{\mathrm{Intra}}} \quad ms$$

where

$\mathrm{T}_{\mathrm{basic\_identify\_E\text{-}UTRA\_TDD\_eICIC,\ intra}}$ is 1000 ms.

$\mathrm{T}_{\mathrm{Intra}}$ is the minimum time available for intra-frequency measurements, during the measurement period with an arbitrarily chosen timing. The time is assumed to be available for performing intra-frequency measurements whenever the receiver is guaranteed to be active on the intra-frequency carrier.

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.3 and 9.1.2.4 and RSRQ related side conditions given in Clause 9.1.5.2 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.8 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $\mathrm{T}_{\mathrm{Measurement\_Period\_eICIC,\ Intra}}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells , including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $\mathrm{Y}_{\mathrm{measurement\_intra\_eICIC}}$ cells , where $\mathrm{Y}_{\mathrm{measurement\_intra\_eICIC}}$ is defined in the following equation. If the UE has identified more than $\mathrm{Y}_{\mathrm{measurement\_intra\_eICIC}}$ cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathrm{Y}_{\mathrm{measurement\_intra\_eICIC}} = Floor\left\{ X_{\mathrm{basic\_measurement\_TDD\_eICIC}} \cdot \frac{\mathrm{T}_{\mathrm{Intra}}}{\mathrm{T}_{\mathrm{Measurement\_Period\_eICIC,Intra}}} \right\} \text{cells}$$

where

$\mathrm{X}_{\mathrm{basic\_measurement\_TDD\_eICIC}}$ = 8 (cells)

$\mathrm{T}_{\mathrm{Measurement\_Period\_eICIC,\ Intra}}$ = 200 ms is the measurement period for intra-frequency RSRP and RSRQ measurements.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

8.1.2.8.2.1.1 Measurement Reporting Requirements

8.1.2.8.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

8.1.2.8.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.2.1.1.3.

8.1.2.8.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_eICIC}$ defined in Clause 8.1.2.8.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_eICIC}$ defined in clause 8.1.2.8.2.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_eICIC,\ Intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.8.2.2 E-UTRAN intra-frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{identify\_intra\_eICIC}$ as shown in table 8.1.2.8.2.2-1.

Table 8.1.2.8.2.2-1: Requirement to identify a newly detectable TDD intra-frequency cell

DRX cycle length (s)	$T_{identify\_intra\_eICIC}$ (s) (DRX cycles)
≤0.04	1 (Note1)
0.04<DRX-cycle≤0.08	Note2 (52)
0.128	4.22 (33)
0.128<DRX-cycle≤2.56	Note2 (28)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.3 and 9.1.2.4 and RSRQ related side conditions given in Clause 9.1.5.2 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.8 for a corresponding Band.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_eICIC}$ as shown in table 8.1.2.8.2.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_eICIC}$.

Table 8.1.2.8.2.2-2: Requirement to measure TDD intra-frequency cells

DRX cycle length (s)	$T_{measure\_intra\_eICIC}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤0.16	Note2 (7)
0.16<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use. Note2: Time depends upon the DRX cycle in use.	

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

8.1.2.8.2.2.1 Measurement Reporting Requirements

8.1.2.8.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

8.1.2.8.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.2.2.1.3.

8.1.2.8.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.3, 9.1.2.4, and 9.1.5.2, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_eICIC}$ defined in Clause 8.1.2.8.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_eICIC}$ defined in clause 8.1.2.8.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_eICIC}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.8.3 E-UTRAN FDD intra-frequency measurements with CRS assistance information

The requirements in clause 8.1.2.8.3 shall apply for the UEs supporting the PSS/SSS and common channel interference handling, and CRS interference handling features. Moreover, the core requirements shall be satisfied provided that the following additional conditions are fulfilled:

- The UE is provided with the CRS assistance information via higher layers (TS 36.331 [2]),
- The CRS assistance information is valid during the entire measurement period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

8.1.2.8.3.1 E-UTRAN intra-frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra-frequency cell within:

$$T_{\text{identify\_intra\_FeICIC}} = T_{\text{basic\_identify\_E-UTRA\_FDD\_FeICIC, intra}} \cdot \frac{T_{\text{Measurement\_Period\_FeICIC, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{\text{basic\_identify\_E-UTRA\_FDD\_FeICIC, intra}}$ is 1000 ms.

T_{Intra} is the minimum time available for intra-frequency measurements, during the measurement period with an arbitrarily chosen timing. The time is assumed to be available for performing intra-frequency measurements whenever the receiver is guaranteed to be active on the intra-frequency carrier.

A cell shall be considered detectable when:

- RSRP related side conditions given in Sections 9.1.2.5 and 9.1.2.6 and RSRQ related side conditions given in Section 9.1.5.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B, clause B.2.9 for a corresponding Band (Notes 1, 2).

Note 1: Part of the Iot includes the interference from at least:

- the PCell , or
- PCell and one intra-frequency neighbouring cell indicated in the CRS assistance information, or
- One or two intra-frequency neighbouring cells indicated in the CRS assistance information.

CRS assistance information has been provided for the intra-frequency neighbouring cells that generate interference. UE may use the CRS assistance information to mitigate the interference.

Note 2: An intra-frequency cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{\text{Measurement\_Period\_FeICIC, Intra}}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern and the cells indicated in the CRS assistance information, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{\text{measurement\_intra\_FeICIC}}$ cells , where $Y_{\text{measurement\_intra\_FeICIC}}$ is defined in the following equation. If the UE has identified more than $Y_{\text{measurement\_intra\_FeICIC}}$ cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement\_intra\_FeICIC}} = Floor\left\{ X_{\text{basic\_measurement\_FDD\_FeICIC}} \cdot \frac{T_{\text{Intra}}}{T_{\text{Measurement\_Period\_FeICIC, Intra}}} \right\} \text{ cells}$$

where

$X_{\text{basic\_measurement\_FDD\_FeICIC}}$ = 8 (cells).

$T_{\text{Measurement\_Period\_FeICIC, Intra}}$ = 200 ms is the measurement period for intra-frequency RSRP and RSRQ measurements.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements with CRS assistance information shall be as specified in the sub-clauses 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.3.1.1 Measurement Reporting Requirements

8.1.2.8.3.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.3.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.3.1.1.3.

8.1.2.8.3.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify\_intra\_FeICIC}}$ defined in Clause 8.1.2.8.3.1. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra\_FeICIC}}$ defined in clause 8.1.2.8.3.1 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period\_FeICIC, Intra}}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.8.3.2 E-UTRAN intra-frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{\text{identify\_intra\_FeICIC}}$ as shown in table 8.1.2.8.3.2-1.

Table 8.1.2.8.3.2-1: Requirement to identify a newly detectable FDD intra-frequency cell

DRX cycle length (s)	$T_{identify\_intra\_FeICIC}$ (s) (DRX cycles)
≤0.04	1 (Note 1)
0.04<DRX-cycle≤0.08	Note 2 (52)
0.128	4.22 (33)
0.128<DRX-cycle≤2.56	Note 2 (28]
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use. NOTE 2: Time depends upon the DRX cycle in use.	

A cell shall be considered detectable when:

- RSRP related side conditions given in Sections 9.1.2.5 and 9.1.2.6 and RSRQ related side conditions given in Section 9.1.5.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B, clause B.2.9 for a corresponding Band (Notes 1, 2).

Note 1: Part of the Iot includes the interference from at least:

- the PCell , or
- PCell and one intra-frequency neighbouring cell indicated in the CRS assistance information, or
- One or two intra-frequency neighbouring cells indicated in the CRS assistance information.

CRS assistance information has been provided for the intra-frequency neighbouring cells that generate interference. UE may use the CRS assistance information to mitigate the interference.

Note 2: An intra-frequency cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is $T_{measure\_intra\_FeICIC}$ as shown in table 8.1.2.8.3.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern and the cell indicated in CRS assistance information, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_FeICIC}$.

Table 8.1.2.8.3.2-2: Requirement to measure FDD intra-frequency cells

DRX cycle length (s)	$T_{identify\_intra\_FeICIC}$ (s) (DRX cycles)
≤0.04	0.2 (Note 1)
0.04<DRX-cycle≤0.16	Note 2 (7)
0.16<DRX-cycle≤2.56	Note 2 (5)
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use. NOTE 2: Time depends upon the DRX cycle in use.	

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.3.2.1 Measurement Reporting Requirements

8.1.2.8.3.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.3.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.3.2.1.3.

8.1.2.8.3.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_FeICIC}$ defined in clause 8.1.2.8.3.2. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_FeICIC}$ defined in clause 8.1.2.8.3.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_FeICIC}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.8.4 E-UTRAN TDD intra-frequency measurements with CRS assistance infromation

The requirements in clause 8.1.2.8.3 shall apply for the UEs upporting the PSS/SSS and common channel interference handling, and CRS interference handling features. Moreover, the core requirements shall be satisfied provided that the following additional conditions are fulfilled:

- The UE is provided with the CRS assistance information via higher layers (TS 36.331 [2]),
- The CRS assistance information is valid during the entire measurement period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

8.1.2.8.4.1 E-UTRAN intra-frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra-frequency cell within

$$T_{identify\_intra\_FeICIC} = T_{basic\_identify\_E\text{-}UTRA\_TDD\_FeICIC,\ intra} \cdot \frac{T_{Measurement\_Period\_FeICIC,\ Intra}}{T_{Intra}} \quad ms$$

where

$T_{basic\_identify\_E\text{-}UTRA\_TDD\_eICIC,\ intra}$ is 1000 ms.

T_{Intra} is the minimum time available for intra-frequency measurements, during the measurement period with an arbitrarily chosen timing. The time is assumed to be available for performing intra-frequency measurements whenever the receiver is guaranteed to be active on the intra-frequency carrier.

A cell shall be considered detectable when:

- RSRP related side conditions given in Sections 9.1.2.5 and 9.1.2.6 and RSRQ related side conditions given in Section 9.1.5.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.9 for a corresponding Band (Notes 1, 2).

Note 1: Part of the Iot includes the interference from at least:

- the PCell , or
- PCell and one intra-frequency neighbouring cell indicated in the CRS assistance information, or
- One or two intra-frequency neighbouring cells indicated in the CRS assistance information

CRS assistance information has been provided for the intra-frequency neighbouring cells that generate interference. UE may use the CRS assistance information to mitigate the interference.

Note 2: An intra-frequency cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_FeICIC, Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is 200 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells , including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern and the cells indicated in the CRS assistance information, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{measurement\_intra\_FeICIC}$ cells , where $Y_{measurement\_intra\_FeICIC}$ is defined in the following equation. If the UE has identified more than $Y_{measurement\_intra\_FeICIC}$ cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement\_intra\_FeICIC}} = Floor\left\{ X_{\text{basic\_measurement\_TDD\_FeICIC}} \cdot \frac{T_{\text{Intra}}}{T_{\text{Measurement\_Period\_FeICIC, Intra}}} \right\} \text{ cells}$$

where

$X_{basic\_measurement\_TDD\_FeICIC}$ = 8 (cells)

$T_{Measurement\_Period\_FeICIC, Intra}$ = 200ms is the measurement period for intra-frequency RSRP and RSRQ measurements.

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements with CRS assistance information shall be as specified in the sub-clauses 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.4.1.1 Measurement Reporting Requirements

8.1.2.8.4.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.4.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.4.1.1.3.

8.1.2.8.4.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_FeICIC}$ defined in clause 8.1.2.8.4.1. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_FeICIC}$ defined in clause 8.1.2.8.4.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_FeICIC, Intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.8.4.2 E-UTRAN intra-frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{identify\_intra\_FeICIC}$ as shown in table 8.1.2.8.4.2-1.

Table 8.1.2.8.4.2-1: Requirement to identify a newly detectable TDD intra-frequency cell

DRX cycle length (s)	$T_{identify\_intra\_FeICIC}$ (s) (DRX cycles)
≤0.04	1 (Note 1)
0.04<DRX-cycle≤0.08	Note 2 (52)
0.128	4.22 (33)
0.128<DRX-cycle≤2.56	Note 2 (28)
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use. NOTE 2: Time depends upon the DRX cycle in use.	

A cell shall be considered detectable when:

- RSRP related side conditions given in Sections 9.1.2.5 and 9.1.2.6 and RSRQ related side conditions given in Section 9.1.5.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.9 for a corresponding Band (Notes 1, 2).

Note 1: Part of the Iot includes the interference from at least:

- the PCell , or
- PCell and one intra-frequency neighbouring cell indicated in the CRS assistance information, or
- One or two intra-frequency neighbouring cells indicated in the CRS assistance information.

CRS assistance information has been provided for the intra-frequency neighbouring cells that generate interference. UE may use the CRS assistance information to mitigate the interference.

Note 2: An intra-frequency cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_FeICIC}$ as shown in table 8.1.2.8.4.2-2. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells, including also the cells which are not measured in the subframes indicated by the time-domain measurement resource restriction pattern and the cell indicated in CRS assistance information, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_FeICIC}$.

Table 8.1.2.8.4.2-2: Requirement to measure TDD intra-frequency cells

DRX cycle length (s)	$T_{identify\_intra\_FeICIC}$ (s) (DRX cycles)
≤0.04	0.2 (Note 1)
0.04<DRX-cycle≤0.16	Note 2 (7)
0.16<DRX-cycle≤2.56	Note 2 (5)
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use. NOTE 2: Time depends upon the DRX cycle in use.	

The RSRP and RSRQ measurement accuracy for the measured cells configured with a time-domain measurement resource restriction pattern for RRM intra-frequency measurements shall be as specified in the sub-clauses 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.4.2.1 Measurement Reporting Requirements

8.1.2.8.4.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

8.1.2.8.4.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.8.2.2.1.3.

8.1.2.8.4.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.5, 9.1.2.6, and 9.1.5.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify_intra_FeICIC defined in clause 8.1.2.8.4.2. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_FeICIC}$ defined in clause 8.1.2.8.4.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_FeICIC}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.1.2.9 E-UTRAN E-CID Measurements when Time Domain Measurement Resource Restriction Pattern is Configured

8.1.2.9.1 E-UTRAN FDD UE Rx-Tx Time Difference Measurements

The requirements in this clause apply for UE configured with a time-domain measurement resource restriction pattern for PCell measurements, provided that also the following additional conditions are fulfilled:

- The time domain measurement resource restriction pattern configured for the PCell (TS 36.331 [2]) indicates at least one subframe per radio frame for performing the PCell measurements, and
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

When the UE is provided with a time-domain measurement resource restriction pattern for PCell measurements, the UE Rx-Tx time difference measurement shall meet the measurement requirements specified in Clause 8.1.2.7.1 and accuracy requirements specified in Clause 9.1.9.3, where the condition Ês/Iot ≥ -3dB in Table 9.1.9.3-1 corresponds to the CRS Ês/Iot in subframes indicated by the time-domain measurement resource restriction pattern for PCell measurements (TS 36.331 [2]).

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

8.1.2.9.2 E-UTRAN TDD UE Rx-Tx Time Difference Measurements

The requirements in this clause apply for UE configured with a time-domain measurement resource restriction pattern for PCell measurements, provided that also the following additional conditions are fulfilled:

- The time domain measurement resource restriction pattern configured for the PCell (TS 36.331 [2]) indicates at least one subframe per radio frame for performing the PCell measurements, and
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

When the UE is provided with a time-domain measurement resource restriction pattern for PCell measurements, the UE Rx-Tx time difference measurement shall meet the measurement requirements specified in Clause 8.1.2.7.2 and accuracy requirements specified in Clause 9.1.9.3, where the condition Ês/Iot ≥ -3dB in Table 9.1.9.3-1 corresponds to the CRS Ês/Iot in subframes indicated by the time-domain measurement resource restriction pattern for PCell measurements (TS 36.331 [2]).

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

8.1.2.9.3 E-UTRAN FDD UE Rx-Tx Time Difference Measurements with CRS Assistance Information

For UE configured with a time-domain measurement resource restriction pattern for PCell measurements, the requirements in this section apply under the following conditions:

- The time domain measurement resource restriction pattern configured for the PCell (TS 36.331 [2]) indicates at least one subframe per radio frame for performing the PCell measurements, and
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern, and
- The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

When the UE is provided with a time-domain measurement resource restriction pattern for serving cell measurements, the UE Rx-Tx time difference measurement shall meet the measurement requirements specified in Section 8.1.2.7.1 and accuracy requirements specified in Section 9.1.9.4.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

8.1.2.9.4 E-UTRAN TDD UE Rx-Tx Time Difference Measurements with CRS Assistance Information

For UE configured with a time-domain measurement resource restriction pattern for PCell measurements, the requirements in this section apply under the following conditions:

- The time domain measurement resource restriction pattern configured for the PCell (TS 36.331 [2]) indicates at least one subframe per radio frame for performing the PCell measurements, and
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern, and
- The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

When the UE is provided with a time-domain measurement resource restriction pattern for serving cell measurements, the UE Rx-Tx time difference measurement shall meet the measurement requirements specified in Section 8.1.2.7.2 and accuracy requirements specified in Section 9.1.9.4.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

8.2 Capabilities for Support of Event Triggering and Reporting Criteria

8.2.1 Introduction

This clause contains requirements on UE capabilities for support of event triggering and reporting criteria. As long as the measurement configuration does not exceed the requirements stated in clause 8.2.2, the UE shall meet the performance requirements defined in clause 9.

The UE can be requested to make measurements under different measurement identities defined in TS 36.331 [2]. Each measurement identity corresponds to either event based reporting, periodic reporting, logged measurement reporting [2] or no reporting. In case of event based reporting, each measurement identity is associated with an event. In case of periodic reporting, a measurement identity is associated with one periodic reporting criterion. In case of logged measurement reporting, a measurement identity is associated with one logged measurement reporting criterion. In case of no reporting, a measurement identity is associated with one no reporting criterion.

The purpose of this clause is to set some limits on the number of different event, periodic, logged measurement and no reporting criteria the UE may be requested to track in parallel.

8.2.2 Requirements

In this clause a reporting criterion corresponds to either one event (in the case of event based reporting), or one periodic reporting criterion (in case of periodic reporting), or one logged measurement reporting criterion (in case of logged measurement reporting), or one no reporting criterion (in case of no reporting). For event based reporting, each instance of event, with the same or different event identities, is counted as separate reporting criterion in table 8.2.2-1.

The UE shall be able to support in parallel per category up to E_{cat} reporting criteria according to table 8.2.2-1. For the measurement categories belonging to measurements on: E-UTRA intra-frequency cells, E-UTRA inter-frequency cells, and inter-RAT per supported RAT(i.e. without counting other categories that the UE shall always support in parallel), the UE need not support more than the total number of reporting criteria as follows:

- 26 reporting criteria in total if the UE is not configured with any SCell or PSCell carrier frequency,
- 35 reporting criteria in total if the UE is configured with one SCell carrier frequency,
- 44 reporting criteria in total if the UE is configured with two SCell carrier frequencies,
- 53 reporting criteria in total if the UE is configured with three SCell carrier frequencies,
- 62 reporting criteria in total if the UE is configured with four SCell carrier frequencies,
- 35 reporting criteria in total if the UE is configured with one PSCell carrier frequency, and
- 44 reporting criteria in total if the UE is configured with one PSCell carrier frequency and one SCell carrier frequency.

Editor's note: the total reporting criteria above are to be updated if all UEs will have to support RS-SINR measurements.

A UE supporting increased number of carriers to monitor beyond 3 carriers shall be able to support up to 20 reporting criteria for inter-frequency measurement category according to table 8.2.2-1. Additionally such UE shall be able to support in parallel per category up to E_{cat} reporting criteria according to table 8.2.2-1. For the measurement categories belonging to measurements on: E-UTRA intra-frequency cells, E-UTRA inter-frequency cells, and inter-RAT per supported RAT, the UE need not support more than the total number of reporting criteria as follows:

- 39 reporting criteria in total if the UE is not configured with any SCell carrier frequency,
- 48 reporting criteria in total if the UE is configured with one SCell carrier frequency,
- 57 reporting criteria in total if the UE is configured with two SCell carrier frequencies,
- 48 reporting criteria in total if the UE is configured with one PSCell carrier frequency,
- 57 reporting criteria in total if the UE is configured with one PSCell carrier frequency and one SCell carrier frequencies,
- 66 reporting criteria in total if the UE is configured with three SCell carrier frequencies, and
- 75 reporting criteria in total if the UE is configured with four SCell carrier frequencies.

Editor's note: the total reporting criteria above are to be updated if all UEs will have to support RS-SINR measurements.

Table 8.2.2-1: Requirements for reporting criteria per measurement category

Measurement category	E_{cat}	Note
Intra-frequency Note 1	10	Events for any one or a combination of intra-frequency RSRP, RSRQ, and RS-SINR Note4 for E-UTRA intra-frequency cells
Intra-frequency UE Rx-Tx time difference	2	Intra-frequency UE Rx-Tx time difference measurements reported to E-UTRAN via RRC and to positioning server via LPP. Applies for UE supporting both LPP and UE Rx-Tx time difference measurement.
Intra-frequency RSTD Note 2	1	Intra-frequency RSTD measurement reporting for UE supporting OTDOA; 1 report capable of minimum 16 cell measurements for the intra-frequency
Intra-frequency RSRP and RSRQ measurements for E-CID	1	Intra-frequency RSRP and RSRQ measurements for E-CID reported to E-SMLC via LPP [24]. One report capable of at least in total 9 intra-frequency RSRP and RSRQ measurements. Applicable to UE capable of reporting RSRP and RSRQ to E-SMLC via LPP.
Inter-frequency	10 / 28	Events for any one or a combination of inter-frequency RSRP, RSRQ, and RS-SINR Note4 for E-UTRA inter-frequency cells (see note 3)
Inter-frequency RSTD Note 2	1	Inter-frequency RSTD measurement reporting for UE supporting OTDOA; 1 report capable of minimum 16 cell measurements for at least one inter-frequency. Only applicable as specified in Section 8.1.2.6.
Inter-RAT (GSM, cdma2000 1 x RTT and HRPD)	5	Only applicable for UE with this (inter-RAT) capability. This requirement ($\mathbf{E_{cat}}$ = 5) is per supported RAT.
Inter-RAT (UTRAN FDD, UTRAN TDD)	5 or 11	Only applicable for UE with this (inter-RAT) capability. This requirement ($\mathbf{E_{cat}}$ = 5 or 11) is per supported RAT. For UE which indicate support for Increased UE carrier monitoring UTRA $\mathbf{E_{cat}}$ = 11.
MBSFN measurements for MDT	1	MBSFN measurement reporting for UE supporting MBSFN measurements (MBSFN RSRP, MBSFN RSRQ, and MCH BLER) for MDT [2]; 1 report capable of minimum 1 MBSFN RSRP measurement [4], 1 MBSFN RSRQ measurement [4], and 1 MCH BLER measurement [4].
Note 1: When the UE is configured with SCell, PSCell or PCell carrier frequency, E_{cat} for Intra-frequency is applied per serving frequency. Note 2: When the UE is configured with one SCell carrier frequency, the UE shall be capable of supporting at least 2 reporting criteria for all RSTD measurements configured to be performed on PCell carrier frequency, SCell carrier frequency and inter-frequency carrier. When the UE is configured with two SCell carrier frequencies, the UE shall be capable of supporting at least 3 reporting criteria for all RSTD measurements configured to be performed on PCell carrier frequency, the two SCell carrier frequencies and inter-frequency carrier. These requirements apply when there is a single on-going LPP OTDOA location session. Note 3: Support of Ecat of 28 for Measurement category Inter-frequency is applied for a UE supporting increased number of carriers to monitor beyond 3. Note 4: For UEs supporting RS-SINR measurements (Editor's note: the note is to be removed if the RS-SINR measurement support is mandatory).		

8.3 Measurements for E-UTRA carrier aggregation

8.3.1 Introduction

Requirements in this clause are applicable to UE supporting E-UTRA FDD, E-UTRA TDD and/or E-UTRA TDD-FDD carrier aggregation.

Non configured frequencies may be measured with measurement gaps or autonomous gaps according to the requirements in clause 8.1.2.3 (E-UTRAN inter frequency measurements and E-UTRAN inter frequency measurements with autonomous gaps).

For UE, which does not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331, and is compliant to the requirements for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx specified in TS 36.101, the inter-band CA requirements in Section 8.3 shall apply also with different TDD UL/DL subframe configurations and/or different special subframe configurations used in CCs of different bands, under the following additional conditions:

- UE is not simultaneously scheduled in UL and DL on the different CCs, and
- at least DL subframe #0 or DL subframe #5 are available for measurements in the measured cell.

8.3.2 Measurements of the primary component carrier

Measurements of cells on the primary component carrier shall meet all applicable requirements (FDD or TDD) in clause 8.1.2.2 (E-UTRAN intra frequency measurements and E-UTRAN intra frequency measurements with autonomous gaps)

8.3.3 Measurements of a secondary component carrier

A Secondary component carrier may be activated and deactivated by MAC-CE commands as specified in [17]. The applicable performance requirements depend on whether the SCell on the corresponding frequency is actived or deactivated.

8.3.3.1 Measurements of a secondary component carrier with active SCell

When the SCell is activated, measurement performance requirements for the frequency are those given in clause 8.1.2.2(E-UTRAN intra frequency measurements and E-UTRAN intra frequency measurements with autonomous gaps). If common DRX is in use, then the requirements for that secondary component carrier are given by the applicable DRX requirements (FDD or TDD) in clause 8.1.2.2, otherwise the non DRX requirements are applicable. The applicable measurement accuracy requirements are in clause 9.1.11 (Carrier aggregation measurement accuracy)

8.3.3.2 Measurements of a secondary component carrier with deactivated SCell

This clause defines the measurement requirements of a secondary component carrier with deactivated SCell based on the parameter *measCycleSCell* defined in TS 36.331 [2].

8.3.3.2.1 E-UTRAN secondary component carrier measurements when no common DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD or TDD cell on a secondary component carrier within $T_{identify\_scc}$, according to the parameter *measCycleSCell* where $T_{identify\_scc}$ = 20 *measCycleSCell*

A cell shall be considered detectable when

- RSRP related side condition given in Clause 9.1 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.7 for a corresponding Band

The measurement period for deactivated scell measurements is $T_{measure\_scc}$ according to the parameter *measCycleSCell* where $T_{measure\_scc}$ = 5 *measCycleSCell*. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_scc}$.

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.11 (Carrier aggregation measurement accuracy)

A UE may reconfigure the receiver bandwidth or turn on/off one of the RF chains when performing measurements on up to four SCCs with deactivated SCell. This may cause interruptions on PCell or activated SCell(s) or both that are specified in Section 7.8.

8.3.3.2.1.1 Measurement Reporting Requirements

8.3.3.2.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

8.3.3.2.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.3.3.2.1.1.3.

8.3.3.2.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_scc}$ defined in Clause 8.3.3.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_scc}$ defined in clause 8.3.3.2.1 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_scc}$ provided the timing to that cell has not changed more than $\pm$ 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.3.3.2.2 E-UTRAN secondary component carrier measurements when common DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD or TDD cell on a secondary component carrier within $T_{identify\_scc}$, according to the parameter *measCycleSCell* where $T_{identify\_scc}$ = max(20 *measCycleSCell*, $T_{identify\_scc1}$). $T_{identify\_scc1}$ is given in table 8.3.3.2.2-1.

Table 8.3.3.2.2-1: Requirement for $T_{identify\_scc1}$

DRX cycle length (s)	$T_{identify\_scc1}$ (s) (DRX cycles)
≤0.04	0.8 (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side condition given in Clause 9.1 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.7 for a corresponding Band

The measurement period for deactivated scell measurements is $T_{measure\_scc}$ according to the parameter *measCycleSCell* where $T_{measure\_scc}$ =max(5 *measCycleSCell*, $T_{measure\_scc1}$). The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_scc}$. $T_{measure\_scc1}$ is given in table 8.3.3.2.2-2

Table 8.3.3.2.2-2: Requirement for $T_{measure\_scc1}$

DRX cycle length (s)	$T_{measure\_scc1}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.11 (Carrier aggregation measurement accuracy).

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making measurements of cells on up to four SCCs with deactivated SCell. This may cause interruptions (packet drops) to a PCell or activated SCell(s) or both when the PCell and the SCell belong to the same frequency band. No interruptions while the On Duration timer is running shall be allowed when common DRX is used. The requirement considers only interruptions due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

8.3.3.2.2.1 Measurement Reporting Requirements

8.3.3.2.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

8.3.3.2.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.3.3.2.2.1.3.

8.3.3.2.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_scc}$ defined in Clause 8.3.3.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_scc}$ defined in clause 8.3.3.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_scc}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.4 OTDOA RSTD Measurements for E-UTRAN carrier aggregation

8.4.1 Introduction

This clause contains RSTD measurement requirements on UE capabilities for support of E-UTRA carrier aggregation. Requirements in this clause are applicable to all carrier aggregation capable UE which have been configured with one or two downlink Scell(s). Non-configured frequencies may be measured with measurement gaps according to the requirements in clause 8.1.2.6, i.e., E-UTRAN inter-frequency RSTD measurement period applies. Requirements in this clause are applicable for E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD carrier aggregation.

For UE, which does not support simultaneous reception and transmission for inter-band TDD CA specified in TS 36.331 [2], and is compliant to the requirements for inter-band CA with uplink in one E-UTRA band and without simultaneous Rx/Tx specified in TS 36.101 [5], RSTD requirements in Section 8.4 shall apply also with different TDD UL/DL subframe configurations and/or different special subframe configurations used in CCs of different bands, under the following additional conditions:

all positioning subframes indicated in the OTDOA assistance data and specified in Section 9.1.10 are available for RSTD measurements in the measured and reference cells; and

- UE is not simultaneously scheduled in UL and DL on the different CCs.

8.4.2 Measurements on the primary component carrier

The RSTD measurements on cells belonging to the primary component carrier shall meet all applicable requirements (FDD or TDD) specified in clause 8.1.2.5, i.e., E-UTRAN intra-frequency RSTD measurement period applies.

The RSTD measurement accuracy for all the measurements on the primary component carrier shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.12.

If the PCell is changed, regardless whether the primary component carrier is changed or not while the RSTD measurements are being performed on cells belonging to the primary component carrier, then the UE shall complete the ongoing OTDOA measurement session. In case of change of the primary component carrier, the requirements shall apply only if the primary component carrier is swapped with any of the currently configured secondary component carrier(s). The UE shall also meet the OTDOA measurement and accuracy requirements for the primary component carrier. However in this case the total RSTD measurement period ($\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,PCell\_change}}$) shall be according to the following expression:

$$\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,\,PCell\_change}} = \mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN}} + K \times T_{\mathrm{PRS}} + T_{\mathrm{PCell\_change}} \qquad ms\,,$$

where:

K is the number of times the PCell is changed during $\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,PCell\_change}}$,

T_{PRS} is defined in clause 8.1.2.5,

$T_{\mathrm{PCell\_change}}$ is the time during which the RSTD measurement may not be possible due to PCell change; it can be up to 25 ms,

$\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN}}$ corresponds to the E-UTRAN intra-frequency RSTD measurement period as specified in clause 8.1.2.5.

Furthermore, due to the PCell changing the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCell/SCell(s) on whose carriers RSTD measurement is performed during the RSTD measurement period.

8.4.3 Measurements on a secondary component carrier

The RSTD measurements when all cells are on a configured secondary component carrier shall meet all applicable requirements (FDD or TDD) specified in clause 8.1.2.5, i.e., E-UTRAN intra-frequency RSTD measurement period applies, regardless of whether the Scell on the corresponding frequency is activated or deactivated by the MAC-CE commands as specified in [17].

The RSTD measurement accuracy for all the measurements on the secondary component carrier shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.12.

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making RSTD measurements on cells belonging to SCC with deactivated SCell. This may cause interruptions (packet drops) to a PCell when the PCell and the SCell belong to the adjacent or non-adjacent component carriers in the same frequency band or to different frequency bands. In this case, the UE shall follow the interruption requirements specified in Section 7.10. No interruption to the PCell shall be allowed during the PRS positioning occasion on the PCell.

If the PCell is changed, regardless whether the primary component carrier is changed or not while the RSTD measurements are being performed on cells belonging to the secondary component carrier, then the UE shall complete the ongoing OTDOA measurement session. In case of change of the primary component carrier, the requirements shall apply only if the primary component carrier is swapped with any of the currently configured secondary component carrier(s). The UE shall also meet the OTDOA measurement and accuracy requirements for the secondary component carrier. However in this case the total RSTD measurement period ($\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,\,PCell\_change}}$) shall be according to the following expression:

$$\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,\,PCell\_change}} = \mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN}} + K \times T_{\mathrm{PRS}} + T_{\mathrm{PCell\_change}} \qquad ms\,,$$

where:

K is the number of times the PCell is changed during $\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,\,PCell\_change}}$,

T_{PRS} is defined in clause 8.1.2.5,

$T_{\mathrm{PCell\_change}}$ is the time during which the RSTD measurement may not be possible due to PCell change; it can be up to 25 ms,

$\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN}}$ corresponds to the E-UTRAN intra-frequency RSTD measurement period as specified in clause 8.1.2.5.

Furthermore, due to the PCell changing the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCell/SCell(s) on whose carriers RSTD measurement is performed during the RSTD measurement period.

8.4.4 Measurements on both primary component carrier and a secondary component carrier

The RSTD measurements of cells on both primary component carrier and a configured secondary component carrier shall meet all applicable requirements (FDD-FDD, TDD-TDD, TDD-FDD or FDD-TDD inter-Frequency OTDOA) specified in clause 8.1.2.6, i.e., E-UTRAN inter-frequency RSTD measurement period applies regardless of whether the SCell on the corresponding frequency is activated or deactivated by the MAC-CE commands as specified in [17], with the following exceptions

- the number of PRS positioning occasions is as specified in Table 8.4.4-1 shall apply, and
- TDD uplink-downlink subframes configurations as specified in Clause 8.1.2.5.2, Table 8.1.2.5.2-2 shall apply.

Table 8.4.4-1: Number of PRS positioning occasions within measurement period

Positioning subframe configuration period T_{PRS}	Number of PRS positioning occasions M
160 ms	32
>160 ms	16

The RSTD measurement accuracy for all the measurements on both primary component carrier and the secondary component carrier shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.12.

A UE may reconfigure its receiver bandwidth taking into account the SCell activation/deactivation status, and when performing RSTD measurements on cells belonging to at least SCC with deactivated SCell. This may cause interruptions (packet drops) on a PCell when the PCell and the SCell belong to the adjacent or non-adjacent component carriers in the same frequency band or to different frequency bands. In this case, the UE shall follow the interruption requirements specified in Section 7.10. No interruption to the PCell shall be allowed during the PRS positioning occasion on the PCell.

If the PCell is changed regardless whether the primary component carrier is changed or not while the RSTD measurements are being performed on cells belonging to both the primary component carrier and the secondary component carrier then the UE shall complete the ongoing OTDOA measurement session. In case of change of the primary component carrier, the requirements shall apply only if the primary component carrier is swapped with any of the currently configured secondary component carrier(s). The UE shall also meet the OTDOA measurement and accuracy requirements for the primary and secondary component carrier. However in this case the total RSTD measurement period ($\text{T}_{\text{RSTD, E-UTRAN,PCell\_change}}$) shall be according to the following expression:

$$\text{T}_{\text{RSTD, E-UTRAN, PCell\_change}} = \text{T}_{\text{RSTD, E-UTRAN}} + K \times T_{\text{PRS}} + T_{\text{PCell\_change}} \qquad ms\,,$$

where:

K is the number of times the PCell is changed during $\text{T}_{\text{RSTD, E-UTRAN,PCell\_change}}$,

T_{PRS} is defined in clause 8.1.2.6,

$T_{\text{PCell\_change}}$ is the time during which the RSTD measurement may not be possible due to PCell change; it can be up to 25 ms,

$\text{T}_{\text{RSTD, E-UTRAN}}$ corresponds to the E-UTRAN inter-frequency RSTD measurement period as specified in clause 8.1.2.6 with the exception that the number of PRS positioning occasions is as specified in Table 8.4.4-1.

Furthermore, due to the PCell changing the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCell/SCell(s) on whose carriers RSTD measurement is performed during the RSTD measurement period.

8.4.5 Measurements on different secondary component carriers

The RSTD measurements of cells on a configured secondary component carrier and another configured secondary component carrier shall meet all applicable requirements (FDD-FDD, TDD-TDD, TDD-FDD or FDD-TDD inter-Frequency OTDOA) specified in clause 8.1.2.6, i.e., E-UTRAN inter-frequency RSTD measurement period applies regardless of whether the SCell on the corresponding frequency is activated or deactivated by the MAC-CE commands as specified in [17], with the following exceptions

- the number of PRS positioning occasions is as specified in Table 8.4.4-1 shall apply, and
- TDD uplink-downlink subframes configurations as specified in Clause 8.1.2.5.2, Table 8.1.2.5.2-2 shall apply.

Table 8.4.4-1: Number of PRS positioning occasions within measurement period

Positioning subframe configuration period T_{PRS}	Number of PRS positioning occasions M
160 ms	32
>160 ms	16

The RSTD measurement accuracy for all the measurements on the secondary component carriers shall be fulfilled according to the accuracy as specified in the sub-clause 9.1.12.

A UE may reconfigure its receiver bandwidth taking into account the SCell activation/deactivation status, and when performing RSTD measurements on cells belonging to at least SCC with deactivated SCell. This may cause interruptions (packet drops) on a PCell when the PCell and the SCell belong to the adjacent or non-adjacent component carriers in the same frequency band or to different frequency bands. In this case, the UE shall follow the interruption requirements specified in Section 7.10. No interruption to the PCell shall be allowed during the PRS positioning occasion on the PCell.

If the PCell is changed regardless whether the primary component carrier is changed or not while the RSTD measurements are being performed on cells belonging to the secondary component carriers then the UE shall complete the ongoing OTDOA measurement session. In case of change of the primary component carrier, the requirements shall apply only if the primary component carrier is swapped with any of the currently configured secondary component carrier(s). The UE shall also meet the OTDOA measurement and accuracy requirements for the secondary component carriers. However in this case the total RSTD measurement period ($\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,PCell\_change}}$) shall be according to the following expression:

$$\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,\,PCell\_change}} = \mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN}} + K \times T_{\mathrm{PRS}} + T_{\mathrm{PCell\_change}} \qquad ms\,,$$

where:

K is the number of times the PCell is changed during $\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN,PCell\_change}}$,

T_{PRS} is defined in clause 8.1.2.6,

$T_{\mathrm{PCell\_change}}$ is the time during which the RSTD measurement may not be possible due to PCell change; it can be up to 25 ms,

$\mathrm{T}_{\mathrm{RSTD,\,E\text{-}UTRAN}}$ corresponds to the E-UTRAN inter-frequency RSTD measurement period as specified in clause 8.1.2.6 with the exception that the number of PRS positioning occasions is as specified in Table 8.4.4-1.

Furthermore, due to the PCell changing the UE shall meet the RSTD measurement accuracy for a PRS bandwidth which is not larger than the minimum channel bandwidth of those PCell/SCell(s) on whose carriers RSTD measurement is performed during the RSTD measurement period.

8.5 Measurements for UE category 0

8.5.1 Introduction

The UE category 0 applicability of the requirements in subclause 8.5 is defined in Section 3.6.1.

This clause contains requirements on the UE regarding measurement reporting in RRC_CONNECTED state. The requirements are specified for E-UTRA intra frequency measurements. These measurements may be used by the E-UTRAN, e.g. for handover decisions. The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracies are specified in clause 9. Control of measurement reporting is specified in TS 36.331 [2].

When the UE is provided with IDC solution, the UE shall also perform RRM measurements and meet the corresponding requirements in clause 8.

8.5.2 Requirements

8.5.2.1 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency cells and perform RSRP measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

8.5.2.1.1 E-UTRAN FDD intra frequency measurements

8.5.2.1.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within

$$T_{\text{identify intra\_UE cat 0}} = T_{\text{basic\_identify\_E-UTRA\_FDD\_UE cat 0}} \cdot \frac{T_{\text{Measurement\_Period\_UE cat 0, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{\text{basic\_identify\_E-UTRA\_FDD\_UE cat 0, intra}}$ is 1000 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{\text{Measurement\_Period\_ UE cat 0 Intra}}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is 400 ms. When no measurement gaps are activated, the low complexity UE shall be capable of performing RSRPand RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 400 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{\text{measurement intra\_UE cat 0}}$ cells , where $Y_{\text{measurement intra\_ UE cat 0}}$ is defined in the following equation. If the UE has identified more than $Y_{\text{measurement intra\_UE cat 0}}$ cells, the UE shall perform measurements of at least 8 identified intra- frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement\_intra\_UE cat 0}} = Floor\left\{ X_{\text{basic\_measurement\_FDD\_UE cat 0}} \cdot \frac{T_{\text{Intra}}}{T_{\text{Measurement\_Period\_UE cat 0, Intra}}} \right\}$$

cells where

$X_{\text{basic measurement FDD\_UE cat 0}}$ = 8 (cells)

$T_{\text{Measurement\_Period\_UE cat 0, Intra}}$ = 400 ms. The measurement period for Intra frequency RSRP and RSRQ measurements.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

8.5.2.1.1.1.1 Measurement Reporting Requirements

8.5.2.1.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

8.5.2.1.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.1.1.1.3.

8.5.2.1.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resoureces for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify intra\_UE cat 0}}$ defined in Clause 8.5.2.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra\_UE cat 0}}$ defined in clause 8.5.2.1.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period\_UE cat 0, Intra}}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.5.2.1.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{\text{identify\_intra\_UE cat 0}}$ as shown in table 8.5.2.1.1.2-1. When eDRX_CONN is in use the UE shall be able to identify a new detectable FDD intra-frequency cell within $T_{\text{identify\_intra\_UE cat 0}}$ as shown in table 8.5.2.1.1.2-1A.

Table 8.5.2.1.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

DRX cycle length (s)	$T_{\text{identify\_intra\_UE cat 0}}$ (s) (DRX cycles)
≤0.04	[1] (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.5.2.1.1.2-1A: Requirement to identify a newly detectable FDD intra-frequency cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_intra\_UE\ cat\ 0}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note(20)
Note: Time depends upon the eDRX_CONN cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_UE\ cat\ 0}$. When DRX is used, $T_{measure\_intra\_UE\ cat\ 0}$ is as defined in table 8.5.2.1.1.2-2, when eDRX_CONN is used, $T_{measure\_intra\_UE\ cat\ 0}$ is as defined in table 8.5.2.1.1.2-3. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_UE\ cat\ 0}$.

Table 8.5.2.1.1.2-2: Requirement to measure FDD intrafrequency cells

DRX cycle length (s)	$T_{measure\_intra\_UE\ cat\ 0}$ (s) (DRX cycles)
≤0.08	0.4 (Note1)
0.08<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.5.2.1.1.2-3: Requirement to measure FDD intra-frequency cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_intra\_UE\ cat\ 0}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (5)
Note: Time depends upon the eDRX_CONN cycle in use	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

8.5.2.1.1.2.1 Measurement Reporting Requirements

8.5.2.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

8.5.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.1.2.1.3.

8.5.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra, UE cat 0}$ defined in Clause 8.5.2.1.1.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE cat 0}$ defined in clause 8.5.2.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_UE cat 0}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.5.2.1.2 E-UTRAN intra frequency measurements for HD-FDD

8.5.2.1.2.1 E-UTRAN intra frequency measurements when no DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

The requirements defined in clause 8.5.2.1.1.1 also apply for this section provided the following conditions are met:

- at least downlink subframe # 0 or downlink subframe # 5 per radio frame of an intra-frequency cell to be identified by the UE is available at the UE over $T_{identify\_intra\_UE cat 0}$;
- at least one downlink subframe per radio frame of measured cell is available at the UE for RSRP and RSRQ measurements assuming measured cell is identified cell over $T_{measure\_intra\_UE cat 0}$.

8.5.2.1.2.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\_intra\_UE cat 0}$ as shown in table 8.5.2.1.2.2-1. When eDRX_CONN is in use the UE shall be able to identify a new detectable FDD intra-frequency cell within $T_{identify\_intra\_UE cat 0}$ as shown in table 8.5.2.1.2.2-1A.

Table 8.5.2.1.2.2-1: Requirement to identify a newly detectable HD-FDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra\_UE cat 0}$ (s) (DRX cycles)
≤0.04	1 (Note1)
0.04<DRX-cycle≤0.08	Note2 (50)
0.128	3.2 (32)
0.128<DRX-cycle≤2.56	Note2(25)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.5.2.1.2.2-1A: Requirement to identify a newly detectable HD-FDD intra-frequency cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_intra\_UE\ cat\ 0}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (25)
Note: Time depends upon the eDRX_CONN cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

When DRX is in use, in the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_UE\ cat\ 0}$ as shown in table 8.5.2.1.2.2-2. When eDRX_CONN is in use in the RRC_CONNECTED state, the measurement period for intra-frequency measurements is $T_{measure\_intra\_UE\ cat\ 0}$ as shown in table 8.5.2.1.2.2-3. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_UE\ cat\ 0}$.

Table 8.5.2.1.2.2-2: Requirement to measure HD-FDD intrafrequency cells

DRX cycle length (s)	$T_{measure\_intra\_UE\ cat\ 0}$ (s) (DRX cycles)
≤0.04	0.4 (Note1)
0.04<DRX-cycle≤0.16	Note2 (7)
0.16<DRX-cycle≤2.56	Note2(5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.5.2.1.2.2-3: Requirement to measure HD-FDD intra-frequency cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_intra\_UE\ cat\ 0}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (5)
Note: Time depends upon the eDRX_CONN cycle in use	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

8.5.2.1.1.2.1 Measurement Reporting Requirements

8.5.2.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

8.5.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.1.2.1.3.

8.5.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_UE\ cat\ 0}$ defined in Clause 8.5.2.1.1.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE\ cat\ 0}$ defined in clause 8.5.2.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_UE\ cat\ 0}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.5.2.1.3 E-UTRAN TDD intra frequency measurements

8.5.2.1.3.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within

$$T_{\text{identify intra\_UE cat 0}} = T_{\text{basic identify } E-UTRA\text{\_TDD\_UE cat 0, intra}} \cdot \frac{T_{\text{Measurement Period\_UE cat 0, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{basic\_identify\_E\text{-}UTRA\_TDD\_UE\ cat\ 0,\ intra}$ is 1000 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. Time is assumed to be available for performing intra frequency measurements whenever the receiver is guaranteed to be active on the intra frequency carrier.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_UE\ cat\ 0\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is 400 ms. When no measurement gaps are activated, the UE shall be capable of performing RSRP and RSRQ measurements for 8 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 400 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{measurement\ intra\_UE\ cat\ 0}$ cells , where $Y_{measurement\ intra\_UE\ cat\ 0}$ is defined in the following equation. If the UE has identified more than $Y_{measurement\ ,intra\_UE\ cat\ 0}$ cells, the UE shall perform measurements of at least 8 identified intra-frequency cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement intra\_UE cat 0}} = Floor\left\{ X_{\text{basic measurement TDD\_UE cat 0}} \cdot \frac{T_{\text{Intra}}}{T_{\text{Measurement\_Period\_UE cat 0, Intra}}} \right\}$$

cells where

$X_{\text{basic measurement TDD\_UE cat 0}}$ = 8 (cells)

$T_{\text{Measurement\_Period intra\_UE cat 0}}$ = 400 ms. The measurement period for Intra frequency RSRP and RSRQ measurements.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

8.5.2.1.3.1.1 Measurement Reporting Requirements

8.5.2.1.3.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

8.5.2.1.3.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.3.1.1.3.

8.5.2.1.3.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify intra\_UE cat 0}}$ defined in Clause 8.5.2.1.3.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra\_UE cat 0}}$ defined in clause 8.5.2.1.3.1 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period Intra\_UE cat 0}}$ provided the timing to that cell has not changed more than $\pm$ 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.5.2.1.3.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{\text{identify\_intra\_UE cat 0}}$ as shown in table 8.5.2.1.3.2-1. When eDRX_CONN is in use the UE shall be able to identify a new detectable TDD intra-frequency cell within $T_{\text{identify\_intra\_UE cat 0}}$ as defined in table 8.5.2.1.3.2-1A.

Table 8.5.2.1.3.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra\_UE\ cat\ 0}$ (s) (DRX cycles)
≤0.04	1 (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

Table 8.5.2.1.3.2-1A: Requirement to identify a newly detectable TDD intra-frequency cell when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{identify\_intra\_UE\ cat\ 0}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (20)
Note: Time depends upon the eDRX_CONN cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.13.1 and 9.1.13.2 and RSRQ related side conditions given in Clause 9.1.13.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band

When DRX is in use in the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_UE\ cat\ 0}$ as shown in table 8.5.2.1.3.2-2. When eDRX_CONN in the RRC_CONNECTED state is in use, the measurement period for intra-frequency measurements is $T_{measure\_intra\_UE\ cat\ 0}$ as defined in table 8.5.2.1.3.2-3. The UE shall be capable of performing RSRP and RSRQ measurements for 8 identified intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_UE\ cat\ 0}$.

Table 8.5.2.1.3.2-2: Requirement to measure TDD intra frequency cells

DRX cycle length (s)	$T_{measure\_intra\_UE\ cat\ 0}$ (s) (DRX cycles)
≤0.08	0.4 (Note1)
0.08<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use. Note2: Time depends upon the DRX cycle in use.	

Table 8.5.2.1.3.2-3: Requirement to measure TDD intra-frequency cells when eDRX_CONN cycle is used

eDRX_CONN cycle length (s)	$T_{measure\_intra\_UE\ cat\ 0}$ (s) (eDRX_CONN cycles)
2.56<eDRX_CONN cycle≤10.24	Note (5)
Note: Time depends upon the eDRX_CONN cycle in use.	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.13.1 and 9.1.13.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.13.3.

8.5.2.1.3.2.1 Measurement Reporting Requirements

8.5.2.1.3.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

8.5.2.1.3.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.5.2.1.3.2.1.3.

8.5.2.1.3.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.13.1, 9.1.13.2 and 9.1.13.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_UE\ cat\ 0}$ defined in Clause 8.5.2.1.3.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE\ cat\ 0}$ defined in clause 8.5.2.1.3.2 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_UE\ cat\ 0}$ provided the timing to that cell has not changed more than $\pm$ 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.5.2.1.4 E-UTRAN FDD intra frequency measurements with autonomous gaps for UE category 0

The requirements defined in this subclause 8.5.2.1.4 apply provided the following condition is met:

- Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.

8.5.2.1.4.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX or eDRX_CONN is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI\_LC\text{-}UE,\,intra} = T_{basic\_identify\_CGI\_LC\text{-}UE,\,intra} \quad ms$$

Where

$T_{basic\_identify\_CGI\_LC\text{-}UE,\ intra}$ = 190 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [TBD].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI\_LC\text{-}UE,.intra}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

Within the time, $T_{identify\_CGI\_LC\text{-}UE,\, intra}\ ms$, over which the UE identifies the new CGI of E-UTRA cell, the UE shall transmit at least 92 ACK/NACKs on PCell provided that:

- there is continuous DL data allocation,
- no DRX and no eDRX_CONN cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

8.5.2.1.4.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. In case eDRX_CONN is used, the ECGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.5.2.1.5 E-UTRAN intra frequency measurements with autonomous gaps for HD-FDD UE category 0

The requirements in this section are applicable for the UE which supports half duplex FDD operation on one or more supported frequency bands [2].

The requirements defined in this subclause 8.5.2.1.5 apply provided the following condition is met:

- Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.

8.5.2.1.5.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

All the CGI requirements with the exception of requirement on the number of ACK/NACK transmission on PCell defined in clause 8.5.2.1.4.1 also apply for this section.

For the UE supporting half duplex FDD operation there is no requirement in terms of number of ACK/NACK transmission on PCell.

8.5.2.1.5.2 ECGI Reporting Delay

The ECGI reporting delay defined in clause 8.5.2.1.4.2 also apply for this section.

8.5.2.1.6 E-UTRAN TDD intra frequency measurements with autonomous gaps for UE category 0

The requirements defined in this subclause 8.5.2.1.6 apply provided the following condition is met:

- Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.

8.5.2.1.6.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1 messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX or eDRX_CONN is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{\text{identify\_CGI\_LC-UE, intra}} = T_{\text{basic\_identify\_CGI\_LC-UE, intra}} \quad ms$$

Where

$T_{\text{basic\_identify\_CGI\_LC-UE, intra}}$ = 190 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable when the following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [TBD].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{\text{basic\_identify\_CGI\_LC-UE, intra}}$ is applicable when no DRX is used as well as when any of the DRX or eDRX_CONN cycles specified in TS 36.331 [2] is used.

Within the time, $T_{\text{identify\_CGI\_LC-UE, intra}}\ ms$, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs stated in Table 8.5.2.1.6.1-1 on PCell provided that:

- there is continuous DL data allocation,
- no DRX and no eDRX_CONN cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.5.2.1.6.1-1: Requirement on minimum number of ACK/NACKs to transmit during $T_{\text{basic\_identify\_CGI\_LC-UE, intra}}$.

UL/DL configuration	Minimum number of transmitted ACK/NACKs
0	30
1	54
2	68
3	56
4	61
5	66
6	46

8.5.2.1.6.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. In case eDRX_CONN is used, the ECGI reporting may be delayed until the next eDRX_CONN cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.6 Discovery signal measurements

8.6.1 Introduction

This clause contains requirements on the UE for measurement reporting in RRC_CONNECTED state when discovery signal [16] is configured. The requirements are specified for E-UTRA CRS based discovery signal measurements and CSI-RS based discovery signal measurements. These measurements may be used by the E-UTRAN, e.g. for handover decisions. The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracy requirements are specified in clause 9. Control of measurement reporting is specified in TS 36.331 [2].

The requirements in Section 9 are applicable for a UE performing measurements according to Section 8.6.

8.6.2 Requirements for CRS based discovery signal measurements

8.6.2.1 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency cells and perform measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

8.6.2.1.1 E-UTRAN FDD intra frequency measurements

8.6.2.1.1.1 E-UTRAN FDD intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\_intra\_SCE}$,

$T_{identify\_intra\_SCE} = 12 * T_{DMTC\_periodicity} + T_{Measurement\_Period\_intra\_FDD\_CRS}$

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

$T_{Measurement\_Period\_intra\_FDD\_CRS}$ is the intra-frequency period for measurements as shown in table 8.6.2.1.1.1-1

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\ intra\_FDD\_CRS}$ when no DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{Measurement\_Period\_intra\_FDD\_CRS}$ as shown in table 8.6.2.1.1.1-1, when no DRX is in use. The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_Period\_intra\_FDD\_CRS}$

Table 8.6.2.1.1.1-1: Requirement to measure FDD intra frequency cell

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ intra\_FDD\_CRS}$[ms]
≥ 6	≥1	5 * $T_{DMTC\_periodicity}$
≥ 25	≥1	3 * $T_{DMTC\_periodicity}$

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

8.6.2.1.1.1.1 Measurement Reporting Requirements

8.6.2.1.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

8.6.2.1.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.1.1.1.1.3.

8.6.2.1.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_SCE}$ defined in Clause 8.6.2.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_SCE}$ defined in clause 8.6.2.1.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_intra\_FDD\_CRS}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.2.1.1.2 E-UTRAN FDD intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\_intra\_SCE\_DRX}$.

$T_{identify\_intra\_SCE\_DRX}$ = 16* *Max* { $T_{DMTC\_periodicity}$, DRX cycle length}+ $T_{Measurement\_Period\ \_intra\_FDD\_CRS\_DRX}$

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

$T_{Measurement\_Period\ \_intra\_FDD\_CRS\_DRX}$ is the intra-frequency period for measurements as shown in table 8.6.2.1.1.2-1

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\ intra\_FDD\_\ CRS\_DRX}$ when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{Measurement\_Period\ \_intra\_FDD\_CRS\_DRX}$ as shown in table 8.6.2.1.1.2-1, when DRX is in use. The UE shall be capable of performing RSRP and

RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_Period\ \_intra\_FDD\_\ CRS\_DRX}$.

Table 8.6.2.1.1.2-1: Requirement to measure FDD intra frequency cell

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ intra\_FDD\_CRS\_DRX}$ [ms]
≥ 6	≥1	5 * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
≥ 25	≥1	3 * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

8.6.2.1.1.2.1 Measurement Reporting Requirements

8.6.2.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

8.6.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.1.1.2.1.3.

8.6.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_SCE\_DRX}$ defined in Clause 8.6.2.1.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_SCE\_DRX}$ defined in clause 8.6.2.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_intra\_FDD\_CRS\_DRX}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.2.1.2 E-UTRAN TDD intra frequency measurements

8.6.2.1.2.1 E-UTRAN TDD intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{identify\_intra\_SCE}$,

$T_{identify\_intra\_SCE} = 12 * T_{DMTC\_periodicity} + T_{Measurement\_Period\_intra\_TDD\_CRS}$

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

$T_{Measurement\_Period\_intra\_TDD\_CRS}$ is the intra-frequency period for measurements

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_intra\_TDD\_CRS}$ when no DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{Measurement\_Period\_intra\_TDD\_CRS}$ as shown in table 8.6.2.1.2.1-1, when no DRX is in use. The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_Period\_intra\_TDD\_CRS}$

Table 8.6.2.1.2.1-1: Requirement to measure TDD intra frequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ intra\_TDD\_CRS}$[ms]
≥ 6	≥2	5 * $T_{DMTC\_periodicity}$
≥ 25	≥2	3 * $T_{DMTC\_periodicity}$

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

8.6.2.1.2.1.1 Measurement Reporting Requirements

8.6.2.1.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

8.6.2.1.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.1.2.1.1.3.

8.6.2.1.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_SCE}$ defined in Clause 8.6.2.1.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_SCE}$ defined in clause 8.6.2.1.2.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_intra\_TDD\_CRS}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.2.1.2.2 E-UTRAN TDD intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{identify\_intra\_SCE\_DRX}$.

$T_{identify\_intra\_SCE\_DRX} = 16 * \max \{ T_{DMTC\_periodicity}, \text{DRX cycle length}\} + T_{Measurement\_Period\ \_intra\_TDD\_CRS\_DRX}$

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\ intra\_TDD\_CRS\_DRX}$ when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{Measurement\_Period\ \_intra\_TDD\_CRS\_DRX}$ as shown in table 8.6.2.1.2.2-1, when DRX is in use. The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_Period\ \_intra\_TDD\_CRS\_DRX}$

Table 8.6.2.1.2.2-1: Requirement to measure TDD intra frequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ intra\_TDD\_CRS\_DRX}$ [ms]
≥ 6	≥2	5 * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
≥ 25	≥2	3 * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

8.6.2.1.2.2.1 Measurement Reporting Requirements

8.6.2.1.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

8.6.2.1.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.1.2.2.1.3.

8.6.2.1.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_SCE\_DRX}$ defined in Clause 8.6.2.1.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_SCE\_DRX}$ defined in clause 8.6.2.1.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_intra\_TDD\_CRS\_DRX}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.2.2 E-UTRAN inter frequency measurements

The UE shall be able to identify new inter-frequency cells and perform RSRP and RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the PCell, even if no explicit neighbour list with physical layer cell identities is provided. The discovery signal occasion and the measurement gap should be aligned, provided that also the following additional conditions are fulfilled:

Entire discovery signal occasion should be contained in the measurement gap.

The subframe contained discovery signal for the measurement is not overlapped with the first 0.5ms period and the last 0.5ms period in every gap.

8.6.2.2.1 E-UTRAN FDD – FDD inter-frequency measurements

8.6.2.2.1.1 E-UTRAN FDD – FDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new FDD inter-frequency within $T_{Identify\_Inter\_SCE}$ according to the following expression:

$T_{Identify\_Inter\_SCE} = \underline{13} * Max\ \{T_{DMTC\_periodicity}, \text{MGRP}\} * N_{freq} + T_{Measurement\_Period\_inter\_FDD\_CRS}$

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1.14.2 and RSRQ related side conditions given in Sections 9.1.14.4 are fulfilled,
- $SCH\_RP|_{dBm}$ SCH Ês/Iot according to Annex B.2.11 for a corresponding Band,

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

$T_{Measurement\_Period\ \_intra\_FDD\_CRS}$ is the inter-frequency period for measurements as shown in table 8.6.2.2.1.2-1. N_{freq} is defined in clause 8.1.2.1.1.

When measurement gaps are scheduled for FDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.2 and 9.1.14.4, respectively, with measurement period given by table 8.6.2.3.1.1-1.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 3 identified inter-frequency cells per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.6.2.2.1.1-1 when no DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.2.2.1.1-1: Requirement to measure FDD inter frequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ inter\_FDD\_CRS}$ [ms]
≥ 6	≥1	5 * *Max*{ $T_{DMTC\_periodicity}$, MGRP}*N_{freq}
≥ 25	≥1	3 * *Max*{ $T_{DMTC\_periodicity}$, MGRP}*N_{freq}

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

8.6.2.2.1.1.1 Measurement Reporting Requirements

8.6.2.2.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4,respectively.

8.6.2.2.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.2.1.1.1.3.

8.6.2.2.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{Identify\_Inter\_SCE}$ defined in Clause 8.6.2.2.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{Identify\_Inter\_SCE}$ defined in clause 8.6.2.2.1.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_inter\_FDD\_CRS}$ provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.2.2.1.2 E-UTRAN FDD – FDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN FDD inter frequency cell within $T_{identify\_inter\_SCE\_DRX}$.

$T_{identify\_inter\_SCE\ DRX}$ = 17 * *Max* { $T_{DMTC\_periodicity}$, DRX cycle length, MGRP} *N_{freq} +$T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX}$

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.2 and RSRQ related side conditions given in Clause 9.1.14.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

$T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX}$ is the inter-frequency period for measurements as shown in Table 8.6.2.2.1.2-1. N_{freq} is defined in clause 8.1.2.1.1.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX}$ when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 3 identified inter-frequency cells per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.6.2.2.1.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.2.2.1.2-1: Requirement to measure FDD interfrequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ inter\_FDD\_CRS\_DRX}$ [ms]
≥ 6	≥1	5 * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length,MGRP}*N_{freq}
≥ 25	≥1	3 * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length,MGRP}*N_{freq}

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

8.6.2.2.1.2.1 Measurement Reporting Requirements

8.6.2.2.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4 respectively.

8.6.2.2.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2 and 9.1.14.4 respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.2.1.2.1.3.

8.6.2.2.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4 respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_inter\_SCE\ DRX}$ defined in Clause 8.6.2.2.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_inter\_SCE\ DRX}$ defined in clause 8.6.2.2.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_inter\_FDD\_CRS\_DRX}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.2.2.2 E-UTRAN TDD – TDD inter frequency measurements

8.6.2.2.2.1 E-UTRAN TDD – TDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new TDD inter-frequency within $T_{Identify\_Inter\_SCE}$ according to the following expression:

$T_{identify\_inter\_SCE} = 13 * \mathit{Max}\ \{ T_{DMTC\_periodicity}, MGRP\} * N_{freq} + T_{Measurement\_Period\_inter\_TDD\_CRS}$

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1.14.2 and RSRQ related side conditions given in Sections 9.1.14.4 are fulfilled,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

$T_{Measurement\_Period\_inter\_TDD\_CRS}$ is the inter-frequency period for measurements as shown in Table 8.6.2.2.2.1-1. N_{freq} is defined in clause 8.1.2.1.1.

When measurement gaps are scheduled for TDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.2, and 9.1.14.4, respectively, with measurement period $T_{Measurement\_Period\ inter\_TDD\_CRS}$ given by table 8.6.2.2.2.1-1:

Table 8.6.2.2.2.1-1: Requirement to measure TDD interfrequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ inter\_TDD\_CRS}$ [ms]
≥ 6	≥2	5 * *Max*{ $T_{DMTC\_periodicity}$, MGRP}*N_{freq}
≥ 25	≥2	3 * *Max*{ $T_{DMTC\_periodicity}$, MGRP}*N_{freq}

The UE shall be capable of performing RSRP and RSRQ measurements of at least 3 identified inter-frequency cells per FDD inter-frequency for up to 3TDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.6.2.2.1.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

8.6.2.2.2.1.1 Measurement Reporting Requirements

8.6.2.2.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

8.6.2.2.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.2.2.2.1.1.3.

8.6.2.2.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{Identify\_Inter}$ defined in clause 8.6.2.2.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{Identify\_Inter\_SCE}$ defined in clause 8.6.2.2.2.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ inter\_TDD\_CRS}$ defined in clause 8.6.2.2.2.1 provided the timing to that cell has not changed more than ± 50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.2.2.2.2 E-UTRAN TDD – TDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN TDD inter frequency cell within $T_{identify\_inter\_SCE\_DRX}$

$T_{identify\_inter\_SCE\_DRX} = 17 * \mathit{Max}\ \{ T_{DMTC\_periodicity}, \text{DRX cycle length, MGRP}\} *N_{freq} + T_{Measurement\_Period\_inter\_TDD\_CRS\_DRX}$

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.14.2 and RSRQ related side conditions given in Sections 9.1.14.4 are fulfilled,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

$T_{Measurement\_Period\_inter\_TDD\_CRS\_DRX}$ is the inter-frequency period for measurements as shown in Table 8.6.2.2.2.2-1. N_{freq} is defined in clause 8.1.2.1.1.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\ intra\_TDD\_CRS\_DRX}$ when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 3 identified inter-frequency cells per TDD inter-frequency for up to 3 TDD inter-frequencies and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.6.2.2.1.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.2.2.2.2-1: Requirement to measure TDD interfrequency cell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ inter\_TDD\_CRS\_DRX}$ [ms]
≥ 6	≥2	5 * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length,MGRP}*N_{freq}
≥ 25	≥2	3 * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length,MGRP}*N_{freq}

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.14.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.14.4.

8.6.2.2.2.2.1 Measurement Reporting Requirements

8.6.2.2.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

8.6.2.2.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.1.2.3.2.1.1.3.

8.6.2.2.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.2, and 9.1.14.4, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{Identify\_Inter}$ defined in clause 8.1.2.3.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_inter\_SCE\_DRX}$ defined in clause 8.6.2.2.2.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_inter\_TDD\_CRS\_DRX}$ defined in clause 8.6.2.2.2.2 provided the timing to that cell has not changed more than ± 50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.2.2.3 E-UTRAN TDD – FDD inter frequency measurements

8.6.2.2.3.1 E-UTRAN TDD – FDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.2.2.1.1 also apply for this section.

8.6.2.2.3.2 E-UTRAN TDD – FDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.2.2.1.2 also apply for this section.

8.6.2.2.4 E-UTRAN FDD – TDD inter frequency measurements

8.6.2.2.4.1 E-UTRAN FDD – TDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.2.2.2.1 also apply for this section.

8.6.2.2.4.2 E-UTRAN FDD – TDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.2.2.2.2 also apply for this section.

8.6.3 Requirements for CSI-RS based discovery signal measurements

8.6.3.1 E-UTRAN intra frequency measurements

The UE shall be able to identify new intra-frequency TPs and perform CSI-RSRP measurements of intra-frequency TPs with an explicit intra-frequency TP list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra frequency TPs and additionally search for and identify new intra frequency TPs.

8.6.3.1.1 E-UTRAN FDD intra frequency measurements

8.6.3.1.1.1 E-UTRAN FDD intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency TP within $T_{identify\_intra\_TP\_SCE}$,

$T_{identify\_intra\_TP\_SCE} = T_{identify\_intra\_SCE} + T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS}$

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{identify\_intra\_SCE}$ is the intra-frequency period for cell identification in section 8.6.2.1.1.1. $T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS}$ is the intra-frequency period for TP measurement as shown in table 8.6.3.1.1.1-1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_intra\_FDD\_CSI-RS}$ when no DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{Measurement\_Period\_intra\_FDD\_CSI-RS}$ as shown in table 8.6.3.1.1.1-1, when no DRX is in use. The UE shall be capable of performing CSI-RSRP measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_Period\_intra\_FDD\_CSI-RS}$

Table 8.6.3.1.1.1-1: Requirement to measure FDD intra frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS}$ [ms]
≥ 6	≥1	5* $T_{DMTC\_periodicity}$
≥ 25	≥1	3* $T_{DMTC\_periodicity}$

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

8.6.3.1.1.1.1 Measurement Reporting Requirements

8.6.3.1.1.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

8.6.3.1.1.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.1.1.1.1.3.

8.6.3.1.1.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_TP\_SCE}$ defined in Clause 8.6.3.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_intra\_TP\_SCE}$ defined in clause 8.6.3.1.1.1 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.3.1.1.2 E-UTRAN FDD intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency TP within $T_{identify\_intra\_TP\_SCE\_DRX}$.

$T_{identify\_intra\_TP\_SCE\_DRX} = T_{identify\_intra\_SCE\_DRX} + T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS\_DRX}$

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{identify\_intra\_SCE\_DRX}$ is the intra-frequency period for cell identification in section 8.6.2.1.1.2. $T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS\_DRX}$ is the intra-frequency period for TP measurement as shown in table 8.6.3.1.1.2-1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_intra\_FDD\_CSI-RS\_DRX}$ when DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS\_DRX}$ as shown in table 8.6.3.1.1.2-1, when DRX is in use. The UE shall be capable of performing CSI-RSRP measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_Period\ \_intra\_FDD\_\ CSI-RS\_DRX}$.

Table 8.6.3.1.1.2-1: Requirement to measure FDD intra frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ intra\_FDD\_\ CSI-RS\_DRX}$ [ms]
≥ 6	≥1	5**Max*{$T_{DMTC\_periodicity}$, DRX cycle length}
≥ 25	≥1	3**Max*{$T_{DMTC\_periodicity}$, DRX cycle length}

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

8.6.3.1.1.2.1 Measurement Reporting Requirements

8.6.3.1.1.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

8.6.3.1.1.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.1.1.2.1.3.

8.6.3.1.1.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_TP\_SCE\_DRX}$ defined in Clause 8.6.3.1.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_intra\_TP\_SCE\_DRX}$ defined in clause 8.6.3.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS\_DRX}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.3.1.2 E-UTRAN TDD intra frequency measurements

8.6.3.1.2.1 E-UTRAN TDD intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency TP within $T_{identify\_intra\_TP\_SCE}$,

$T_{identify\_intra\_TP\_SCE} = T_{identify\_intra\_SCE} + T_{Measurement\_Period\ \_intra\_TDD\_CSI-RS}$

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{identify\_intra\_SCE}$ is the intra-frequency period for cell identification in section 8.6.2.1.2.1. $T_{Measurement\_Period\ \_intra\_TDD\_CSI-RS}$ is the intra-frequency period for TP measurement as shown in table 8.6.3.1.2.1-1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_intra\_TDD\_CSI-RS}$ when no DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{Measurement\_Period\ \_intra\_TDD\_CSI-RS}$ as shown in table 8.6.3.1.2.1-1, when no DRX is in use. The UE shall be capable of performing measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_Period\ \_intra\_TDD\_\ CSI-RS}$

Table 8.6.3.1.2.1-1: Requirement to measure TDD intra frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ \_intra\_TDD\_CSI-RS}$ [ms]
≥ 6	≥2	5* $T_{DMTC\_periodicity}$
≥ 25	≥2	3* $T_{DMTC\_periodicity}$

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

8.6.3.1.2.1.1 Measurement Reporting Requirements

8.6.3.1.2.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

8.6.3.1.2.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.1.2.1.1.3.

8.6.3.1.2.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_TP\_SCE}$ defined in Clause 8.6.3.1.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_intra\_TP\_SCE}$ defined in clause 8.6.3.1.2.1 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_intra\_TDD\_CSI-RS}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.3.1.2.2 E-UTRAN TDD intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency TP within $T_{identify\_intra\_TP\_SCE\_DRX}$.

$$T_{identify\_intra\_TP\_SCE\_DRX} = T_{identify\_intra\_SCE\_DRX} + T_{Measurement\_Period\ \_intra\_TDD\_CSI-RS\_DRX}$$

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{identify\_intra\_SCE\_DRX}$ is the intra-frequency period for cell identification as shown in section 8.6.2.1.2.2. $T_{Measurement\_Period\_intra\_TDD\_CSI-RS\_DRX}$ is the intra-frequency period for TP measurement as shown in table 8.6.3.1.2.2-1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_intra\_TDD\_CSI-RS\_DRX}$ when DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{Measurement\_Period\ \_intra\_TDD\_CSI-RS\_DRX}$ as shown in table 8.6.3.1.2.2-1, when DRX is in use. The UE shall be capable of performing CSI-RSRP measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_Period\ \_intra\_TDD\_\ CSI-RS\_DRX}$

Table 8.6.3.1.2.2-1: Requirement to measure TDD intrafrequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ intra\_TDD\_\ CSI-RS\_DRX}$ [ms]
≥ 6	≥2	5*Max{$T_{DMTC\_periodicity}$, DRX cycle length}
≥ 25	≥2	3*Max{$T_{DMTC\_periodicity}$, DRX cycle length}

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

8.6.3.1.2.2.1 Measurement Reporting Requirements

8.6.3.1.2.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

8.6.3.1.2.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.1.2.2.1.3.

8.6.3.1.2.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_TP\_SCE\_DRX}$ defined in Clause 8.6.3.1.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_intra\_TP\_SCE\_DRX}$ defined in clause 8.6.3.1.2.2 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_intra\_TDD\_CSI\text{-}RS\_DRX}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.3.2 E-UTRAN inter frequency measurements

The UE shall be able to identify new inter-frequency TPs and perform CSI-RSRP measurements of inter-frequency TP with an explicit inter-frequency TP list containing physical layer cell identities. The discovery signal occasion and the measurement gap should be aligned, provided that also the following additional conditions are fulfilled:

Entire discovery signal occasion should be contained in the measurement gap.

The subframe contained discovery signal for the measurement is not overlapped with the first 0.5ms period and the last 0.5ms period in every gap.

8.6.3.2.1 E-UTRAN FDD – FDD inter frequency measurements

8.6.3.2.1.1 E-UTRAN FDD – FDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new FDD inter-frequency TP within $T_{identify\_inter\_TP\_SCE}$ according to the following expression:

$T_{identify\_inter\_TP\_SCE} = T_{identify\_Inter\_SCE} + T_{Measurement\_Period\ \_inter\_FDD\_CSI\text{-}RS}$

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

$T_{identify\_inter\_SCE}$ is the inter-frequency period for cell identification as shown in section 8.6.2.2.1.1. N_{freq} is defined in clause 8.1.2.1.1. $T_{Measurement\_Period\ \_inter\_FDD\_CSI\text{-}RS}$ is the inter-frequency period for TP measurement as shown in table 8.6.3.2.1.1-1.

When measurement gaps are scheduled for FDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.3, with measurement period given by table 8.6.3.2.1.1-1.

The UE shall be capable of performing CSI-RSRP measurements of at least 3 identified inter-frequency TPs per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with the measurement period defined in table 8.6.3.2.1.1-1 when no DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.3.2.1.1-1: Requirement to measure FDD inter frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ inter\_FDD\_\ CSI-RS}$ [ms]
≥ 6	≥1	$5*Max\{T_{DMTC\_periodicity}, MGRP\}*N_{freq}$
≥ 25	≥1	$3*Max\{T_{DMTC\_periodicity}, MGRP\}*N_{freq}$

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

8.6.3.2.1.1.1 Measurement Reporting Requirements

8.6.3.2.1.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

8.6.3.2.1.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.2.1.1.1.3.

8.6.3.2.1.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_inter\_TP\_SCE}$ defined in Clause 8.6.3.2.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify_inter_TP_SCE}$defined in clause 8.6.3.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_inter\_FDD\_CSI-RS}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.3.2.1.2 E-UTRAN FDD – FDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN FDD inter frequency TP within $T_{identify\_inter\_TP\_SCE\_DRX}$ according to the following expression:

$T_{identify\_inter\_TP\_SCE\_DRX} = T_{identify\_inter\_SCE\_DRX} + T_{Measurement\_Period\_inter\_FDD\_CSI\text{-}RS\_DRX}$

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

$T_{identify\_inter\_SCE\_DRX}$ is the inter-frequency period for cell identification as shown in section 8.6.2.2.1.2. N_{freq} is defined in clause 8.1.2.1.1. $T_{Measurement\_Period\_inter\_FDD\_CSI\text{-}RS\_DRX}$ is the inter-frequency period for TP measurement as shown in table 8.6.3.2.1.2-1.

When measurement gaps are scheduled for FDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.3, with measurement period given by table 8.6.3.2.1.2-1.

The UE shall be capable of performing CSI-RSRP measurements of at least 3 identified inter-frequency TPs per FDD inter-frequency for up to 3 FDD inter-frequencies and the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with the measurement period defined in table 8.6.3.2.1.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.3.2.1.2-1: Requirement to measure FDD inter frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ inter\_FDD\_\ CSI\text{-}RS\_DRX}$ [ms]
≥ 6	≥1	5**Max*{$T_{DMTC\_periodicity}$, DRX cycle length, MGRP}*N_{freq}
≥ 25	≥1	3**Max*{$T_{DMTC\_periodicity}$, DRX cycle length, MGRP}*N_{freq}

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

8.6.3.2.1.2.1 Measurement Reporting Requirements

8.6.3.2.1.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3 respectively.

8.6.3.2.1.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.2.1.2.1.3.

8.6.3.2.1.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_inter\_TP\_SCE\_DRX}$ defined in clause 8.6.3.2.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_inter\_TP\_SCE\_DRX}$ defined in clause 8.6.3.2.1.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_inter\_FDD\_CSI-RS\_DRX}$ provided the timing to that TP has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.3.2.2 E-UTRAN TDD – TDD inter frequency measurements

8.6.3.2.2.1 E-UTRAN TDD – TDD inter frequency measurements when no DRX is used

When measurement gaps are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new TDD inter-frequency TP within $T_{identify\_inter\_TP\_SCE}$ according to the following expression:

$T_{identify\_inter\_TP\_SCE} = T_{identify\_inter\_SCE} + T_{Measurement\_Period\ \_inter\_TDD\_CSI-RS}$

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

$T_{identify\_inter\_SCE}$ is the inter-frequency period for cell identification as shown in section 8.6.2.2.2.1. N_{freq} is defined in clause 8.1.2.1.1. $T_{Measurement\_Period\ \_inter\_TDD\_CSI-RS}$ is the inter-frequency period for TP measurement as shown in table 8.6.3.2.2.1-1.

When measurement gaps are scheduled for TDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting RSRP measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.3, with measurement period given by table 8.6.3.2.2.1-1.

The UE shall be capable of performing CSI-RSRP measurements of at least 3 identified inter-frequency TP per TDD inter-frequency for up to 3TDD inter-frequencies and the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with the measurement period defined in table 8.6.3.2.2.1-1 when no DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.3.2.2.1-1: Requirement to measure TDD inter frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ inter\_TDD\_\ CSI-RS}$ [ms]
≥ 6	≥2	$5*Max\{T_{DMTC\_periodicity}, MGRP\}*N_{freq}$
≥ 25	≥2	$3*Max\{T_{DMTC\_periodicity}, MGRP\}*N_{freq}$

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

8.6.3.2.2.1.1 Measurement Reporting Requirements

8.6.3.2.2.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

8.6.3.2.2.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.2.2.1.1.3.

8.6.3.2.2.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_inter\_TP\_SCE}$ defined in clause 8.6.3.2.2.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_inter\_TP\_SCE}$ defined in clause 8.6.3.2.2.1 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_inter\_TDD\_CSI\text{-}RS}$ provided the timing to that TP has not changed more than ± 50 Ts while measurementgap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.3.2.2.2 E-UTRAN CSI-RS based TDD – TDD inter frequency measurements when DRX is used

When DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable E-UTRAN TDD inter frequency TP within $T_{identify\_inter\_TP\_SCE\_DRX}$ according to the following expression:

$$T_{identify\_inter\_TP\_SCE\_DRX} = T_{identify\_inter\_SCE\_DRX} + T_{Measurement\_Period\ \_inter\_TDD\_CSI\text{-}RS\_DRX}$$

A TP shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.14.3 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.11 for a corresponding Band

$T_{identify\_inter\_SCE\_DRX}$ is the inter-frequency period for cell identification as shown in section 8.6.2.2.2.2. N_{freq} is defined in clause 8.1.2.1.1. $T_{Measurement\_Period\ \_inter\_TDD\_CSI\text{-}RS\_DRX}$ is the inter-frequency period for TP measurement as shown in table 8.6.3.2.2.2-1.

When measurement gaps are scheduled for TDD inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.14.3, with measurement period given by table 8.6.3.2.1.2-1.

The UE shall be capable of performing CSI-RSRP measurements of at least 3 identified inter-frequency TPs per TDD inter-frequency for up to 3 TDD inter-frequencies and the UE physical layer shall be capable of reporting CSI-RSRP measurements to higher layers with the measurement period defined in table 8.6.3.2.2.2-1 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

Table 8.6.3.2.2.2-1: Requirement to measure TDD inter frequency TP

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{Measurement\_Period\ inter\_TDD\_\ CSI-RS\_DRX}$ [ms]
≥ 6	≥2	5**Max*{$T_{DMTC\_periodicity}$, DRX cycle length, MGRP}*N_{freq}
≥ 25	≥2	3**Max*{$T_{DMTC\_periodicity}$, DRX cycle length, MGRP}*N_{freq}

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer.

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in the sub-clauses 9.1.14.3.

8.6.3.2.2.2.1 Measurement Reporting Requirements

8.6.3.2.2.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.14.3.

8.6.3.2.2.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.14.3.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.6.3.2.2.2.1.3.

8.6.3.2.2.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.14.3.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_inter\_TP\_SCE\_DRX}$ defined in Clause 8.6.3.2.2.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_inter\_TP\_SCE\_DRX}$ in clause 8.6.3.2.2.2 and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ \_inter\_TDD\_CSI-RS\_DRX}$ provided the timing to that TP has not changed more than $\pm$ 50 Ts while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.6.3.2.3 E-UTRAN TDD – FDD inter frequency measurements

8.6.3.2.3.1 E-UTRAN TDD – FDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.3.2.1.1 also apply for this section.

8.6.3.2.3.2 E-UTRAN TDD – FDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.3.2.1.2 also apply for this section.

8.6.3.2.4 E-UTRAN FDD – TDD inter frequency measurements

8.6.3.2.4.1 E-UTRAN FDD – TDD inter frequency measurements when no DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.3.2.2.1 also apply for this section.

8.6.3.2.4.2 E-UTRAN FDD – TDD inter frequency measurements when DRX is used

The requirements in this clause shall apply to UE supporting FDD and TDD.

The requirements in clause 8.6.3.2.2.2 also apply for this section.

8.7 Discovery signal measurements for E-UTRA carrier aggregation

8.7.1 Introduction

Requirements in this clause are applicable to UE supporting E-UTRA FDD, E-UTRA TDD and/or E-UTRA TDD-FDD carrier aggregation.

Non configured frequencies may be measured with measurement gaps according to the requirements in clause 8.6.2.2 and clause 8.6.3.2 (E-UTRAN CRS based inter frequency measurements and E-UTRAN CSI-RS based inter frequency measurements).

8.7.2 Requirements for CRS based discovery signal measurements for E-UTRA carrier aggregation

8.7.2.1 Measurements of the primary component carrier

CRS based measurements of cells on the primary component carrier shall meet all applicable requirements (FDD or TDD) in clause 8.6.2.1.

8.7.2.2 Measurements of a secondary component carrier

A Secondary component carrier may be activated and deactivated by MAC-CE commands as specified in [17]. The applicable performance requirements depend on whether the SCell on the corresponding frequency is actived or deactivated.

8.7.2.3 Measurements of a secondary component carrier with active SCell

When the SCell is activated, measurement performance requirements for the frequency are those given in clause 8.6.2.1. If common DRX is in use, then the requirements for that secondary component carrier are given by the applicable DRX requirements (FDD or TDD) in clause 8.6.2.1 , otherwise the non DRX requirements are applicable. The applicable measurement accuracy requirements are in clause 9.1.15.

8.7.2.4 Measurements of a secondary component carrier with deactivated SCell

This clause defines the measurement requirements of a secondary component carrier with deactivated SCell based on the parameter *measCycleSCell* defined in TS 36.331 [2].

8.7.2.4.1 E-UTRAN secondary component carrier measurements when no common DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD or TDD cell on a secondary component carrier within $T_{identify\_scc\_SCE}$, according to the parameter *measCycleSCell* where $T_{identify\_scc\_CRS}$ = 13 **measCycleSCell*+ $T_{measure\_scc\_CRS}$

A cell shall be considered detectable when

- RSRP related side condition given in Clause 9.1.15 are fulfilled for a corresponding Band,
- SCH_RP$|_{dBm}$ and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

The measurement period for deactivated scell measurements is $T_{measure\_scc\_CRS}$ according to the parameter *measCycleSCell* shown in Tables 8.7.2.4.1-1 and 8.7.2.4.1-2.

Table 8.7.2.4.1-1: Requirement to measure intra frequency cell on FDD SCC with deactivated SCell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_scc\_CRS}$ [ms]
≥ 6	≥1	5* *measCycleSCell*
≥ 25	≥1	3 * *measCycleSCell*

Table 8.7.2.4.1-2: Requirement to measure intra frequency cell on TDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_scc\_CRS}$ [ms]
≥ 6	≥2	5* *measCycleSCell*
≥ 25	≥2	3 * *measCycleSCell*

The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_scc\_CRS}$.

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.15.

A UE may reconfigure the receiver bandwidth or turn on/off one of the RF chains when performing measurements on up to four SCCs with deactivated SCell. This may cause interruptions on PCell or activated SCell(s) or both that are specified in Section 7.8.

8.7.2.4.1.1 Measurement Reporting Requirements

8.7.2.4.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

8.7.2.4.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic CRS based measurement reporting shall meet the requirements specified in clause 8.7.2.4.1.1.3.

8.7.2.4.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_scc\_CRS}$ defined in Clause 8.7.2.4.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_scc\_SCE}$ defined in clause 8.7.2.4.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_scc\_CRS}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.7.2.4.2 E-UTRAN secondary component carrier measurements when common DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD or TDD cell on a secondary component carrier within $T_{identify\_scc}$, according to the parameter *measCycleSCell* where $T_{identify\_scc\_SCE\_DRX}$ = 17**Max*(*measCycleSCell*, DRX cycle length)+$T_{measure\_scc\_CRS\_DRX}$.

A cell shall be considered detectable when

- RSRP related side condition given in Clause 9.1.15 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

The measurement period for deactivated scell measurements is $T_{measure\_scc\_CRS\_DRX}$ according to the parameter *measCycleSCell* shown in Tables 8.7.2.4.2-1 and 8.7.2.4.2-1.

Table 8.7.2.4.2-1: Requirement to measure intrafrequency cell on FDD SCC with deactivated SCell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_scc\_CRS\_DRX}$ [ms]
≥ 6	≥1	5* *Max*{ *measCycleSCell*, DRX cycle length }
≥ 25	≥1	3 * *Max*{ *measCycleSCell*, DRX cycle length }

Table 8.7.2.4.2-2: Requirement to measure intrafrequency cell on TDD SCC with deactivated SCell

Measurement bandwidth[RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_scc\_CRS\_DRX}$ [ms]
≥ 6	≥2	5* *Max*{ *measCycleSCell*, DRX cycle length }
≥ 25	≥2	3 * *Max*{ *measCycleSCell*, DRX cycle length }

The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_scc\_CRS\_DRX.}$

The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.15.

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making measurements of cells on up to four SCCs with deactivated SCell. This may cause interruptions (packet drops) to a PCell or activated SCell(s) or both when the PCell and the SCell belong to the same frequency band. No interruptions while the On Duration timer is running shall be allowed when common DRX is used. The requirement considers only interruptions due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

8.7.2.4.2.1 Measurement Reporting Requirements

8.7.2.4.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

8.7.2.4.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.7.2.4.2.1.3.

8.7.2.4.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered CRS based measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_scc\_CRS}$ defined in Clause 8.7.2.4.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_scc\_SCE\_DRX}$ defined in clause 8.7.2.4.2 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_scc\_CRS\_DRX}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.7.3 Requirements for CSI-RS based discovery signal measurements for E-UTRA carrier aggregation

8.7.3.1 Measurements of the primary component carrier

Measurements of cells on the primary component carrier shall meet all applicable requirements (FDD or TDD) in clause 8.6.3.1.

8.7.3.2 Measurements of a secondary component carrier

A Secondary component carrier may be activated and deactivated by MAC-CE commands as specified in [17]. The applicable performance requirements depend on whether the SCell on the corresponding frequency is actived or deactivated.

8.7.3.3 Measurements of a secondary component carrier with active SCell

When the SCell is activated, measurement performance requirements for the frequency are those given in clause 8.6.3.1. If common DRX is in use, then the requirements for that secondary component carrier are given by the applicable DRX requirements (FDD or TDD) in clause 8.6.3.1 , otherwise the non DRX requirements are applicable. The applicable measurement accuracy requirements are in clause 9.1.15.

8.7.3.4 Measurements of a secondary component carrier with deactivated SCell

This clause defines the measurement requirements of a secondary component carrier with deactivated SCell based on the parameter *measCycleSCell* defined in TS 36.331 [2].

8.7.3.4.1 E-UTRAN secondary component carrier measurements when no common DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FDD or TDD TP on a secondary component carrier within $T_{identify\_scc\_TP\_SCE}$, according to the parameter *measCycleSCell*, where $T_{identify\_scc\_TP\_SCE} = T_{identify\_scc\_SCE} + T_{measure\_scc\_CSI\text{-}RS}$,

A cell shall be considered detectable when

- CSI-RSRP related side condition given in Clause 9.1.15 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{identify\_scc\_SCE}$ is the intra-frequency period for cell identification in section 8.7.2.4.1. $T_{measure\_scc\_CSI\text{-}RS}$ is the intra-frequency period for TP measurement in table 8.7.3.4.1-1.

The measurement period for deactivated scell measurements is $T_{measure\_scc\_CSI\text{-}RS}$ according to the parameter *measCycleSCell* as shown in tables 8.7.3.4.1-1 and 8.7.3.4.1-1.

Table 8.7.3.4.1-1: Requirement to measure intra frequency TP on FDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_scc\_CSI\text{-}RS}$ [ms]
≥ 6	≥1	5* *measCycleSCell*
≥ 25	≥1	3* *measCycleSCell*

Table 8.7.3.4.1-2: Requirement to measure intra frequency TP on TDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_scc\_CSI\text{-}RS}$ [ms]
≥ 6	≥2	5* *measCycleSCell*
≥ 25	≥2	3* *measCycleSCell*

The UE shall be capable of performing RSRP measurements for 3 identified TPs on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_scc\_CSI\text{-}RS}$.

The measurement accuracy for all measured TPs shall be as specified in the sub-clause 9.1.15.

A UE may reconfigure the receiver bandwidth or turn on/off one of the RF chains when performing measurements on up to four SCCs with deactivated SCell. This may cause interruptions on PCell or activated SCell(s) or both that are specified in Section 7.8.

8.7.3.4.1.1 Measurement Reporting Requirements

8.7.3.4.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

8.7.3.4.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.7.3.4.1.1.3.

8.7.3.4.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_scc\_TP\_SCE}$ defined in Clause 8.7.3.4.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_scc\_TP\_SCE}$ defined in clause 8.7.3.4.1 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_scc\_CSI\text{-}RS}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.7.3.4.2 E-UTRAN secondary component carrier measurements when common DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD or TDD TP on a secondary component carrier within $T_{identify\_scc\_TP\_SCE\_DRX}$, according to the parameter *measCycleSCell*, where $T_{identify\_scc\_TP\_SC E\_DRX}$ = $T_{identify\_scc\_SCE\_DRX}$ + $T_{measure\_scc\_CSI\text{-}RS\_DRX}$,

A cell shall be considered detectable when

- CSI-RSRP related side condition given in Clause 9.1.15 are fulfilled for a corresponding Band,
- SCH_RP$|_{dBm}$ and SCH Ês/Iot according to Annex B.2.10 for a corresponding Band

$T_{identify\_scc\_SCE\_DRX}$ is the intra-frequency period for cell identification in section 8.7.2.4.2. $T_{measure\_scc\_CSI\text{-}RS\_DRX}$ is the intra-frequency period for TP measurement in table 8.7.3.4.2-1.

The measurement period for deactivated scell measurements is $T_{measure\_scc\_CSI\text{-}RS\_DRX}$ according to the parameter *measCycleSCell* as shown in tables 8.7.3.4.2-1 and 8.7.3.4.2-2.

Table 8.7.3.4.2-1: Requirement to measure intrafrequency TP on FDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_scc\_TP\_SCE\_DRX}$ [ms]
≥ 6	≥1	5* max {*measCycleSCell*, DRX cycle length }
≥ 25	≥1	3* max {*measCycleSCell*, DRX cycle length }

Table 8.7.3.4.2-1: Requirement to measure intrafrequency TP on TDD SCC with deactivated SCell

Measurement bandwidth [RB]	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_scc\_TP\_SCE\_DRX}$ [ms]
≥ 6	≥2	5* max {*measCycleSCell*, DRX cycle length }
≥ 25	≥2	3* max {*measCycleSCell*, DRX cycle length }

The UE shall be capable of performing CSI-RSRP measurements for 3 identified TPs on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_scc\_CSI-RS\_DRX}$.

The measurement accuracy for all measured TPs shall be as specified in the sub-clause 9.1.15.

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making measurements of TPs on up to four SCCs with deactivated SCell. This may cause interruptions (packet drops) to a PCell or activated SCell(s) or both when the PCell and the SCell belong to the same frequency band. No interruptions while the On Duration timer is running shall be allowed when common DRX is used. The requirement considers only interruptions due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

8.7.3.4.2.1 Measurement Reporting Requirements

8.7.3.4.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in clause 9.

8.7.3.4.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.7.3.4.2.1.3.

8.7.3.4.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in clause 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_scc\_TP\_SCE\_DRX}$ defined in Clause 8.7.3.4.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_scc\_TP\_SCE\_DRX}$ defined in clause 8.7.3.4.2 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_scc\_CSI-RS\_DRX}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.8 Measurements for E-UTRA dual connectivity

8.8.1 Introduction

This clause contains requirements for UE supporting E-UTRA dual connectivity. Requirements in this clause are applicable to UEs which have been configured with one SCell in either MCG or SCG and one PSCell for inter-band dual connectivity. Requirements in this clause are applicable to E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD dual connectivity.

8.8.2 Intra-frequency measurements requirements on PCell

PCell intra-frequency measurements shall meet all applicable requirements in clause 8.1.2.2. If MCG DRX is in use, then the PCell intra-frequency requirements for when DRX is in use in clause 8.1.2.2 shall apply and shall depend on the MCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply. The applicable measurement accuracy requirements are in clause 9.1.

8.8.3 Intra-frequency measurements requirements on PSCell

PSCell starts with activated state upon configuration and cannot be deactivated. PSCell intra-frequency measurements shall meet all applicable requirements in clause 8.1.2.2. If SCG DRX is in use, then the PSCell intra-frequency requirements for when DRX is in use in clause 8.1.2.2 shall apply and shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply. The applicable measurement accuracy requirements are in clause 9.1.

8.8.4 Inter-frequency and inter-RAT measurement requirements

Inter-frequency measurements shall meet all applicable requirements in clause 8.1.2.3. If MCG DRX is in use, then the inter-frequency requirements for when DRX is in use in clause 8.1.2.3 shall apply and shall depend on the MCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply. The applicable measurement accuracy requirements are in clause 9.1.

Inter-RAT measurements shall meet all applicable requirements in clause 8.1.2.4. If MCG DRX is in use, then the inter-RAT requirements for when DRX is in use in clause 8.1.2.4 shall apply and shall depend on the MCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply. The applicable measurement accuracy requirements are in clause 9.2, 9.3, 9.4 and 9.5.

8.8.5 Intra-frequency measurements with autonomous gaps

8.8.5.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in both MCG and SCG in downlink reception and uplink transmission for receiving MIB and SIB1 messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or whether the SCell is configured, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{\text{identify\_CGI, intra}} = T_{\text{basic\_identify\_CGI, intra}} \text{ ms}$$

where

$T_{\text{basic\_identify\_CGI, intra}}$ = 150 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,

- SCH_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided that the PBCH demodulation requirements in [5] are met.

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI,.intra}$ is applicable when no DRX is used as well as when any of the DRX cycles specified in TS 36.331 [2] is used.

Within the time $T_{identify\_CGI,\,intra}$ ms, over which the UE identifies the CGI of a new E-UTRA cell, the UE shall transmit at least a minimum number of ACK/NACKs on cells in MCG and SCG, respectively, as specified in Table 8.8.5.1-1. The requirement depends on duplex mode, dual connectivity mode of operation, and whether a cell belongs to MCG or SCG, and is further conditioned on:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured.

Table 8.8.5.1-1: Requirement on minimum number of ACK/NACKs to transmit during $T_{identify\_CGI,\,intra}$.

Serving cell configuration	Minimum number of transmitted ACK/NACKs			
	Synchronous operation		Asynchronous operation	
	MCG	SCG	MCG	SCG
FDD	60		60	49
TDD UL/DL configuration 0	18		N/A	N/A
TDD UL/DL configuration 1	35		N/A	N/A
TDD UL/DL configuration 2	43		N/A	N/A
TDD UL/DL configuration 3	36		N/A	N/A
TDD UL/DL configuration 4	39		N/A	N/A
TDD UL/DL configuration 5	42		N/A	N/A
TDD UL/DL configuration 6	30		N/A	N/A

8.8.5.2 ECGI reporting delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.8.6 Inter-frequency measurements with autonomous gaps

8.8.6.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in both MCG and SCG in downlink reception and uplink transmission for receiving MIB and SIB1 messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or whether the SCell is configured, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI,\,inter} = T_{basic\_identify\_CGI,\,inter} \text{ ms}$$

where

$T_{basic\_identify\_CGI,\ inter}$ = 150 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.2 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided that the PBCH demodulation requirements in [5] are met.

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI,.inter}$ is applicable when no DRX is used as well as when any of the DRX cycles specified in TS 36.331 [2] is used.

Within the time $T_{identify\_CGI,inter}$ ms, over which the UE identifies the CGI of a new E-UTRA cell, the UE shall transmit at least a minimum number of ACK/NACKs on cells in MCG and SCG, respectively, as specified in Table 8.8.6.1-1. The requirement depends on duplex mode, dual connectivity mode of operation, and whether a cell belongs to MCG or SCG, and is further conditioned on:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured.

Table 8.8.6.1-1: Requirement on minimum number of ACK/NACKs to transmit during $T_{identify\_CGI,\ inter}$.

Serving cell configuration	Minimum number of transmitted ACK/NACKs			
	Synchronous operation		Asynchronous operation	
	MCG	SCG	MCG	SCG
FDD	60		60	49
TDD UL/DL configuration 0	18		N/A	N/A
TDD UL/DL configuration 1	30		N/A	N/A

8.8.6.2 ECGI reporting delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.8.7 SSTD Measurements

8.8.7.1 Introduction

This clause contains SSTD measurement requirements on UE capabilities for support of E-UTRA dual connectivity.

8.8.7.2 SSTD Measurement requirements

When no DRX is used the physical layer measurement period of the SSTD measurement shall be $T_{measure\_SSTD1}$ = 200 ms.

When either MCG DRX or SCG DRX is used, or both MCG DRX and SCG DRX are used in RRC_CONNECTED state the physical layer measurement period ($T_{measure\_SSTD1}$) of the SSTD measurement shall be as specified in table 8.8.7.2-1.

Table 8.8.7.2-1: SSTD measurement requirement when DRX is used

DRX cycle length (s)	$T_{measure\_SSTD1}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use Note3: DRX cycle length in this table refers to the DRX cycle length configured on the CG in which DRX is used. When DRX is used in both MCG and SCG, DRX cycle length in this table refers to the longer DRX cycle length between MCG DRX and SCG DRX.	

If PCell is changed without changing PCC, and/or if PSCell is changed without changing a frequency of PSCell or if both PCell and PSCell are change by swapping the PCC with the frequency of PSCell while the UE is performing SSTD measurements, then the UE shall also meet the SSTD measurement and accuracy requirements corresponding to the new PCell and/or PSCell. However in this case the UE shall restart the SSTD measurement. In this case the total physical layer measurement period of the SSTD measurement shall not exceed $T_{measure\_SSTD2}$ as defined in the following expression:

$$T_{measure\_SSTD2} = (N+M+1)*(T_{measure\_SSTD1}) + N*T_{PCell\_change\_DC} + M*T_{PSCell\_change\_DC}$$

Where:

N is the number of times the PCell is changed over the measurement period ($T_{measure\_SSTD2}$),

M is the number of times the PSCell is changed over the measurement period ($T_{measure\_SSTD2}$),

$T_{PCell\_change\_DC}$ is the time necessary to change the PCell; it can be up to 25 ms,

$T_{PSCell\_change\_DC}$ is the time necessary to change the PSCell; it can be up to 25 ms.

The measurement accuracy for the SSTD measurement when DRX is used as well as when no DRX is used shall be as specified in the sub-clause 9.1.20.

8.8.7.3 SSTD Measurement Reporting Delay

This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in sub-clause 9.1.20.

8.8.8 Intra-frequency measurements requirements on SCell

SCell intra-frequency measurements shall meet all applicable requirements in clause 8.3.3. In case where the SCell belongs to MCG, the term “common DRX” in clause 8.3.3 shall be deemed to be replaced with “MCG DRX”. In case where the SCell belongs to SCG, the term “common DRX” and PCell in clause 8.3.3 shall be replaced with “SCG DRX” and PSCell, respectively.

8.9 MBSFN Measurements

8.9.1 Introduction

The requirements specified in Section 8.9 apply for MBSFN measurements (MBSFN RSRP, MBSFN RSRQ, and MCH BLER defined in [4]), which are performed in RRC_CONNECTED and logged for MDT by UEs which are MBMS-capable and also indicate their MBSFN measurement logging capability [2].

UE shall measure MBSFN RSRP, MBSFN RSRQ and MCH BLER only in subframes and on carriers where UE is decoding PMCH. The requirements are specified for any carrier where PMCH is received by UE. The requirements specified in this section apply for any carrier frequency with configured MBSFN subframes with PMCH, which may be the same as or different from any serving unicast carrier.

The UE receiving PMCH on any non-serving carrier and performing MBSFN measurements shall not cause interruptions on any serving carrier in unicast subframes and in the subframes with non-MBSFN multicast transmissions such as system information.

8.9.2 MBSFN RSRP Measurements

The UE physical layer shall be capable of performing the MBSFN RSRP measurement [4] within the MBSFN RSRP measurement period and report the measurement, while meeting the MBSFN RSRP measurement accuracy requirements specified in section 9.8.2.

The MBSFN RSRP measurement period is defined as the maximum between 640ms and the period during which the UE decodes [5, Section 10] 5 subframes containing PMCH transmissions.

The MBSFN RSRP measurement period is the same for UE using any DRX cycle, any eDRX_CONN cycle, or no DRX.

8.9.3 MBSFN RSRQ Measurements

The UE physical layer shall be capable of performing the MBSFN RSRQ measurement [4] within the MBSFN RSRP measurement period and report the measurement, while meeting the MBSFN RSRQ measurement accuracy requirements specified in section 9.8.3.

The MBSFN RSRQ measurement period is defined as the maximum between 640ms and the period during which the UE decodes [5, Section 10] 5 subframes containing PMCH transmissions.

The MBSFN RSRQ measurement period is the same for UE using any DRX cycle, any eDRX_CONN cycle, and no DRX.

8.9.4 MCH BLER Measurements

The UE physical layer shall be capable of performing and reporting the MCH BLER measurement [4] to higher layers within the MCH BLER measurement period. The MCH BLER measurement reporting is according to section 9.8.4.

The MCH BLER measurement period is equal to the MBSFN logging interval configured by higher layers [2].

8.10 Proximity-based Services

8.10.1 Introduction

This section contains the requirements for the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery in RRC_CONNECTED state.

8.10.2 Requirements

When a UE in RRC_CONNECTED state is performing transmissions and/or reception for ProSe Direct Discovery and/or ProSe Direct Communication, the UE shall meet all the requirements specified in Section 8.

Note: The UE may need to interrupt ProSe operation in order to meet the measurement requirements of Section 8.

8.10.2.1 Initiation/Cease of SLSS transmissions with ProSe Direct Discovery

The requirements in this subclause are applicable to a UE capable of ProSe Direct Discovery and SLSS transmission and reception.

The requirements apply when the conditions for SLSS transmissions specified in [2] are met; *networkControlledSyncTx* is not configured; and *syncTxThreshIC* is included in *SystemInformationBlockType19*. The UE shall be capable of measuring the RSRP of the cell used to transmit Prose Direct Discovery announcements and evaluate to initiate/cease SLSS transmissions within $T_{evaluate,SLSS}$ where,

- $T_{evaluate,SLSS}$ = 0.4 seconds when UE is not configured with DRX, or,
- $T_{evaluate,SLSS}$ = as specified in Table 8.10.2.1-1 when UE is configured with DRX.

Table 8.10.2.1-1: $T_{evaluate,SLSS}$ with ProSe Direct Discovery

DRX cycle length [s]	$T_{evaluate,SLSS}$ [s] (number of DRX cycles)
≤0.04	0.4 (Note 1)
0.04<DRX-cycle≤2.56	Note 2 (6)
Note1: Number of DRX cycles depends upon the DRX cycle in use Note2: Time depends upon the DRX cycles in use	

If higher layer filtering is configured, an additional delay in evaluation to initiate/cease SLSS transmissions can be expected.

For the cell used to transmit ProSe Direct Discovery announcements:

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 for a corresponding Band are fulfilled,
- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band are fulfilled.

8.10.2.2 Initiation/Cease of SLSS transmissions with ProSe Direct Communication

The requirements in this subclause are applicable to a UE capable of ProSe Direct Communication.

The requirements apply when the conditions for SLSS transmissions specified in [2] are met; *networkControlledSyncTx* is not configured; and *syncTxThreshIC* is included in *SystemInformationBlockType18*. The UE shall be capable of measuring the RSRP of the cell used to transmit Prose Direct Communication to evaluate to initiate/cease SLSS transmissions within $T_{evaluate,SLSS}$

where,

- $T_{evaluate,SLSS}$ = 0.4 seconds when UE is not configured with DRX.
- $T_{evaluate,SLSS}$ = as specified in Table 8.10.2.2-1 when UE is configured with DRX.

Table 8.10.2.2-1: $T_{evaluate,SLSS}$ with ProSe Direct Communication

DRX cycle length [s]	$T_{evaluate,SLSS}$ [s] (number of DRX cycles)
≤0.04	0.4 (Note 1)
0.04<DRX-cycle≤2.56	Note 2 (6)
Note1: Number of DRX cycles depends upon the DRX cycle in use Note2: Time depends upon the DRX cycles in use	

If higher layer filtering is configured, an additional delay in evaluation to initiate/cease SLSS transmissions can be expected.

For the cell used to transmit ProSe Direct Communication:

- RSRP related side conditions given in Sections 9.1.2.1 and 9.1.2.2 and RSRQ related side conditions given in Clause 9.1.5.1 for a corresponding Band are fulfilled,

- SCH_RP and SCH Ês/Iot according to Annex B.2.1 for a corresponding Band are fulfilled.

8.11 Discovery Signal Measurements under Operation with Frame Structure 3

8.11.1 Introduction

This section contains requirements on the UE for measurement reporting in RRC_CONNECTED state when discovery signal [16] is configured. The requirements are specified for E-UTRA CRS based discovery signal measurements and CSI-RS based discovery signal measurements.

The requirements in Section 8.11.2 shall apply for CRS based discovery signal measurements comprising RSRP and RSRQ measurements [4]. The requirements in Section 8.11.3 shall apply for CSI-RS based discovery signal measurements comprising CSI-RSRP measurements [4].

The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracy requirements are specified in Section 9. Control of measurement reporting is specified in TS 36.331 [2].

The requirements in this Section shall apply for carrier with E-UTRA operation following the frame structure type 3 [16].

The requirements in Section 9 are applicable for a UE performing measurements according to Section 8.11.

8.11.2 CRS based discovery signal measurements

8.11.2.1 E-UTRAN intra-frequency measurements

NOTE: The requirements in this section are applicable only for measurements on SCC following the frame structure type 3 [16].

The UE shall be able to identify new intra-frequency FS3 cells and perform measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra-frequency cells and additionally search for and identify new intra-frequency cells.

8.11.2.1.1 Requirements

8.11.2.1.1.1 Requirements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FS3 intra-frequency cell within $T_{identify\_intra\_FS3}$,

$T_{identify\_intra\_FS3} = T_{detect\ intra\_FS3} + T_{measure\ intra\_FS3\_CRS}$,

where:

$T_{detect\ intra\_FS3}$ is the intra-frequency period for cell detection as specified in Table 8.11.2.1.1.1-1,

$T_{measure\_intra\_FS3\_CRS}$ is the intra-frequency period for measurements as shown in Table 8.11.2.1.1.1-2,

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer,

L is the number of configured discovery signal occasions which are not available during $T_{detect\ intra\_FS3}$ for cell detection at the UE due to the absence of the necessary radio signals,

M is the number of configured discovery signal occasions which are not available during $T_{measure\_intra\_FS3\_CRS}$ for the measurements at the UE due to the absence of the necessary radio signals.

Table 8.11.2.1.1.1-1: Intra-frequency cell detection under operation with frame structure 3

SCH Ês/Iot	$T_{detect\ intra\_FS3}$, [ms]
[0] ≤ SCH Ês/Iot	([1]+L) * $T_{DMTC\_periodicity}$
[-6] ≤ SCH Ês/Iot < [0]	([4]+L) * $T_{DMTC\_periodicity}$

A cell shall be considered detectable when

- RSRP related side conditions given in Section 9.1.18.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Section 9.1.18.3 are fulfilled for a corresponding Band,
- SCH_RP is according to Annex B.2.12 for a corresponding Band and SCH Ês/Iot is according to Table 8.11.2.1.1.1-1.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{measure\_intra\_FS3\_CRS}$ when no DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is $T_{measure\_intra\_FS3\_CRS}$ as shown in Table 8.11.2.1.1.1-2, when no DRX is in use. The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers within the measurement period of $T_{measure\_intra\_FS3\_CRS}$.

Table 8.11.2.1.1.1-2: Intra-frequency measurement requirements under operation with frame structure 3

Measurement bandwidth [RB]	CRS Ês/Iot	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_intra\_FS3\_CRS}$ [ms]
≥ 6	[0] ≤ CRS Ês/Iot	1	([3]+M) * $T_{DMTC\_periodicity}$
≥ 6	[-6] ≤ CRS Ês/Iot < [0]	1	([5]+M) * $T_{DMTC\_periodicity}$
≥ 25	[0] ≤ CRS Ês/Iot	1	([1]+M) * $T_{DMTC\_periodicity}$
≥ 25	[-6] ≤ CRS Ês/Iot < [0]	1	([3]+M) * $T_{DMTC\_periodicity}$

The RSRP measurement accuracy for all measured cells shall be as specified in Section 9.1.18.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in Section 9.1.18.3.

8.11.2.1.1.1.1 Measurement Reporting Requirements

8.11.2.1.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in Sections 9.1.18.2 and 9.1.18.3, respectively.

8.11.2.1.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in Sections 9.1.18.2 and 9.1.18.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in Section 8.11.2.1.1.1.1.3.

8.11.2.1.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in Sections 9.1.18.2 and 9.1.18.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_FS3}$ defined in Section 8.11.2.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_FS3}$ defined in Section 8.11.2.1.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_FS3\_CRS}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.11.2.1.1.2 Requirements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FS3 intra-frequency cell within $T_{identify\_intra\_FS3\_DRX}$.

$T_{identify\_intra\_FS3\_DRX} = T_{detect\_intra\_FS3\_DRX} + T_{measure\_intra\_FS3\_CRS\_DRX}$,

where:

$T_{detect\_intra\_FS3\_DRX}$ is the intra-frequency period for cell detection as shown in Table 8.11.2.1.1.2-1,

$T_{measure\_intra\_FS3\_CRS\_DRX}$ is the intra-frequency period for measurements as shown in Table 8.11.2.1.1.2-2,

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer,

L is the number of configured discovery signal occasions during ON DURATION and which are not available during $T_{detect\ intra\_FS3\_DRX}$ for cell detection at the UE due to the absence of the necessary radio signals,

M is the number of configured discovery signal occasions during ON DURATION and which are not available during $T_{measure\_intra\_FS3\_CRS\_DRX}$ for the measurements at the UE due to the absence of the necessary radio signals.

Table 8.11.2.1.1.2-1: Intra-frequency cell detection under operation with frame structure 3

SCH Ês/Iot	$T_{detect\ intra\_FS3\_CRS\_DRX}$, [ms]
[0] ≤ SCH Ês/Iot	(TBD+L) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
[-6] ≤ SCH Ês/Iot < [0]	(TBD+L) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }

A cell shall be considered detectable when

- RSRP related side conditions given in Section 9.1.18.2 are fulfilled for a corresponding Band,
- RSRQ related side conditions given in Section 9.1.18.3 are fulfilled for a corresponding Band,
- SCH_RP is according to Annex B.2.12 for a corresponding Band and SCH Ês/Iot is according to Table 8.11.2.1.1.2-1.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{measure\_intra\_FS3\_ CRS\_DRX}$ when DRX is used. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is $T_{measure\_ intra\_FS3\_CRS\_DRX}$ as shown in Table 8.11.2.1.1.2-2, when DRX is in use. The UE shall be capable of p performing RSRP and RSRQ measurements for 3 identified intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers within the measurement period of $T_{measure\_intra\_FS3\_CRS\_DRX}$.

Table 8.11.2.1.1.2-2: Intra-frequency measurement requirements under operation with frame structure 3

Measurement bandwidth [RB]	CRS Ês/Iot	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_intra\_FS3\_CRS\_DRX}$, [ms]
≥ 6	[0] ≤ CRS Ês/Iot	1	([3]+M) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
≥ 6	[-6] ≤ CRS Ês/Iot < [0]	1	([5]+M) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
≥ 25	[0] ≤ CRS Ês/Iot	1	([1]+M) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
≥ 25	[-6] ≤ CRS Ês/Iot < [0]	1	([3]+M) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }

The RSRP measurement accuracy for all measured cells shall be as specified in Section 9.1.18.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in Section 9.1.18.3.

8.11.2.1.1.2.1 Measurement Reporting Requirements

8.11.2.1.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in Sections 9.1.18.2 and 9.1.18.3, respectively.

8.11.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in Sections 9.1.18.2 and 9.1.18.3, respectively.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in Section 8.11.2.1.1.2.1.3.

8.11.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in Sections 9.1.18.2 and 9.1.18.3, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_FS3\_DRX}$ defined in Section 8.11.2.1.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_FS3\_DRX}$ defined in Section 8.11.2.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measuer\_intra\_FS3\_CRS\_DRX}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.11.2.2 E-UTRAN inter-frequency measurements

Editor's note: the requirements are TBD.

8.11.3 CSI-RS based discovery signal measurements

8.11.3.1 E-UTRAN intra-frequency measurements

The UE shall be able to identify new intra-frequency FS3 TPs and perform CSI-RSRP measurements of intra-frequency TPs with an explicit intra-frequency TP list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra-frequency TPs and additionally search for and identify new intra-frequency TPs.

8.11.3.1.1 Requirements

8.11.3.1.1.1 Requirements when no DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FS3 intra-frequency TP within $T_{identify\_intra\_TP\_FS3}$.

$T_{identify\_intra\_TP\_FS3} = T_{identify\_intra\_FS3} + T_{measure\_intra\_FS3\_CSI-RS}$,

where

$T_{identify\_intra\_FS3}$ is the intra-frequency period for cell identification in Section 8.11.2.1.1.1,

$T_{measure\_ intra\_FS3\_CSI-RS}$ is the intra-frequency period for TP measurement as shown in Table 8.11.3.1.1.1-1,

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer,

M is the number of configured discovery signal occasions which are not available during $T_{measure\_ intra\_FS3\_CSI-RS}$ for the measurements at the UE due to the absence of the necessary radio signals.

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Section 9.1.18.4 are fulfilled for a corresponding Band,
- SCH_RP is according to Annex B.2.12 for a corresponding Band and SCH Ês/Iot is according to Section 8.11.2.1.1.1.

Identification of a TP shall include identification of the cell and additionally performing a single measurement on the TP within the measurement period of $T_{measure\_ intra\_FS3\_CSI-RS}$ when no DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra-frequency measurements is $T_{measure\_intra\_FS3\_CSI-RS}$ as shown in table 8.11.3.1.1.1-1, when no DRX is in use. The UE shall be capable of performing CSI-RSRP measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_FS3\_CSI-RS}$

Table 8.11.3.1.1.1-1: Intra-frequency TP measurement requirements under operation with frame structure 3

Measurement bandwidth [RB]	CSI-RS Ês/Iot	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_intra\_FS3\_CSI-RS}$, [ms]
≥ 6	[0] ≤ CSI-RS Ês/Iot	1	([3]+M) * $T_{DMTC\_periodicity}$
≥ 6	[-6] ≤ CSI-RS Ês/Iot < [0]	1	([5]+M) * $T_{DMTC\_periodicity}$
≥ 25	[0] ≤ CSI-RS Ês/Iot	1	([1]+M) * $T_{DMTC\_periodicity}$
≥ 25	[-6] ≤ CSI-RS Ês/Iot < [0]	1	([3]+M) * $T_{DMTC\_periodicity}$

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in Section 9.1.18.4.

8.11.3.1.1.1.1 Measurement Reporting Requirements

8.11.3.1.1.1.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in Section 9.1.18.4.

8.11.3.1.1.1.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in Section 9.1.18.4.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in Section 8.11.3.1.1.1.1.3.

8.11.3.1.1.1.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in Section 9.1.18.4.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_TP\_FS3}$ defined in Section 8.11.3.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_intra\_TP\_FS3}$ defined in Section 8.11.3.1.1.1 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_FS3\_CSI-RS}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.11.3.1.1.2 Requirements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FS3 intra-frequency TP within $T_{identify\_intra\_TP\_FS3\_DRX}$.

$T_{identify\_intra\_TP\_FS3\_DRX} = T_{identify\_intra\_FS3\_DRX} + T_{measure\_ intra\_FS3\_CSI-RS\_DRX}$,

where:

$T_{identify\_intra\_FS3\_DRX}$ is the intra-frequency period for cell identification in Section 8.11.2.1.1.2.

$T_{measure\_ intra\_FS3\_CSI-RS\_DRX}$ is the intra-frequency period for TP measurement as shown in Table 8.11.3.1.1.2-1, where

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer,

M is the number of configured discovery signal occasions during ON DURATION and which are not available duting $T_{measure\_intra\_FS3\_CSI-RS\_DRX}$ for the measurements at the UE due to the absence of the necessary radio signals.

A TP shall be considered detectable when

- CSI-RSRP related side conditions given in Section 9.1.18.4 are fulfilled for a corresponding Band,
- SCH_RP is according to Annex B.2.12 for a corresponding Band and SCH Ês/Iot is according to Section 8.11.2.1.1.2.

Identification of a TP shall include identification of the cell and additionally performing a single measurement on the TP within measurement period of $T_{measure\_intra\_FS3\_CSI-RS\_DRX}$ when DRX is used. If higher layer filtering is used, an additional TP identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_FS3\_CSI-RS\_DRX}$ as shown in Table 8.11.3.1.1.2-1, when DRX is in use. The UE shall be capable of performing CSI-RSRP measurements for 3 identified intra-frequency TPs, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_FS3\_CSI-RS\_DRX}$.

Table 8.11.3.1.1.2-1: Intra-frequency TP measurement requirements under operation with frame structure 3

Measurement bandwidth [RB]	CSI-RS Ês/Iot	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_intra\_FS3\_CSI-RS\_DRX}$, [ms]
≥ 6	[0] ≤ CSI-RS Ês/Iot	1	([3]+M) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
≥ 6	[-6]≤ CSI-RS Ês/Iot<[0]	1	([5]+M) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
≥ 25	[0] ≤ CSI-RS Ês/Iot	1	([1]+M) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }
≥ 25	[-6]≤ CSI-RS Ês/Iot<[0]	1	([3]+M) * *Max*{ $T_{DMTC\_periodicity}$, DRX cycle length }

The CSI-RSRP measurement accuracy for all measured TPs shall be as specified in Section 9.1.18.4.

8.11.3.1.1.2.1 Measurement Reporting Requirements

8.11.3.1.1.2.1.1 Periodic Reporting

Reported CSI-RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in Section 9.1.18.4.

8.11.3.1.1.2.1.2 Event-triggered Periodic Reporting

Reported CSI-RSRP measurements contained in event triggered periodic measurement reports shall meet the requirements in Section 9.1.18.4.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in Section 8.11.3.1.1.2.1.3.

8.11.3.1.1.2.1.3 Event Triggered Reporting

Reported CSI-RSRP measurements contained in event triggered measurement reports shall meet the requirements in Section 9.1.18.4.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_TP\_FS3\_DRX}$ defined in Section 8.11.3.1.1.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_intra\_TP\_FS3\_DRX}$ defined in Section 8.11.3.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_FS3\_CSI-RS\_DRX}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.11.3.2 E-UTRAN inter-frequency measurements

Editor's note: requirements are TBD.

8.11.4 RSSI measurements

8.11.4.1 E-UTRAN intra-frequency measurements

NOTE: The requirements in this section are applicable only for measurements on SCC following the frame structure type 3 [16].

The UE physical layer shall be capable of performing the RSSI measurements [4] on one or more serving carriers operating under frame structure type 3 [16], if the carrier(s) are indicated by higher layers [2], and reporting the RSSI measurements to higher layers. The UE physical layer shall provide to higher layers a single RSSI sample for each OFDM symbol within each configured RSSI measurement duration [2] occurring with a configured RSSI measurement timing configuration periodicity [2]. The RSSI measurement period corresponds to max(*reportInterval*, *rmtc-Period*), where *reportInterval* and *rmtc-Period* [2] are configured for the RSSI measurement by higher layers.

The RSSI measurement performed and reported according to this section shall meet the RSSI measurement accuracy requirement in Section 9.1.18.5.2.

8.11.4.2 E-UTRAN inter-frequency measurements

The UE physical layer shall be capable of performing the RSSI measurements on one or more serving carriers, if the carrier(s) are indicated by higher layers [2], and reporting the RSSI measurements to higher layers.

Editor's note: Requirements are TBD.

8.12 Discovery Signal Measurements for E-UTRA Carrier Aggregation under Operation with Frame Structure 3

8.12.1 Introduction

This section contains requirements on UE capabilities for support of E-UTRA carrier aggregation.

Non configured frequencies may be measured with measurement gaps according to the requirements in Section 8.11.2.2 and Section 8.11.3.2.

The requirements in Section 8.12 shall apply for E-UTRA carrier aggregation of one FDD PCell or one TDD PCell and SCells one one or more SCCs, where all SCCs are following the frame structure type 3 [16].

8.12.2 CRS based discovery signal measurements for E-UTRA carrier aggregation

8.12.2.1 Introduction

The requirements in Section 8.12.2 shall apply for CRS based discovery signal measurements comprising RSRP and RSRQ measurements [4].

8.12.2.2 Measurements of a secondary component carrier

A secondary component carrier may be activated and deactivated by MAC-CE commands as specified in [17]. The applicable performance requirements depend on whether the SCell on the corresponding frequency is actived or deactivated.

8.12.2.3 Measurements of a secondary component carrier with active SCell

When the SCell is activated, measurement performance requirements for the frequency are those given in Section 8.11.2.1. If common DRX is in use, then the requirements for that secondary component carrier are given by the DRX requirements in Section 8.11.2.1.1.2, otherwise the non-DRX requirements are applicable. The applicable measurement accuracy requirements are in Section 9.1.19.

8.12.2.4 Measurements of a secondary component carrier with deactivated SCell

This section defines the measurement requirements of a secondary component carrier with deactivated SCell based on the parameter *measCycleSCell* defined in TS 36.331 [2].

8.12.2.4.1 E-UTRAN secondary component carrier measurements when no common DRX is used

When no DRX is in use the UE shall be able to identify a new detectable cell on a secondary component carrier within $T_{identify\_SCC\_FS3}$, according to the parameter *measCycleSCell*.

$T_{identify\_SCC\_FS3} = T_{detect\_SCC\_FS3} + T_{measure\_SCC\_FS3\_CRS}$,

where:

$T_{detect\_SCC\_FS3}$ is the time period for cell detection as specified in Table 8.12.2.4.1-1,

$T_{measure\_SCC\_FS3\_CRS}$ is thetime period for measurements as shown in Table 8.12.2.4.1-2,

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer,

L is the number of configured discovery signal occasions which are not available during $T_{detect\_SCC\_FS3}$ for cell detection at the UE due to the absence of the necessary radio signals,

M is the number of configured discovery signal occasions which are not available during $T_{measure\_SCC\_FS3\_CRS}$ for the measurements at the UE due to the absence of the necessary radio signals.

Table 8.12.2.4.1-1: Intra-frequency cell detection on SCC under operation with frame structure 3 with deactivated SCell

SCH Ês/Iot	$T_{detect\ SCC\_FS3}$, [ms]
[0] ≤ SCH Ês/Iot	([1]+L) * *measCycleSCell*
[-6] ≤ SCH Ês/Iot < [0]	([5]+L) * *measCycleSCell*

A cell shall be considered detectable when

- RSRP related side condition given in Section 9.1.19 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ is according to Annex B.2.12 for a corresponding Band and SCH Ês/Iot is according to Table 8.12.2.4.1-1.

The measurement period for deactivated SCell measurements is $T_{measure\_SCC\_FS3\_CRS}$ according to the parameter *measCycleSCell* shown in Table 8.12.2.4.1-1.

Table 8.12.2.4.1-2: Intra-frequency cell measurement requirements on SCC under operation with frame structure 3 with deactivated SCell

Measurement bandwidth [RB]	CRS Ês/Iot	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_SCC\_FS3\_CRS}$ [ms]
≥ 6	[0] ≤ CRS Ês/Iot	1	([3]+M) * *measCycleSCell*
≥ 6	[-6] ≤ CRS Ês/Iot < [0]	1	([5]+M) * *measCycleSCell*
≥ 25	[0] ≤ CRS Ês/Iot	1	([1]+M) * *measCycleSCell*
≥ 25	[-6] ≤ CRS Ês/Iot < [0]	1	([3]+M) * *measCycleSCell*

The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers within the measurement period of $T_{measure\_SCC\_FS3\_CRS}$.

The measurement accuracy for all measured cells shall be as specified in Section 9.1.19.

A UE may reconfigure the receiver bandwidth or turn on/off one of the RF chains when performing measurements on one or two SCCs with deactivated SCell. This may cause interruptions on PCell or an activated SCell that are specified in Section 7.8.

8.12.2.4.1.1 Measurement Reporting Requirements

8.12.2.4.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in Section 9.

8.12.2.4.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in Section 9.

The first report in event triggered periodic CRS based measurement reporting shall meet the requirements specified in Section 8.12.2.4.1.1.3.

8.12.2.4.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in Section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_SCC\_FS3}$ defined in Section 8.12.2.4.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_SCC\_FS3}$ defined in Section 8.12.2.4.1 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_SCC\_FS3\_CRS}$ provided the timing to that cell has not changed more than $\pm$ 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.12.2.4.2 E-UTRAN secondary component carrier measurements when common DRX is used

When DRX is in use the UE shall be able to identify a new detectable FS3 cell on a secondary component carrier within $T_{identify\_SCC\_FS3\_DRX}$, according to the parameter *measCycleSCell*.

$T_{identify\_SCC\_FS3\_DRX} = T_{detect\_SCC\_FS3\_DRX} + T_{measure\_SCC\_FS3\_CRS\_DRX}$,

where:

$T_{detect\_SCC\_FS3\_DRX}$ is the time period for cell detection as shown in Table 8.12.2.4.2-1,

$T_{measure\_SCC\_FS3\_CRS\_DRX}$ is the time period for measurements as shown in Table 8.12.2.4.2-2,

$T_{DMTC\_periodicity}$ is the discovery signal measurement timing configuration periodicity of higher layer, L is the number of configured discovery signal occasions during ON DURATION and which are not available during $T_{detect\_SCC\_FS3\_DRX}$ for cell detection at the UE due to the absence of the necessary radio signals,

M is the number of configured discovery signal occasions during ON DURATION and which are not available during $T_{measure\_SCC\_FS3\_CRS\_DRX}$ for the measurements at the UE due to the absence of the necessary radio signals.

Table 8.12.2.4.2-1: Cell detection on SCC under operation with frame structure 3

SCH Ês/Iot	$T_{detect\ SCC\_FS3\_\ DRX}$, [ms]
[0] ≤ SCH Ês/Iot	(TBD+L) * *Max*{ *measCycleSCell*, DRX cycle length }
[-6] ≤ SCH Ês/Iot < [0]	(TBD +L) * *Max*{ *measCycleSCell*, DRX cycle length }

A cell shall be considered detectable when

- RSRP related side condition given in Section 9.1.19 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ is according to Annex B.2.12 for a corresponding Band and SCH Ês/Iot is according to Table 8.12.2.4.2-1.

The measurement period for deactivated scell measurements is $T_{measure\_SCC\_FS3\_CRS\_DRX}$ according to the parameter *measCycleSCell* shown in Table 8.12.2.4.2-2.

Table 8.12.2.4.2-2: Measurement requirements on SCC under operation with frame structure 3

Measurement bandwidth [RB]	CRS Ês/Iot	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_SCC\_FS3\_CRS\_DRX}$, [ms]
≥ 6	[0] ≤ CRS Ês/Iot	1	([3]+M) * *Max*{ *measCycleSCell*, DRX cycle length }
≥ 6	[-6] ≤ CRS Ês/Iot < [0]	1	([5]+M) * *Max*{ *measCycleSCell*, DRX cycle length }
≥ 25	[0] ≤ CRS Ês/Iot	1	([1]+M) * *Max*{ *measCycleSCell*, DRX cycle length }
≥ 25	[-6] ≤ CRS Ês/Iot < [0]	1	([3]+M) * *Max*{ *measCycleSCell*, DRX cycle length }

The UE shall be capable of performing RSRP and RSRQ measurements for 3 identified cells on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_SCC\_FS3\_CRS\_DRX}$.

The measurement accuracy for all measured cells shall be as specified in Section 9.1.19.

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making measurements of cells on one or two SCCs with deactivated SCell. This may cause interruptions (packet drops) to a PCell or an activated SCell. No interruptions while the On Duration timer is running shall be allowed when common DRX is used. The requirement considers only interruptions due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

8.12.2.4.2.1 Measurement Reporting Requirements

8.12.2.4.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in Section 9.

8.12.2.4.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in Section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in Section 8.12.2.4.2.1.3.

8.12.2.4.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in Section 9.

The UE shall not send any event triggered CRS based measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_SCC\_FS3}$ defined in Section 8.12.2.4.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_SCC\_FS3\_DRX}$ defined in Section 8.12.2.4.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_SCC\_FS3\_CRS\_DRX}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.12.3 Requirements for CSI-RS based discovery signal measurements for E-UTRA carrier aggregation

8.12.3.1 Introduction

The requirements in Section 8.12.3 shall apply for CSI-RS based discovery signal measurements comprising CSI-RSRP measurements [4].

8.12.3.2 Measurements of a secondary component carrier

A Secondary component carrier may be activated and deactivated by MAC-CE commands as specified in [17]. The applicable performance requirements depend on whether the SCell on the corresponding frequency is actived or deactivated.

8.12.3.3 Measurements of a secondary component carrier with active SCell

When the SCell is activated, measurement performance requirements for the frequency are those given in Section 8.11.3.1. If common DRX is in use, then the requirements for that secondary component carrier are given by the DRX requirements in Section 8.11.3.1.1.2, otherwise the non DRX requirements are applicable. The applicable measurement accuracy requirements are in Section 9.1.19.

8.12.3.4 Measurements of a secondary component carrier with deactivated SCell

This section defines the measurement requirements of a secondary component carrier with deactivated SCell based on the parameter *measCycleSCell* defined in TS 36.331 [2].

8.12.3.4.1 E-UTRAN secondary component carrier measurements when no common DRX is used

When no DRX is in use the UE shall be able to identify a new detectable FS3 TP on a secondary component carrier within $T_{identify\_SCC\_TP\_FS3}$, according to the parameter *measCycleSCell*.

$T_{identify\_SCC\_TP\_FS3} = T_{identify\_SCC\_FS3} + T_{measure\_SCC\_FS3\_CSI\text{-}RS}$,

where:

$T_{identify\_SCC\_FS3}$ is the time period for cell identification in Section 8.12.2.4.1,

$T_{measure\_SCC\_FS3\_CSI-RS}$ is the time period for TP measurement in Table 8.12.3.4.1-1,

M is the number of configured discovery signal occasions which are not available for the measurements at the UE during $T_{measure\_SCC\_FS3\_CSI-RS}$ due to the absence of the necessary radio signals.

Table 8.12.3.4.1-1: Measurement requirements for a TP on SCC under operation with frame structure 3

Measurement bandwidth [RB]	CSI-RS Ês/Iot	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_SCC\_FS3\_CSI-RS}$ [ms]
≥ 6	[0] ≤ CSI-RS Ês/Iot	1	([3]+M) * *measCycleSCell*
≥ 6	[-6] ≤ CSI-RS Ês/Iot < [0]	1	([5]+M) * *measCycleSCell*
≥ 25	[0] ≤ CSI-RS Ês/Iot	1	([1]+M) * *measCycleSCell*
≥ 25	[-6] ≤ CSI-RS Ês/Iot < [0]	1	([3]+M) * *measCycleSCell*

A cell shall be considered detectable when

- CSI-RSRP related side condition given in Section 9.1.19 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ is according to Annex B.2.12 for a corresponding Band and SCH Ês/Iot is accordin g to Table 8.12.2.4.1-1.

The UE shall be capable of performing RSRP measurements for 3 identified TPs on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_SCC\_FS3\_CSI-RS}$.

The measurement accuracy for all measured TPs shall be as specified in Section 9.1.19.

A UE may reconfigure the receiver bandwidth or turn on/off one of the RF chains when performing measurements on one or two SCCs with deactivated SCell. This may cause interruptions on PCell or an activated SCell that are specified in Section 7.8.

8.12.3.4.1.1 Measurement Reporting Requirements

8.12.3.4.1.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in Section 9.

8.12.3.4.1.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in Section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in Section 8.12.3.4.1.1.3.

8.12.3.4.1.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in Section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_SCC\_TP\_FS3}$ defined in Section 8.12.3.4.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_SCC\_TP\_FS3}$ defined in Section 8.12.3.4.1 becomes undetectable for a period ≤ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_SCC\_FS3\_CSI-RS}$ provided the timing to that TP has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.12.3.4.2 E-UTRAN secondary component carrier measurements when common DRX is used

When DRX is in use the UE shall be able to identify a new detectable FS3 TP on a secondary component carrier within $T_{identify\_SCC\_TP\_FS3\_DRX}$, according to the parameter *measCycleSCell*.

$T_{identify\_SCC\_TP\_FS3\_DRX} = T_{identify\_SCC\_FS3\_DRX} + T_{measure\_SCC\_FS3\_CSI-RS\_DRX}$,

where:

$T_{identify\_SCC\_FS3\_DRX}$ is the time period for cell identification in Section 8.12.2.4.2,

$T_{measure\_SCC\_FS3\_CSI-RS\_DRX}$ is the time period for TP measurement in Table 8.12.3.4.2-1,

M is the number of configured discovery signal occasions during ON DURATION and which are not available during $T_{measure\_SCC\_FS3\_CSI-RS\_DRX}$ for the measurements at the UE due to the absence of the necessary radio signals.

Table 8.12.3.4.2-1: Measurement requirements for a TP on SCC under operation with frame structure 3

Measurement bandwidth [RB]	CSI-RS Ês/Iot	Discovery signal occasion duration (*ds-OccasionDuration*) [ms]	$T_{measure\_SCC\_FS3\_CSI-RS\_DRX}$, [ms]
≥ 6	[0] ≤ CSI-RS Ês/Iot	1	([3]+M) * *Max*{ *measCycleSCell*, DRX cycle length }
≥ 6	[-6] ≤ CSI-RS Ês/Iot < [0]	1	([5]+M) * *Max*{ *measCycleSCell*, DRX cycle length }
≥ 25	[0] ≤ CSI-RS Ês/Iot	1	([1]+M) * *Max*{ *measCycleSCell*, DRX cycle length }
≥ 25	[-6] ≤ CSI-RS Ês/Iot < [0]	1	([3]+M) * *Max*{ *measCycleSCell*, DRX cycle length }

A cell shall be considered detectable when

- CSI-RSRP related side condition given in Section 9.1.19 are fulfilled for a corresponding Band,
- $SCH\_RP|_{dBm}$ is according to Annex B.2.12 for a corresponding Band and SCH Ês/Iot is according to Table 8.12.2.4.2-1.

The UE shall be capable of performing CSI-RSRP measurements for 3 identified TPs on a secondary component carrier, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_SCC\_FS3\_CSI-RS\_DRX}$.

The measurement accuracy for all measured TPs shall be as specified in Section 9.1.19.

A UE may reconfigure receiver bandwidth taking into account the SCell activation/deactivation status, and when making measurements of TPs on one or two SCCs with deactivated SCell. This may cause interruptions (packet drops) to a PCell or an activated SCell. No interruptions while the On Duration timer is running shall be allowed when common DRX is used. The requirement considers only interruptions due to reconfiguration of the receiver bandwidth, and not due to other causes such as RF impairments or channel conditions.

8.12.3.4.2.1 Measurement Reporting Requirements

8.12.3.4.2.1.1 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in Section 9.

8.12.3.4.2.1.2 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in Section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in Section 8.12.3.4.2.1.3.

8.12.3.4.2.1.3 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in Section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which is caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_SCC\_TP\_FS3\_DRX}$ defined in Section 8.12.3.4.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a TP which has been detectable at least for the time period $T_{identify\_SCC\_TP\_FS3\_DRX}$ defined in Section 8.12.3.4.2 becomes undetectable for a period $\leq$ 5 seconds and then the TP becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_SCC\_FS3\_CSI\text{-}RS\_DRX}$ provided the timing to that TP has not changed more than $\pm$ 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

8.13 Measurements for UE Category M1

8.13.1 Introduction

The UE category M1 applicability of the requirements in subclause 8.13 is defined in Section 3.1.

This clause contains requirements on the UE regarding measurement reporting in RRC_CONNECTED state. The requirements are specified for E-UTRA intra frequency measurements. These measurements may be used by the E-UTRAN, e.g. for handover decisions. The measurement quantities are defined in [4], the measurement model is defined in [22] and measurement accuracies are specified in clause 9. Control of measurement reporting is specified in TS 36.331 [2].

When the UE is provided with IDC solution, the UE shall also perform RRM measurements and meet the corresponding requirements in clause 8.

8.13.2 Requirements for UE category M1 with CE mode A

The UE category M1 applicability of the requirements in subclause 8.13.2 is defined in Section 3.1. The requirements defined in clause 8.13.2 apply provided the following conditions are met:

- UE is configured with measurement gap according to any of gap patterns defined in Table 8.1.2.1-1.

8.13.2.1 E-UTRAN intra frequency measurements by UE category M1 with CE mode A

The UE shall be able to identify new intra-frequency cells and perform RSRP measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

8.13.2.1.1 E-UTRAN FDD intra frequency measurements

8.13.2.1.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify and measure a new detectable FDD intra frequency cell according to requirements in Table 8.13.2.1.1.1-1 when SCH Ês/Iot >= -6 dB

Table 8.13.2.1.1.1-1: Requirement on cell detection delay and measurement delay for FDD intrafrequency cell

Gap pattern ID	Cell detection delay ($T_{identify\_intra\_UE\ cat\ M1}$)	Measurement delay ($T_{Measurement\_Period\_UE\ cat\ M1,\ Intra}$)
0	1.44 seconds	480 ms
1	2.88 seconds	960 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-1 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_\ UE\ cat\ M1\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is according to Table 8.13.2.1.1.1-1. When measurement gaps are activated the UE shall be capable of performing measurements for at least 6 cells. If the UE has identified more than 6 cells, the UE shall perform measurements but the reporting rate of RSRP measurement of cells from UE physical layer to higher layers may be decreased.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

8.13.2.1.1.1.1 Measurement Reporting Requirements

8.13.2.1.1.1.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

8.13.2.1.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.1.1.1.3.

8.13.2.1.1.1.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resoureces for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify intra\_UE cat M1}}$ defined in Clause 8.13.2.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra\_UE cat M1}}$ defined in clause 8.13.2.1.1.1 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period\_UE cat M1, Intra}}$ provided the timing to that cell has not changed more than $\pm$ 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.2.1.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{\text{identify\_intra\_UE cat M1}}$ as shown in table 8.13.2.1.1.2-1

Table 8.13.2.1.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

DRX cycle length (s)	$T_{\text{identify\_intra\_UE cat M1}}$ (s) (DRX cycles)
≤0.04	[1] (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use NOTE 2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.12-1 for a corresponding Band

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{\text{measure\_intra\_UE cat M1}}$ as shown in table 8.13.2.1.1.2-2. The UE shall be capable of performing RSRP measurements for 6 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{\text{measure\_intra\_UE cat M1}}$.

Table 8.13.2.1.1.2-2: Requirement to measure FDD intrafrequency cells

DRX cycle length (s)	$T_{\text{measure\_intra\_UE cat M1}}$ (s) (DRX cycles)
≤0.08	0.4 (Note1)
0.08<DRX-cycle≤2.56	Note2 (5)
NOTE 1 Number of DRX cycle depends upon the DRX cycle in use NOTE 2: Time depends upon the DRX cycle in use	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

8.13.2.1.1.2.1 Measurement Reporting Requirements

8.13.2.1.1.2.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

8.13.2.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.1.2.1.3.

8.13.2.1.1.2.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify\_intra, UE cat M1}}$ defined in Clause 8.13.2.1.1.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra\_UE cat M1}}$ defined in clause 8.13.2.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{measure\_intra\_UE cat M1}}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.2.1.2 E-UTRAN intra frequency measurements for HD-FDD

8.13.2.1.2.1 E-UTRAN intra frequency measurements when no DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

The requirements defined in clause 8.13.2.1.1.1 also apply for this section provided the following conditions are met:

- at least downlink subframe # 0 or downlink subframe # 5 per radio frame of an intra-frequency cell to be identified by the UE is available at the UE over $T_{\text{identify\_intra\_UE cat M1}}$;
- at least one downlink subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell over $T_{\text{measure\_intra\_UE cat M1}}$.
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-2 for a corresponding Band

8.13.2.1.2.2 E-UTRAN intra frequency measurements when DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{\text{identify\_intra\_UE cat M1}}$ as shown in table 8.13.2.1.2.2-1

Table 8.13.2.1.2.2-1: Requirement to identify a newly detectable HD-FDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra\_UE\ cat\ M1}$ (s) (DRX cycles)
≤0.04	1 (Note1)
0.04<DRX-cycle≤0.08	Note2 (50)
0.128	3.2 (32)
0.128<DRX-cycle≤2.56	Note2(25)
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use NOTE2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-2 for a corresponding Band

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_UE\ cat\ M1}$ as shown in table 8.13.2.1.2.2-2. The UE shall be capable of performing RSRP measurements for 6 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_UE\ cat\ M1}$.

Table 8.13.2.1.2.2-2: Requirement to measure HD-FDD intrafrequency cells

DRX cycle length (s)	$T_{measure\_intra\_UE\ cat\ M1}$ (s) (DRX cycles)
≤0.04	0.4 (Note1)
0.04<DRX-cycle≤0.16	Note2 (7)
0.16<DRX-cycle≤2.56	Note2(5)
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use NOTE 2: Time depends upon the DRX cycle in use	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

8.13.2.1.2.2.1 Measurement Reporting Requirements

8.13.2.1.2.2.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

8.13.2.1.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.2.2.1.3.

8.13.2.1.2.2.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_UE\ cat\ M1}$ defined in Clause 8.13.2.1.2.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE\ cat\ M1}$ defined in clause 8.13.2.1.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_UE\ cat\ M1}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.2.1.3 E-UTRAN TDD intra frequency measurements

8.13.2.1.3.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify and measure a new detectable FDD intra frequency cell according to requirements in Table 8.13.2.1.3.1-1 when SCH Ês/Iot >= -6 dB

Table 8.13.2.1.3.1-1: Requirement on cell detection delay and measurement delay for TDD intrafrequency cell

Gap pattern ID	Cell detection delay ($T_{identify\_intra\_UE\ cat\ M1}$)	Measurement delay ($T_{Measurement\_Period\_UE\ cat\ M1,\ Intra}$)
0	1.44 seconds	480 ms
1	2.88 seconds	960 ms

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-1 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_\ UE\ cat\ M1\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is according to Table 8.13.2.1.3.1-1. When measurement gaps are activated the UE shall be capable of performing measurements for at least 6 cells. If the UE has identified more than 6 cells, the UE shall perform measurements but the reporting rate of RSRP measurements of cells from UE physical layer to higher layers may be decreased.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

8.13.2.1.3.1.1 Measurement Reporting Requirements

8.13.2.1.3.1.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

8.13.2.1.3.1.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.3.1.1.3.

8.13.2.1.3.1.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify intra\_UE cat M1}}$ defined in Clause 8.13.2.1.3.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra\_UE cat M1}}$ defined in clause 8.13.2.1.3.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period Intra\_UE cat M1}}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.2.1.3.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{\text{identify\_intra\_LC UE Type2}}$ as shown in table 8.13.2.1.3.2-1

Table 8.13.2.1.3.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

DRX cycle length (s)	$T_{\text{identify\_intra\_UE cat M1}}$ (s) (DRX cycles)
≤0.04	1 (Note1)
0.04<DRX-cycle≤0.08	Note2 (40)
0.128	3.2 (25)
0.128<DRX-cycle≤2.56	Note2(20)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.21.1 and 9.1.21.2 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-1 for a corresponding Band

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{\text{measure\_intra\_UE cat M1}}$ as shown in table 8.13.2.1.3.2-2. The UE shall be capable of performing RSRP measurements for 6 identified intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{\text{measure\_intra\_UE cat M1}}$.

Table 8.13.2.1.3.2-2: Requirement to measure TDD intra frequency cells

DRX cycle length (s)	$T_{measure\_intra\_UE\ cat\ M1}$ (s) (DRX cycles)
≤0.08	0.4 (Note1)
0.08<DRX-cycle≤2.56	Note2 (5)
NOTE 1: Number of DRX cycle depends upon the DRX cycle in use. NOTE 2: Time depends upon the DRX cycle in use.	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.1 and 9.1.21.2.

8.13.2.1.3.2.1 Measurement Reporting Requirements

8.13.2.1.3.2.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

8.13.2.1.3.2.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.2.1.3.2.1.3.

8.13.2.1.3.2.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.1 and 9.1.21.2.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_UE\ cat\ M1}$ defined in Clause 8.13.2.1.3.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE\ cat\ M1}$ defined in clause 8.13.2.1.3.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_UE\ cat\ M1}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.2.2 E-UTRAN E-CID Measurements Requirements for UE category M1 with CE mode A

8.13.2.2.1 E-UTRAN FDD Intra-frequency E-CID RSRP Measurements

8.13.2.2.1.1 Introduction

The requirements in section 8.13.2.2.1 shall apply provided the UE has received ECID-RequestLocationInformation message from E-SMLC via LPP requesting the UE to report E-CID E-UTRAN FDD intra-frequency RSRP measurements [24].

8.13.2.2.1.2 Measurement Requirements

The requirements in section 8.13.2.1.1 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP are defined in section 8.13.2.2.1.3.

8.13.2.2.1.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.17.1 and 9.1.17.2 respectively.

8.13.2.2.2 E-UTRAN HD-FDD Intra-frequency E-CID RSRP Measurements

8.13.2.2.2.1 Introduction

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

The requirements defined in clause 8.13.2.2.1.1 also apply for this section provided the following conditions are met:

- at least downlink subframe # 0 and downlink subframe # 5 per radio frame of an intra-frequency cell to be identified by the UE is available at the UE over $T_{identify\_intra\_UE\ cat\ M1}$;
- at least two consecutive downlink subframe per radio frame of measured cell is available at the UE for RSRP measurements assuming measured cell is identified cell over $T_{measure\_intra\_UE\ cat\ M1}$.
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-4

8.13.2.2.2.2 Measurement Requirements

The requirements in section 8.13.2.1.2 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP are defined in section 8.13.2.2.2.3.

8.13.2.2.2.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.17.1 and 9.1.17.2 respectively.

8.13.2.2.3 E-UTRAN TDD Intra-frequency E-CID RSRP Measurements

8.13.2.2.3.1 Introduction

The requirements in section 8.13.2.2.3 shall apply provided the UE has received ECID-RequestLocationInformation message from E-SMLC via LPP requesting the UE to report E-CID E-UTRAN TDD intra-frequency RSRP measurements [24].

8.13.2.2.3.2 Measurement Requirements

The requirements in section 8.13.2.1.3 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP are defined in section 8.13.2.2.3.3.

8.13.2.2.3.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.17.1 and 9.1.17.2 respectively.

8.13.3 Requirements for UE category M1 with CE mode B

The UE category M1 applicability of the requirements in subclause 8.13.3 is defined in Section 3.1. The requirements defined in clause 8.13.3 apply provided the following conditions are met:

- UE is configured with measurement gap according to any of gap patterns defined in Table 8.1.2.1-1.

8.13.3.1 E-UTRAN intra frequency measurements by UE category M1 with CE mode B

The UE shall be able to identify new intra-frequency cells and perform RSRP measurements of identified intra-frequency cells without an explicit intra-frequency neighbour cell list containing physical layer cell identities. During the RRC_CONNECTED state the UE shall continuously measure identified intra frequency cells and additionally search for and identify new intra frequency cells.

8.13.3.1.1 E-UTRAN FDD intra frequency measurements

8.13.3.1.1.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify and measure a new detectable FDD intra frequency cell according to requirements in Table 8.13.3.1.1.1-1 when SCH Ês/Iot >= -15 dB

Table 8.13.3.1.1.1-1: Requirement on cell detection delay and measurement delay for FDD intrafrequency cell

Gap pattern ID	Cell detection delay ($T_{identify\_intra\_UE\ cat\ M1}$)	Measurement delay ($T_{Measurement\_Period\_UE\ cat\ M1,\ Intra}$)
0	As specified in Table 8.13.3.1.1.1-2	800 ms
1	As specified in Table 8.13.3.1.1.1-2	800 ms

Table 8.13.3.1.1.1-2: Requirement on cell detection delay and measurement delay for FDD intrafrequency cell

SCH Ês/Iot of already identified cell including serving cell: Q1	Neighbouring cell SCH Ês/Iot: Q2	$T_{basic\_identify\_E-UTRA\_FDD\_UE\ cat\ M1,\ intra}$ (s)
-15≤Q1<-6	-15≤ Q2 < -6	320.8
-15≤Q1<-6	Q2≥-6	Requirements in 8.13.2 apply
Q1≥ -6	Q2≥-6	Requirements in 8.13.2 apply

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-1 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_\ UE\ cat\ M1\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is according to Table 8.13.3.1.1.1-1. When measurement gaps are activated the UE shall be capable of performing measurements for at least 6 cells. If the UE has identified more than 6 cells, the UE shall perform measurements but the reporting rate of RSRP measurements of cells from UE physical layer to higher layers may be decreased.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

8.13.3.1.1.1.1 Measurement Reporting Requirements

8.13.3.1.1.1.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1. 17.3 and 9.1.21.4.

8.13.3.1.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.1.1.1.3.

8.13.3.1.1.1.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resoureces for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\ intra\_UE\ cat\ M1}$ defined in Clause 8.13.3.1.1.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE\ cat\ M1}$ defined in clause 8.13.3.1.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\_UE\ cat\ M1,\ Intra}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.1.1.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\_intra\_UE\ cat\ M1}$ as shown in table 8.13.3.1.1.2-1

Table 8.13.3.1.1.2-1: Requirement to identify a newly detectable FDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra\_UE\ cat\ M1}$ (s) (DRX cycles)
DRX-cycle ≤ 0.640	[320.8] (Note1)
1.28<DRX-cycle≤2.56	Note2(400)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-3 for a corresponding Band

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_UE\ cat\ M1}$ as shown in table 8.13.3.1.1.2-2. The UE shall be capable of performing RSRP measurements for 6 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_UE\ cat\ M1}$.

Table 8.13.3.1.1.2-2: Requirement to measure FDD intrafrequency cells

DRX cycle length (s)	$T_{measure\_intra\_UE\ cat\ M1}$ (s) (DRX cycles)
≤0.08	0.8 (Note1)
0.08<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

8.13.3.1.1.2.1 Measurement Reporting Requirements

8.13.3.1.1.2.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

8.13.3.1.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.1.2.1.3.

8.13.3.1.1.2.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra,\ UE\ cat\ M1}$ defined in Clause 8.13.3.1.1.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE\ cat\ M1}$ defined in clause 8.13.3.1.1.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_UE\ cat\ M1}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.1.2 E-UTRAN intra frequency measurements for HD-FDD

8.13.3.1.2.1 E-UTRAN intra frequency measurements when no DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

The requirements defined in clause 8.13.3.1.1.1 also apply for this section provided the following conditions are met:

- at least downlink subframe # 0 and downlink subframe # 5 per radio frame of an intra-frequency cell to be identified by the UE is available at the UE over $T_{identify\_intra\_UE\ cat\ M1}$;
- at least two consecutive downlink subframe per radio frame of measured cell is available at the UE for RSRP measurements assuming measured cell is identified cell over $T_{measure\_intra\_UE\ cat\ M1}$.
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-4

8.13.3.1.2.2 E-UTRAN intra frequency measurements when DRX is used

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\_intra\_UE\ cat\ M1}$ as shown in table 8.13.3.1.2.2-1

Table 8.13.3.1.2.2-1: Requirement to identify a newly detectable HD-FDD intrafrequency cell

DRX cycle length (s)	$T_{identify\_intra\_UE\ cat\ M1}$ (s) (DRX cycles)
DRX-cycle ≤ 0.640	[320.8] (Note1)
1.28<DRX-cycle≤2.56	Note2(400)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,

- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-4 for a corresponding Band

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{measure\_intra\_UE\ cat\ M1}$ as shown in table 8.13.3.1.2.2-2. The UE shall be capable of performing RSRP measurements for 6 identified-intra-frequency cells, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{measure\_intra\_UE\ cat\ M1}$.

Table 8.13.3.1.2.2-2: Requirement to measure HD-FDD intrafrequency cells

DRX cycle length (s)	$T_{measure\_intra\_UE\ cat\ M1}$ (s) (DRX cycles)
≤0.04	0.8 (Note1)
0.04<DRX-cycle≤0.16	Note2 (7)
0.16<DRX-cycle≤2.56	Note2(5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

8.13.3.1.2.2.1 Measurement Reporting Requirements

8.13.3.1.2.2.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

8.13.3.1.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.2.2.1.3.

8.13.3.1.2.2.1.3 Event Triggered Reporting

Reported RSRP measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_UE\ cat\ M1}$ defined in Clause 8.13.3.1.2.2 When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE\ cat\ M1}$ defined in clause 8.13.3.1.2.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_UE\ cat\ M1}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.1.3 E-UTRAN TDD intra frequency measurements

8.13.3.1.3.1 E-UTRAN intra frequency measurements when no DRX is used

When no DRX is in use the UE shall be able to identify and measure a new detectable FDD intra frequency cell according to requirements in Table 8.13.3.1.3.1-1when SCH Ês/Iot >= -15 dB

Table 8.13.3.1.3.1-1: Requirement on cell detection delay and measurement delay for FDD intrafrequency cell

Gap pattern ID	Cell detection delay ($T_{identify\_intra\_UE\ cat\ M1}$)	Measurement delay ($T_{Measurement\_Period\_UE\ cat\ M1,\ Intra}$)
0	As specified in Table 8.13.3.1.3.1-2	800 ms
1	As specified in Table 8.13.3.1.3.1-2	800 ms

Table 8.13.3.1.3.1-2: Requirement on cell detection delay and measurement delay for FDD intrafrequency cell

SCH Ês/Iot of already identified cell including serving cell: Q1	Neighbouring cell SCH Ês/Iot: Q2	$T_{basic\_identify\_E\text{-}UTRA\_FDD\_UE\ cat\ M1,\ intra}$ (s)
-15≤Q1<-6	-15≤ Q2 < -6	320.8
-15≤Q1<-6	Q2≥-6	Requirements in 8.13.2 apply
Q1≥ -6	Q2≥-6	Requirements in 8.13.2 apply

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-1 for a corresponding Band.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{Measurement\_Period\_\ UE\ cat\ M1\ Intra}$. If higher layer filtering is used, an additional cell identification delay can be expected.

In the RRC_CONNECTED state the measurement period for intra frequency measurements is according to Table 8.13.3.1.3.1-1. When measurement gaps are activated the UE shall be capable of performing measurements for at least 6 cells. If the UE has identified more than 6 cells, the UE shall perform measurements but the reporting rate of RSRP measurements of cells from UE physical layer to higher layers may be decreased.

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

8.13.3.1.3.1.1 Measurement Reporting Requirements

8.13.3.1.3.1.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

8.13.3.1.3.1.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.3.1.1.3.

8.13.3.1.3.1.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify intra\_UE cat M1}}$ defined in Clause 8.13.3.1.3.1. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{identify\_intra\_UE cat M1}}$ defined in clause 8.13.3.1.3.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period Intra\_UE cat M1}}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.1.3.2 E-UTRAN intra frequency measurements when DRX is used

When DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within $T_{\text{identify\_intra\_LC UE Type2}}$ as shown in table 8.13.3.1.3.2-1

Table 8.13.3.1.3.2-1: Requirement to identify a newly detectable TDD intrafrequency cell

DRX cycle length (s)	$T_{\text{identify\_intra\_UE cat M1}}$ (s) (DRX cycles)
DRX-cycle ≤ 0.640	[320.8] (Note1)
1.28<DRX-cycle≤2.56	Note2(400)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.21.3 and 9.1.21.4 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-3 for a corresponding Band

In the RRC_CONNECTED state the measurement period for intra frequency measurements is $T_{\text{measure\_intra\_UE cat M1}}$ as shown in table 8.13.3.1.3.2-2. The UE shall be capable of performing RSRP measurement for 6 identified intra-frequency cells and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{\text{measure\_intra\_UE cat M1}}$.

Table 8.13.3.1.3.2-2: Requirement to measure TDD intra frequency cells

DRX cycle length (s)	$T_{\text{measure\_intra\_UE cat M1}}$ (s) (DRX cycles)
≤0.08	0.8 (Note1)
0.08<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use. Note2: Time depends upon the DRX cycle in use.	

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.21.3 and 9.1.21.4.

8.13.3.1.3.2.1 Measurement Reporting Requirements

8.13.3.1.3.2.1.1 Periodic Reporting

Reported RSRP measurement contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

8.13.3.1.3.2.1.2 Event-triggered Periodic Reporting

Reported RSRP measurement contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in clause 8.13.3.1.3.2.1.3.

8.13.3.1.3.2.1.3 Event Triggered Reporting

Reported RSRP measurement contained in event triggered measurement reports shall meet the requirements in sections 9.1.21.3 and 9.1.21.4.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}.This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify\_intra\_UE\ cat\ M1}$ defined in Clause 8.13.3.1.3.2. When L3 filtering is used or IDC autonomous denial is configured an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra\_UE\ cat\ M1}$ defined in clause 8.13.3.1.3.2 becomes undetectable for a period $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measure\_intra\_UE\ cat\ M1}$ provided the timing to that cell has not changed more than $\pm$ 50 Ts and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.1.4 E-UTRAN FDD intra frequency measurements with autonomous gaps for UE category M1 with CE mode B

The requirements defined in this subclause 8.13.3.1.4 apply provided the following condition is met:

- Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.
- Repetitions of MIB/SIB1bis are supported in the target cell to be detected.

8.13.3.1.4.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose ‘reportCGI’. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1bis message according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of ‘reportCGI’, regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$T_{identify\_CGI\_Cat\ M1,\ intra} = T_{basic\_identify\_CGI\_Cat\ M1,\ intra} \quad ms$$

Where

$T_{basic\_identify\_CGI\_Cat\ M1,\ intra}$ = 190 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.12 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [TBD].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{basic\_identify\_CGI\_Cat\ M1,.intra}$ is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time, $T_{identify\_CGI\_Cat\ M1,\ intra}\ ms$, over which the UE identifies the new CGI of E-UTRA cell, the UE shall transmit at least the number of ACK/NACKs stated in Table 8.13.3.1.4.1-1on PCell provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).

Table 8.13.3.1.4.1-1: Condition for requirement on minimum number of ACK/NACKs to transmit during $T_{basic\_identify\_CGI\_Cat\ M1,\ intra}$.

Serving cell		Target cell	
SNR [dB]	Minimum ACK/NACK requirement	MIB repetition level	SIB1bis repetition level
≥ -6	TBD	4	TBD
< -6	N/A	4	TBD

8.13.3.1.4.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.1.5 E-UTRAN intra frequency measurements with autonomous gaps for HD-FDD UE category M1 with CE mode B

The requirements in this section are applicable for the UE which supports half duplex FDD operation on one or more supported frequency bands [2].

The requirements defined in this subclause 8.13.3.1.5 apply provided the following condition is met:

- Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.
- Repetitions of MIB/SIB1bis are supported in the target cell to be detected.

8.13.3.1.5.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

All the CGI requirements with the exception of requirement on the number of ACK/NACK transmission on PCell defined in clause 8.13.3.1.4.1 also apply for this section.

For the UE supporting half duplex FDD operation there is no requirement in terms of number of ACK/NACK transmission on PCell.

8.13.3.1.5.2 ECGI Reporting Delay

The ECGI reporting delay defined in clause 8.13.3.1.5.2 also apply for this section

8.13.3.1.6 E-UTRAN TDD intra frequency measurements with autonomous gaps for UE category M1 with CE mode B

The requirements defined in this subclause 8.13.3.1.6 apply provided the following condition is met:

- Tx diversity or transmission using multiple antennas are supported in the target cell to be detected.
- Repetitions of MIB/SIB1bis are supported in the target cell to be detected.

8.13.3.1.6.1 Identification of a new CGI of E-UTRA cell with autonomous gaps

No explicit neighbour list is provided to the UE for identifying a new CGI of E-UTRA cell. The UE shall identify and report the CGI when requested by the network for the purpose 'reportCGI'. The UE may make autonomous gaps in downlink reception and uplink transmission for receiving MIB and SIB1bis messages according to clause 5.5.3.1 of TS 36.331 [2]. Note that a UE is not required to use autonomous gap if si-RequestForHO is set to false. If autonomous gaps are used for measurement with the purpose of 'reportCGI', regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of E-UTRA cell within:

$$\mathrm{T}_{\text{identify\_CGI\_Cat M1, intra}} = \mathrm{T}_{\text{basic\_identify\_CGI\_Cat M1, intra}} \quad ms$$

Where

$T_{\text{basic\_identify\_CGI\_Cat M1, intra}}$ = 190 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of an E-UTRA cell is defined, provided that the E-UTRA cell has been already identified by the UE.

A cell shall be considered identifiable when the following conditions are fulfilled:

- RSRP related side conditions given in Clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP and SCH Ês/Iot according to Annex B.2.12 for a corresponding Band

The MIB of an E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [TBD].

The requirement for identifying a new CGI of an E-UTRA cell within $T_{\text{basic\_identify\_CGI\_Cat M1, intra}}$ is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are used.

Within the time, $\mathrm{T}_{\text{identify\_CGI\_Cat M1, intra}}$ ms, over which the UE identifies the new CGI of E-UTRA cell, the UE shall be able to transmit at least the number of ACK/NACKs as stated in Table 8.13.3.1.6.1-2 on PCell provided that:

- there is continuous DL data allocation,
- no DRX cycle is used,
- no measurement gaps are configured,
- only one code word is transmitted in each subframe,
- no MBSFN subframes are configured in the PCell or each of activated SCell(s).
- and condition in Table 8.13.3.1.6.1-1 are met.

Table 8.13.3.1.6.1-1: Condition for requirement on minimum number of ACK/NACKs to transmit during $T_{basic\_identify\_CGI\_Cat\ M1,\ intra}$.

Serving cell		Target cell	
SNR [dB]	Minimum ACK/NACK requirement	MIB repetition level	SIB1bis repetition level
≥ -6	As stated in Table 8.13.3.1.6.1-2	4	TBD
< -6	N/A	4	TBD

Table 8.13.3.1.6.1-2: Requirement on minimum number of ACK/NACKs to transmit during $T_{basic\_identify\_CGI\_Cat\ M1,\ intra}$.

UL/DL configuration	Minimum number of transmitted ACK/NACKs
0	TBD
1	TBD
2	TBD
3	TBD
4	TBD
5	TBD
6	TBD

8.13.3.1.6.2 ECGI Reporting Delay

The ECGI reporting delay occurs due to the delay uncertainty when inserting the ECGI measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. In case DRX is used, the ECGI reporting may be delayed until the next DRX cycle. If IDC autonomous denial is configured, an additional delay can be expected.

8.13.3.2 E-UTRAN E-CID Measurements Requirements for UE category M1 with CE mode B

8.13.3.2.1 E-UTRAN FDD Intra-frequency E-CID RSRP Measurements

8.13.3.2.1.1 Introduction

The requirements in section 8.13.3.2.1 shall apply provided the UE has received ECID-RequestLocationInformation message from E-SMLC via LPP requesting the UE to report E-CID E-UTRAN FDD intra-frequency RSRP measurements [24].

8.13.3.2.1.2 Measurement Requirements

The requirements in section 8.13.3.1.1 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP are defined in section 8.13.3.2.1.3.

8.13.3.2.1.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.17.3 and 9.1.17.4 respectively.

8.13.3.2.2 E-UTRAN HD-FDD Intra-frequency E-CID RSRP Measurements

8.13.3.2.2.1 Introduction

The requirements in this section are applicable for the UE which supports half duplex operation on one or more supported frequency bands [2].

The requirements defined in clause 8.13.3.2.1.1 also apply for this section provided the following conditions are met:

- at least downlink subframe # 0 and downlink subframe # 5 per radio frame of an intra-frequency cell to be identified by the UE is available at the UE over $T_{identify\_intra\_UE\ cat\ M1}$;
- at least two consecutive downlink subframe per radio frame of measured cell is available at the UE for RSRP measurements assuming measured cell is identified cell over $T_{measure\_intra\_UE\ cat\ M1}$.
- SCH_RP and SCH Ês/Iot according to Annex Table B.2.12-4

8.13.3.2.2.2 Measurement Requirements

The requirements in section 8.13.3.1.2 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP are defined in section 8.13.3.2.2.3.

8.13.3.2.2.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.17.3 and 9.1.17.4 respectively.

8.13.3.2.3 E-UTRAN TDD Intra-frequency E-CID RSRP Measurements

8.13.3.2.3.1 Introduction

The requirements in section 8.13.3.2.3 shall apply provided the UE has received ECID-RequestLocationInformation message from E-SMLC via LPP requesting the UE to report E-CID E-UTRAN TDD intra-frequency RSRP measurements [24].

8.13.3.2.3.2 Measurement Requirements

The requirements in section 8.13.3.1.3 also apply for this section except the measurement reporting requirements. The measurement reporting requirements for E-CID RSRP are defined in section 8.13.3.2.3.3.

8.13.3.2.3.3 Measurement Reporting Delay

This requirement assumes that that the measurement report is not delayed by other LPP signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

Reported RSRP measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.1.17.3 and 9.1.17.4 respectively.

9 Measurements performance requirements for UE

One of the key services provided by the physical layer is the measurements used to trigger or perform a multitude of functions. Both the UE and the E-UTRAN are required to perform measurements. The physical layer measurement model and a complete list of measurements are specified in [25] and [22] respectively. The physical layer measurements are described and defined in [4]. In this clause for each measurement the relevant requirements on the measurement period, reporting range, granularity and performance in terms of accuracy are specified.

Since the UE reference sensitivity requirements are different depending on supported band, this is noted in each case with definition of the range Io for each frequency band. Definitions of each frequency bands can be found in [5].

Except for requirements in sections 9.1.2A, 9.1.3A, 9.1.5A and 9.1.6A, the accuracy requirements in this clause are applicable for AWGN radio propagation conditions and assume independent interference (noise) at each receiver antenna port.

9.1 E-UTRAN measurements

9.1.1 Introduction

The requirements in this clause are applicable for a UE:

- in state RRC_CONNECTED
- performing measurements with appropriate measurement gaps as defined in Clause 8.1.2.1.
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in [25].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the higher layer filtering disabled.

In the requirements of Section 9 for the UE capable of CA and the UEs configured with up to four downlink SCell(s), the applicable exceptions for side conditions are specified in Annex B, Sections B.4.2 and B.4.3, respectively.

9.1.2 Intra-frequency RSRP Accuracy Requirements

9.1.2.1 Absolute RSRP Accuracy

The requirements for absolute accuracy of RSRP in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.2.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

Table 9.1.2.1-1: RSRP Intra frequency absolute accuracy

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io [Note 1] range			
			E-UTRA operating band groups [Note 3]	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±4.5	±9	≥-6 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥-6 dB	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.						

9.1.2.2 Relative Accuracy of RSRP

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency.

The accuracy requirements in Table 9.1.2.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.8 for a corresponding Band.

Table 9.1.2.2-1: RSRP Intra frequency relative accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot [Note 2]	Io [Note 1] range		
			E-UTRA operating band groups [Note 5]	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz [Note 4]	$dBm/BW_{Channel}$
±2	±3	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3	±3	≥-6 dB	Note 3	Note 3	Note 3
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies. NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement. NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.					

9.1.2.3 Absolute RSRP Accuracy under Time Domain Measurement Resource Restriction

The requirements for absolute accuracy of RSRP in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRP measurements on this cell is configured by higher layers (TS 36.331 [2]).

The accuracy requirements in Table 9.1.2.3-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled,

$RSRP|_{dBm}$ according to Annex B.3.9 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

Table 9.1.2.3-1: RSRP Intra frequency absolute accuracy under time domain measurement resource restriction

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io Note 2 range			
			E-UTRA operating band groups Note 4	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 1, 3	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±4.5	±9	≥-4 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥-4 dB	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50

NOTE 1: This minimum Io condition is expressed as the average Io per RE over all REs in that symbol.
NOTE 2: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRP measurements of this cell. The Io range defined by the minimum and the maximum Io levels applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

For time domain measurements restriction under colliding CRS with ABS configured in non-MBSFN subframes, requirements in Section 9.1.2.1 apply.

9.1.2.4 Relative Accuracy of RSRP under Time Domain Measurement Resource Restriction

The requirements for relative accuracy of RSRP in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRP measurements for this cell is configured by higher layers (TS 36.331 [2]).

The accuracy requirements in Table 9.1.2.4-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports, Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled,

RSRP1,2$|_{\text{dBm}}$ according to Annex B.3.10 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

Table 9.1.2.4-1: RSRP Intra frequency relative accuracy under time domain measurement resource restriction

Accuracy		Conditions			
			Io Note 3 range		
Normal condition	Extreme condition	Ês/Iot Note 2	E-UTRA operating band groups Note 6	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 1, 5	dBm/BW$_{\text{Channel}}$
±2	±3	≥-2 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3	±3	≥-4 dB	Note 4	Note 4	Note 4

NOTE 1: This minimum Io condition is expressed as the average Io per RE over all REs in that symbol.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRP measurements of this cell. The Io range defined by the minimum and the maximum Io levels applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

For time domain measurements restriction under colliding CRS with ABS configured in non-MBSFN subframes, requirements in Section 9.1.2.2 apply.

9.1.2.5 Absolute RSRP Accuracy under Time Domain Measurement Resource Restriction with CRS assistance information

The requirements for absolute accuracy of RSRP in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRP measurements on this cell is configured by higher layers (TS 36.331 [2]) and the CRS assistance information is provided. The requirements apply for UEs supporting CRS interference handling.

The accuracy requirements in Table 9.1.2.5-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Secion 7.3 for reference sensitivity are fulfilled,

RSRP$|_{\text{dBm}}$ according to Annex B.3.11 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern, The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

Table 9.1.2.5-1: RSRP Intra frequency absolute accuracy under Time Domain Measurement Resource Restriction with CRS assistance information

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io Note 2 range			
			E-UTRA operating band groups Note 4	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 1, 3	dBm/BW$_{Channel}$	dBm/BW$_{Channel}$
±4.5	±9	≥-9.46	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥-9.46	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50

NOTE 1: This Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.
NOTE 2: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRP measurements of this cell. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.2.6 Relative Accuracy of RSRP under Time Domain Measurement Resource Restriction with CRS assistance information

The requirements for relative accuracy of RSRP in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRP measurements for this cell is configured by higher layers (TS 36.331 [2]) and the CRS assistance information is provided. The requirements apply for UEs supporting CRS interference handling.

The accuracy requirements in Table 9.1.2.6-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled,

RSRP1,2$|_{dBm}$ according to Annex B.3.12 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern,

The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

The requirements in this section shall also be met also when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

Table 9.1.2.6-1: RSRP Intra frequency relative accuracy under Time Domain Measurement Resource Restriction with CRS assistance information

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2, 6	Io Note 3 range		
			E-UTRA operating band groups Note 7	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 1, 5	$dBm/BW_{Channel}$
±2	±3	≥-6.96	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3	±3	≥-9.46	Note 4	Note 4	Note 4

NOTE 1: This Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRP measurements of this cell. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 6: The gap between the Es/Iot level in table 9.1.2.6-1 and 9.1.2.4-1 is due to the interference from either PCell or at least one neighbour cell indicated within the CRS assistance information.
NOTE 7: E-UTRA operating band groups are as defined in Section 3.5.

9.1.2A Intra-frequency RSRP Accuracy Requirements in High Doppler Conditions

The accuracy requirements in this clause are applicable for [EVA300 and EVA600] propagation conditions and assume independent interference (noise) at each receiver antenna port.

9.1.2A.1 Absolute RSRP Accuracy in high Doppler conditions

The requirements for absolute accuracy of RSRP in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.2A.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

Table 9.1.2A1-1: RSRP Intra frequency absolute accuracy

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range			
			E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±6	±10.5	≥-6 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±9.5	±12.5	≥-6 dB	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.						

9.1.2A.2 Relative Accuracy of RSRP in high Doppler conditions

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency.

The accuracy requirements in Table 9.1.2A.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.8 for a corresponding Band.

Table 9.1.2A.2-1: RSRP Intra frequency relative accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
±3.3	±4.3	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±4.3	±4.3	≥-6 dB	Note 3	Note 3	Note 3
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies. NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement. NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.					

9.1.3 Inter-frequency RSRP Accuracy Requirements

9.1.3.1 Absolute RSRP Accuracy

The requirements for absolute accuracy of RSRP in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.3.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 for a corresponding Band

Table 9.1.3.1-1: RSRP Inter frequency absolute accuracy

Accuracy		Conditions				
			Io Note 1 range			
Normal condition	Extreme condition	Ês/Iot	E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±4.5	±9	≥-6 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥-6 dB	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

9.1.3.2 Relative Accuracy of RSRP

The relative accuracy of RSRP in inter frequency case is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.3.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq 27dB$$

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.3.2-1: RSRP Inter frequency relative accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	dBm/$BW_{Channel}$
±4.5	±6	≥-6 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.3A Inter-frequency RSRP Accuracy Requirements in High Doppler Conditions

The accuracy requirements in this clause are applicable for [EVA300 and EVA600] propagation conditions and assume independent interference (noise) at each receiver antenna port.

9.1.3A.1 Absolute RSRP Accuracy in high Doppler conditions

The requirements for absolute accuracy of RSRP in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.3A.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 for a corresponding Band

Table 9.1.3A.1-1: RSRP Inter frequency absolute accuracy

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range			
			E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±6	±10.5	≥-6 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±9.5	±12.5	≥-6 dB	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

9.1.3A.2 Relative Accuracy of RSRP in high Doppler conditions

The relative accuracy of RSRP in inter frequency case is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.3A.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq 27dB$$

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.3A.2-1: RSRP Inter frequency relative accuracy

Accuracy		Conditions			
			Io Note 1 range		
Normal condition	Extreme condition	Ês/Iot Note 2	E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	dBm/$BW_{Channel}$
±5.8	±7.3	≥-6 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.4 RSRP Measurement Report Mapping

The reporting range of RSRP is defined from -140 dBm to -44 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 9.1.4-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.4-1: RSRP measurement report mapping

Reported value	Measured quantity value	Unit
RSRP_00	RSRP < -140	dBm
RSRP_01	-140 ≤ RSRP < -139	dBm
RSRP_02	-139 ≤ RSRP < -138	dBm
…	…	…
RSRP_95	-46 ≤ RSRP < -45	dBm
RSRP_96	-45 ≤ RSRP < -44	dBm
RSRP_97	-44 ≤ RSRP	dBm

9.1.5 Intra-frequency RSRQ Accuracy Requirements

9.1.5.1 Absolute RSRQ Accuracy

The requirements for absolute accuracy of RSRQ in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.5.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

Table 9.1.5.1-1: RSRQ Intra frequency absolute accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	$dBm/BW_{Channel}$
±2.5	±4	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3.5	±4	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.5.2 Absolute RSRQ Accuracy under Time Domain Measurement Resource Restriction

The requirements for absolute accuracy of RSRQ in this clause shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRQ measurements of this cell is configured by higher layers (TS 36.331 [2]).

The accuracy requirements in Table 9.1.5.2-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled,

$RSRP|_{dBm}$ according to Annex B.3.9 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRQ measurement,

The RSRQ measurement is not performed in any subframe other than those indicated by the time domain measurement resource restriction pattern configured for the measured cell,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

Table 9.1.5.2-1: RSRQ Intra frequency absolute accuracy under time domain measurement resource restriction

Accuracy		Conditions			
			Io Note 2 range		
Normal condition	Extreme condition	Ês/Iot	E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 1, 4	$dBm/BW_{Channel}$
±2.5	±4	≥-2 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3.5	±4	≥-4 dB	Note 3	Note 3	Note 3

NOTE 1: This minimum Io condition is expressed as the average Io per RE over all REs in that symbol.
NOTE 2: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRQ measurements of this cell. The Io range defined by the minimum and the maximum Io levels applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

For time domain measurements restriction under colliding CRS with ABS configured in non-MBSFN subframes, requirements in Section 9.1.5.1 apply.

9.1.5.3 Absolute RSRQ Accuracy under Time Domain Measurement Resource Restriction with CRS assistance information

The requirements for absolute accuracy of RSRQ in this section shall apply to a cell on the same frequency as that of the serving cell when a time domain measurement resource restriction pattern for performing RSRQ measurements of this cell is configured by higher layers (TS 36.331 [2]) and the CRS assistance information is provided. The requirements apply for UEs supporting CRS interference handling.

The accuracy requirements in Table 9.1.5.3-1 are valid under the following conditions:

Cell specific reference signals in the measured cell are transmitted either from one, two or four antenna ports,

Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled,

$RSRP|_{dBm}$ according to Annex B.3.11 for a corresponding Band,

The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRQ measurement,

The RSRQ measurement is not performed in any subframe other than those indicated by the time domain measurement resource restriction pattern configured for the measured cell,

Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern,

The UE is provided with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

Table 9.1.5.3-1: RSRQ Intra frequency absolute accuracy under Time Domain Measurement Resource Restriction with CRS assistance information

Accuracy		Conditions			
			Io Note 2 range		
Normal condition	Extreme condition	Ês/Iot Note 5	E-UTRA operating band groups Note 6	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 1, 4	dBm/$BW_{Channel}$
±2.5	±4	≥-6.96	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3.5	±4	≥-9.46	Note 3	Note 3	Note 3

NOTE 1: This Io condition is expressed as the average Io per RE over all REs in that symbol.
NOTE 2: Io is defined in subframes indicated by the time domain measurement resource restriction pattern configured for performing RSRQ measurements of this cell. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: The gap between the Es/Iot level in table 9.1.5.3-1 and 9.1.5.2-1 is due to the interference from either PCell or at least one neighbour cell indicated within the CRS assistance information.
NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

9.1.5.4 Absolute WB-RSRQ Accuracy

The requirements in this section shall apply when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. The WB-RSRQ accuracy figures in Table 9.1.5.4-1are relative to the value that would be obtained by using the *AllowedMeasBandwidth* in TS 36.331 [2].

The accuracy requirements in Table 9.1.5.4-1 are valid under the following conditions:

The value of the parameter, *AllowedMeasBandwidth* in TS 36.331 [2], is 50 resource blocks or larger

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in TS 36.101 [5] Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band.

Table 9.1.5.4-1: WB-RSRQ Intra frequency absolute accuracy

Accuracy		Conditions				
				Io range Note 1		
Normal condition	Extreme condition	Ês/Iot Note 3	Io1-Io2 Note 2	E-UTRA operating band groups Note 6	Minimum Io Note 5	Maximum Io
dB	dB	dB	dB		dBm/15kHz	$dBm/BW_{Channel}$
±2.5	±4	≥-3 dB	0 ≤Io1-Io2	FDD_A, TDD_A	-121	-50
				FDD_B	-120.5	-50
				FDD_C, TDD_C	-120	-50
				FDD_D	-119.5	-50
				FDD_E, TDD_E	-119	-50
				FDD_F	-118.5	-50
				FDD_G	-118	-50
				FDD_H	-117.5	-50
				FDD_N	-114.5	-50
±3.5	±4	≥-6 dB		Note 4	Note 4	Note 4

NOTE 1: Io is the average across all the resource blocks within the *AllowedMeasBandwidth* in TS 36.331 [2].
NOTE 2: Io1 is the Io level in the resource blocks other than central 6 resource blocks within the *AllowedMeasBandwidth* in TS 36.331 [2] and Io2 is the Io level in central 6 resource blocks. The Io1 and Io2 have the same range as defined for Io.
NOTE 3: Iot is the received power spectrum density of total interference and noise for all the resource blocks, other than central 6 resource blocks.
NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

9.1.5A Intra-frequency RSRQ Accuracy Requirements in High Doppler Conditions

The accuracy requirements in this clause are applicable for [EVA300 and EVA600] propagation conditions and assume independent interference (noise) at each receiver antenna port.

9.1.5A.1 Absolute RSRQ Accuracy in high Doppler conditions

The requirements for absolute accuracy of RSRQ in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.5A.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

Table 9.1.5A.1-1: RSRQ Intra frequency absolute accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	$dBm/BW_{Channel}$
±4	±5.5	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±5	±5.5	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.6 Inter-frequency RSRQ Accuracy Requirements

9.1.6.1 Absolute RSRQ Accuracy

The requirements for absolute accuracy of RSRQ in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.6.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 for a corresponding Band

Table 9.1.6.1-1: RSRQ Inter frequency absolute accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	$dBm/BW_{Channel}$
±2.5	±4	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3.5	±4	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.6.2 Relative Accuracy of RSRQ

The relative accuracy of RSRQ in inter frequency case is defined as the RSRQ measured from one cell compared to the RSRQ measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.6.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2$|_{dBm}$ according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \le 27dB$$

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.6.2-1: RSRQ Inter frequency relative accuracy

Accuracy		Conditions			
			Io Note 1 range		
Normal condition	Extreme condition	Ês/Iot Note 2	E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	dBm/BW$_{Channel}$
±3	±4	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±4	±4	≥-6 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

9.1.6.3 Absolute WB-RSRQ Accuracy

The requirements in this section shall apply when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. The WB-RSRQ accuracy figures in Table 9.1.6.3-1are relative to the value that would be obtained by using the *AllowedMeasBandwidth* in TS 36.331 [2].

The accuracy requirements in Table 9.1.6.3-1 are valid under the following conditions:

The value of the parameter, *AllowedMeasBandwidth* in TS 36.331 [2], is 50 resource blocks or larger

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in TS 36.101 [5] Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band.

Table 9.1.6.3-1: WB-RSRQ Inter frequency absolute accuracy

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot Note 3	Io1-Io2 Note 2	Io range Note 1		
				E-UTRA operating band groups Note 6	Minimum Io Note 5	Maximum Io
dB	dB	dB	dB		dBm/15kHz	dBm/$BW_{Channel}$
±2.5	±4	≥-3 dB	0 ≤Io1-Io2	FDD_A, TDD_A	-121	-50
				FDD_B	-120.5	-50
				FDD_C, TDD_C	-120	-50
				FDD_D	-119.5	-50
				FDD_E, TDD_E	-119	-50
				FDD_F	-118.5	-50
				FDD_G	-118	-50
				FDD_H	-117.5	-50
				FDD_N	-114.5	-50
±3.5	±4	≥-6 dB		Note 4	Note 4	Note 4

NOTE 1: Io is the average across all the resource blocks within the *AllowedMeasBandwidth* in TS 36.331 [2].
NOTE 2: Io1 is the Io level in the resource blocks other than central 6 resource blocks within the *AllowedMeasBandwidth* in TS 36.331 [2] and Io2 is the Io level in central 6 resource blocks. The Io1 and Io2 have the same range as defined for Io.
NOTE 3: Iot is the received power spectrum density of total interference and noise for all the resource blocks, other than central 6 resource blocks.
NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

9.1.6.4 Relative WB-RSRQ Accuracy

The requirements in this section shall apply when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. The WB-RSRQ accuracy figures in Table 9.1.6.4-1are relative to the value that would be obtained by using the *AllowedMeasBandwidth* in TS 36.331 [2].

The accuracy requirements in Table 9.1.6.4-1 are valid under the following conditions:

The value of the parameter, *AllowedMeasBandwidth* in TS 36.331 [2], is 50 resource blocks or larger for the measured cells from different frequencies

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in TS 36.101 [5] Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq 27dB$$

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.6.4-1: WB-RSRQ Inter frequency relative accuracy

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot Note 3	Io1-Io2 Note 2	Io range Note 1		
				E-UTRA operating band groups Note 6	Minimum Io Note 5	Maximum Io
dB	dB	dB	dB		dBm/15kHz	$dBm/BW_{Channel}$
±3	±4	≥-3 dB	0 ≤Io1-Io2	FDD_A, TDD_A	-121	-50
				FDD_B	-120.5	-50
				FDD_C, TDD_C	-120	-50
				FDD_D	-119.5	-50
				FDD_E, TDD_E	-119	-50
				FDD_F	-118.5	-50
				FDD_G	-118	-50
				FDD_H	-117.5	-50
				FDD_N	-114.5	-50
±4	±4	≥-6 dB		Note 4	Note 4	Note 4

NOTE 1: Io is the average across all the resource blocks within the *AllowedMeasBandwidth* in TS 36.331 [2].
NOTE 2: Io1 is the Io level in the resource blocks other than central 6 resource blocks within the *AllowedMeasBandwidth* in TS 36.331 [2] and Io2 is the Io level in central 6 resource blocks. The Io1 and Io2 have the same range as defined for Io.
NOTE 3: Iot is the received power spectrum density of total interference and noise for all the resource blocks, other than central 6 resource blocks. The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies
NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

9.1.6A Inter-frequency RSRQ Accuracy Requirements in High Doppler Conditions

The accuracy requirements in this clause are applicable for [EVA300 and EVA600] propagation conditions and assume independent interference (noise) at each receiver antenna port.

9.1.6A.1 Absolute RSRQ Accuracy in high Doppler conditions

The requirements for absolute accuracy of RSRQ in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.6A.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 for a corresponding Band

Table 9.1.6A.1-1: RSRQ Inter frequency absolute accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	dBm/$BW_{Channel}$
±4	±5.5	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±5	±5.5	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.6A.2 Relative Accuracy of RSRQ in high Doppler conditions

The relative accuracy of RSRQ in inter frequency case is defined as the RSRQ measured from one cell compared to the RSRQ measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.6A.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.4 for a corresponding Band

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq 27dB$$

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.6A.2-1: RSRQ Inter frequency relative accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
±3.5	±5.0	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±4.5	±5.0	≥-6 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

9.1.7 RSRQ Measurement Report Mapping

The reporting range of RSRQ is defined from -34 dB to 2.5 dB with 0.5 dB resolution.

The mapping of measured quantity is defined in table 9.1.7-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.7-1: RSRQ measurement report mapping

Reported value	Measured quantity value	Unit
RSRQ_-30	RSRQ < -34	dB
RSRQ_-29	-34 ≤ RSRQ < -33.5	dB
…	…	…
RSRQ_-02	-20.5 ≤ RSRQ < -20	dB
RSRQ_-01	-20 ≤ RSRQ < -19.5	dB
RSRQ_00	RSRQ < -19.5	dB
RSRQ_01	-19.5 ≤ RSRQ < -19	dB
RSRQ_02	-19 ≤ RSRQ < -18.5	dB
…	…	…
RSRQ_32	-4 ≤ RSRQ < -3.5	dB
RSRQ_33	-3.5 ≤ RSRQ < -3	dB
RSRQ_34	-3 ≤ RSRQ	dB
RSRQ_35	-3 ≤ RSRQ < -2.5	dB
RSRQ_36	-2.5 ≤ RSRQ < -2	dB
…	…	…
RSRQ_45	2 ≤ RSRQ < 2.5	dB
RSRQ_46	2.5 ≤ RSRQ	dB

Note: The ranges from RSRQ_-30 to RSRQ_-01 and from RSRQ_35 to RSRQ_46 apply for the UE who can support extended RSRQ range in [31].

9.1.8 Power Headroom

The requirements in this clause shall apply for power headroom Type 1 and for power headroom Type 2, which are specified in clause 5.1.1.2 in [3].

For a UE not configured with a secondary cell, the power headroom provides the serving eNB with information about the differences between the UE configured maximum output power ($P_{CMAX,}$) defined in TS 36.101 [5] and the estimated power for UL-SCH transmission of the serving cell [3]. In this case the UE shall meet requirements for power headroom Type 1.

For a UE configured with a secondary cell, the power headroom provides the serving eNB with information about the differences between the UE configured maximum output power ($P_{CMAX,c}$) defined in TS 36.101[5] and the estimated power for UL-SCH transmission per activated serving cell c, or the estimated power for simultaneous PUSCH and PUCCH transmission on PCell [3]. In this case the UE shall meet requirements for both power headroom Type 1 and Type 2.

9.1.8.1 Period

The reported power headroom shall be estimated over 1 subframe.

When *extendedPHR* is not configured [17], the Type 1 power headroom shall be estimated for the primary serving cell as defined in clause 5.1.1.2 in TS 36.213 [3].

When *extendedPHR* is configured [17], the Type 1 and Type 2 power headroom shall be estimated for each activated serving cell with configured uplink as defined in clause 5.1.1.2 in TS 36.213 [3].

9.1.8.2 Reporting Delay

The power headroom reporting delay is defined as the time between the beginning of the power headroom reference period and the time when the UE starts transmitting the power headroom over the radio interface. The reporting delay of the power headroom shall be 0 ms, which is applicable for all configured triggering mechanisms for power headroom reporting.

9.1.8.3 Void

9.1.8.4 Report Mapping

The power headroom reporting range is from -23 ...+40 dB. Table 9.1.8.4-1 defines the report mapping.

Table 9.1.8.4-1: Power headroom report mapping

Reported value	Measured quantity value (dB)
POWER_HEADROOM_0	-23 ≤ PH < -22
POWER_HEADROOM_1	-22 ≤ PH < -21
POWER_HEADROOM_2	-21 ≤ PH < -20
POWER_HEADROOM_3	-20 ≤ PH < -19
POWER_HEADROOM_4	-19 ≤ PH < -18
POWER_HEADROOM_5	-18 ≤ PH < -17
…	…
POWER_HEADROOM_57	34 ≤ PH < 35
POWER_HEADROOM_58	35 ≤ PH < 36
POWER_HEADROOM_59	36 ≤ PH < 37
POWER_HEADROOM_60	37 ≤ PH < 38
POWER_HEADROOM_61	38 ≤ PH < 39
POWER_HEADROOM_62	39 ≤ PH < 40
POWER_HEADROOM_63	PH ≥ 40

9.1.9 UE Rx – Tx time difference

9.1.9.1 Measurement Requirement

The UE RX-TX time difference is measured from the PCell.

The accuracy requirements in Table 9.1.9.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

No changes to the uplink transmission timing are applied during the measurement period.

$RSRP|_{dBm}$ according to Annex B.3.5 for a corresponding Band

Table 9.1.9.1-1: UE Rx – Tx time difference measurement accuracy

Accuracy	Conditions				
	Ês/Iot	Downlink transmission bandwidth of PCell	Io Note 1 range		
			E-UTRA operating band groups Note 6	Minimum Io	Maximum Io
Ts Note 2	dB	MHz		dBm/15kHz Note 5	$dBm/BW_{Channel}$
±20	≥-3 dB	≥1.4 MHz	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G Note 4	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±14	≥-3 dB	≥ 3 MHz	Note 3	Note 3	Note 3
±10	≥-3 dB	≥ 5 MHz	Note 3	Note 3	Note 3
±7	≥-3 dB	≥10 MHz	Note 3	Note 3	Note 3

NOTE 1: When in dBm/15kHz, the minimum Io condition is expressed as the average Io per RE over all REs in that symbol. Io may be different in different symbols within a subframe.
NOTE 2: Ts is the basic timing unit defined in TS 36.211.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with downlink bandwidth ≥1.4 MHz.
NOTE 4: Except Band 29 and Band 32.
NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

9.1.9.2 Measurement Report mapping

The reporting range of UE Rx - Tx time difference is defined from 0 to $20472T_s$ with $2T_s$ resolution for UE Rx - Tx time difference less than $4096T_s$ and 8Ts for UE Rx - Tx time difference equal to or greater than $4096T_s$.

The mapping of measured quantity is defined in Table 9.1.9.2-1.

Table 9.1.9.2-1: UE Rx - Tx time difference measurement report mapping

Reported value	Measured quantity value	Unit
RX-TX_TIME_DIFFERENCE_0000	$T_{UE\ Rx-Tx} < 2$	T_s
RX-TX_TIME_DIFFERENCE_0001	$2 \le T_{UE\ Rx-Tx} < 4$	T_s
RX-TX_TIME_DIFFERENCE_0002	$4 \le T_{UE\ Rx-Tx} < 6$	T_s
…	…	…
RX-TX_TIME_DIFFERENCE_2046	$4092 \le T_{UE\ Rx-Tx} < 4094$	T_s
RX-TX_TIME_DIFFERENCE_2047	$4094 \le T_{UE\ Rx-Tx} < 4096$	T_s
RX-TX_TIME_DIFFERENCE_2048	$4096 \le T_{UE\ Rx-Tx} < 4104$	T_s
RX-TX_TIME_DIFFERENCE_2049	$4104 \le T_{UE\ Rx-Tx} < 4112$	T_s
…	…	…
RX-TX_TIME_DIFFERENCE_4093	$20456 \le T_{UE\ Rx-Tx} < 20464$	T_s
RX-TX_TIME_DIFFERENCE_4094	$20464 \le T_{UE\ Rx-Tx} < 20472$	T_s
RX-TX_TIME_DIFFERENCE_4095	$20472 \le T_{UE\ Rx-Tx}$	T_s

9.1.9.3 Measurement Requirement under Time Domain Measurement Resource Restriction

The requirements in this section apply for UE configured with a time-domain measurement resource restriction pattern for PCell measurements. The UE Rx-Tx time difference is measured from the Pcell.

The accuracy requirements in Table 9.1.9.3-1 are valid under the following conditions:

- Cell specific reference signals are transmitted either from one, two or four antenna ports,
- Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled,
- No changes to the uplink transmission timing are applied during the measurement period,

RSRP$|_{\text{dBm}}$ according to Annex B.3.5 for a corresponding Band,

- The time domain measurement resource restriction pattern configured for the PCell indicates at least one subframe per radio frame for performing the PCell measurements [2],
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern.

Table 9.1.9.3-1: UE Rx–Tx time difference measurement accuracy under time domain measurement resource restriction

Accuracy	Conditions				
	Ês/Iot Note 6	Downlink transmission bandwidth of PCell	Io Note 1, 5 range		
			E-UTRA operating band groups Note 8	Minimum Io	Maximum Io
Ts Note 2	dB	MHz		dBm/15kHz Note 7	dBm/BW$_{\text{Channel}}$
±20	≥-3 dB	≤ 3 MHz	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G Note 4	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±10	≥-3 dB	≥ 5 MHz	Note 3	Note 3	Note 3

NOTE 1: When in dBm/15kHz, the minimum Io condition is expressed as the average Io per RE over all REs in that symbol. Io may be different in different symbols within a subframe.
NOTE 2: Ts is the basic timing unit defined in TS 36.211.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with downlink bandwidth ≤ 3 MHz.
NOTE 4: Except Band 29 and Band 32.
NOTE 5: Io is defined for the subframes indicated by the time-domain measurement resource restriction pattern for serving cell measurements. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
NOTE 6: CRS Ês/Iot is in subframes indicated for PCell measurements by the time-domain measurement resource restriction pattern.
NOTE 7: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

9.1.9.4 Measurement Requirement when Time Domain Measurement Resource Restriction Pattern is Configured with CRS Assistance Information

The UE Rx-Tx time difference measurement is performed for the PCell.

For UE configured with a time-domain measurement resource restriction pattern for PCell measurements, the accuracy requirements in Table 9.1.9.4-1 apply provided that the following conditions are met for the PCell:

- PCell cell specific reference signals are transmitted from one, two or four antenna ports,
- Conditions defined in 36.101 Section 7.3 for reference sensitivity are fulfilled,
- No changes to the uplink transmission timing are applied during the measurement period,
- $RSRP|_{dBm}$ according to Annex B.3.13 for a corresponding Band,
- The time domain measurement resource restriction pattern configured for the measured cell indicates at least one subframe per radio frame for performing the RSRP measurement,
- Four symbols containing CRS are available in all subframes indicated by the time domain measurement resource restriction pattern, and
- The UE is provided via PCell with the CRS assistance information (TS 36.331 [2]) and the CRS assistance information is valid throughout the entire evaluation period.

The requirements in this section shall also be met when the number of transmit antenna ports [16] of one or more cells whose CRS assistance information is provided [2] is different from the number of transmit antenna ports of the measured cell.

When the CRS assistance information is provided, the transmission bandwidth [30] in all intra-frequency cells in the CRS assistance information [2] is the same or larger than the transmission bandwidth of the PCell for which measurement is performed.

Table 9.1.9.4-1: UE Rx–Tx time difference measurement accuracy

Accuracy	Conditions				
	CRS Ês/Iot Note 6	Downlink transmission bandwidth of PCell	Io range Note 5		
			E-UTRA operating band groups Note 8	Minimum Io Note 1, 7	Maximum Io
Ts Note 2	dB	MHz		dBm/15kHz Note 7	dBm/BW_{Channel}
±20	≥-7.76	≤ 3 MHz	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G Note 4	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±10	≥-7.76	≥ 5 MHz	Note 3	Note 3	Note 3

NOTE 1: This Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.
NOTE 2: Ts is the basic timing unit defined in TS 36.211.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with downlink bandwidth ≤ 3 MHz.
NOTE 4: Except Band 29 and Band 32.
NOTE 5: Io is defined in subframes indicated for PCell measurements by the time domain measurement resource restriction pattern. The specified Io range applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.
NOTE 6: CRS Ês/Iot is in subframes indicated for PCell measurements by the time-domain measurement resource restriction pattern.
NOTE 7: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.

NOTE: It is up to the UE implementation whether the UE Rx-Tx time difference measurement is performed in any subframe or in subframes indicated by the time-domain measurement resource restriction pattern.

9.1.10 Reference Signal Time Difference (RSTD)

NOTE: This measurement is used for UE positioning purposes.

9.1.10.1 Intra-Frequency Accuracy Requirement

The accuracy requirements in Table 9.1.10.1-1 are valid under the following conditions:

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

PRP $1,2|_{\text{dBm}}$ according to Annex B.3.6 for a corresponding Band

There are no measurement gaps overlapping with the PRS subframes of the measured serving cell.

The parameter expectedRSTDUncertainty signalled over LPP by E-SMLC as defined in TS 36.355 [24] is less than 5 μs.

Table 9.1.10.1-1: RSTD measurement accuracy

Accuracy	Conditions					
	PRS Ês/Iot	Minimum PRS bandwidth, which is minimum of serving cell channel bandwidth and the PRS bandwidths of the reference cell and the measured neighbour cell *i* Note 5	Minimum number of available measurement subframes among the reference cell and the measured neighbour cell *i*	Io Note 7 range		
				E-UTRA operating band groups Note 8	Minimum Io Note 1	Maximum Io
Ts Note 2	dB	RB			dBm/15kHz Note 6	dBm/$BW_{Channel}$
±15	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_{i}$ ≥-13dB	≥ 6	6	FDD_A, TDD_A	-121	-50
				FDD_B	-120.5	-50
				FDD_C, TDD_C	-120	-50
				FDD_D	-119.5	-50
				FDD_E, TDD_E	-119	-50
				FDD_F	-118.5	-50
				FDD_G	-118	-50
				FDD_H	-117.5	-50
				FDD_N	-114.5	-50
±10	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_{i}$ ≥-13dB	≥ 15	6	Note 4	Note 4	Note 4
±6	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_{i}$ ≥-13dB	≥ 25	≥ 2	Note 4	Note 4	Note 4
±5	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_{i}$ ≥-13dB	≥ 50	≥ 1	Note 4	Note 4	Note 4
±4	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_{i}$ ≥-13dB	≥ 75	≥ 1	Note 4	Note 4	Note 4

NOTE 1: This minimum Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.
NOTE 2: Ts is the basic timing unit defined in TS 36.211 [16].
NOTE 3: PRS bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth ≥ 6 RB.
NOTE 5: The serving cell, the reference cell, and the measured neighbour cell i are on the same carrier frequency.
NOTE 6: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 7: The Io is defined in PRS positioning subframes. The same Io range applies to PRS and non-PRS symbols. Io levels are different in PRS and non-PRS symbols within the same subframe.
NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.

9.1.10.2 Inter-Frequency Accuracy Requirement

The accuracy requirements in Table 9.1.10.2-1 are valid under the following conditions:

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

PRP 1,2|$_{dBm}$ according to Annex B.3.7 for a corresponding Band

There are no measurement gaps overlapping with the PRS subframes in cells belonging to the serving carrier frequency.

The parameter expectedRSTDUncertainty signalled over LPP by E-SMLC as defined in TS 36.355 [24] is less than 5 μs.

Table 9.1.10.2-1: RSTD measurement accuracy

Accuracy	Conditions					
	PRS Ês/Iot	Minimum PRS bandwidth which is minimum of serving cell channel bandwidth Note 7 and the PRS bandwidths of the reference cell and the measured neighbour cell *i*	Minimum number of available measurement subframes among the reference cell and the measured neighbour cell *i*	Io Note 6 range		
				E-UTRA operating band groups Note 8	Minimum Io Note 1	Maximum Io
Ts Note 2	dB	RB			dBm/15kHz Note 5	$dBm/BW_{Channel}$
±21	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_i$ ≥-13dB	≥ 6	4	FDD_A, TDD_A	-121	-50
				FDD_B	-120.5	-50
				FDD_C, TDD_C	-120	-50
				FDD_D	-119.5	-50
				FDD_E, TDD_E	-119	-50
				FDD_F	-118.5	-50
				FDD_G	-118	-50
				FDD_H	-117.5	-50
				FDD_N	-114.5	-50
±16	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_i$ ≥-13dB	≥ 15	4	Note 4	Note 4	Note 4
±10	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_i$ ≥-13dB	≥ 25	≥ 2	Note 4	Note 4	Note 4
±9	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_i$ ≥-13dB	≥ 50	≥ 1	Note 4	Note 4	Note 4
±8	(PRS Ês/Iot)$_{ref}$ ≥-6dB and (PRS Ês/Iot)$_i$ ≥-13dB	≥ 75	≥ 1	Note 4	Note 4	Note 4

NOTE 1: This minimum Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.
NOTE 2: Ts is the basic timing unit defined in TS 36.211 [16].
NOTE 3: PRS bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth ≥ 6 RB.
NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 6: The Io is defined in PRS positioning subframes. The same Io range applies to PRS and non-PRS symbols. Io levels are different in PRS and non-PRS symbols within the same subframe.
NOTE 7: If a CA capable UE is configured with one or two SCell(s), the serving cell channel bandwidth is the minimum of the serving cell channel bandwidths in the component carriers involved in the RSTD measurement. If any of the serving cells is not involved in this RSTD measurement for CA, the channel bandwidth of that serving cell is not included in the determination of the minimum PRS bandwidth.
NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.

9.1.10.3 RSTD Measurement Report Mapping

The reporting range of RSTD is defined from -15391T_s to 15391T_s with 1T_s resolution for absolute value of RSTD less or equal to 4096T_s and 5Ts for absolute value of RSTD greater than 4096T_s.

The mapping of measured quantity is defined in Table 9.1.10.3-1.

Table 9.1.10.3-1: RSTD report mapping

Reported Value	Measured Quantity Value	Unit
RSTD_0000	-15391 > RSTD	T_s
RSTD_0001	-15391 ≤ RSTD < -15386	T_s
…	…	…
RSTD_2258	-4106 ≤ RSTD < -4101	T_s
RSTD_2259	-4101 ≤ RSTD < -4096	T_s
RSTD_2260	-4096 ≤ RSTD < -4095	T_s
RSTD_2261	-4095 ≤ RSTD < -4094	T_s
…	…	…
RSTD_6353	-3 ≤ RSTD < -2	T_s
RSTD_6354	-2 ≤ RSTD < -1	T_s
RSTD_6355	-1 ≤ RSTD ≤ 0	T_s
RSTD_6356	0 < RSTD ≤ 1	T_s
RSTD_6357	1 < RSTD ≤ 2	T_s
RSTD_6358	2 < RSTD ≤ 3	T_s
…	…	…
RSTD_10450	4094 < RSTD ≤ 4095	T_s
RSTD_10451	4095 < RSTD ≤ 4096	T_s
RSTD_10452	4096 < RSTD ≤ 4101	T_s
RSTD_10453	4101 < RSTD ≤ 4106	T_s
…	…	…
RSTD_12709	15381 < RSTD ≤ 15386	T_s
RSTD_12710	15386 < RSTD ≤ 15391	T_s
RSTD_12711	15391 < RSTD	T_s

9.1.11 Carrier aggregation measurement accuracy

This clause contains requirements on UE capabilities for support of E-UTRA FDD, TDD and TDD-FDD carrier aggregation. Requirements in this clause are applicable to all carrier aggregation capable UEs which have been configured with up to four downlink SCell(s). Note: This clause covers measurement accuracy requirements for frequencies corresponding to those used for the PCell and SCell(s); measurements of any other frequency are considered to be inter-frequency measurements covered by the accuracy requirements in clause 9.1.3 and 9.1.6

The requirements in this clause apply for bandwidths defined in the bandwidth combination set for the CA configurations supported by the UE [5].

9.1.11.1 Primary component carrier accuracy requirement

RSRP and RSRQ measurements of cells on the primary component carrier shall meet the intrafrequency absolute accuracy requirements in sections 9.1.2.1 and 9.1.5.1. Comparisons between RSRP of cells on the primary component carrier shall also meet the intra-frequency relative accuracy requirements in sections 9.1.2.2.

9.1.11.2 Secondary component carrier accuracy requirement

RSRP and RSRQ measurements of cells on any of the secondary component carrier(s) shall meet the intrafrequency absolute accuracy requirements in sections 9.1.2.1 and 9.1.5.1. Comparisons between RSRP of cells on the same secondary component carrier shall meet the intra-frequency relative accuracy requirements in sections 9.1.2.2

9.1.11.3 Primary and secondary component carrier relative accuracy requirement

When measurements of cells on the primary component carrier are compared with measurements of cells on any of the secondary component carrier(s), the applicable relative accuracy requirements are the RSRP and RSRQ inter-frequency accuracy requirements in sections 9.1.3.2 and 9.1.6.2.

9.1.11.4 Secondary component carrier relative accuracy requirement

When measurements of cells on any of the secondary component carrier(s) are compared with measurements of cells on the other secondary component carrier, the applicable relative accuracy requirements are the RSRP and RSRQ inter-frequency accuracy requirements in sections 9.1.3.2 and 9.1.6.2.

9.1.12 Reference Signal Time Difference (RSTD) Measurement Accuracy Requirements for Carrier Aggregation

This clause contains requirements for E-UTRA FDD, TDD and TDD-FDD carrier aggregation. This clause contains RSTD measurement accuracy requirements for a UE configured with one or two downlink SCell(s). The UE may operate in one of the E-UTRA carrier aggregations listed in clause 8.3.1. The requirements in this clause shall apply regardless whether the configured downlink secondary cell is activated or deactivated by the MAC-CE command [17]. The requirements apply for bandwidths defined in the bandwidth combination set for the CA configurations supported by the UE [5].

The RSTD measurements, which are obtained when both the reference cell and neighbouring cell belong to the primary component carrier, shall meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.

The RSTD measurements, which are obtained when both the reference cell and neighbouring cell belong to the same secondary component carrier, shall meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.

The RSTD measurements, which are obtained when the reference cell and neighbouring cell do not belong to the same carrier, shall meet the inter-frequency RSTD accuracy requirements defined in clause 9.1.10.2.

9.1.13 Measurement accuracy for UE category 0

9.1.13.1 Intra-frequency Absolute RSRP Accuracy for UE category 0

The requirements for absolute accuracy of RSRP in this clause apply to a cell on the same frequency as that of the serving cell for UE category 0.

The accuracy requirements in Table 9.1.13.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell.

Table 9.1.13.1-1: RSRP Intra frequency absolute accuracy for UE category 0

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range			
			E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±7	±10	≥-6 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±9	±12	≥-6 dB	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

9.1.13.2 Intra-frequency Relative Accuracy of RSRP for UE category 0

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency for category 0 UE.

The accuracy requirements in Table 9.1.13.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.8 for a corresponding Band.

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell.

Table 9.1.13.2-1: RSRP Intra frequency relative accuracy for UE category 0

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
±3	±4	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±4	±4	≥-6 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

9.1.13.3 Intra-frequency Absolute RSRQ Accuracy for UE category 0

The requirements for absolute accuracy of RSRQ in this clause apply to a cell on the same frequency as that of the serving cell for category 0 UE.

The accuracy requirements in Table 9.1.13.3-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRQ measurement assuming measured cell is identified cell.

Table 9.1.13.3-1: RSRQ Intra frequency absolute accuracy for UE category 0

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	$dBm/BW_{Channel}$
±3.5	±5	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±4.5	±5	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.14 Accuracy requirements for Discovery Signal Measurements

9.1.14.1 Introduction

Discovery signal measurements are performed when higher layers indicate measurements based on discovery signals according to DMTC configuration [2]. The discovery measurement accuracy requirements are defined for the following physical layer measurements performed in discovery signal occasions [16],

RSRP measured in subframes of the configured discovery signal occasions as specified in [4],

CSI-RSRP measurements specified in [4],

RSRQ measured in subframes of the configured discovery signal occasions as specified in [4].

9.1.14.2 RSRP measurements in discovery signal occasions

Intra-frequency absolute RSRP measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.2.1.

Intra-frequency relative RSRP measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.2.2.

Inter-frequency absolute RSRP measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.3.1.

Inter-frequency relative RSRP measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.3.2.

Measurement report mapping for RSRP measurements in discovery signal occasions are the same as specified in Section 9.1.4.

9.1.14.3 CSI-RSRP measurements in discovery signal occasions

9.1.14.3.1 Intra-frequency CSI-RSRP measurements

9.1.14.3.1.1 Absolute CSI-RSRP measurement requirements

In this clause, absolute CSI-RSRP measurement accuracy requirements in discovery signal occasions apply to a cell or TP on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.14.3.1.1-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP,

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is specified in Annex B.3.14 for a corresponding Band.

Table 9.1.14.3.1.1-1: Intra-frequency absolute CSI-RSRP measurement accuracy

Accuracy		Conditions				
Normal condition	Extreme condition	CSI Ês/Iot	Io Note 1 range			
			E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±4.5	±9	≥ 0 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥0 dB	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.						

9.1.14.3.1.2 Relative CSI-RSRP measurement requirements

In this section, the relative CSI-RSRP measurement is defined as the CSI-RSRP measured from one cell or TP compared to the CSI-RSRP measured on the same frequency from another cell or from another TP. If two TPs are compared, they may belong to the same or different cells.

The accuracy requirements in Table 9.1.14.3.1.2-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is specified in Annex B.3.15 for a corresponding Band.

Table 9.1.14.3.1.2-1: Intra-frequency relative CSI-RSRP measurement accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	CSI Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
±2	±3	≥0 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3	±3	≥ 0 dB	Note 3	Note 3	Note 3
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The parameter CSI Ês/Iot is the minimum CSI Ês/Iot of the pair of cells or TPs to which the requirement applies. NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement. NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.					

9.1.14.3.2 Inter-frequency CSI-RSRP measurements

9.1.14.3.2.1 Absolute CSI-RSRP measurement requirements

In this clause, absolute CSI-RSRP measurement accuracy requirements for discovery signal measurements apply to a cell or TP on a different carrier frequency from that of the serving cell.

The accuracy requirements in Table 9.1.14.3.2.1-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is specified in Annex B.3.16 for a corresponding Band.

Table 9.1.14.3.2.1-1: Inter-frequency absolute CSI-RSRP measurement accuracy

<table>
<tr><th colspan="2">Accuracy</th><th colspan="5">Conditions</th></tr>
<tr><th rowspan="2">Normal condition</th><th rowspan="2">Extreme condition</th><th rowspan="2">CSI Ês/Iot</th><th colspan="4">Io Note 1 range</th></tr>
<tr><th>E-UTRA operating band groups Note 3</th><th colspan="2">Minimum Io</th><th>Maximum Io</th></tr>
<tr><th>dB</th><th>dB</th><th>dB</th><th></th><th>dBm/15kHz Note 2</th><th>dBm/BW_{Channel}</th><th>dBm/BW_{Channel}</th></tr>
<tr><td rowspan="9">±4.5</td><td rowspan="9">±9</td><td rowspan="9">≥0 dB</td><td>FDD_A, TDD_A</td><td>-121</td><td>N/A</td><td>-70</td></tr>
<tr><td>FDD_B</td><td>-120.5</td><td>N/A</td><td>-70</td></tr>
<tr><td>FDD_C, TDD_C</td><td>-120</td><td>N/A</td><td>-70</td></tr>
<tr><td>FDD_D</td><td>-119.5</td><td>N/A</td><td>-70</td></tr>
<tr><td>FDD_E, TDD_E</td><td>-119</td><td>N/A</td><td>-70</td></tr>
<tr><td>FDD_F</td><td>-118.5</td><td>N/A</td><td>-70</td></tr>
<tr><td>FDD_G</td><td>-118</td><td>N/A</td><td>-70</td></tr>
<tr><td>FDD_H</td><td>-117.5</td><td>N/A</td><td>-70</td></tr>
<tr><td>FDD_N</td><td>-114.5</td><td>N/A</td><td>-70</td></tr>
<tr><td>±8</td><td>±11</td><td>≥0 dB</td><td>FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N</td><td>N/A</td><td>-70</td><td>-50</td></tr>
<tr><td colspan="7">NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.</td></tr>
</table>

9.1.14.3.2.2 Relative CSI-RSRP measurement requirements

In this section, the relative CSI-RSRP measurement is defined as the CSI-RSRP measured from one cell or TP compared to the CSI-RSRP measured on a different frequency from another cell or from another TP.

The accuracy requirements in Table 9.1.14.3.2.2-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is specified in Annex B.3.17 for a corresponding Band.

$$\left| CSI\_RSRP1|_{dBm} - CSI\_RSRP2|_{dBm} \right| \leq 27dB$$

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.14.3.2.2-1: Inter-frequency relative CSI-RSRP measurement accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	CSI Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	dBm/$BW_{Channel}$
±4.5	±6	≥0 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The parameter CSI Ês/Iot is the minimum CSI Ês/Iot of the pair of cells or TPs to which the requirement applies. NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.					

9.1.14.3.3 CSI-RSRP measurement report mapping

The reporting range of CSI-RSRP is defined from -140 dBm to -44 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 9.1.14.3.3-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.14.3.3-1: CSI-RSRP measurement report mapping

Reported value	Measured quantity value	Unit
CSI_RSRP_00	CSI_RSRP < -140	dBm
CSI_RSRP _01	-140 ≤ CSI_RSRP < -139	dBm
CSI_RSRP _02	-139 ≤ CSI_RSRP < -138	dBm
…	…	…
CSI_RSRP _95	-46 ≤ CSI_RSRP < -45	dBm
CSI_RSRP _96	-45 ≤ CSI_RSRP < -44	dBm
CSI_RSRP _97	-44 ≤ CSI_RSRP	dBm

9.1.14.4 RSRQ measurements in discovery signal occasions

Intra-frequency absolute RSRQ measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.5.1.

Inter-frequency absolute RSRQ measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.6.1.

Inter-frequency relative RSRQ measurement accuracy requirements in discovery signal occasions are the same as specified in Section 9.1.6.2.

Measurement report mapping for RSRQ measurements in discovery signal occasions are the same as specified in Section 9.1.7.

9.1.15 Discovery signal measurements accuracy for E-UTRAN carrier aggregation

This clause contains requirements on UE capabilities for support of E-UTRA FDD, TDD and TDD-FDD carrier aggregation when discovery signal [16] is configured. Requirements in this clause are applicable to all carrier aggregation capable UEs which have been configured with up to four downlink SCell(s). Note : This clause covers measurement accuracy requirements for frequencies corresponding to those used for the PCell and SCell(s).

Measurements of any other frequency are considered to be inter-frequency measurements covered by the accuracy requirements in clause 9.1.14.

The requirements in this clause apply for bandwidths defined in the bandwidth combination set for the CA configurations supported by the UE [5].

9.1.15.1 Requirements for CRS based discovery signal measurements accuracy for E-UTRAN carrier aggregation

9.1.15.1.1 Primary component carrier accuracy requirement

RSRP and RSRQ measurements of cells on the primary component carrier shall meet the intrafrequency absolute accuracy requirements in sections 9.1.14.2 and 9.1.14.4. Comparisons between RSRP of cells on the primary component carrier shall also meet the intra-frequency relative accuracy requirements in sections 9.1.14.2.

9.1.15.1.2 Secondary component carrier accuracy requirement

RSRP and RSRQ measurements of cells on any of the secondary component carrier(s) shall meet the intrafrequency absolute accuracy requirements in sections 9.1.14.2 and 9.1.14.4. Comparisons between RSRP of cells on the same secondary component carrier shall meet the intra-frequency relative accuracy requirements in sections 9.1.14.2.

9.1.15.1.3 Primary and secondary component carrier relative accuracy requirement

When measurements of cells on the primary component carrier are compared with measurements of cells on any of the secondary component carrier(s), the applicable relative accuracy requirements are the RSRP and RSRQ inter-frequency accuracy requirements in sections 9.1.14.2 and 9.1.14.4.

9.1.15.1.4 Secondary component carrier relative accuracy requirement

When measurements of cells on any of the secondary component carrier(s) are compared with measurements of cells on the other secondary component carrier, the applicable relative accuracy requirements are the RSRP and RSRQ inter-frequency accuracy requirements in sections 9.1.14.2 and 9.1.14.4.

9.1.15.2 Requirements for CSI-RS based discovery signal measurements accuracy for E-UTRAN carrier aggregation

9.1.15.2.1 Primary component carrier accuracy requirement

RSRP measurements of cells on the primary component carrier shall meet the intrafrequency absolute accuracy requirements in sections 9.1.14.3.1.1. Comparisons between RSRP of cells on the primary component carrier shall also meet the intra-frequency relative accuracy requirements in sections 9.1.14.3.1.2.

9.1.15.2.2 Secondary component carrier accuracy requirement

RSRP measurements of cells on any of the secondary component carrier(s) shall meet the intrafrequency absolute accuracy requirements in sections 9.1.14.3.1.1. Comparisons between RSRP of cells on the same secondary component carrier shall meet the intra-frequency relative accuracy requirements in sections 9.1.14.3.1.2.

9.1.15.2.3 Primary and secondary component carrier relative accuracy requirement

When measurements of cells on the primary component carrier are compared with measurements of cells on any of the secondary component carrier(s), the applicable relative accuracy requirements are the RSRP inter-frequency accuracy requirements in sections 9.1.14.3.2.2.

9.1.15.2.4 Secondary component carrier relative accuracy requirement

When measurements of cells on any of the secondary component carrier(s) are compared with measurements of cells on the other secondary component carrier, the applicable relative accuracy requirements are the RSRP inter-frequency accuracy requirements in sections 9.1.14.3.2.2.

9.1.16 Accuracy requirements for RSRQ measurement on all OFDM symbols

This clause contains requirements for RSRQ measurement when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2].

Intra-frequency absolute RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.5.1.

Inter-frequency absolute RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.6.1.

Inter-frequency relative RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.6.2.

NOTE: The minimum Io condition in Table 9.1.5.1-1, Table 9.1.6.1-1 and Table 9.1.6.2-1 is expressed as the average Io per RE over all REs in that symbol.

NOTE: The Io range defined by the minimum and the maximum Io levels in Table 9.1.5.1-1, Table 9.1.6.1-1 and Table 9.1.6.2-1applies to CRS and non-CRS symbols. Io may be different in different symbols within a subframe.

NOTE: Iot in Table 9.1.5.1-1, Table 9.1.6.1-1 and Table 9.1.6.2-1 is the received power spectrum density of total interference and noise averaged over CRS REs.

Intra-frequency absolute WB-RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.5.4.

Inter-frequency absolute WB-RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.6.3.

Inter-frequency relative WB-RSRQ measurement accuracy requirements when measured on all OFDM symbols are the same as specified in Section 9.1.6.4.

NOTE: The minimum Io condition in Table 9.1.5.4-1, Table 9.1.6.3-1 and Table 9.1.6.4-1 is expressed as the average Io per RE over all REs in that symbol across all the resource blocks within the *AllowedMeasBandwidth* in TS 36.331 [2].

NOTE: The Io1, Io2 and Io range defined by the minimum and the maximum Io levels in Table 9.1.5.4-1, Table 9.1.6.3-1 and Table 9.1.6.4-1 applies to CRS and non-CRS symbols. Io1, Io2 and Io may be different in different symbols within a subframe.

NOTE: Iot in Table 9.1.5.4-1, Table 9.1.6.3-1 and Table 9.1.6.4-1 is the received power spectrum density of total interference and noise averaged over CRS REs.

9.1.17 RS-SINR Measurements

9.1.17.1 Measurement Report Mapping

The reporting range of RS-SINR measurement is defined from -23 dB to 40 dB with 0.5 dB resolution.

The mapping of the measured quantity is defined in table 9.1.17.3-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.17.1-1: RS-SINR measurement report mapping

Reported Value	Measured Quantity Value	Unit
RS-SINR_000	RS-SINR < -23	dB
RS-SINR_001	-23 ≤ RS-SINR < -22.5	dB
…	…	…
RS-SINR_126	39.5 ≤ RS-SINR < 40	dB
RS-SINR_127	40 ≤ RS-SINR	dB

9.1.17.2 Intra-frequency RS-SINR Measurement Accuracy Requirements

9.1.17.2.1 Absolute RS-SINR Measurement Accuracy Requirements

The requirements for absolute accuracy of intra-frequency RS-SINR in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 9.1.17.2.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.18 for a corresponding Band.

Table 9.1.17.2.1-1: Intra-frequency RS-SINR absolute accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	$dBm/BW_{Channel}$
±TBD	±TBD	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±TBD	±TBD	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.17.3 Inter-frequency RS-SINR Measurement Accuracy Requirements

9.1.17.3.1 Absolute RS-SINR Measurement Accuracy Requirements

The requirements for absolute accuracy of inter-frequency RS-SINR in this clause apply to a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.17.3-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.19 for a corresponding Band.

Table 9.1.17.3.1-1: Inter-frequency RS-SINR absolute accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range		
			E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 3	$dBm/BW_{Channel}$
±TBD	±TBD	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±TBD	±TBD	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.17.3.2 Relative RS-SINR Measurement Accuracy Requirements

The relative accuracy of inter-frequency RS-SINR in this clause is defined as the RS-SINR measured from one cell compared to the RS-SINR measured from another cell on a different frequency.

The accuracy requirements in Table 9.1.17.3.2-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.20 for a corresponding Band.

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq 27dB$$

| Channel 1_Io - Channel 2_Io | ≤ 20 dB

Table 9.1.17.3.2-1: Inter-frequency RS-SINR relative accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
±TBD	±TBD	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±TBD	±TBD	≥-6 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

9.1.18 Accuracy Requirements for Measurements under Operation with Frame Structure 3

9.1.18.1 Introduction

The accuracy requirements in this section are defined for the following physical layer measurements: RSRP, RSRQ, CSI-RSRP, and RSSI, where the measurements are performed on cells of E-UTRA carriers during the configured DMTC occasion [2] under operation with frame structure 3 [16].

9.1.18.2 RSRP measurements

9.1.18.2.1 RSRP measurement report mapping

The measurement report mapping for RSRP measurements is as defined in Section 9.1.4.

9.1.18.2.2 Inter-frequency absolute RSRP measurement accuracy requirements

Editor's node: requirements are TBD.

9.1.18.2.3 Inter-frequency relative RSRP measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

Editor's node: requirements are TBD.

9.1.18.2.4 Intra-frequency absolute RSRP measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

Editor's node: requirements are TBD.

9.1.18.2.5 Intra-frequency relative RSRP measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

Editor's node: requirements are TBD.

9.1.18.3 RSRQ measurements

9.1.18.3.1 RSRQ measurement report mapping

The measurement report mapping for RSRQ measurements is as defined in Section 9.1.7.

9.1.18.3.2 Inter-frequency absolute RSRQ measurement accuracy requirements

Editor's node: requirements are TBD.

9.1.18.3.3 Inter-frequency relative RSRQ measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

Editor's node: requirements are TBD.

9.1.18.3.4 Intra-frequency absolute RSRQ measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

Editor's node: requirements are TBD.

9.1.18.4 CSI-RSRP measurements

9.1.18.4.1 CSI-RSRP measurement report mapping

The measurement report mapping for CSI-RSRP measurements is as defined in Section 9.1.14.3.3.

9.1.18.4.2 Inter-frequency absolute CSI-RSRP measurement accuracy requirements

Editor's node: requirements are TBD.

9.1.18.4.3 Inter-frequency relative CSI-RSRP measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

Editor's node: requirements are TBD.

9.1.18.4.4 Intra-frequency absolute CSI-RSRP measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

In this clause, absolute CSI-RSRP measurement accuracy requirements in discovery signal occasions apply to a cell or TP on a serving carrier frequency operating under frame structure 3 [3].

The accuracy requirements in Table 9.1.18.4.4-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP,

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is as specified in Annex B.3.21.3 for a corresponding Band.

The discovery signal occasion does not contain any MBSFN subframe and contains at least two CSI REs per resource block within the measured bandwidth in two adjacent slots of the same subframe or different subframes.

Table 9.1.18.4.4-1: Intra-frequency absolute CSI-RSRP measurement accuracy

Accuracy		Conditions				
Normal condition	Extreme condition	CSI Ês/Iot	Io Note 1 range			
			E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
[±4.5]	[±9]	≥0 dB	FS3_G	-118	N/A	-70
[±8]	[±11]	≥0 dB	FS3_G	N/A	-70	-50
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.						

9.1.18.4.5 Intra-frequency relative CSI-RSRP measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

In this section, the relative CSI-RSRP measurement is defined as the CSI-RSRP measured from one cell or TP compared to the CSI-RSRP measured on the same frequency from another cell or from another TP operating under frame structure 3 [16]. If two TPs are compared, they may belong to the same or different cells.

The accuracy requirements in Table 9.1.18.4.5-1 are valid under the following conditions:

CSI reference signals in discovery signal occasions are transmitted on one antenna port only from each TP.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

CSI-RSRP is as specified in Annex B.3.22.3 for a corresponding Band.

The discovery signal occasion does not contain any MBSFN subframe and contains at least two CSI REs per resource block within the measured bandwidth in two adjacent slots of the same subframe or different subframes.

Table 9.1.18.4.5-1: Intra-frequency relative CSI-RSRP measurement accuracy

Accuracy		Conditions			
			Io Note 1 range		
Normal condition	Extreme condition	CSI Ês/Iot Note 2	E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
[±2]	[±3]	≥ 0 dB	FS3_G	-118	-50
[±3]	[±3]	≥ 0 dB	Note 3	Note 3	Note 3
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The parameter CSI Ês/Iot is the minimum CSI Ês/Iot of the pair of cells or TPs to which the requirement applies. NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement. NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.					

9.1.18.5 RSSI measurements

9.1.18.5.1 RSSI measurement report mapping

The reporting range of RSSI measurement is defined from -100 dBm to -25 dBm with 1 dBm resolution.

The mapping of the measured quantity is defined in table 9.1.18.5.1-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.18.5.1-1: RSSI measurement report mapping

Reported value	Measured quantity value	Unit
RSSI_00	RSSI < -100	dBm
RSSI_01	-100 ≤ RSSI < -99	dBm
RSSI_02	-99 ≤ RSSI < -98	dBm
…	…	…
RSSI_74	-27 ≤ RSSI < -26	dBm
RSSI_75	-26 ≤ RSSI < -25	dBm
RSSI_76	-25 ≤ RSSI	dBm

9.1.18.5.2 Intra-frequency absolute RSSI measurement accuracy requirements

NOTE: These requirements are applicable only for CA under operation with frame structure 3 [16].

The intra-frequency RSSI requirements are specified in Table 9.1.18.5.2-1. The requirements apply for any configured RSSI *measDuration* [2], provided that:

- All symbols duing each RSSI measurement duration are available for RSSI sampling within the same reporting interval.

Table 9.1.18.5.2-1: Intra-frequency RSSI accuracy

Accuracy		Conditions		
		Io Note 1 range		
Normal condition	Extreme condition	E-UTRA operating band groups Note 4	Minimum Io	Maximum Io
dB	dB		dBm/15kHz Note 3	dBm/$BW_{Channel}$
±2.5	±5.5	FS3_G	-118	-50
±4.5	±7.5	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.1.18.5.3 Inter-frequency absolute RSSI measurement accuracy requirements

The inter-frequency RSSI requirements are the same as specified in Section 9.1.18.5.2.

9.1.19 Accuracy Requirements for Carrier Aggregation for Measurements under Operation with Frame Structure 3

9.1.19.1 Introduction

The accuracy requirements in this section are defined for the following physical layer measurements: RSRP, RSRQ, CSI-RSRP, and RSSI, where the measurements are performed on cells of E-UTRA carriers during the configured DMTC occasion [2] under operation with frame structure 3 [16].

9.1.19.2 Accuracy requirements for measurements on SCC

The requirements in this section are for the measurements on cells of E-UTRA carriers operated under frame structure 3 on one SCC.

Absolute RSRP measurements of cells on SCC shall meet the intra-frequency absolute accuracy requirements in Section 9.1.18.2.4.

Comparisons between RSRP measurements of cells on the same SCC shall meet the intra-frequency relative accuracy requirements in Section 9.1.18.2.5.

Absolute RSRQ measurements of cells on SCC shall meet the intra-frequency absolute accuracy requirements in Section 9.1.18.3.4.

CSI-RSRP measurements of cells on SCC shall meet the intra-frequency absolute accuracy requirements in Section 9.1.18.4.4.

Comparisons between CSI-RSRP measurements of cells on the same SCC shall meet the intra-frequency relative accuracy requirements in Section 9.1.18.4.5.

RSSI measurements on SCC shall meet the intra-frequency absolute accuracy requirements in Section 9.1.18.5.3.

9.1.19.3 Relative accuracy requirements for measurements on different SCCs

The requirements in this section are for the measurements on cells of E-UTRA carriers operated under frame structure 3 on two different SCCs.

When RSRP measurements of cells on any of the SCC are compared with RSRP measurements of cells on the other SCC, the applicable relative accuracy requirements are the inter-frequency relative RSRP measurement accuracy requirements in Section 9.1.18.2.3.

When RSRQ measurements of cells on any of the SCC are compared with RSRQ measurements of cells on the other SCC, the applicable relative accuracy requirements are the inter-frequency relative RSRQ measurement accuracy requirements in Section 9.1.18.3.3.

When CSI-RSRP measurements of cells on any of the SCC are compared with CSI-RSRP measurements of cells on the other SCC, the applicable relative accuracy requirements are the inter-frequency relative CSI-RSRP measurement accuracy requirements in Section 9.1.18.4.3.

9.1.20 SFN and Subframe Time Difference (SSTD)

9.1.20.1 SSTD Accuracy Requirement

The SFN and subframe time difference (SSTD) is measured between MeNB and SeNB.

The accuracy requirements in Table 9.1.20.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

No changes to the uplink transmission timing are applied during the measurement period.

$RSRP|_{dBm}$ according to Annex B.3.5 for a corresponding Band

Table 9.1.20.1-1: SFN and subframe time difference measurement accuracy

Accuracy	Conditions				
	Ês/Iot	MIN(PCell downlink transmission Bandwidth, PSCell downlink transmission Bandwidth)	Io Note 1 range		
			E-UTRA operating band groups Note 6	Minimum Io	Maximum Io
Ts Note 2	dB	MHz		dBm/15kHz Note 5	$dBm/BW_{Channel}$
±52	≥-3 dB	≥1.4 MHz	FDD_A, TDD_A	-121	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G Note 4	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±40	≥-3 dB	≥ 3 MHz	Note 3	Note 3	Note 3

NOTE 1: When in dBm/15kHz, the minimum Io condition is expressed as the average Io per RE over all REs in that symbol. Io may be different in different symbols within a subframe.
NOTE 2: Ts is the basic timing unit defined in TS 36.211.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with downlink bandwidth ≥1.4 MHz.
NOTE 4: Except Band 29 and Band 32.
NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 6: E-UTRA operating band groups are as defined in Section 3.5.

9.1.20.2 SSTD Measurement Report Mapping

SFN and subframe timing difference (SSTD) measurement report comprises 3 elements:

SFN offset between MeNB and SeNB (ΔX)

Reporting range of ΔX is between frame number # 0 to frame number # 1023 as defined in TS 36.331 [2].

Frame boundary offset between MeNB and SeNB (ΔY)

Reporting range of ΔY is between subfrane number #-4 and subframe number# 5 as defined in TS 36.331 [2].

Subframe boundary offset between MeNB and SeNB (ΔZ)

The reporting range of absolute value of ΔZ is between 700Ts and 1320Ts with reporting granularity of 10Ts.

The mapping of measured Subframe boundary offset (ΔZ) is defined in Table 9.1.20.2-1.

Table 9.1.20.2-1: SSTD report mapping

Reported Value	Measured Quantity Value	Unit
SUBFRAME_BOUNDARY_OFFSET_00	abs(ΔZ) ≤ 700	T_s
SUBFRAME_BOUNDARY_OFFSET_01	700 < abs(ΔZ) ≤ 710	T_s
SUBFRAME_BOUNDARY_OFFSET_02	710 < abs(ΔZ) ≤ 720	T_s
…	…	…
SUBFRAME_BOUNDARY_OFFSET_61	1300 < abs(ΔZ) ≤ 1310	T_s
SUBFRAME_BOUNDARY_OFFSET_62	1310 < abs(ΔZ) ≤ 1320	T_s
SUBFRAME_BOUNDARY_OFFSET_63	1320<abs(ΔZ)	T_s

9.1.21 Measurement accuracy for UE category M1

9.1.21.1 Intra-frequency Absolute RSRP Accuracy for UE category M1 with CE mode A

The requirements for absolute accuracy of RSRP in this clause apply to a cell on the same frequency as that of the serving cell for UE category M1.

The accuracy requirements in Table 9.1.21.1-1 and Table 9.1.21.1-2 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell.

Table 9.1.21.1-1: RSRP Intra frequency absolute accuracy for UE category M1 with CE mode A for FDD and TDD

Accuracy		Conditions				
			Io Note 1 range			
Normal condition	Extreme condition	Ês/Iot	E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±7	±10	≥-6 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_N	-114.5	N/A	-70
±9	±12	≥-6 dB	FDD_A, TDD_A, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

Table 9.1.21.1-2: RSRP Intra frequency absolute accuracy for UE category M1 with CE mode A for HD-FDD

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range			
			E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	dBm/BW_{Channel}	dBm/BW_{Channel}
±7	±10	≥-6 dB	FDD_A	-121	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_N	-114.5	N/A	-70
±9	±12	≥-6 dB	FDD_A, FDD_D, FDD_E, FDD_F, FDD_G, FDD_N	N/A	-70	-50
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.						

9.1.21.2 Intra-frequency Relative Accuracy of RSRP for UE category M1 with CE mode A

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency for category M1 UE.

The accuracy requirements in Table 9.1.13.2-1 and Table 9.1.13.2-2 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP1,2$|_{dBm}$ according to Annex B.3.8 for a corresponding Band.

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell.

Table 9.1.21.2-1: RSRP Intra frequency relative accuracy for UE category M1 with CE mode A for FDD and TDD

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	dBm/BW_{Channel}
±3	±4	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_N	-114.5	-50
±4	±4	≥-6 dB	Note 3	Note 3	Note 3
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies. NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement. NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.					

Table 9.1.21.2-2: RSRP Intra frequency relative accuracy for UE category M1 with CE mode A for HD-FDD

Accuracy		Conditions			
			Io Note 1 range		
Normal condition	Extreme condition	Ês/Iot Note 2	E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
±3	±4	≥-3 dB	FDD_A	-121	-50
			FDD_D	-119.5	-50
			FDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_N	-114.5	-50
±4	±4	≥-6 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

9.1.21.3 Intra-frequency Absolute RSRP Accuracy for UE category M1 with CE mode B

The requirements for absolute accuracy of RSRP in this clause apply to a cell on the same frequency as that of the serving cell for UE category M1.

The accuracy requirements in Table 9.1.21.3-1 and Table 9.1.21.3-2 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.1 for a corresponding Band

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell.

Table 9.1.21.3-1: RSRP Intra frequency absolute accuracy for UE category M1 with CE mode A for FDD and TDD

Accuracy		Conditions				
			Io Note 1 range			
Normal condition	Extreme condition	Ês/Iot	E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±8	±11	≥-6 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_N	-114.5	N/A	-70
±10	±13	≥-6 dB	FDD_A, TDD_A, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

Table 9.1.21.3-2: RSRP Intra frequency absolute accuracy for UE category M1 with CE mode A for HD-FDD

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range			
			E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±8	±11	≥-6 dB	FDD_A	-121	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_N	-114.5	N/A	-70
±10	±13	≥-6 dB	FDD_A, FDD_D, FDD_E, FDD_F, FDD_G, FDD_N	N/A	-70	-50
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.						

9.1.21.4 Intra-frequency Relative Accuracy of RSRP for UE category M1 with CE mode B

The relative accuracy of RSRP is defined as the RSRP measured from one cell compared to the RSRP measured from another cell on the same frequency for category M1 UE.

The accuracy requirements in Table 9.1.21.4-1 and Table 9.1.21.4-2 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm}$ according to Annex B.3.8 for a corresponding Band.

At least 1 DL subframe per radio frame of measured cell is available at the UE for RSRP measurement assuming measured cell is identified cell.

Table 9.1.21.4-1: RSRP Intra frequency relative accuracy for UE category M1 with CE mode A for FDD and TDD

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2	Io Note 1 range		
			E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
±4	±5	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_N	-114.5	-50
±5	±5	≥-6 dB	Note 3	Note 3	Note 3
NOTE 1: Io is assumed to have constant EPRE across the bandwidth. NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies. NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement. NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.					

Table 9.1.21.4-2: RSRP Intra frequency relative accuracy for UE category M1 with CE mode A for HD-FDD

Accuracy		Conditions			
			Io Note 1 range		
Normal condition	Extreme condition	Ês/Iot Note 2	E-UTRA operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	dBm/$BW_{Channel}$
±4	±5	≥-3 dB	FDD_A	-121	-50
			FDD_D	-119.5	-50
			FDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_N	-114.5	-50
±5	±5	≥-6 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of cells to which the requirement applies.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA operating band groups are as defined in Section 3.5.

9.2 UTRAN FDD Measurements

The requirements in this clause are applicable for a UE:

- in state RRC_CONNECTED
- performing measurements according to clause 8.1.2.4 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

9.2.1 UTRAN FDD CPICH RSCP

NOTE: This measurement is for handover between E-UTRAN and UTRAN FDD and for SON.

The requirements in this clause are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is specified in clauses 8.1.2.4.1 and 8.1.2.4.2.

In RRC_CONNECTED state the accuracy requirements shall meet the absolute accuracy requirements in table 9.2.1-1, under the following conditions:

- CPICH Ec/Io condition for a detectable cell is as specified in clauses 8.1.2.4.1, 8.1.2.4.2, 8.1.2.4.7, 8.1.2.4.8;
- SCH_Ec/Io condition for a detectable cell is as specified in clauses 8.1.2.4.1, 8.1.2.4.2, 8.1.2.4.7, 8.1.2.4.8.

Table 9.2.1-1: UTRAN FDD CPICH_RSCP absolute accuracy

<table>
<tr><th colspan="2">Accuracy</th><th colspan="3">Conditions</th></tr>
<tr><th rowspan="2">Normal condition</th><th rowspan="2">Extreme condition</th><th colspan="3">Io range</th></tr>
<tr><th>UTRA operating bands</th><th>Minimum Io</th><th>Maximum Io</th></tr>
<tr><th>dB</th><th>dB</th><th></th><th>dBm/3.84 MHz</th><th>dBm/3.84 MHz</th></tr>
<tr><td rowspan="5">±6</td><td rowspan="5">±9</td><td>Band I, IV, VI, X XI, XIX and XXI</td><td>-94</td><td>-70</td></tr>
<tr><td>Band IX</td><td>-93</td><td>-70</td></tr>
<tr><td>Band II, V and VII</td><td>-92</td><td>-70</td></tr>
<tr><td>Band III, VIII, XII, XIII, XIV , XX and XXII</td><td>-91</td><td>-70</td></tr>
<tr><td>Band XXV, XXVI Note 1</td><td>-90.5</td><td>-70</td></tr>
<tr><td>±8</td><td>±11</td><td>Note 2</td><td>-70</td><td>-50</td></tr>
<tr><td colspan="5">NOTE 1: For Band XXVI, the condition has the minimum Io of -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.
NOTE 2: The same bands apply for this requirement as for the corresponding highest accuracy requirement.</td></tr>
</table>

If the UE, in RRC_CONNECTED state, needs measurement gaps to perform UTRAN FDD measurements, the relevant UTRAN FDD measurement procedure and measurement gap pattern stated in clause 8.1.2.4 shall apply.

The reporting range and mapping specified for FDD CPICH RSCP in TS 25.133 [18] shall apply.

9.2.2 Void

9.2.3 UTRAN FDD CPICH Ec/No

NOTE: This measurement is for handover between E-UTRAN and UTRAN FDD and for SON.

The requirements in this clause are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is specified in clauses 8.1.2.4.1 and 8.1.2.4.2.

In RRC_CONNECTED state the accuracy requirements shall be the same as the inter-frequency measurement accuracy requirements for FDD CPICH Ec/No in TS 25.133 [18].

If the UE, in RRC_CONNECTED state, needs measurement gaps to perform UTRAN FDD measurements, the UTRAN FDD measurement procedure and measurement gap pattern stated in clause 8.1.2.4.1 shall apply.

The reporting range and mapping specified for FDD CPICH Ec/No in TS 25.133 [18] shall apply.

9.3 UTRAN TDD Measurements

The requirements in this clause are applicable for a UE:

- in state RRC_CONNECTED
- performing measurements according to clause 8.1.2.4 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

9.3.1 UTRAN TDD P-CCPCH RSCP

NOTE: This measurement is for handover between E-UTRAN and UTRAN TDD and for SON.

The requirements in this clause are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is specified in clauses 8.1.2.4.3 and 8.1.2.4.4.

In RRC_CONNECTED state the accuracy requirements shall be the same as the inter-frequency measurement accuracy requirements for TDD P-CCPCH in TS 25.123 [19].

If the UE, in RRC_CONNECTED state, needs measurement gaps to perform UTRAN TDD measurements, the relevant UTRAN TDD measurement procedure and measurement gap pattern stated in clause 8.1.2.4 shall apply.

The reporting range and mapping specified for TDD P-CCPCH RSCP in TS 25.123 [19] shall apply.

9.3.2 Void

9.3.3 Void

9.4 GSM Measurements

The requirements in this clause are applicable for a UE:

- in state RRC_CONNECTED
- performing measurements according to clause 8.1.2.4.5 with appropriate measurement gaps
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS 25.302 [6].

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

9.4.1 GSM carrier RSSI

NOTE: This measurement is for handover between E-UTRAN and GSM.

The requirements in this clause are valid for terminals supporting this capability.

The measurement period for RRC_CONNECTED state is specified in clause 8.1.2.4.5.

In RRC_CONNECTED state the measurement accuracy requirements for RXLEV in TS 45.008 [8] shall apply.

If the UE, in RRC_CONNECED state, needs measurement gaps to perform GSM measurements, the GSM measurement procedure and measurement gap pattern stated in clause 8.1.2.4.5 shall apply.

The reporting range and mapping specified for RXLEV in TS 45.008 [8] shall apply.

9.5 CDMA2000 1x RTT Measurements

The requirements in this clause are applicable for a UE:

- in RRC_CONNECTED state.
- synchronised to the cell that is measured.

9.5.1 CDMA2000 1x RTT Pilot Strength

NOTE: This measurement is for handover between E-UTRAN and cdma2000 1 x RTT.

The requirements in this clause are valid for terminals supporting this capability.

CDMA2000 1xRTT Pilot Strength defined in sub-clause 5.1.10 of [4] shall meet the performance requirement defined in sub-clause 3.2.4 of [14] on the cdma2000 1xRTT neighbour cells indicated by the serving eNode B.

9.6 $P_{CMAX,c}$

For a UE configured with a secondary cell, the UE is required to report the UE configured maximum output power ($P_{CMAX,c}$) together with the power headroom. This clause defines the requirements for the $P_{CMAX,c}$ reporting.

9.6.1 Report Mapping

The $P_{CMAX,c}$ reporting range is defined from -29dBm to 33 dBm with 1 dB resolution. Table 9.6.1-1 defines the reporting mapping.

Table 9.6.1-1 Mapping of $P_{CMAX,c}$

Reported value	Measured quantity value	Unit
PCMAX_C_00	$P_{CMAX,c} < -29$	dBm
PCMAX_C_01	$-29 \le P_{CMAX,c} < -28$	dBm
PCMAX_C_02	$-28 \le P_{CMAX,c} < -27$	dBm
…	…	…
PCMAX_C_61	$31 \le P_{CMAX,c} < 32$	dBm
PCMAX_C_62	$32 \le P_{CMAX,c} < 33$	dBm
PCMAX_C_63	$33 \le P_{CMAX,c}$	dBm

9.6.2 Estimation Period

When *extendedPHR* is configured and UE is required to include $P_{CMAX,c}$ in Extended PHR MAC control element as defined in subclause 5.4.6 in [17], the UE shall calculate the $P_{CMAX,c}$ per activated serving cell c for UL-SCH transmission according to subclause 6.2.5A of TS 36.101 [5] over 1 subframe.

9.6.3 Reporting Delay

The $P_{CMAX,c}$ reporting delay is defined as the time between the beginning of the $P_{CMAX,c}$ reference period and the time when the UE starts transmitting $P_{CMAX,c}$ over the radio interface. The reporting delay of the $P_{CMAX,c}$ shall be 0 ms, which is applicable for all configured triggering mechanisms for $P_{CMAX,c}$ reporting.

9.7 IEEE802.11 Measurements

The requirements in this clause are applicable for a UE:

- in RRC_CONNECTED state.
- synchronised to the IEEE 802.11 access point that is measured.

9.7.1 WLAN RSSI

NOTE: This measurement is for access network selection and traffic steering between E-UTRAN and WLAN.

The requirements in this clause are valid for terminals supporting this capability.

WLAN RSSI defined in sub-clause 5.1.16 of [4] shall meet the performance requirement defined in [32].

9.7.2 WLAN RSSI Measurement Report Mapping

The reporting range of WLAN RSSI is defined from -100 dBm to 40 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 9.7.2-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.7.2-1: WLAN RSSI measurement report mapping

Reported value	Measured quantity value	Unit
WLAN RSSI_00	WLAN RSSI < -100	dBm
WLAN RSSI_01	-100 ≤ WLAN RSSI < -99	dBm
WLAN RSSI_02	-99 ≤ WLAN RSSI < -98	dBm
…	…	…
WLAN RSSI_139	38 ≤ WLAN RSSI < 39	dBm
WLAN RSSI_140	39 ≤ WLAN RSSI < 40	dBm
WLAN RSSI_141	40 ≤ WLAN RSSI	dBm

9.8 MBSFN Measurements

9.8.1 Introduction

MBSFN measurements include MBSFN RSRP, MBSFN RSRQ, and MCH BLER, which are defined in [4]. The measurements are used for MDT.

9.8.2 MBSFN RSRP

9.8.2.1 Absolute MBSFN RSRP measurement accuracy requirements

The requirements for absolute accuracy of MBSFN RSRP in this clause apply to any carrier, which may be the same as or different from any serving unicast carrier, where PMCH is received while meeting performance requirements in Section 10 of [5].

The accuracy requirements in Table 9.8.2.1-1 are valid under the following conditions:

MBSFN RS are transmitted from antenna port 4 in the MBSFN subframes where PMCH is received.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

MBSFN RSRP|dBm/15kHz is the same as RSRP|dBm/15kHz specified in Annex B.3.1 for each corresponding Band.

Table 9.8.2.1-1: Absolute MBSFN RSRP measurement accuracy

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot	Io Note 1 range			
			E-UTRA operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	dBm/BW$_{Channel}$	dBm/BW$_{Channel}$
±4.5	±9	≥-6 dB	FDD_A, TDD_A	-121	N/A	-70
			FDD_B	-120.5	N/A	-70
			FDD_C, TDD_C	-120	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_H	-117.5	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥-6 dB	FDD_A, TDD_A, FDD B, FDD_C, TDD_C, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_H, FDD_N	N/A	-70	-50
NOTE 1: Io is assumed to have constant EPRE across the bandwidth.						
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.						
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.						

9.8.2.2 MBSFN RSRP measurement report mapping

The reporting range of MBSFN RSRP is defined from -140 dBm to -44 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 9.8.2.2-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.8.2.2-1: MBSFN RSRP measurement report mapping

Reported value	Measured quantity value	Unit
MBSFN_RSRP_00	MBSFN_RSRP < -140	dBm
MBSFN_RSRP_01	-140 ≤ MBSFN_RSRP < -139	dBm
MBSFN_RSRP_02	-139 ≤ MBSFN_RSRP < -138	dBm
…	…	…
MBSFN_RSRP_95	-46 ≤ MBSFN_RSRP < -45	dBm
MBSFN_RSRP_96	-45 ≤ MBSFN_RSRP < -44	dBm
MBSFN_RSRP_97	-44 ≤ MBSFN_RSRP	dBm

9.8.3 MBSFN RSRQ

9.8.3.1 Absolute MBSFN RSRQ measurement accuracy requirements

The requirements for absolute accuracy of MBSFN RSRQ in this clause apply to any carrier, which may be the same as or different from a serving unicast carrier, where PMCH is received while meeting performance requirements in Section 10 of [5].

The accuracy requirements in Table 9.8.3.1-1 are valid under the following conditions:

MBSFN RS are transmitted from antenna port 4 in the MBSFN subframes where PMCH is received.

Conditions defined in 36.101 Clause 7.3 for reference sensitivity are fulfilled.

MBSFN RSRP|dBm/15kHz is the same as RSRP|dBm/15kHz specified in Annex B.3.1 for each corresponding Band.

Table 9.8.3.1-1: Absolute MBSFN RSRQ measurement accuracy

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot	Io [Note 1] range		
			E-UTRA operating band groups [Note 4]	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz [Note 3]	$dBm/BW_{Channel}$
±2.5	±4	≥-3 dB	FDD_A, TDD_A	-121	-50
			FDD_B	-120.5	-50
			FDD_C, TDD_C	-120	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_H	-117.5	-50
			FDD_N	-114.5	-50
±3.5	±4	≥-6 dB	Note 2	Note 2	Note 2

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 4: E-UTRA operating band groups are as defined in Section 3.5.

9.8.3.2 MBSFN RSRQ measurement report mapping

The reporting range of MBSFN RSRQ is defined from -23 dB to -7.5 dB with 0.5 dB resolution.

The mapping of measured quantity is defined in Table 9.8.3.2-1. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.8.3.2-1: MBSFN RSRQ measurement report mapping

Reported value	Measured quantity value	Unit
MBSFN_RSRQ_00	MBSFN_RSRQ < -23	dB
MBSFN_RSRQ_01	-23 ≤ MBSFN_RSRQ < -22.5	dB
MBSFN_RSRQ_02	-22.5 ≤ MBSFN_RSRQ < -22	dB
…	…	…
MBSFN_RSRQ_30	-8.5 ≤ MBSFN_RSRQ < -8	dB
MBSFN_RSRQ_31	-8 ≤ MBSFN_RSRQ	dB

9.8.4 MCH BLER

MCH BLER shall be measured as defined in [4].

9.8.4.1 Measurement report mapping for MCH BLER

The UE shall report MCH BLER together with the corresponding total number of MCH blocks, which were received by the UE during the MCH BLER measurement period and used for calculating the reported MCH BLER.

The reporting range of MCH BLER is defined from 0.1% to 50% with uniform quantization in log domain.

The mapping of measured quantity is defined in Table 9.8.4.1-1. The range in the signalling may be larger than the range specified in the table below.

Table 9.8.4.1-1: MCH BLER measurement report mapping

Reported value	Measured quantity value	Unit
MCH BLER_00	MCH BLER < 0.1	%
MCH BLER_01	0.1≤ MCH BLER < 0.123	%
MCH BLER_02	0.123≤ MCH BLER < 0.151	%
MCH BLER_03	0.151≤ MCH BLER <0.186	%
MCH BLER_04	0.186≤ MCH BLER <0.229	%
MCH BLER_05	0.229≤ MCH BLER <0.282	%
MCH BLER_06	0. 282≤ MCH BLER <0.347	%
MCH BLER_07	0. 347≤ MCH BLER <0.426	%
MCH BLER_08	0. 426≤ MCH BLER <0.525	%
MCH BLER_09	0. 525≤ MCH BLER <0.645	%
MCH BLER_10	0. 645≤ MCH BLER <0.794	%
MCH BLER_11	0. 794≤ MCH BLER <0.976	%
MCH BLER_12	0. 976≤ MCH BLER <1.201	%
MCH BLER_13	1. 201≤ MCH BLER <1.478	%
MCH BLER_14	1. 478≤ MCH BLER <1.818	%
MCH BLER_15	1. 818≤ MCH BLER <2.236	%
MCH BLER_16	2. 236≤ MCH BLER <2.751	%
MCH BLER_17	2. 751≤ MCH BLER <3.384	%
MCH BLER_18	3. 384≤ MCH BLER <4.163	%
MCH BLER_19	4.163≤ MCH BLER <5.121	%
MCH BLER_20	5.121≤ MCH BLER <6.300	%
MCH BLER_21	6.300≤ MCH BLER <7.750	%
MCH BLER_22	7.750≤ MCH BLER <9.533	%
MCH BLER_23	9.533≤ MCH BLER <11.728	%
MCH BLER_24	11.728≤ MCH BLER <14.427	%
MCH BLER_25	14.427≤ MCH BLER <17.478	%
MCH BLER_26	17.478≤ MCH BLER <21.833	%
MCH BLER_27	21.833≤ MCH BLER <26.858	%
MCH BLER_28	26.858≤ MCH BLER <33.040	%
MCH BLER_29	33.040≤ MCH BLER <40.645	%
MCH BLER_30	40.645≤ MCH BLER < 50	%
MCH BLER_31	50 ≤ MCH BLER	%

9.8.4.2 Measurement report mapping for MCH Block Number

The reporting range of the total number of received MCH blocks during the measurement period is defined from 0 to 65152. The total number of received MCH blocks is quantized to two values n and m with the mappings defined in Table 9.8.4.2-1 and Table 9.8.4.2-2, respectively.

The range in the signalling may be larger than the range specified in the table below.

N_R in Table 9.8.4.2-1 and Table 9.8.4.2-2 represents the total number of received MCH blocks. $f(N_R)$ is a function of N_R with the definition that $f\left(N_R\right) = \frac{N_R - \left(2^n - 1\right) \times 2^8}{2^n}$, from where the quantized total number of MCH blocks is found as $\left(2^n - 1\right) \times 2^8 + m \times 2^n$.

Table 9.8.4.2-1: Number of received MCH blocks mapping to n

Reported value, n	Number of received MCH blocks
MCH_NR_N_00	$0 \le N_R < 256$
MCH_NR_N_01	$256 \le N_R < 768$
MCH_NR_N_02	$768 \le N_R < 1792$
MCH_NR_N_03	$1792 \le N_R < 3840$
MCH_NR_N_04	$3840 \le N_R < 7936$
MCH_NR_N_05	$7936 \le N_R < 16128$
MCH_NR_N_06	$16128 \le N_R < 32512$
MCH_NR_N_07	$32512 \le N_R$

Table 9.8.4.2-2: Number of received MCH blocks mapping to m

Reported value, m	$f(N_R)$
MCH_NR_M_00	$0 \le f(N_R) < 1$
MCH_NR_M_01	$1 \le f(N_R) < 2$
MCH_NR_M_02	$2 \le f(N_R) < 3$
…	…
MCH_NR_M_253	$253 \le f(N_R) < 254$
MCH_NR_M_254	$254 \le f(N_R) < 255$
MCH_NR_M_255	$255 \le f(N_R)$

9.9 ProSe Measurements

9.9.1 Introduction

The requirements in this section are applicable for a UE capable of ProSe Direct Communication and/or ProSe Direct Discovery.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in [25].

The accuracy requirements in this clause are:

- applicable for AWGN radio propagation conditions,
- assume independent interference (noise) at each receiver antenna port.
- valid for the reported measurement result after layer 1 filtering,
- are verified from the measurement report at point D in the measurement model having the higher layer filtering disabled.

9.9.2 Intra-Frequency S-RSRP Measurement Accuracy Requirements

9.9.2.1 Absolute S-RSRP Accuracy

The requirements for absolute accuracy of S-RSRP in this clause apply to a ProSe synchronization source on the same frequency as that of the own ProSe UE performing the measurement.

The accuracy requirements in Table 9.9.2.1-1 are valid under the following conditions:

- Demodulation reference signals are transmitted from one port.
- Conditions defined in 36.101 Clause 7.3D for reference sensitivity are fulfilled.
- S-RSRP|dBm according to Annex B.5.1 for a corresponding Band are fulfilled.

Table 9.9.2.1-1: Intra-frequency S-RSRP absolute accuracy for UE capable of ProSe Direct Communication and/or ProSe Direct Discovery

Accuracy		Conditions				
Normal condition	Extreme condition	Ês/Iot Note 4	Io Note 1 range			
			E-UTRA ProSe operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±4.5	±9	≥-6 dB	FDD_A	-121	N/A	-70
			FDD_D	-119.5	N/A	-70
			FDD_E, TDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥-6 dB	FDD_A, FDD_D, FDD_E, TDD_E, FDD_F, FDD_G, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.
NOTE 4: Ês/Iot for a SyncRef UE is the minimum of the Ês/Iot of PSSS/PSBCH and the Ês/Iot of SSSS

9.9.2.2 Relative Accuracy of S-RSRP

The relative accuracy of S-RSRP is defined as the S-RSRP measured from one ProSe synchronization source compared to the S-RSRP measured from another ProSe synchronization source on the same frequency.

The accuracy requirements in Table 9.9.2.2-1 are valid under the following conditions:

- Demodulation reference signals are transmitted from one port.
- Conditions defined in 36.101 Clause 7.3D for reference sensitivity are fulfilled.
- $S\text{-}RSRP1,2|_{dBm}$ according to Annex B.5.2 for a corresponding Band.

Table 9.9.2.2-1: S-RSRP Intra frequency relative accuracy for UE capable of ProSe direct communication and/or ProSe Direct Discovery

Accuracy		Conditions			
Normal condition	Extreme condition	Ês/Iot Note 2, 6	Io Note 1 range		
			E-UTRA ProSe operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	$dBm/BW_{Channel}$
±2	±3	≥-3 dB	FDD_A	-121	-50
			FDD_D	-119.5	-50
			FDD_E, TDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_N	-114.5	-50
±3	±3	≥-6 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter Ês/Iot is the minimum Ês/Iot of the pair of SyncRef UEs to which the requirement applies.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.
NOTE 6: Ês/Iot for a SyncRef UE is the minimum of the Ês/Iot of PSSS/PSBCH and the Ês/Iot of SSSS

9.9.3 Intra-Frequency SD-RSRP Measurement Accuracy Requirements

The requirements in this clause are applicable for a remote ProSe UE:

- in state RRC_IDLE or RRC_CONNECTED if the frequency used for ProSe is the serving frequency, or
- is out of coverage on the frequency used for ProSe, and
- that is synchronised to the ProSe relay UE that is measured.

9.9.3.1 Absolute SD-RSRP Accuracy

The requirements for absolute accuracy of SD-RSRP in this clause apply to a ProSe UE performing SD-RSRP measurements on the same frequency as used by the ProSe relay UE transmitting the relay Discovery message.

The accuracy requirements in Table 9.9.3.1-1 are valid under the following conditions:

- Demodulation reference signals are transmitted from one port.
- Conditions defined in 36.101 Clause 7.3D for reference sensitivity are fulfilled.
- SD-RSRP|dBm according to Annex B.5.4 for a corresponding Band are fulfilled.
- *numReTx* is configured as 3 for the relay Discovery transmissions. For *numReTx* < 3, the minimum $\hat{E}s/N_{oc}$ at which the accuracy requirements are fulfilled is expected to be higher than as specified for *numReTx*=3.

Table 9.9.3.1-1: Intra-frequency SD-RSRP absolute accuracy for remote UE [2] capable of ProSe Direct Communication and ProSe Direct Discovery and configured by upper layers for relay operation.

Accuracy		Conditions				
			Io Note 1 range			
Normal condition	Extreme condition	$\hat{E}s/N_{oc}$ Note 4	E-UTRA ProSe operating band groups Note 3	Minimum Io		Maximum Io
dB	dB	dB		dBm/15kHz Note 2	$dBm/BW_{Channel}$	$dBm/BW_{Channel}$
±4.5	±9	≥-1.5 dB	FDD_D	-119.5	N/A	-70
			FDD_E	-119	N/A	-70
			FDD_F	-118.5	N/A	-70
			FDD_G	-118	N/A	-70
			FDD_N	-114.5	N/A	-70
±8	±11	≥-1.5 dB	FDD_D, FDD_E, FDD_F, FDD_G, FDD_N	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.
NOTE 4: When *numReTx* is configured as 3 for the relay Discovery transmissions. For *numReTx* < 3, the minimum $\hat{E}s/N_{oc}$ at which the accuracy requirements are fulfilled is expected to be higher than as specified for *numReTx*=3.
NOTE 5: Layer 1 filtering for SD-RSRP is performed using PSDCH (re)transmissions within a discovery period.

9.9.3.2 Relative Accuracy of SD-RSRP

The relative accuracy of SD-RSRP in this clause apply to a ProSe UE performing SD-RSRP measurements on the same frequency as used by the ProSe relay UE transmitting the relay Discovery message.

The accuracy requirements in Table 9.9.3.2-1 are valid under the following conditions:

- Demodulation reference signals are transmitted from one port.

- Conditions defined in 36.101 Clause 7.3D for reference sensitivity are fulfilled.
- SD-RSRP|dBm according to Annex B.5.5 for a corresponding Band are fulfilled.
- *numReTx* is configured as 3 for the relay Discovery transmissions. For *numReTx* < 3, the minimum $\hat{E}s/N_{oc}$ at which the accuracy requirements are fulfilled is expected to be higher than as specified for *numReTx*=3.

Table 9.9.3.2-1: Intra-frequency SD-RSRP relative accuracy for remote UE [2] capable of ProSe Direct Communication and ProSe Direct Discovery and configured by upper layers for relay operation.

Accuracy		Conditions			
			Io Note 1 range		
Normal condition	Extreme condition	$\hat{E}s/N_{oc}$ Note 6	E-UTRA ProSe operating band groups Note 5	Minimum Io	Maximum Io
dB	dB	dB		dBm/15kHz Note 4	dBm/$BW_{Channel}$
±2	±3	≥-1.5 dB	FDD_D	-119.5	-50
			FDD_E	-119	-50
			FDD_F	-118.5	-50
			FDD_G	-118	-50
			FDD_N	-114.5	-50
±3	±3	≥-1.5 dB	Note 3	Note 3	Note 3

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
NOTE 2: The parameter $\hat{E}s/N_{oc}$ is the minimum $\hat{E}s/N_{oc}$ of the pair of ProSe Relay UEs to which the requirement applies.
NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.
NOTE 4: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 5: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.
NOTE 6: When *numReTx* is configured as 3 for the relay Discovery transmissions. For *numReTx* < 3, the minimum $\hat{E}s/N_{oc}$ at which the accuracy requirements are fulfilled is expected to be higher than as specified for *numReTx*=3.
NOTE 7: Layer 1 filtering for SD-RSRP is performed using PSDCH (re)transmissions within a discovery period.

10 Measurements Performance Requirements for E-UTRAN

10.1 Received Interference Power

The measurement period shall be 100 ms.

10.1.1 Absolute accuracy requirement

Table 10.1.1-1: Received Interference Power absolute accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Iob [dBm/180 kHz]
Iob	dBm/180 kHz	± 4	-117 ... -96

10.1.2 Relative accuracy requirement

The relative accuracy is defined as the Received Interference Power measured at one frequency compared to the Received Interference Power measured from the same frequency at a different time.

Table 10.1.2-1: Received Interference Power relative accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Iob [dBm/180 kHz]
Iob	dBm/180 kHz	± 0.5	-117 ... -96 AND for changes ≤ ±9.0 dB

10.1.3 Received Interference Power measurement report mapping

The reporting range for *Received Interference Power (RIP)* is from -126 ... -75 dBm.

In table 10.2.3-1 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 10.1.3-1: Received Interference Power measurement reporting range

Reported value	Measured quantity value	Unit
RTWP_LEV _000	RIP < -126.0	dBm
RTWP_LEV _001	-126.0 ≤ RIP < -125.9	dBm
RTWP_LEV _002	-125.9 ≤ RIP < -125.8	dBm
…	…	…
RTWP_LEV _509	-75.2 ≤ RIP < -75.1	dBm
RTWP_LEV _510	-75.1 ≤ RIP < -75.0	dBm
RTWP_LEV _511	-75.0 ≤ RIP	dBm

10.2 Angle of Arrival (AOA)

10.2.1 Range/mapping

The reporting range for AOA measurement is from 0 to 360 degree, with resolution of 0.5 degree.

The mapping of the measured quantity is defined in table 10.2.1-1.

Table 10.2.1-1: AOA measurement report mapping

Reported value	Measured quantity value	Unit
AOA_ANGLE _000	0 ≤ AOA_ANGLE < 0.5	degree
AOA_ANGLE _001	0.5 ≤ AOA_ANGLE < 1	degree
AOA_ANGLE _002	1 ≤ AOA_ANGLE < 1.5	degree
…	…	…
AOA_ANGLE _717	358.5 ≤ AOA_ANGLE < 359	degree
AOA_ANGLE _718	359 ≤ AOA_ANGLE < 359.5	degree
AOA_ANGLE _719	359.5 ≤ AOA_ANGLE < 360	degree

10.3 Timing Advance (T_{ADV})

10.3.1 Report mapping

The reporting range of T_{ADV} is defined from 0 to 49232T_s with 2T_s resolution for timing advance less or equal to 4096T_s and 8T_s for timing advance greater than 4096T_s.

The mapping of measured quantity is defined in Table 10.3.1-1.

Table 10.3.1-1: T_{ADV} measurement report mapping

Reported value	Measured quantity value	Unit
TIME_ADVANCE_00	$T_{ADV} < 2$	T_s
TIME_ADVANCE_01	$2 \le T_{ADV} < 4$	T_s
TIME_ADVANCE_02	$4 \le T_{ADV} < 6$	T_s
…	…	…
TIME_ADVANCE_2046	$4092 \le T_{ADV} < 4094$	T_s
TIME_ADVANCE_2047	$4094 \le T_{ADV} < 4096$	T_s
TIME_ADVANCE_2048	$4096 \le T_{ADV} < 4104$	T_s
TIME_ADVANCE_2049	$4104 \le T_{ADV} < 4112$	T_s
…	…	…
TIME_ADVANCE_7688	$49216 \le T_{ADV} < 49224$	T_s
TIME_ADVANCE_7689	$49224 \le T_{ADV} < 49232$	T_s
TIME_ADVANCE_7690	$49232 \le T_{ADV}$	T_s

11 ProSe Requirements in Any Cell Selection state

11.1 Introduction

This section contains the requirements for the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery when the UE is out of coverage on the carrier used for ProSe operation, as defined in [1]. The ProSe requirements shall apply provided that the sidelink used by the UE for ProSe Direct Communication and/or ProSe Direct Discovery is on the carrier that is preconfigured in the ProSe UE for out-of-coverage operation. The requirement apply when the UE is:

- in any cell selection state, or,
- out of coverage on the ProSe carrier and is associated with a serving cell on a non-ProSe carrier.

Note: Any cell selection state refers to a UE that is out of network coverage and is not associated with a serving cell on any carrier [1].

11.2 UE Transmit Timing for ProSe in Any Cell Selection State

11.2.1 Introduction

This clause contains requirements on the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery regarding transmit timing if the UE is out of coverage on the carrier used for ProSe operation.

11.2.2 ProSe UE transmission timing

The requirements in this subclause are applicable when the reference timing used for deriving ProSe transmission is from another ProSe UE transmitting sidelink synchronization signals.

The sidelink transmissions takes place $(N_{\mathrm{TA,SL}} + N_{\mathrm{TA\,offset}}) \cdot T_{\mathrm{s}}$ before the reception of the first detected path (in time) of the corresponding timing reference frame from the UE, with $N_{\mathrm{TA\,offset}} = 0$ and $N_{\mathrm{TA,SL}} = 0$ [16]. The transmission timing error for sidelink transmissions shall be less than or equal to $\pm T_e$ where the timing error limit value T_e is specified in Table 11.2.2-1.

Table 11.2.2-1: T_e Timing Error Limit

Sidelink Bandwidth (MHz)	T_e
≥1.4	$24*T_S$
Note: T_S is the basic timing unit defined in TS 36.211	

11.3 Initiation/Cease of SLSS Transmissions

11.3.1 Introduction

The requirements in this subclause apply when the conditions for SLSS transmissions specified in [2] are met and if *syncTxThreshOoC* is included in the preconfigured ProSe parameters.

11.3.2 Requirements

The UE shall be capable of measuring the S-RSRP of the selected SyncRef UE used to derive transmission timing for Prose Direct Communication and/or ProSe Direct Discovery and evaluate it to initiate/cease SLSS transmissions within $T_{evaluate,SLSS}$ = 0.8 seconds.

If higher layer filtering for S-RSRP measurements is pre-configured, an additional delay in evaluation to initiate/cease SLSS transmissions can be expected.

For the selected SyncRef UE [2] used to derive transmission timing for ProSe Direct Communication and/or ProSe Direct Discovery:

- S-RSRP related side conditions given in Section 11.5 for a corresponding Band are fulfilled,

- ProSe SCH_RP and SCH Ês/Iot according to Annex B.5.1 for a corresponding Band are fulfilled.

11.4 Measurements for ProSe in Any Cell Selection State

11.4.1 Introduction

This clause contains requirements for E-UTRA cell identification for the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery if the UE is out of coverage on the carrier used for ProSe operation.

The UE can be preconfigured with ProSe resources for out of coverage ProSe operation.

The requirements in this section are applicable for the ProSe if the UE is out of coverage on the carrier used for ProSe operation using the preconfigured ProSe resources. The ProSe UE shall:

- continuously search for any detectable E-UTRA cell on the donwlink carrier frequency associated with the preconfigured ProSe carrier frequency for out of coverage ProSe operation, and

- if in any cell selection state, then search cells also on other carriers and perform cell selection according to the procedure specified in section 4.1.

11.4.2 Requirements

11.4.2.1 E-UTRA FDD

The requirements in this subclause are applicable when the preconfigured ProSe carrier is FDD (parameter *tdd-ConfigSL* is configured as *none*).

The UE capable of ProSe Direct Communication and/or ProSe Direct Discovery immediately upon being out of coverage on the ProSe carrier shall search for any detectable cell on the carrier preconfigured with ProSe resources.

The UE shall be able to identify a newly detectable E-UTRA FDD cell on the downlink carrier frequency associated with the preconfigured with ProSe carrier frequency:

- within $T_{basic\_identify\_OoC\_ProSe\ Tx\_ON}$ if the UE is performing ProSe transmissions on the sidelink, or
- within $T_{basic\_identify\_OoC\_ProSe\ Tx\_OFF}$ if the UE is not performing ProSe transmissions on the sidelink.

where,

$T_{basic\_identify\_OoC\_ProSe\ Tx\_ON}$ = 6.4 seconds, and

$T_{basic\_identify\_OoC\_ProSe\ Tx\_OFF}$ = 32 seconds.

An E-UTRA cell is considered detectable provided it meets the intra-frequency cell identification conditions specified in section 8.1.2.2.

11.4.2.2 E-UTRA TDD

The requirements in this subclause are applicable when the preconfigured ProSe carrier is configured as TDD.

The UE capable of ProSe Direct Discovery immediately upon being out of coverage on the ProSe carrier shall search for any detectable cell on the carrier preconfigured with ProSe resources.

The UE shall be able to identify a newly detectable E-UTRA TDD cell on TDD carrier frequency preconfigured for ProSe operation:

- within $T_{basic\_identify\_OoC\_ProSe\ Tx\_ON}$ if the UE is performing ProSe transmissions on the sidelink, or
- within $T_{basic\_identify\_OoC\_ProSe\ Tx\_OFF}$ if the UE is not performing ProSe transmissions on the sidelink.

where,

$T_{basic\_identify\_OoC\_ProSe\ Tx\_ON}$ = 6.4 seconds, and

$T_{basic\_identify\_OoC\_ProSe\ Tx\_OFF}$ = 32 seconds.

An E-UTRA cell is considered detectable provided it meets the intra-frequency cell identification conditions specified in section 8.1.2.2.

The UE shall be allowed to interrupt ProSe Direct Discovery operation in order to meet the requirements in this subclause.

11.5 Selection / Reselection of ProSe Synchronization Reference

11.5.1 Introduction

This clause contains requirements for the measurements performed by the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery if the UE is out of coverage on the carrier used for ProSe operation.

11.5.2 Selection/Reselection to intra-frequency SyncRef UE

11.5.2.1 Introduction

This clause contains requirements for the measurement for the ProSe synchronization on the UE capable of ProSe Direct Communication and/or ProSe Direct Discovery if the UE is out of coverage on the carrier used for ProSe operation.

11.5.2.2 Requirements

The UE shall be able to identify newly detectable SyncRef UE within $T_{detect,SyncRef\ UE}$ seconds if SyncRef UE meets the selection / reselection criterion defined in TS 36.331 [2].

ProSe synchronization source, SyncRef UE, is defined as a ProSe synchronization source which is capable to transmit ProSe synchronization signals.

A SyncRef UE is considered to be detectable when

- S-RSRP related side conditions given in Section 9.9.2 are fulfilled for a corresponding Band,
- ProSe SCH_RP and SCH Ês/Iot are fulfilled according to Annex B.5.3 for a corresponding Band.

$T_{detect,SyncRef\ UE}$ is defined as 20 seconds at SCH Es/Iot ≥ -4 dB, provided that the ProSe UE is allowed to drop a maximum of 2% of its ProSe Direct Communication and ProSe Direct Discovery transmissions at the physical layer for the purpose of SyncRef UE selection / reselection.

The UE capable of ProSe Direct Communication and/or ProSe Direct Discovery shall be capable of performing S-RSRP measurements for 6 identified ProSe synchronization sources with the measurement period of 400 ms. It is assumed that the ProSe synchronization sources do not drop or delay more than one SLSS transmission within the measurement period. Otherwise, the measurement period may be extended.

11.6 Void

11.7 Selection / Reselection of ProSe relay UE

11.7.1 Introduction

This section contains the requirements related to selection and reselection of ProSe relay UE when the remote UE is out of coverage on the frequency used for ProSe Direct Communication.

The requirements apply for the selection and reselection of candidate relay UEs that are transmitting relay discovery signals within the discovery resource pool as configured for the remote UE, and follow a synchronization source that either the same or is synchronized to the one use by remote UE.

11.7.2 Selection / Reselection of intra-frequency ProSe relay UE

For a remote UE configured by upper layer for relay operation, the remote UE shall search for candidate relay UEs for selection and/or reselection every discovery period.

If the remote UE has a selected sidelink relay UE, then the remote UE shall measure the SD-RSRP of the selected relay once in every four discovery periods and evaluate if it meets the relay selection criterion as defined in [TS 36.331, 5.10.11.4].

The remote UE shall measure SD-RSRP of the candidate relay UEs every $T_{measure,\ ProSe\_Relay\_Intra}$ for intra-frequency relay UEs that are detected and measured according to the measurement rules.

For an intra-frequency relay UEs that are detected, but that has not been selected or reselected to, the remote UE shall be capable of evaluating that the intra-frequency relay UE has met selection or reselection criterion defined in [2, 5.10.11.4] within $T_{evaluate,ProSe\_Relay\_Intra}$ as specified in table 11.7.2-1.

The minimum requirements are required to meet when the selected and candidate relay UEs are transmitting relay discovery message every discovery period.

Table 11.7.2-1: $T_{measure, ProSe\_Relay\_Intra}$ and $T_{evaluate, ProSe\_Relay\_intra}$

Discovery Period [s]	$T_{measure,ProSe\_Relay\_Intra}$ [s] (number of discovery periods)	$T_{evaluate, ProSe\_Relay\_intra}$ [s] (number of discovery periods)
0.04≤Discovery period≤10.24	Note 1 (4)	Note 1 (16)
NOTE 1: Time depends upon the configured Discovery period.		

Annex A (normative): Test Cases

A.1 Purpose of annex

This Annex specifies test specific parameters for some of the functional requirements in sections 4 to 9. The tests provide additional information to how the requirements should be interpreted for the purpose of conformance testing. The tests in this Annex are described such that one functional requirement may be tested in one or several test and one test may verify several requirements. Some requirements may lack a test.

The conformance tests are specified in TS 36.521-3 [23]. Statistical interpretation of the requirements is described in Annex A.2.

A.2 Requirement classification for statistical testing

Requirements in this specification are either expressed as absolute requirements with a single value stating the requirement, or expressed as a success rate. There are no provisions for the statistical variations that will occur when the parameter is tested.

Annex A outlines the tests in more detail and lists the test parameters needed. The test will result in an outcome of a test variable value for the device under test (DUT) inside or outside the test limit. Overall, the probability of a "good" DUT being inside the test limit(s) and the probability of a "bad" DUT being outside the test limit(s) should be as high as possible. For this reason, when selecting the test variable and the test limit(s), the statistical nature of the test is accounted for.

The statistical nature depends on the type of requirement. Some have large statistical variations, while others are not statistical in nature at all. When testing a parameter with a statistical nature, a confidence level is set. This establishes the probability that a DUT passing the test actually meets the requirements and determines how many times a test has to be repeated and what the pass and fail criteria are. Those aspects are not covered by TS 36.133. The details of the tests on how many times to run it and how to establish confidence in the tests are described in TS 36.521-3 [23]. This Annex establishes the variable to be used in the test and whether it can be viewed as statistical in nature or not.

A.2.1 Types of requirements in TS 36.133

A.2.1.1 Time and delay requirements on UE higher layer actions

A very large part of the RRM requirements are delay requirements:

- In E-UTRAN RRC_IDLE state mobility (clause A.4) there is cell re-selection delay.
- In E-UTRAN RRC_CONNECTED state mobility (clauses A.5 and A.8) there is handover delay, cell search delay and measurement reporting delay.
- In RRC Connection Control (clause A.6) there is RRC re-establishment delay.

All have in common that the UE is required to perform an action observable in higher layers (e.g. camp on the correct cell) within a certain time after a specific event (e.g. when a new strong pilot or reference signal appears). The delay time is statistical in nature for several reasons, among others that several of the measurements are performed by the UE in a fading radio environment.

The variations make a strict limit unsuitable for a test. Instead there is a condition set for a correct action by the UE, e.g. that the UE shall camp on the correct cell within X seconds. Then the rate of correct events is observed during repeated tests and a limit is set on the rate of correct events, usually 90% correct events are required. How the limit is applied in the test depends on the confidence required, further detailed are in TS 36.521-3 [23].

A.2.1.2 Measurements of power levels, relative powers and time

A very large number of requirements are on measurements that the UE performs:

- In E-UTRAN RRC_CONNECTED state mobility (clause A.5) there are measurement reports.
- In Measurement Performance Requirements (clause A.9) there are requirements for all type of measurements.

The accuracy requirements on measurements are expressed in this specification as a fixed limit (e.g. +/-X dB), but the measurement error will have a distribution that is not easily confined in fixed limits. Assuming a Gaussian distribution of the error, the limits will have to be set at +/-3.29σ if the probability of failing a "good DUT" in a single test is to be kept at 0.1%. It is more reasonable to set the limit tighter and test the DUT by counting the rate of measurements that are within the limits, in a way similar to the requirements on delay.

A.2.1.3 Implementation requirements

A few requirements are strict actions the UE should take or capabilities the UE should have, without any allowance for deviations. These requirements are absolute and should be tested as such. Examples are:

- "Event triggered report rate" in E-UTRAN RRC_CONNECTED state mobility (clauses A.5 and A.8)
- "Correct behaviour at time-out" in RRC connection control (clause A.6)

A.2.1.4 Physical layer timing requirements

There are requirements on Timing and Signaling Characteristics (clauses A.7). There are both absolute and relative limits on timing accuracy depending upon the type of requirement. Examples are:

- Initial Transmit Timing (clause A.7.1) has an absolute limit on timing accuracy.
- Timing Advance (clause A.7.2) has a relative limit on timing accuracy.

A.3 RRM test configurations

A.3.1 Reference Measurement Channels

A.3.1.1 PDSCH

A.3.1.1.1 FDD

Table A.3.1.1.1-1: PDSCH Reference Measurement Channels for FDD

Parameter	Unit	Value								
Reference channel		R.2 FDD		R.5 FDD	R.7 FDD	R.0 FDD	R.1 FDD	R.3 FDD	R.4 FDD	R.6 FDD
Channel bandwidth	MHz	1.4	3	5	5	10	10	10	20	20
Number of transmitter antennas		1		1	1	1	2	1	1	1
Allocated resource blocks (Note 4)		2		11	11	24	24	24	24	24
Allocated subframes per Radio Frame		10		10	10	10	10	10	10	10
Modulation		QPSK		QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Target Coding Rate		1/3		1/3	1/3	1/3	1/3	1/3	1/3	1/3
Information Bit Payload										
For Sub-Frames 4, 9	Bits	120		968	968	2088	2088	2088	2088	2088
For Sub-Frame 5	Bits	104		776	776	2088	1736	2088	2088	2088
For Sub-Frame 0	Bits	32		616	616	1736	1736	1736	1736	1736
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0		0	968	0	0	2088	0	2088
Number of Code Blocks per Sub-Frame (Note 5)										
For Sub-Frames 4, 9		1		1	1	1	1	1	1	1
For Sub-Frame 5		1		1	1	1	1	1	1	1
For Sub-Frame 0		1		1	1	1	1	1	1	1
For Sub-Frame 1, 2, 3, 6, 7, 8		0		0	1	0	0	1	0	1
Binary Channel Bits Per Sub-Frame										
For Sub-Frames 4, 9	Bits	456		2772	2772	6624	6336	6624	6624	6624
For Sub-Frame 5	Bits	360		2484	2484	6336	6048	6336	6336	6336
For Sub-Frame 0	Bits	176		1932	1932	5784	5520	5784	5784	5784
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0		0	2772	0	0	6624	0	6624
Max. Throughput averaged over 1 frame	kbps	37.6		332.8	913.6	800	765	2053	800	2053

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5 MHz channel BW.
Note 2: Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [16].
Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 36.213 [3].
Note 4: Allocation is located in the middle of bandwidth.
Note 5: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)
Note 6: PDSCH allocation applies only to subframes not configured as PRS subframes.

A.3.1.1.2 TDD

Table A.3.1.1.2-1: PDSCH Reference Measurement Channels for TDD UL/DL configuration1

Parameter	Unit	Value					
Reference channel		R.2 TDD		R.4 TDD	R.0 TDD	R.1 TDD	R.3 TDD
Channel bandwidth	MHz	1.4	3	5	10	10	20
Number of transmitter antennas		1		1	1	2	1
Allocated resource blocks (Note 4)		2		11	24	24	24
Uplink-Downlink Configuration (Note 5)		1		1	1	1	1
Special Subframe Configuration (Note 6)		6		6	6	6	6
Allocated subframes per Radio Frame		6		6	6	6	6
Modulation		QPSK		QPSK	QPSK	QPSK	QPSK
Target Coding Rate		1/3		1/3	1/3	1/3	1/3
Information Bit Payload							
For Sub-Frames 4,9	Bits	120		968	2088	2088	2088
For Sub-Frame 5	Bits	104		968	2088	2088	2088
For Sub-Frame 0	Bits	56		616	2088	1736	2088
For Sub-Frame 1, 6 (DwPTS)	Bits	56		472	1032	1032	1032
Number of Code Blocks per Sub-Frame (Note 7)		1		1	1	1	1
For Sub-Frames 4,9		1		1	1	1	1
For Sub-Frame 5		1		1	1	1	1
For Sub-Frame 0		1		1	1	1	1
For Sub-Frame 1, 6 (DwPTS)		1		1	1	1	1
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4,9	Bits	456		2772	6624	6336	6624
For Sub-Frame 5	Bits	408		2628	6480	6192	6480
For Sub-Frame 0	Bits	224		2076	5928	5664	5928
For Sub-Frame 1, 6 (DwPTS)	Bits	272		1616	3696	3504	3696
Max. Throughput averaged over 1 frame	Mbps	0.0512		0.4464	1.0416	1.0064	1.0416

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. For special subframe (1 & 6) only 2 OFDM symbols are allocated to PDCCH for all bandwidths.
Note 2: Reference signal, synchronization signals and PBCH allocated as defined in TS 36.211 [16].
Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in TS 36.213 [3].
Note 4: Allocation is located in the middle of bandwidth.
Note 5: As per Table 4.2-2 in TS 36.211 [16]
Note 6: As per Table 4.2-1 in TS 36.211 [16]
Note 7: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)
Note 8: PDSCH allocation applies only to subframes not configured as PRS subframes.

Table A.3.1.1.2-2: PDSCH Reference Measurement Channels for TDD UL/DL configuration0

Parameter	Unit	Value					
Reference channel					R.5 TDD		
Channel bandwidth	MHz	1.4	3	5	10	10	20
Number of transmitter antennas					1		
Allocated resource blocks (Note 4)					24		
Uplink-Downlink Configuration (Note 5)					0		
Special Subframe Configuration (Note 6)					6		
Allocated subframes per Radio Frame					4		
Modulation					QPSK		
Target Coding Rate					1/3		
Information Bit Payload							
For Sub-Frames 4,9	Bits				N/A		
For Sub-Frame 5	Bits				2088		
For Sub-Frame 0	Bits				2088		
For Sub-Frame 1, 6 (DwPTS)	Bits				1032		
Number of Code Blocks per Sub-Frame (Note 7)					1		
For Sub-Frames 4,9					N/A		
For Sub-Frame 5					1		
For Sub-Frame 0					1		
For Sub-Frame 1, 6 (DwPTS)					1		
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4,9	Bits				N/A		
For Sub-Frame 5	Bits				6480		
For Sub-Frame 0	Bits				5928		
For Sub-Frame 1, 6 (DwPTS)	Bits				3696		
Max. Throughput averaged over 1 frame	Mbps				0.624		

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. For special subframe (1 & 6) only 2 OFDM symbols are allocated to PDCCH for all bandwidths.
Note 2: Reference signal, synchronization signals and PBCH allocated as defined in TS 36.211 [16].
Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in TS 36.213 [3].
Note 4: Allocation is located in the middle of bandwidth.
Note 5: As per Table 4.2-2 in TS 36.211 [16]
Note 6: As per Table 4.2-1 in TS 36.211 [16]
Note 7: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)
Note 8: PDSCH allocation applies only to subframes not configured as PRS subframes.

A.3.1.1.3 FDD for UE category 0

Table A.3.1.1.3-1: PDSCH Reference Measurement Channels for FDD

Parameter	Unit	Value		
Reference channel		R.13 FDD	R.14 FDD	R.15 FDD
Channel bandwidth	MHz	10	10	10
Number of transmitter antennas		1	2	2
Allocated resource blocks (Note 4)		24	24	24
Allocated subframes per Radio Frame		10	10	10
Modulation		QPSK	QPSK	QPSK
Target Coding Rate		1/10	1/10	1/10
Information Bit Payload				
For Sub-Frames 4, 9	Bits	648	648	648
For Sub-Frame 5	Bits	648	648	648
For Sub-Frame 0	Bits	648	648	648
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0	0	648
Number of Code Blocks per Sub-Frame (Note 5)				
For Sub-Frames 4, 9		1	1	1
For Sub-Frame 5		1	1	1
For Sub-Frame 0		1	1	1
For Sub-Frame 1, 2, 3, 6, 7, 8		1	1	1
Binary Channel Bits Per Sub-Frame				
For Sub-Frames 4, 9	Bits	6624	6336	6636
For Sub-Frame 5	Bits	6336	6048	6408
For Sub-Frame 0	Bits	5784	5520	5520
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0	0	6636
Max. Throughput averaged over 1 frame	kbps	259.2	259.2	648

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5 MHz channel BW.
Note 2: Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [16].
Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 36.213 [3].
Note 4: Allocation is located in the middle of bandwidth.
Note 5: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)
Note 6: PDSCH allocation applies only to subframes not configured as PRS subframes.

A.3.1.1.4 HD-FDD for UE category 0

Table A.3.1.1.4-1: PDSCH Reference Measurement Channels for HD-FDD

Parameter	Unit		Value
Reference channel		R.1 HD-FDD	R.2 HD-FDD
Channel bandwidth	MHz	10	10
Number of transmitter antennas		1	2
Allocated resource blocks (Note 4)		24	24
Allocated subframes per Radio Frame		10	10
Modulation		QPSK	QPSK
Target Coding Rate		1/10	1/10
Information Bit Payload			
For Sub-Frames 4, 9,	Bits	0	0
For Sub-Frame 5 (Note 7)	Bits	424	424
For Sub-Frame 0 (Note 7)		648	648
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0	0
For Sub-Frame 1, 6	Bits		
Number of Code Blocks per Sub-Frame (Note 5)			
For Sub-Frames 4, 9		1	1
For Sub-Frame 5		1	1
For Sub-Frame 0		1	1
For Sub-Frame 1, 2, 3, 6, 7, 8		1	1
Binary Channel Bits Per Sub-Frame			
For Sub-Frames 4, 9	Bits	0	0
For Sub-Frame 5	Bits	6336	6048
For Sub-Frame 0	Bits	5784	5520
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0	0
Max. Throughput averaged over 1 frame	kbps		

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5 MHz channel BW.
Note 2: Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [16].
Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 36.213 [3].
Note 4: Allocation is located in the middle of bandwidth.
Note 5: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)
Note 6: PDSCH allocation applies only to subframes not configured as PRS subframes.
Note 7: Sub-frame 0 or sub-frame 5 is randomly scheduled in downlink.

A.3.1.1.5 TDD for UE category 0

Table A.3.1.1.5-1: PDSCH Reference Measurement Channels for TDD UL/DL configuration1

Parameter	Unit	Value	
Reference channel		R.12 TDD	R.13 TDD
Channel bandwidth	MHz	10	10
Number of transmitter antennas		1	2
Allocated resource blocks (Note 4)		24	24
Uplink-Downlink Configuration (Note 5)		1	1
Special Subframe Configuration (Note 6)		6	6
Allocated subframes per Radio Frame		6	6
Modulation		QPSK	QPSK
Target Coding Rate		1/10	1/10
Information Bit Payload			
For Sub-Frames 4,9	Bits	648	648
For Sub-Frame 5	Bits	648	648
For Sub-Frame 0	Bits	648	648
For Sub-Frame 1, 6 (DwPTS)	Bits	488	488
Number of Code Blocks per Sub-Frame (Note 7)		1	1
For Sub-Frames 4,9		1	1
For Sub-Frame 5		1	1
For Sub-Frame 0		1	1
For Sub-Frame 1, 6 (DwPTS)		1	1
Binary Channel Bits Per Sub-Frame			
For Sub-Frames 4,9	Bits	6624	6336
For Sub-Frame 5	Bits	6580	6192
For Sub-Frame 0	Bits	5928	5664
For Sub-Frame 1, 6 (DwPTS)	Bits	3696	3408
Max. Throughput averaged over 1 frame	Mbps	0.3552	0.3552

Note 1: 2 symbols allocated to PDCCH for 10 MHz channel BW. 3 OFDM symbols allocated to PDCCH for 5MHz channel BW. 4 symbols allocated to PDCCH for 1.4 MHz channel BW. For special subframe (1 & 6) only 2 OFDM symbols are allocated to PDCCH for all bandwidths.
Note 2: Reference signal, synchronization signals and PBCH allocated as defined in TS 36.211 [16].
Note 3: If necessary the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in TS 36.213 [3].
Note 4: Allocation is located in the middle of bandwidth.
Note 5: As per Table 4.2-2 in TS 36.211 [16]
Note 6: As per Table 4.2-1 in TS 36.211 [16]
Note 7: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)
Note 8: PDSCH allocation applies only to subframes not configured as PRS subframes.

A.3.1.2 PCFICH/PDCCH/PHICH

A.3.1.2.1 FDD

Table A.3.1.2.1-1: PCFICH/PDCCH/PHICH Reference Channel for FDD

Parameter	Unit	Value							
Reference channel		R.8 FDD	R.11 FDD	R.12 FDD	R.10 FDD	R.13 FDD	R.6 FDD	R.7 FDD	R.9 FDD
Channel bandwidth	MHz	1.4	5	5	20	20	10	10	10
Number of transmitter antennas		1	1	2	1	2	1	2	2
Control region OFDM symbols[Note1]	symbols	4	3	3	2	2	2	2	3
Aggregation level	CCE	2 (Note 6)	8	8	8	8	8	8	8
DCI Format		Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
Cell ID		Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Payload (without CRC)	Bits	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5

Note 1: The control region consists of PCFICH, PHICH and PDCCH.
Note 2: DCI formats are defined in TS 36.212.
Note 3: DCI format shall depend upon the test configuration.
Note 4: Cell ID shall depend upon the test configuration.
Note 5: Payload size shall depend upon the test configuration.
Note 6: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used.

A.3.1.2.2TDD

Table A.3.1.2.2-1: PCFICH/PDCCH/PHICH Reference Channel for TDD

Parameter	Unit	Value							
Reference channel		R.8 TDD	R.11 TDD	R.12 TDD	R.10 TDD	R.13 TDD	R.6 TDD	R.7 TDD	R.9 TDD
Channel bandwidth	MHz	1.4	5	5	20	20	10	10	10
Number of transmitter antennas		1	1	2	1	2	1	2	2
Control region OFDM symbols[Note1]	symbols	4 (Note 6)	3	3	2	2	2	2	3
Aggregation level	CCE	2 (Note 7)	8	8	8	8	8	8	8
DCI Format		Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
Cell ID		Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
Payload (without CRC)	Bits	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5

Note 1: The control region consists of PCFICH, PHICH and PDCCH.
Note 2: DCI formats are defined in TS 36.212.
Note 3: DCI format shall depend upon the test configuration.
Note 4: Cell ID shall depend upon the test configuration.
Note 5: Payload size shall depend upon the test configuration.
Note 6: Only 2 OFDM symbols for special subframes 1 and 6.
Note 7: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used.

A.3.1.2.3 HD-FDD for UE category 0

Table A.3.1.2.3-1: PCFICH/PDCCH/PHICH Reference Channel for HD-FDD

Parameter	Unit	Value		
Reference channel		R.3 HD-FDD	R.4 HD-FDD	R.5 HD-FDD
Channel bandwidth	MHz	10	10	10
Number of transmitter antennas		1	2	2
Control region OFDM symbols[Note1]	symbols	2	2	3
Aggregation level	CCE	8	8	8
DCI Format		Note 3	Note 3	Note 3
Cell ID		Note 4	Note 4	Note 4
Payload (without CRC)	Bits	Note 5	Note 5	Note 5
Note 1: The control region consists of PCFICH, PHICH and PDCCH. Note 2: DCI formats are defined in TS 36.212. Note 3: DCI format shall depend upon the test configuration. Note 4: Cell ID shall depend upon the test configuration. Note 5: Payload size shall depend upon the test configuration. Note 6: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used. Note 7: Sub-frame 0 or sub-frame 5 is randomly scheduled in downlink.				

A.3.2 OFDMA Channel Noise Generator (OCNG)

A.3.2.1 OCNG Patterns for FDD

The following OCNG patterns are used for modelling allocations to virtual UEs (which are not under test) and/or allocations used for MBSFN. The OCNG pattern for each sub frame specifies the allocations that shall be filled with OCNG, and furthermore, the relative power level of each such allocation.

In each test case the OCNG is expressed by parameters OCNG_RA and OCNG_RB which together with a relative power level (γ) specifies the PDSCH EPRE-to-RS EPRE ratios in OFDM symbols without and with reference symbols, respectively. The relative power, which is used for modelling boosting per virtual UE allocation, is expressed by:

$$\gamma_i = PDSCH_i\_RA / OCNG\_RA = PDSCH_i\_RB / OCNG\_RB,$$

where γ_i denotes the relative power level of the *i:th* virtual UE. The parameter settings of OCNG_RA, OCNG_RB, and the set of relative power levels γ are chosen such that when also taking allocations to the UE under test into account, as given by a PDSCH reference channel, a constant transmitted power spectral density that is constant on an OFDM symbol basis is targeted.

Moreover the OCNG pattern is accompanied by a PCFICH/PDCCH/PHICH reference channel which specifies the control region. The number of PDCCH OFDM symbols in the non-MBSFN subframes is the same as specified in the RMC used in the test. The number of PDCCH OFDM symbols in the MBSFN subframe is the maximal allowed according to TS 36.213 [16]. For any aggregation and PHICH allocation, the PDCCH and any unused PHICH groups are padded with resource element groups with a power level given by PDCCH_RA/RB and PHICH_RA/RB as specified in the test case such that a total power spectral density in the control region that is constant on an OFDM symbol basis is targeted.

For subframes configured as PRS subframes the PDSCH allocation defined in the OCNG pattern does not apply.

For subframes configured as ABS subframes the PDSCH and PMCH allocation defined in the OCNG pattern does not apply.

The system information is scheduled in the allocations reserved for the OCNG patterns, in the subframes not configured for MBSFN. For this purpose the number of the RB-s allocated with PDSCH defined in the OCNG pattern can be reduced as necessary.

A.3.2.1.1 OCNG FDD pattern 1: outer resource blocks allocation in 10 MHz

Table A.3.2.1.1-1: OP.1 FDD: OCNG FDD Pattern 1

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**	**PMCH Data**
	Subframe					
	0	5	4,9	1-3, 6-8		
0 – 12	0	0	0	N/A	Note 1	N/A
37 – 49	0	0	0	N/A		
0-49	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.
Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.2 OCNG FDD pattern 2: full bandwidth allocation in 10 MHz

Table A.3.2.1.2-1: OP.2 FDD: OCNG FDD Pattern 2

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**	**PMCH Data**
	Subframe					
	0	5	4, 9	1 – 3, 6 – 8		

0 – 49	0	0	0	N/A	Note 1	N/A
0 – 49	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.3 OCNG FDD pattern 3: outer resource blocks allocation in 1.4 MHz

Table A.3.2.1.3-1: OP.3 FDD: OCNG FDD Pattern 3

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**	**PMCH Data**
	Subframe					
	0	5	4,9	1-3, 6-8		
0 – 1	0	0	0	N/A	Note 1	N/A
4 – 5	0	0	0	N/A		
0 – 5	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.4 OCNG FDD pattern 4: full bandwidth allocation in 1.4 MHz

Table A.3.2.1.4-1: OP.4 FDD: OCNG FDD Pattern 4

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**	**PMCH Data**
	Subframe					
	0	5	4, 9	1 – 3, 6 – 8		
0 – 5	0	0	0	N/A	Note 1	N/A
0 – 5	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.5 OCNG FDD pattern 5: outer resource blocks allocation in 10 MHz (without MBSFN)

Table A.3.2.1.5-1: OP.5 FDD: OCNG FDD Pattern 5

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4,9	1-3, 6-8	
0 – 12	0	0	0	N/A	Note 2
37 – 49	0	0	0	N/A	
0 – 49	N/A	N/A	N/A	0	

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.
N/A: Not Applicable

A.3.2.1.6 OCNG FDD pattern 6: full bandwidth allocation in 10 MHz (without MBSFN)

Table A.3.2.1.6-1: OP.6 FDD: OCNG FDD Pattern 6

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4, 9	1 – 3, 6 – 8	
0 – 49	0	0	0	0	Note 2

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.
N/A: Not Applicable

A.3.2.1.7 OCNG FDD pattern 7: full bandwidth allocation in 1.4 MHz (without MBSFN)

Table A.3.2.1.8-1: OP.7 FDD: OCNG FDD Pattern 7

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4, 9	1 – 3, 6 – 8	
0 – 5	0	0	0	0	Note 2

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.
N/A: Not Applicable

A.3.2.1.8 OCNG FDD pattern 8: outer resource blocks allocation in 10 MHz for MBSFN ABS

Table A.3.2.1.8-1: OP.8 FDD: OCNG FDD Pattern 8

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4,9	(1-3, 6-8)[Note4]	
0 – 12	0	0	0	N/A	Note 2
37 – 49	0	0	0	N/A	
0 – 49	N/A	N/A	N/A	0	

Note 1: PDSCH allocation does not apply to subframes configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.
Note 4: The subframe(s) configured as MBSFN ABS in a test shall not contain any PMCH data and shall contain CRS only in the first symbol of the first time slot. The subframe(s) configured as MBSFN ABS depend upon the MBSFN ABS pattern used in the test.
N/A: Not Applicable

A.3.2.1.9 OCNG FDD pattern 9: full bandwidth allocation in 10 MHz for MBSFN ABS

Table A.3.2.1.9-1: OP.9 FDD: OCNG FDD Pattern 9

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4, 9	(1-3, 6-8)[Note4]	
0 – 49	0	0	0	0	Note 2

Note 1: PDSCH allocation applies only to subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.
Note 4: The subframe(s) configured as MBSFN ABS in a test shall not contain any PMCH data and shall contain CRS only in the first symbol of the first time slot. The subframe(s) configured as MBSFN ABS depend upon the MBSFN ABS pattern used in the test.
N/A: Not Applicable

A.3.2.1.10 OCNG FDD pattern 10: outer resource blocks allocation in 10 MHz with user data in every subframe (without MBSFN)

Table A.3.2.1.10-1: OP.10 FDD: OCNG FDD Pattern 10

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4, 9	1 - 3, 6 - 8	
0 - 12	0	0	0	0	Note 2
37 - 49	0	0	0	0	

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.
N/A: Not Applicable

A.3.2.1.11 OCNG FDD pattern 11: outer resource blocks allocation in 20 MHz

Table A.3.2.1.11-1: OP.11 FDD: OCNG FDD Pattern 11

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**				**PDSCH Data**	**PMCH Data**
	Subframe					
	0	5	4,9	1-3, 6-8		
0 – 37	0	0	0	N/A	Note 1	N/A
62 – 99	0	0	0	N/A		
0-99	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.12 OCNG FDD pattern 12: full bandwidth allocation in 20 MHz

Table A.3.2.1.12-1: OP.12 FDD: OCNG FDD Pattern 12

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**				**PDSCH Data**	**PMCH Data**
	Subframe					
	0	5	4, 9	1 – 3, 6 – 8		
0 – 99	0	0	0	N/A	Note 1	N/A
0 – 99	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.13 OCNG FDD pattern 13: outer resource blocks allocation in 20 MHz (without MBSFN)

Table A.3.2.1.13-1: OP.13 FDD: OCNG FDD Pattern 13

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4,9	1-3, 6-8	
0 – 37	0	0	0	N/A	Note 2
62 – 99	0	0	0	N/A	
0 – 99	N/A	N/A	N/A	0	

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.
N/A: Not Applicable

A.3.2.1.14 OCNG FDD pattern 14: full bandwidth allocation in 20 MHz (without MBSFN)

Table A.3.2.1.14-1: OP.14 FDD: OCNG FDD Pattern 14

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4, 9	1 – 3, 6 – 8	
0 – 99	0	0	0	0	Note 2

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.
N/A: Not Applicable

A.3.2.1.15 OCNG FDD pattern 15: outer resource blocks allocation in 5 MHz

Table A.3.2.1.15-1: OP.15 FDD: OCNG FDD Pattern 15

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data	PMCH Data
	Subframe					
	0	5	4,9	1-3, 6-8		
0 – 6	0	0	0	N/A	Note 1	N/A
18 – 24	0	0	0	N/A		
0-24	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.16 OCNG FDD pattern 16: full bandwidth allocation in 5 MHz

Table A.3.2.1.16-1: OP.16 FDD: OCNG FDD Pattern 16

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data	PMCH Data
	Subframe					
	0	5	4, 9	1 – 3, 6 – 8		

0 – 24	0	0	0	N/A	Note 1	N/A
0 – 24	N/A	N/A	N/A	Note 4	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Note 4: 0dB for 1 transmit antenna with CRS, +3dB for 2 transmit antennas with CRS

N/A: Not Applicable

A.3.2.1.17 OCNG FDD pattern 17: outer resource blocks allocation in 20 MHz with user data in every subframe (without MBSFN)

Table A.3.2.1.17-1: OP.17 FDD: OCNG FDD Pattern 17

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4, 9	1 - 3, 6 - 8	
0 - 37	0	0	0	0	Note 2
62 - 99	0	0	0	0	

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.

Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

N/A: Not Applicable.

A.3.2.1.18 OCNG FDD pattern 18: outer resource blocks allocation in 5 MHz (without MBSFN)

Table A.3.2.1.18-1: OP.18 FDD: OCNG FDD Pattern 18

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	4,9	1-3, 6-8	
0 – 6	0	0	0	N/A	Note 2
18 – 24	0	0	0	N/A	
0 – 24	N/A	N/A	N/A	0	

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.
N/A: Not Applicable

A.3.2.1.19 OCNG FDD pattern 19: full bandwidth allocation in 5 MHz (without MBSFN)

Table A.3.2.1.19-1: OP.19 FDD: OCNG FDD Pattern 19

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	4, 9	1 – 3, 6 – 8	
0 – 24	0	0	0	0	Note 2

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.
N/A: Not Applicable

A.3.2.1.20 OCNG FDD pattern 20: outer resource blocks allocation in 5 MHz with user data in every subframe (without MBSFN)

Table A.3.2.1.20-1: OP.20 FDD: OCNG FDD Pattern 20

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	4, 9	1 - 3, 6 - 8	
0 - 6	0	0	0	0	Note 2
18 - 24	0	0	0	0	

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: If two or more transmit antennas with CRS are used in the test, the PDSCH part of OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power of the PDSCH part of OCNG is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.
N/A: Not Applicable.

A.3.2.2 OCNG Patterns for TDD

The following OCNG patterns are used for modelling allocations to virtual UEs (which are not under test). The OCNG pattern for each sub frame specifies the allocations that shall be filled with OCNG, and furthermore, the relative power level of each such allocation.

In each test case the OCNG is expressed by parameters OCNG_RA and OCNG_RB which together with a relative power level (γ) specifies the PDSCH EPRE-to-RS EPRE ratios in OFDM symbols without and with reference symbols, respectively. The relative power, which is used for modelling boosting per virtual UE allocation, is expressed by:

$$\gamma_i = PDSCH_i\_RA / OCNG\_RA = PDSCH_i\_RB / OCNG\_RB,$$

where γ_i denotes the relative power level of the *i:th* virtual UE. The parameter settings of OCNG_RA, OCNG_RB, and the set of relative power levels γ are chosen such that when also taking allocations to the UE under test into account, as given by a PDSCH reference channel, a transmitted power spectral density that is constant on an OFDM symbol basis is targeted.

Moreover the OCNG pattern is accompanied by a PCFICH/PDCCH/PHICH reference channel which specifies the control region. The number of PDCCH OFDM symbols in the non-MBSFN subframes is the same as specified in the RMC used in the test. The number of PDCCH OFDM symbols in the MBSFN subframe is the maximal allowed according to TS 36.213 [16]. For any aggregation and PHICH allocation, the PDCCH and any unused PHICH groups are padded with resource element groups with a power level given by PDCCH_RA/RB and PHICH_RA/RB as specified in the test case such that a total power spectral density in the control region that is constant on an OFDM symbol basis is targeted.

For subframes configured as PRS subframes the PDSCH allocation defined in the OCNG pattern does not apply.

For subframes configured as ABS subframes the PDSCH and PMCH allocation defined in the OCNG pattern does not apply.

The system information is scheduled in the allocations reserved for the OCNG patterns, in the subframes not configured for MBSFN. For this purpose the number of the RB-s allocated with PDSCH defined in the OCNG pattern can be reduced as necessary.

A.3.2.2.1 OCNG TDD pattern 1: outer resource blocks allocation in 10 MHz

Table A.3.2.2.1-1: OP.1 TDD: OCNG TDD Pattern 1 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe) Note 3	
0 – 12	0	0	0	Table A.3.2.2.1-2	Note 2
37 – 49	0	0	0		

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in TS 36.211 [16].

Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Table A.3.2.2.1-2: OP.1 TDD: OCNG TDD Pattern 1 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]																	
	Special subframe configuration																	
	0		1		2		3		4		5		6		7		8	
	Control region OFDM symbols																	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 12	0		0		0		0		0		0		0		0		0	
37 – 49	0		0		0		0		0		0		0		0		0	

Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].

A.3.2.2.2 OCNG TDD pattern 2: full bandwidth allocation in 10 MHz

Table A.3.2.2.2-1: OP.2 TDD: OCNG TDD Pattern 2 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	3 , 4, 8, 9 and 6 (as normal subframe)Note 3	1 and 6 (as special subframe) Note 3	

0 – 49	0	0	0	0	Note 2

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in TS 36.211 [16].
Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

A.3.2.2.3 OCNG TDD pattern 3: outer resource blocks allocation in 1.4 MHz

Table A.3.2.2.3-1: OP.3 TDD: OCNG TDD Pattern 3 for 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe) Note 3	
0 – 1	0	0	0	0	Note 2
4 – 5	0	0	0	0	

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in TS 36.211 [16].
Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

A.3.2.2.4 OCNG TDD pattern 4: full bandwidth allocation in 1.4 MHz

Table A.3.2.2.4-1: OP.4 TDD: OCNG TDD Pattern 4 for 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe) Note 3	

0 – 5	0	0	0	0	Note 2

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in TS 36.211 [16].
Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

A.3.2.2.5 OCNG TDD pattern 5: outer resource blocks allocation in 10 MHz for MBSFN ABS

Table A.3.2.2.5-1: OP.5 TDD: OCNG TDD Pattern 5 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**				**PDSCH Data**
	Subframe (Note 1)				
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe) Note 3	
0 – 12	0	0	0	Table A.3.2.2.1-2	Note 2
37 – 49	0	0	0		

Note 1: PDSCH allocation does not apply to subframes configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in TS 36.211 [16]. Any of the subframes 3, 4, 8 and 9 configured as MBSFN ABS in a test shall not contain any PMCH data and shall contain CRS only in the first symbol of the first time slot. The subframe(s) configured as MBSFN ABS depend upon the MBSFN ABS pattern used in the test.

Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

Table A.3.2.2.5-2: OP.5 TDD: OCNG TDD Pattern 5 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]																	
	Special subframe configuration																	
	0		1		2		3		4		5		6		7		8	
	Control region OFDM symbols																	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 12	0		0		0		0		0		0		0		0		0	
37 – 49	0		0		0		0		0		0		0		0		0	
Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].																		

A.3.2.2.6 OCNG TDD pattern 6: full bandwidth allocation in 10 MHz for MBSFN ABS

Table A.3.2.2.6-1: OP.6 TDD: OCNG TDD Pattern 6 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	3 , 4, 8, 9 and 6 (as normal subframe)Note 3	1 and 6 (as special subframe) Note 3	
0 – 49	0	0	0	0	Note 2

Note 1: PDSCH allocation does not apply to subframes configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in TS 36.211 [16]. Any of the subframes 3, 4, 8 and 9 configured as MBSFN ABS in a test shall not contain any PMCH data and shall contain CRS only in the first symbol of the first time slot. The subframe(s) configured as MBSFN ABS depend upon the MBSFN ABS pattern used in the test.
Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in clause 7.1 in TS 36.213.

A.3.2.2.7 OCNG TDD pattern 7: outer resource blocks allocation in 20 MHz

Table A.3.2.2.7-1: OP.7 TDD: OCNG TDD Pattern 7 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe) Note 3	
0 – 37	0	0	0	Table A.3.2.1.7-2	Note 2
62 – 99	0	0	0		

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in 3GPP TS 36.211 [16].
Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table A.3.2.2.7-2: OP.7 TDD: OCNG TDD Pattern 7 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	CP length	Relative power level γ_{PRB} [dB]																	
		Special subframe configuration																	
		0		1		2		3		4		5		6		7		8	
		Control region OFDM symbols																	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 37	N	0		0		0		0		0		0		0		0		0	
62 – 99	N	0		0		0		0		0		0		0		0		0	

Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].

A.3.2.2.8 OCNG TDD pattern 8: full bandwidth allocation in 20 MHz

Table A.3.2.2.8-1: OP.8 TDD: OCNG TDD Pattern 8 for 5ms downlink-to-uplink switch-point periodicity

<table>
<tr><th rowspan="3">Allocation
n_{PRB}</th><th colspan="4">Relative power level γ_{PRB} [dB]</th><th rowspan="3">PDSCH Data</th></tr>
<tr><th colspan="4">Subframe (Note 1)</th></tr>
<tr><th>0</th><th>5</th><th>3 , 4, 8, 9 and 6 (as normal subframe)Note 3</th><th>1 and 6 (as special subframe) Note 3</th></tr>
<tr><td>0 – 99</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Note 2</td></tr>
<tr><td colspan="6">Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in 3GPP TS 36.211 [16].
Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.</td></tr>
</table>

A.3.2.2.9 OCNG TDD pattern 9: outer resource blocks allocation in 5 MHz

Table A.3.2.2.9-1: OP.9 TDD: OCNG TDD Pattern 9 for 5ms downlink-to-uplink switch-point periodicity

<table>
<tr><th rowspan="3">Allocation
n_{PRB}</th><th colspan="4">Relative power level γ_{PRB} [dB]</th><th rowspan="3">PDSCH Data</th></tr>
<tr><th colspan="4">Subframe (Note 1)</th></tr>
<tr><th>0</th><th>5</th><th>3 , 4, 8, 9 and 6 (as normal subframe) Note 3</th><th>1 and 6 (as special subframe) Note 3</th></tr>
<tr><td>0 – 6</td><td>0</td><td>0</td><td>0</td><td rowspan="2">Table A.3.2.1.7-2</td><td rowspan="2">Note 2</td></tr>
<tr><td>18 – 24</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td colspan="6">Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in 3GPP TS 36.211 [16].
Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.</td></tr>
</table>

Table A.3.2.2.9-2: OP.9 TDD: OCNG TDD Pattern 9 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	CP length	Relative power level γ_{PRB} [dB]																	
		Special subframe configuration																	
		0		1		2		3		4		5		6		7		8	
		Control region OFDM symbols																	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 6	N	0		0		0		0		0		0		0		0		0	
18 – 24	N	0		0		0		0		0		0		0		0		0	
Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].																			

A.3.2.2.10 OCNG TDD pattern 10: full bandwidth allocation in 5 MHz

Table A.3.2.2.10-1: OP.10 TDD: OCNG TDD Pattern 10 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]				PDSCH Data
	Subframe (Note 1)				
	0	5	3 , 4, 8, 9 and 6 (as normal subframe) Note 3	1 and 6 (as special subframe) Note 3	
0 – 24	0	0	0	0	Note 2

Note 1: The allocation of any PDSCH with or without SIB1 applies only to the subframes not configured as PRS subframes.
Note 2: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.
Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in 3GPP TS 36.211 [16].
Note 4: If two or more transmit antennas with CRS are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas with CRS and according to the antenna transmission mode 2. The parameter γ_{PRB} applies to each antenna port separately, so the transmit power is equal between all the transmit antennas with CRS used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

A.3.3 Reference DRX Configurations

Table A.3.3-1: Reference DRX Configurations

Parameter	Value		Comments
Reference configuration	DRX_S	DRX_L	As defined in 4.8.2.1.5 in TS 36.508
onDurationTimer	psf2	psf6	
drx-InactivityTimer	psf100	psf1920	
drx-RetransmissionTimer	psf16	psf16	
longDRX-CycleStartOffset	sf40, 0	sf1280, 0	
shortDRX	disabled	disabled	
Note: For further information see clause 6.3.2 in TS 36.331.			

A.3.4 ABS Transmission Configurations

A.3.4.1 Non-MBSFN ABS Transmission Configurations

A.3.4.1.1 Non-MBSFN ABS Transmission, 1x2 antenna with PBCH

Table A.3.4.1.1-1: Transmission configuration with non-MBSFN ABS, 1x2 with PBCH

Physical Channels and Signals	Parameters	EPRE, [dB]	
		Non-ABS	ABS
PBCH	PBCH_RA	0	0
	PBCH_RB	0	0
PSS	PSS_RA	0	0
SSS	SSS_RA	0	0
PCFICH	PCFICH_RB	0	0 Note 1
PHICH	PHICH_RA	0	-Inf
	PHICH_RB	0	-Inf
PDCCH	PDCCH_RA	0	0 Note 1
	PDCCH_RB	0	0 Note 1
PDSCH	PDSCH_RA	0	0 Note 1
	PDSCH_RB	0	0 Note 1
OCNG	OCNG_RA	0	-Inf
	OCNG_RB	0	-Inf
NOTE 1: Only used for SIB1, otherwise EPRE is –Inf NOTE 2: 1x2 antenna configuration is assumed			

A.3.4.1.2 Non-MBSFN ABS Transmission, 2x2 antenna without PBCH

Table A.3.4.1.2-1: Transmission configuration #1 with non-MBSFN ABS, 2x2 without PBCH

Physical Channels and Signals	Parameters	EPRE, [dB]	
		Non-ABS	ABS
PBCH	PBCH_RA	-3	-Inf
	PBCH_RB	-3	-Inf
PSS	PSS_RA	-3	-3
SSS	SSS_RA	-3	-3
PCFICH	PCFICH_RB	1	-Inf
PHICH	PHICH_RA	-3	-Inf
	PHICH_RB	-3	-Inf
PDCCH	PDCCH_RA	1	-Inf
	PDCCH_RB	1	-Inf
PDSCH	PDSCH_RA	-3	-Inf
	PDSCH_RB	-3	-Inf
OCNG	OCNG_RA	-3	-Inf
	OCNG_RB	-3	-Inf
NOTE: 2x2 antenna configuration is assumed			

Table A.3.4.1.2-2: Transmission configuration #2 with non-MBSFN ABS, 2x2 without PBCH

Physical Channels and Signals	Parameters	EPRE, [dB]	
		Non-ABS	ABS
PBCH	PBCH_RA	-3	-Inf
	PBCH_RB	-3	-Inf
PSS	PSS_RA	-3	-3
SSS	SSS_RA	-3	-3
PCFICH	PCFICH_RB	1	-Inf
PHICH	PHICH_RA	-3	-Inf
	PHICH_RB	-3	-Inf
PDCCH	PDCCH_RA	-3	-Inf
	PDCCH_RB	-3	-Inf
PDSCH	PDSCH_RA	-3	-Inf
	PDSCH_RB	-3	-Inf
OCNG	OCNG_RA	-3	-Inf
	OCNG_RB	-3	-Inf
NOTE: 2x2 antenna configuration is assumed			

A.3.4.2 MBSFN ABS Transmission Configurations

A.3.4.2.1 MBSFN ABS Transmission, 1x2 antenna

Table A.3.4.2.1-1: Transmission configuration with MBSFN ABS, 1x2

Physical Channels and Signals	Parameters	EPRE, [dB]	
		Non-ABS	ABS
PBCH	PBCH_RA	0	N/A
	PBCH_RB	0	N/A
PSS	PSS_RA	0	N/A
SSS	SSS_RA	0	N/A
PCFICH	PCFICH_RB	0	-Inf
PHICH	PHICH_RA	0	-Inf
	PHICH_RB	0	-Inf
PDCCH	PDCCH_RA	0	-Inf
	PDCCH_RB	0	-Inf
PDSCH	PDSCH_RA	0	-Inf
	PDSCH_RB	0	-Inf
PMCH	PMCH_RA	0	-Inf
	PMCH_RB	0	-Inf
OCNG	OCNG_RA	0	-Inf
	OCNG_RB	0	-Inf
NOTE: 1x2 antenna configuration is assumed			

A.3.4.2.2 MBSFN ABS Transmission, 2x2 antenna

Table A.3.4.2.2-1: Transmission configuration #1 with MBSFN ABS, 2x2

Physical Channels and Signals	Parameters	EPRE, [dB]	
		Non-ABS	ABS
PBCH	PBCH_RA	-3	N/A
	PBCH_RB	-3	N/A
PSS	PSS_RA	-3	N/A
SSS	SSS_RA	-3	N/A
PCFICH	PCFICH_RB	1	-Inf
PHICH	PHICH_RA	-3	-Inf
	PHICH_RB	-3	-Inf
PDCCH	PDCCH_RA	1	-Inf
	PDCCH_RB	1	-Inf
PDSCH	PDSCH_RA	-3	-Inf
	PDSCH_RB	-3	-Inf
PMCH	PMCH_RA	-3	-Inf
	PMCH_RB	-3	-Inf
OCNG	OCNG_RA	-3	-Inf
	OCNG_RB	-3	-Inf
NOTE: 2x2 antenna configuration is assumed			

Table A.3.4.2.2-2: Transmission configuration # 2 with MBSFN ABS, 2x2

Physical Channels and Signals	Parameters	EPRE, [dB]	
		Non-ABS	ABS
PBCH	PBCH_RA	-3	N/A
	PBCH_RB	-3	N/A
PSS	PSS_RA	-3	N/A
SSS	SSS_RA	-3	N/A
PCFICH	PCFICH_RB	1	-Inf
PHICH	PHICH_RA	-3	-Inf
	PHICH_RB	-3	-Inf
PDCCH	PDCCH_RA	-3	-Inf
	PDCCH_RB	-3	-Inf
PDSCH	PDSCH_RA	-3	-Inf
	PDSCH_RB	-3	-Inf
PMCH	PMCH_RA	-3	-Inf
	PMCH_RB	-3	-Inf
OCNG	OCNG_RA	-3	-Inf
	OCNG_RB	-3	-Inf
NOTE: 2x2 antenna configuration is assumed			

A.3.5 Impact of Reference Sensitivity Degradation with Carrier Aggregation on Test Cases

A.3.5.1 Impact of Reference Sensitivity Degradation due to Insertion Loss

For a UE supporting inter-band carrier aggregation configuration with uplink in one E-UTRA band, if there is a relaxation of receiver sensitivity $\Delta R_{IB,c}$>0 dB as defined in TS 36.101 [5], 7.3.1-1A, there is no adjustment of test parameters in the tests specified in TS 36.133 when $\Delta R_{IB,c} \leq 1$ dB.

A.3.6 Carrier Aggregation Test Cases with Different Channel Bandwidth Combinations

A.3.6.1 Introduction

In Annex A carrier aggregation test cases may be defined with different channel bandwidth combinations to verify the same RRM requirement.

If multiple carrier aggregation test cases with different channel bandwidth combinations are defined to verify the same RRM requirement that is channel bandwidth independent, then the UE needs to be tested only with one bandwidth combination out of the bandwidth combination sets supported by that UE.

A.3.7 Test Cases with Different Channel Bandwidths

A.3.7.1 Introduction

This clause defines a principle which is applicable to test cases verifying RRM requirements for single carrier operation.

A.3.7.2 Principle of testing

Test cases defined for 5MHz channel bandwidth that reference this clause are applicable to UEs that support only Band 31.

A.3.8 Antenna Configuration

Unless otherwise specified, E-UTRA FDD or E-UTRA TDD cells in all RRM Test cases in AWGN propagation condition are configured with Antenna Configuration 1x2.

A.3.9 Carrier Aggregation Test Cases with Different Duplex Modes

A.3.9.1 Introduction

This clause defines a principle which is applicable to test cases verifying RRM requirements for carrier aggregation.

A.3.9.2 Principle of testing

In Annex A carrier aggregation test cases may be defined for different duplex modes or combination of duplex modes (E-UTRA FDD, E-UTRA TDD and E-UTRA TDD-FDD) to verify the same RRM requirement.

If multiple carrier aggregation test cases are defined for different duplex modes (E-UTRA FDD or E-UTRA TDD) or for combination of duplex modes (E-UTRA TDD-FDD) to verify the same RRM requirement which is independent of the duplex mode and is identical for different duplex modes or combination of duplex modes, then from UE the performance point of view the test coverage can be considered fulfilled by executing only the corresponding test case(s) with one of the duplex modes supported by the UE.

A.3.10 Carrier Aggregation Test Cases with Different CA Configurations

A.3.10.1 Introduction

This clause defines a principle which is applicable to test cases verifying RRM requirements for carrier aggregation.

A.3.10.2 Principle of testing

In Annex A carrier aggregation test cases may be defined for two CCs as well as for more than two CCs to verify the same RRM requirement.

If multiple carrier aggregation test cases are defined for two CCs as well as for more than two CCs to verify the same RRM requirement, then from the UE performance point of view the test coverage can be considered fulfilled by executing only the test cases with the maximum number of CCs supported by the UE.

Editor's note: whether it is sufficient to test for any one of the band combinations supported by the UE is FFS.

A.3.11 Test Cases for Synchronous and Asynchronous Dual Connectivity

A.3.11.1 Introduction

This clause defines a principle which is applicable to test cases verifying RRM requirements for dual connectivity (DC) operation in synchronous and asynchronous scenarios.

A.3.11.2 Principle of Testing

In Annex A test cases may be defined in both synchronous DC and asynchronous DC scenarios to verify the same RRM requirement.

If test cases are defined in both synchronous and asynchronous DC scenarios to verify the same RRM requirement then the UE capable of both synchronous and asynchronous DC operations needs to be tested with one of the tests in either synchronous or asynchronous DC scenarios.

A.3.12 Proximity-based Services

A.3.12.1 Introduction

This clause also defines the principle and the reference configurations that are applicable to test cases verifying RRM core requirements for ProSe Direct Discovery and ProSe Direct Communication.

A.3.12.2 Reference DRX configurations for ProSe tests

Table A.3.12.2-1: Reference DRX Configurations

Parameter	Value
Reference configuration	DRX_P1
onDurationTimer	psf1
drx-InactivityTimer	psf1
drx-RetransmissionTimer	psf1
longDRX-CycleStartOffset	sf320, 0
shortDRX	Disabled
Note: For further information see clause 6.3.2 in TS 36.331.	

A.3.12.3 Test Cases with Different Channel Bandwidths

A.3.12.3.1 Introduction

This clause defines a principle which is applicable to test cases verifying ProSe RRM requirements with different channel bandwidths.

A.3.12.3.2 Principle of testing

Some ProSe test cases are defined for different channel bandwidths to verify the same RRM requirement.

If test cases with different channel bandwidth are defined to verify the same RRM requirement then the UE is required to pass the test cases only with one of the channel bandiwdths.

A.3.12.4 Reference resource pool configurations for ProSe Direct Discovery

Table A.3.12.4-1: ProSe Direct Discovery configuration for E-UTRA FDD (Configuration #1)

Information Element				Value
discRxPool	*cp-Len*			Normal
	discPeriod			rf32
	numRetx			0
	numRepetition			1
	tf-ResourceConfig	*prb-Num*		12
		prb-Start		0
		prb-End		23
		offsetIndicator		160
		subframeBitmap		11000000 00000000 00000000 00000000 00000000
	txParameters			not present
	rxParameters			not present
discTxPoolCommon	*cp-Len*			Normal
	discPeriod			rf32
	numRetx			0
	numRepetition			1
	tf-ResourceConfig	*prb-Num*		2
		prb-Start		3
		prb-End		5
		offsetIndicator		160
		subframeBitmap		10000000 00000000 00000000 00000000 00000000
	txParameters	*txParametersGeneral*	*alpha*	al0
			p0	31
		ue-SelectedResourceConfig	*poolSelection*	random
			txProbability	p100
	rxParameters			not present
discTxPowerInfo	*discMaxTxPower*			23
SL-SyncConfig	*syncCP-Len*			Normal
	syncOffsetIndicator			35 (155 mod 40)
	slssid			30
	txParameters	*txParametersGeneral*	*alpha*	al0
			p0	31
		syncTxThreshIC		0 (-infinity)
	rxParamsNCell			not present
discInterFreqList				not present

Table A.3.12.4-2: ProSe Direct Discovery configuration for E-UTRA FDD (Configuration #2)

Information Element				Value
discRxPool	*cp-Len*			Normal
	discPeriod			rf32
	numRetx			0
	numRepetition			1
	tf-ResourceConfig	*prb-Num*		12
		prb-Start		0
		prb-End		23
		offsetIndicator		160
		subframeBitmap		11000000 00000000 00000000 00000000 00000000
	txParameters			not present
	rxParameters	*tdd-Config*		not present
		syncConfigIndex		0
discTxPoolCommon				not present
discTxPowerInfo	*discMaxTxPower*			23
SL-SyncConfig	*syncCP-Len*			Normal
	syncOffsetIndicator			20 (140 mod 40)
	slssid			30
	txParameters			not present
	rxParamsNCell	*physCellId*		1
		discSyncWindow		w1
discInterFreqLis				not present

Table A.3.12.4-3: ProSe Direct Discovery configuration for E-UTRA TDD Config 0 (Configuration #3)

Information Element				Value
discRxPool	*cp-Len*			Normal
	discPeriod			rf32
	numRetx			0
	numRepetition			1
	tf-ResourceConfig	*prb-Num*		12
		prb-Start		0
		prb-End		23
		offsetIndicator		163
		subframeBitmap		11000000 00000000 00000000 00000000 00000000 00
	txParameters			not present
	rxParameters			not present
discTxPoolCommon	*cp-Len*			Normal
	discPeriod			rf32
	numRetx			0
	numRepetition			1
	tf-ResourceConfig	*prb-Num*		2
		prb-Start		3
		prb-End		5
		offsetIndicator		163
		subframeBitmap		10000000 00000000 00000000 00000000 00000000 00
	txParameters	*txParametersGeneral*	*alpha*	al0
			p0	31
		ue-SelectedResourceConfig	*poolSelection*	random
			txProbability	p100
	rxParameters			not present
discTxPowerInfo	*discMaxTxPower*			23
SL-SyncConfig	*syncCP-Len*			Normal
	syncOffsetIndicator			38 (158 mod 40)
	slssid			30
	txParameters	*txParametersGeneral*	*alpha*	al0
			p0	31
		syncTxThreshIC		0 (-infinity)
	rxParamsNCell			not present
discInterFreqList				not present

A.3.12.5 Reference resource pool configurations for ProSe Direct Communication

Table A.3.12.5-1: ProSe Direct Communication configuration for E-UTRA FDD (Configuration #1)

Information Element				Value (5MHz)	Value (10MHz)
commRxPool	*sc-CP-Len*			Normal	
	sc-Period			sf40	
	sc-TF-ResourceConfig	*prb-Num*		12	25
		prb-Start		0	0
		prb-End		23	49
		offsetIndicator		0	
		subframeBitmap		00011000 00000000 00000000 00000000 00000000	
	data-CP-Len			Normal	
	dataHoppingConfig	*hoppingParameter*		0	
		numSubbands		ns1	
		rb-Offset		0	
	ue-SelectedResourceConfig	*data-TF-ResourceConfig*	*prb-Num*	12	25
			prb-Start	0	0
			prb-End	23	49
			offsetIndicator	0	
			subframeBitmap	00000000 11111111 11111111 11111111 11111111	
		trpt-Subset-r12		001	
	rxParametersNCell			not present	
	txParameters			not present	
commTxPoolNormalCommon	*sc-CP-Len*			Normal	
	sc-Period			sf40	
	sc-TF-ResourceConfig	*prb-Num*		12	25
		prb-Start		0	0
		prb-End		24	49
		offsetIndicator		0	
		subframeBitmap		00011000 00000000 00000000 00000000 00000000	
	data-CP-Len			Normal	
	dataHoppingConfig	*hoppingParameter*		0	
		numSubbands		ns1	
		rb-Offset		0	
	ue-SelectedResourceConfig	*data-TF-ResourceConfig*	*prb-Num*	12	25
			prb-Start	0	0
			prb-End	23	49
			offsetIndicator	0	
			subframeBitmap	00000000 11111111 11111111 11111111 11111111	
		trpt-Subset-r12		001	
	rxParametersNCell			not present	
	txParameters	*sc-TxParameters*	*alpha*	al0	
			p0	31	
		dataTxParameters	*alpha*	al0	

			p0	31
SL-SyncConfig	*syncCP-Len*			Normal
	syncOffsetIndicator			2
	slssid			30
	txParameters	*txParametersGeneral*	*alpha*	al0
			p0	31
		syncTxThreshIC		0 (-infinity)
	rxParamsNCell			not present

Table A.3.12.5-2: ProSe Direct Communication pre-configuration for E-UTRAN FDD for out-of-network coverage operation (Configuration #2)

Information Element				Value (5MHz)	Value (10MHz)
preconfigSync	*syncCP-Len-r12*			Normal	
	syncOffsetIndicator1			2	
	syncOffsetIndicator2			1	
	syncTxParameters			31	
	syncTxThreshOoC			0 (-110dBm / 15kHz)	
	filterCoefficient			fc0	
	syncRefMinHyst			dB0	
	syncRefDiffHyst			dB0	
preconfigComm	*sc-CP-Len*			Normal	
	sc-Period			sf40	
	sc-TF-ResourceConfig	*prb-Num*		12	25
		prb-Start		0	0
		prb-End		23	49
		offsetIndicator		0	
		subframeBitmap		00011000 00000000 00000000 00000000 00000000	
	data-CP-Len			Normal	
	dataHoppingConfig	*hoppingParameter*		0	
		numSubbands		ns1	
		rb-Offset		0	
	ue-SelectedResourceConfig	*data-TF-ResourceConfig*	*prb-Num*	12	25
			prb-Start	0	0
			prb-End	23	49
			offsetIndicator	0	
			subframeBitmap	00000000 11111111 11111111 11111111 11111111	
		trpt-Subset-r12		001	

A.3.12.6 Reference Measurement Channels for ProSe Direct Discovery

A.3.12.6.1 FDD

Table A.3.12.6-1: PSDCH Reference Measurement Channels for FDD

Parameter	Unit	Value
Reference channel		D.1 FDD
Channel bandwidth	MHz	5
Allocated resource blocks		2
Subcarriers per resource block		12
Allocated subframes per Discovery period		1
DFT-OFDM Symbols per subframe (see note)		11
Modulation		QPSK
Information Bit Payload		232
Transport block CRC	Bits	24
Maximum number of HARQ transmissions		1
Binary Channel Bits (see note)	Bits	528
NOTE1: PSDCH transmissions are rate-matched for 12 DFT-OFDM symbols per subframe, and the last symbol shall be punctured as per TS 36.211.		

A.3.12.7 Reference measurement channels for ProSe Direct Communication

A.3.12.7.1 FDD

Table A.3.12.7-1: PSCCH Reference Measurement Channels for FDD

Parameter		Unit	Value	
Reference channel			CC.1 FDD	CC.2 FDD
Channel bandwidth		MHz	5	10
Allocated resource blocks			1	1
Subcarriers per resource block			12	12
DFT-OFDM Symbols per subframe (see Note 1)			11	11
Modulation			QPSK	QPSK
Information Bit Payload		Bits	41	43
Information bits	Frequency hopping flag		0	
	RB assignment		Set as per PSSCH RB allocation specific in the test	
	Time resource pattern (I_{TRP})		0 (Note 2)	
	Modulation and coding scheme		Set as the PSSCH MCS specified in the test	
	Timing advance indication		0	
	Group destination ID		As set by higher layers	
Transport block CRC		Bits	16	16
Maximum number of HARQ transmissions			2	2
Binary Channel Bits (see Note 1)		Bits	264	264
NOTE1: PSCCH transmissions are rate-matched for 12 DFT-OFDM symbols per subframe, and the last symbol shall be punctured as per TS 36.211. NOTE 2: For N_{TRP} = 8 (FDD) and *trpt-Subset* = 001, I_{TRP} = 0 corresponds to a time repetition pattern of (1,0,0,0,0,0,0,0) as per TS 36.213.				

Table A.3.12.7-1: PSSCH Reference Measurement Channels for FDD

Parameter	Unit	Value	
Reference channel		CD.1 FDD	CD.2 FDD
Channel bandwidth	MHz	5	10
Allocated resource blocks		2	3
Subcarriers per resource block		12	12
DFT-OFDM Symbols per subframe (see Note 1)		11	11
Modulation		QPSK	QPSK
Target Code Rate		1/3	1/3
Information Bit Payload		176	256
Transport block CRC	Bits	24	24
Maximum number of HARQ transmissions		3	3
Binary Channel Bits (see note)	Bits	528	1056
NOTE1: PSDCH transmissions are rate-matched for 12 DFT-OFDM symbols per subframe, and the last symbol shall be punctured as per TS 36.211.			

A.3.12.8 ProSe Receive Traffic Generator

This clause defines the configuration for active Sidelink UEs used to generate receive traffic in ProSe RRM tests.

A.3.12.8.1 ProSe Direct Communication Receive Traffic Generator for FDD

Table A.3.12.8.1-1: Active Sidelink UE configuration for ProSe Direct Communication

Configuration			PCP.1.FDD
Channel BW		MHz	5 or 10
Number of Active Sidelink UEs per sc-period			5 MHz: 12 10 MHz: 16
Active Sidelink UEs	PSCCH RMC (defined in A.3.12.7)		5 MHz: CC.1 FDD 10 MHz: CC.2 FDD
	PSCCH resource allocation		5MHz: [2i:2i], for Sidelink UE i=0,..,11 10MHz:[3i:3i], for Sidelink UE i = 0, .., 15
	PSSCH RMC (defined in A.3.12.7)		5 MHz: CD.1 FDD 10 MHz: CD.2 FDD
	PSSCH resource allocation		Non-overlapping RBs 5MHz: [2i:2i+1], for Sidelink UE i = 0, .., 11 10MHz:[3i:3i+2], for Sidelink UE i = 0, .., 15
	RSRP	dBm/15kHz	-98

A.3.12.8.2 ProSe Direct Discovery Receive Traffic Generator for FDD

Table A.3.12.8.2-1: Active Sidelink UE configuration for ProSe Direct Discovery

Configuration			PDP.1.FDD	PDP.2.FDD
Channel BW		MHz	5	
Number of Active Sidelink UEs per Discovery subframe			12	
Active Sidelink UEs	Sidelink UE Transmissions		PSDCH (RMC D.1 FDD)	PSDCH (RMC D.1 FDD) + SLSS on synchronization subframe
	Resource allocation		Non overlapping RBs in a subframe	
	RSRP	dBm/15kHz	-95	

A.3.13 Time Offset between Cells

A.3.13.1 Introduction

In Annex A in some test cases a parameter called, ‘time offset between cells’ is used. The meaning of this parameter is defined in this clause.

A.3.13.2 Definition

Unless explicitly stated otherwise, the time offset between cells for a pair of cells is defined as the difference between radio frame start timings of the pair of cells.

A.4 E-UTRAN RRC_IDLE state

A.4.2 Cell Re-Selection

A.4.2.1 E-UTRAN FDD – FDD Intra frequency case

A.4.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD intra frequency cell reselection requirements specified in clause 4.2.2.3.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.4.2.1.1-1 and A.4.2.1.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Only Cell 1 is already identified by the UE prior to the start of the test, i.e. Cell 2 is not identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

Table A.4.2.1.1-1: General test parameters for FDD intra frequency cell reselection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2	
T2 end condition	Active cell		Cell2	
	Neighbour cells		Cell1	
Final condition	Visited cell		Cell1	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2
T2		s	40	T2 need to be defined so that cell re-selection reaction time is taken into account.
T3		s	15	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.1.1-2: Cell specific test parameters for FDD intra frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD			OP.2 FDD		
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0			0		
Qrxlevmin	dBm	-140	-140	-140	-140	-140	-140
Pcompensation	dB	0	0	0	0	0	0
$Qhyst_s$	dB	0	0	0	0	0	0
$Qoffset_{s, n}$	dB	0	0	0	0	0	0
Cell_selection_and_reselection_quality_measurement		RSRP			RSRP		
$\hat{E}_s/I_{ot}$	dB	16	-3.11	2.79	-infinity	2.79	-3.11
N_{oc} Note2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	16	13	16	-infinity	16	13
RSRP Note3	dBm/15 kHz	-82	-85	-82	-infinity	-82	-85
Treselection	s	0	0	0	0	0	0
Sintrasearch	dB	Not sent			Not sent		
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.1.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The cell reselection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to an already detected cell shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: $T_{detect,EUTRAN\_Intra} + T_{SI}$, and to an already detected cell can be expressed as: $T_{evaluateFDD,intra} + T_{SI}$,

Where:

$T_{detect,EUTRAN\_Intra}$ See Table 4.2.2.3-1 in clause 4.2.2.3

$T_{evaluateFDD,intra}$ See Table 4.2.2.3-1 in clause 4.2.2.3

T_{SI} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell and 7.68 s, allow 8 s for the cell re-selection delay to an already detected cell in the test case.

A.4.2.2 E-UTRAN TDD – TDD Intra frequency case

A.4.2.2.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD intra frequency cell reselection requirements specified in clause 4.2.2.3.

The test scenario comprises of 1 E-UTRA TDD carrier and 2 cells as given in tables A.4.2.2.1-1 and A.4.2.2.1-2. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.2.1-1: General test parameters for TDD intra frequency cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2	
T2 end condition	Active cell		Cell2	
	Neighbour cells		Cell1	
Final condition	Visited cell		Cell1	
E-UTRA RF Channel Number			1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Time offset between cells		μs	3	Synchronous cells
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2
T2		s	40	T2 need to be defined so that cell re-selection reaction time is taken into account.
T3		s	15	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.2.1-2: Cell specific test parameters for TDD intra frequency cell re-selection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Pattern defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD			OP.2 TDD		
PBCH_RA	dB	0			0		
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA							
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
PDSCH_RA							
PDSCH_RB							
OCNG_RA Note 1							
OCNG_RB Note 1							
Qrxlevmin	dBm	-140			-140		
Pcompensation	dB	0			0		
$Qhyst_s$	dB	0			0		
$Qoffset_{s,\,n}$	dB	0			0		
Cell_selection_and_ reselection_quality_ measurement		RSRP			RSRP		
$\hat{E}_s/I_{ot}$	dB	16	-3.11	2.79	-infinity	2.79	-3.11
N_{oc} Note2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	16	13	16	-infinity	16	13
RSRP Note3	dBm/15 kHz	-82	-85	-82	-infinity	-82	-85
Treselection	s	0	0	0	0	0	0
Sintrasearch	dB	Not sent			Not sent		
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.2.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The cell reselection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: $T_{detect,EUTRAN\_Intra}$ + $T_{SI-EUTRA}$, and to an already detected cell can be expressed as: $T_{evaluate, E-UTRAN\_ intra}$ + $T_{SI-EUTRA}$,

Where:

$T_{detect,EUTRAN\_Intra}$ See Table 4.2.2.3-1 in clause 4.2.2.3

$T_{evaluate,E-UTRAN\_ intra}$ See Table 4.2.2.3-1 in clause 4.2.2.3

$T_{SI-EUTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell and 7.68 s, allow 8 s for the cell re-selection delay to an already detected cell in the test case.

A.4.2.3 E-UTRAN FDD – FDD Inter frequency case

A.4.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency cell reselection requirements specified in clause 4.2.2.4.

The test scenario comprises of 2 E-UTRA FDD cells on 2 different carriers as given in tables A.4.2.3.1-1 and A.4.2.3.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.3.1-1: General test parameters for FDD-FDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
E-UTRA RF Channel Number			1, 2	Two FDD carrier frequencies are used.
Time offset between cells			3 ms	Asynchronous cells
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		s	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.3.1-2: Cell specific test parameters for FDD-FDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD			OP.2 FDD		
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB	0			0		
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
Qrxlevmin	dBm	-140			-140		
N_{oc} Note 2	dBm/15 kHz	-98					
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86
$\hat{E}_s/I_{ot}$	dB	14	14	14	-4	-infinity	12
$\hat{E}_s/N_{oc}$	dB	14	14	14	-4	-infinity	12
$Treselection_{EUTRAN}$	s	0			0		
Snonintrasearch	dB	50			Not sent		
$Thresh_{x, high}$	dB	48			48		
$Thresh_{serving, low}$	dB	44			44		
$Thresh_{x, low}$	dB	50			50		
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.3.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluateFDD,inter} + T_{SI}$, and to lower priority cell can be expressed as: $T_{evaluateFDD,inter} + T_{SI}$,

Where:

$T_{higher\_priority\_search}$ See clause 4.2.2

$T_{evaluateFDD,inter}$ See Table 4.2.2.4-1 in clause 4.2.2.4

T_{SI} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

A.4.2.4 E-UTRAN FDD – TDD Inter frequency case

A.4.2.4.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-TDD inter-frequency cell reselection requirements specified in clause 4.2.2.4.

The test scenario comprises of 1 E-UTRA FDD cell and 1 E-UTRA TDD cell as given in tables A.4.2.4.1-1 and A.4.2.4.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.4.1-1: General test parameters for FDD-TDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
Cell 1 E-UTRA RF Channel Number			1	One FDD carrier frequency is used. And Cell 1 is on RF channel number 1.
Cell 2 E-UTRA RF Channel Number			2	One TDD carrier frequencies is used. And Cell 2 is on RF channel number 2.
Time offset between cells			3 ms	Asynchronous cells
E-UTRA FDD PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA TDD PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
E-UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
E-UTRA TDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		s	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.4.1-2: Cell specific test parameters for FDD-TDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD) and A.3.2.2.2 (OP.2 TDD)		OP.2 FDD			OP.2 TDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
Qrxlevmin	dBm	-140			-140		
N_{oc} Note 2	dBm/15 kHz	-98					
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86
$\hat{E}_s/I_{ot}$	dB	14	14	14	-4	-infinity	12
$\hat{E}_s/N_{oc}$	dB	14	14	14	-4	-infinity	12
$Treselection_{EUTRAN}$	s	0			0		
Snonintrasearch	dB	50			Not sent		
$Thresh_{x, high}$	dB	48			48		
$Thresh_{serving, low}$	dB	44			44		
$Thresh_{x, low}$	dB	50			50		
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.4.2.4.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$, and to lower priority cell can be expressed as: $T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$,

Where:

$T_{higher\_priority\_search}$ See clause 4.2.2

$T_{evaluate,E-UTRAN\_inter}$ See Table 4.2.2.4-1 in clause 4.2.2.4

$T_{SI-EUTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

A.4.2.5 E-UTRAN TDD – FDD Inter frequency case

A.4.2.5.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-FDD inter-frequency cell reselection requirements specified in clause 4.2.2.4.

The test scenario comprises of 1 E-UTRA TDD cell and 1 E-UTRA FDD cell as given in tables A.4.2.5.1-1 and A.4.2.5.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.5.1-1: General test parameters for TDD-FDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
Cell 1 E-UTRA RF Channel Number			1	One TDD carrier frequency is used. And Cell 1 is on RF channel number 1.
Cell 2 E-UTRA RF Channel Number			2	One FDD carrier frequencies is used. And Cell 2 is on RF channel number 2.
Time offset between cells			3 ms	Asynchronous cells
E-UTRA TDD PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
E-UTRA FDD PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
E-UTRA TDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		s	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.5.1-2: Cell specific test parameters for TDD-FDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD) and A.3.2.2.2 (OP.2 TDD)		OP.2 TDD			OP.2 FDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
Qrxlevmin	dBm	-140			-140		
N_{oc} Note 2	dBm/15 kHz	-98					
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86
$\hat{E}_s/I_{ot}$	dB	14	14	14	-4	-infinity	12
$\hat{E}_s/N_{oc}$	dB	14	14	14	-4	-infinity	12
$Treselection_{EUTRAN}$	s	0			0		
Snonintrasearch	dB	50			Not sent		
$Thresh_{x, high}$	dB	48			48		
$Thresh_{serving, low}$	dB	44			44		
$Thresh_{x, low}$	dB	50			50		
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.5.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$, and to lower priority cell can be expressed as: $T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$,

Where:

$T_{higher\_priority\_search}$	See clause 4.2.2
$T_{evaluate,E-UTRAN\_inter}$	See Table 4.2.2.4-1 in clause 4.2.2.4
$T_{SI-EUTRA}$	Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

A.4.2.6 E-UTRAN TDD – TDD: Inter frequency case

A.4.2.6.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter-frequency cell reselection requirements specified in clause 4.2.2.4.

The test scenario comprises of 2 E-UTRA TDD cells on 2 different carriers as given in tables A.4.2.6.1-1 and A.4.2.6.1-2. The test consists of three successive time periods, with time duration of T1, T2, and T2 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.6.1-1: General test parameters for TDD-TDD inter frequency cell reselection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
E-UTRA RF Channel Number			1, 2	Two TDD carrier frequencies are used.
Time offset between cells			3 μs	Synchronous cells
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		s	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.6.1-2: Cell specific test parameters for TDD-TDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Pattern defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD			OP.2 TDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
Qrxlevmin	dBm	-140			-140		
N_{oc} Note 2	dBm/15 kHz	-98					
RSRP Note 3	dBm/15 KHz	-84	-84	-84	-102	-infinity	-86
$\hat{E}_s/I_{ot}$	dB	14	14	14	-4	-infinity	12
$\hat{E}_s/N_{oc}$	dB	14	14	14	-4	-infinity	12
$Treselection_{EUTRAN}$	S	0			0		
Snonintrasearch	dB	50			Not sent		
$Thresh_{x, high}$	dB	48			48		
$Thresh_{serving, low}$	dB	44			44		
$Thresh_{x, low}$	dB	50			50		
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.4.2.6.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to higher priority shall be less than 68 s.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to lower priority shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$, and to lower priority cell can be expressed as: $T_{evaluate,E-UTRAN\_inter} + T_{SI-EUTRA}$,

Where:

$T_{higher\_priority\_search}$	See clause 4.2.2
$T_{evaluate,E-UTRAN\_inter}$	See Table 4.2.2.4-1 in clause 4.2.2.4
$T_{SI-EUTRA}$	Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s for higher priority cell search and 7.68 s for lower priority cell search, allow 68 s for higher priority cell and 8 s for lower priority cell in the test case.

A.4.2.7 E-UTRAN FDD – FDD Inter frequency case in the existence of non-allowed CSG cell

A.4.2.7.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency cell reselection requirements specified in clause 4.2.2.4 when there is the interference from non-allowed CSG cell and the layers have equal priority.

The test scenario comprises of 2 E-UTRA FDD cells on 2 different carriers and 1 non-allowed E-UTRA FDD CSG cell as given in tables A.4.2.7.1-1 and A.4.2.7.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 3 is a non-allowed CSG cell. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.7.1-1: General test parameters for FDD-FDD inter frequency cell re-selection test case with non-allowed CSG cell

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
E-UTRA RF Channel Number			1, 2	Two FDD carrier frequencies are used.
Time offset between cells			3 ms	Asynchronous cells
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that the non-allowed CSG cell is identified.
T2		s	40	T2 need to be defined so that cell re-selection reaction time is taken into account.
T3		s	15	T3 need to be defined so that whether cell re-selection would not occur is insured.

Table A.4.2.7.1-2: Cell specific test parameters for FDD-FDD inter frequency cell re-selection test case with non-allowed CSG cell

Parameter	Unit	Cell 1			Cell 2			Cell 3(Non-allowed CSG cell)		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			1		
$BW_{channel}$	MHz	10			10			10		
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD			OP.2 FDD			OP.2 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
Qrxlevmin	dBm	-140			-140			-140		
Qqualmin	dB	-20								
N_{oc} Note 2	dBm/15 kHz	-98								
RSRP Note 3	dBm/15 kHz	-90	-90	-85	-Infinity	-85	-90	-90	-85	-60
RSRQ Note 3	dB	-14.1	-17.1	-35.8				-14.1	-12.1	-10.8
$\hat{E}_s/I_{ot}$	dB	-0.64	-5.21	-25	-Infinity	13	8	-0.64	4.36	24.8
$\hat{E}_s/N_{oc}$	dB	8	8	13	-Infinity	13	8	8	13	38
Treselection	s	0			0			0		
Snonintrasearch	dB	-10			Not sent			Not sent		
Propagation Condition		AWGN								

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and RSRQ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.7.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

The probability of reselection from Cell 2 to Cell 1 during T3 observed during testing shall be less than 10%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: $T_{detect,EUTRAN\_Inter} + T_{SI}$,

Where:

$T_{detect,EUTRAN\_Inter}$ See Table 4.2.2.4-1 in clause 4.2.2.4

T_{SI} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell in the test case.

A.4.2.8 E-UTRAN TDD – TDD Inter frequency case in the existence of non-allowed CSG cell

A.4.2.8.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter-frequency cell reselection requirements specified in clause 4.2.2.4 when there is the interference from non-allowed CSG cell and the layers have equal priority.

The test scenario comprises of 2 E-UTRA TDD cells on 2 different carriers and 1 non-allowed E-UTRA TDD CSG cell as given in tables A.4.2.8.1-1 and A.4.2.8.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 3 is a non-allowed CSG cell. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.4.2.8.1-1: General test parameters for TDD-TDD inter frequency cell re-selection test case with non-allowed CSG cell

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
E-UTRA RF Channel Number			1, 2	Two TDD carrier frequencies are used.
Time offset between cells		μs	3	Synchronous cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	T1 need to be defined so that the non-allowed CSG cell is identified.
T2		s	40	T2 need to be defined so that cell re-selection reaction time is taken into account.
T3		s	15	T3 need to be defined so that whether cell re-selection would not occur is insured.

Table A.4.2.8.1-2: Cell specific test parameters for TDD-TDD inter frequency cell re-selection test case with non-allowed CSG cell

Parameter	Unit	Cell 1			Cell 2			Cell 3 (Non-allowed CSG cell)		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			1		
$BW_{channel}$	MHz	10			10			10		
OCNG Pattern defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD			OP.2 TDD			OP.2 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
Qrxlevmin	dBm	-140			-140			-140		
Qqualmin	dB	-20								
N_{oc} Note 2	dBm/15kHz	-98								
RSRP Note 3	dBm/15kHz	-90	-90	-85	-Infinity	-85	-90	-90	-85	-60
RSRQ Note 3	dB	-14.1	-17.1	-35.8				-14.1	-12.1	-10.8
$\hat{E}_s/I_{ot}$	dB	-0.64	-5.21	-25	-Infinity	13	8	-0.64	4.36	24.8
$\hat{E}_s/N_{oc}$	dB	8	8	13	-Infinity	13	8	8	13	38
Treselection	S	0			0			0		
Snonintrasearch	dB	-10			Not sent			Not sent		
Propagation Condition		AWGN								

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and RSRQ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.8.2 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 34 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

The probability of reselection from Cell 2 to Cell 1 during T3 observed during testing shall be less than 10%.

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: $T_{detect,EUTRAN\_Inter} + T_{SI}$,

Where:

$T_{detect,EUTRAN\_Inter}$ See Table 4.2.2.4-1 in clause 4.2.2.4

T_{SI} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 33.28 s, allow 34 s for the cell re-selection delay to a newly detectable cell in the test case.

A.4.2.9 E-UTRAN FDD – FDD Intra frequency case for 5MHz bandwidth

A.4.2.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.4.2.1.1.

The parameters of this test are the same as defined in Subclause A.4.2.1.1 except that the values of the parameters in the Table A.4.2.9.1-1 will replace the values of the corresponding parameters in A.4.2.1.1-1, and the values of the parameters in the Table A.4.2.9.1-2 will replace the values of the corresponding parameters in A.4.2.1.1-2.

Table A.4.2.9.1-1: General test parameters for FDD intra frequency cell reselection test case for 5MHz bandwidth

Parameter	Unit	Value	Comment
Channel Bandwidth ($BW_{channel}$)	MHz	5	
Note 1: See Table A.4.2.1.1-1 for the other parameters. Note 2: This is according to the principle defined in section A.3.7.2.			

Table A.4.2.9.1-2: Cell specific test parameters for FDD intra frequency cell reselection test case in AWGN for 5MHz

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	5			5		
OCNG Patterns defined in A.3.2.1.16 (OP.16 FDD)		OP.16 FDD			OP.16 FDD		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: See Table A.4.2.1.1-2 for the other parameters.							

A.4.2.9.2 Test Requirements

The test requirements defined in section A.4.2.1.2 shall apply to this test case.

A.4.2.10 E-UTRAN FDD – FDD reselection using an increased number of carriers

A.4.2.10.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4.

The test scenario comprises of indicating 8 E-UTRA FDD interfrequency cells on 8 different carriers in the neighbour list of cell 1 as given in tables A.4.2.10.1-1 and A.4.2.10.1-2. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2, 3 and 4 which are chosen from the 8 intefrequency layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2, 3 and 4 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test.

Cell 1, 2, 3 and 4 are identified by the UE during time phase T0. Cell 1, cell 2, cell 3 and cell 4 all belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2, 3 or 4. Cells 1, 2, 3 and 4 all have equal absolute priority.

Table A.4.2.10.1-1: General test parameters for FDD-FDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
T0	Active cell		Cell1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2, 3, 4 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T1
	Neighbour cell		Cell 1, cell 3, cell 4	
T2 end condition	Active cell		Cell 3	UE shall perform reselection to cell 3 during T2
	Neighbour cell		Cell 1, cell 2, cell 4	
T3 end condition	Active cell		Cell 4	UE shall perform reselection to cell 4 during T3
	Neighbour cell		Cell 1, cell 2, cell 3	
T4 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T4
	Neighbour cell		Cell 2, cell 3, cell 4	
UE configured E-UTRA RF Channel Number			1, 2,3,4,5,6,7,8,9	Serving cell and eight xDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance
Test eqipment configuration			Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7,8,9	
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211 [16]
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T0		s	(Test equipment frequency selection and configuration time) + 960	T0 is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.
T1		s	25	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	200	T2 need to be defined so that cell re-selection reaction time is taken into account
T3		s	200	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4		s	25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.2.10.1-2: Cell specific test parameters for FDD-FDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1					Cell 2					Cell 3				Cell 4			
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	T0	T1	T2
E-UTRA RF Channel number		1					Randomly selected from 2,3,4 such that cell 2 is in the normal performance group					Randomly selected from 5,6,7,8,9 such that cell 3 is in the reduced performance group				Randomly selected from 5,6,7,8,9 such that cell 4 is in the reduced performance group			
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50					5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50					5MHz: N_{RB} = 25 10MHz: N_{RB} = 50				5MHz: N_{RB}= 25 10MHz: $N_{RB,}$ = 50			
OCNG patterns		OP.16 FDD (5MHz) OP.2 FDD (10MHz)					OP.16 FDD (5MHz) OP.2 FDD (10MHz)					OP.16 FDD (5MHz) OP.2 FDD (10MHz)				OP.16 FDD (5MHz) OP.2 FDD (10MHz)			
PBCH_RA	dB	0					0					0				0			
PBCH_RB	dB																		
PSS_RA	dB																		
SSS_RA	dB																		
PCFICH_RB	dB																		
PHICH_RA	dB																		
PHICH_RB	dB																		
PDCCH_RA	dB																		
PDCCH_RB	dB																		
PDSCH_RA	dB																		
PDSCH_RB	dB																		
OCNG_RA Note 1	dB																		
OCNG_RB Note 1	dB																		
Qrxlevmin	dBm	-140					-140					-140				-140			
N_{oc} Note 2	dBm/15 kHz	-98					-98					-98				-98			
$\hat{E}_s/N_{oc}$	dB	14	8	8	8	14	8	14	8	8	8	8	8	14	8	8	8	8	8
$\hat{E}_s/I_{ot}$	dB	14	8	8	8	14	8	14	8	8	8	8	8	14	8	8	8	8	8
RSRP Note 3	dBm/15 kHz	-84	-90	-90	-90	-84	-90	-84	-90	-90	-90	-90	-90	-84	-90	-90	-90	-90	-90
$Treselection_{EUTRAN}$	s	0					0					0				0			
Snonintrasearch	dB	62					62					62				62			
Propagation Condition		AWGN					AWGN					AWGN				AWGN			
Antenna Configuration		1x2					1x2					1x2				1x2			
Timing offset to Cell 1		-					3ms					3ms				3ms			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled. Note 3: Es/Iot and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.																			

A.4.2.10.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.2.10.2-1.

Table A.4.2.10.2-1 : Reselection delay requirements

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	20.5
T2	Cell 3 (reduced performance group)	193.3
T3	Cell 4 (reduced performance group)	193.3
T4	Cell 1 (normal performance group)	20.5

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as: $K_{carrier,normal}$ * $T_{evaluate,E-UTRAN\_Inter}$, + T_{SI} , and to a reduced performance group cell can be expressed as: 6* $K_{carrier,reduced}$ * $T_{evaluate,E-UTRAN\_Inter}$, + T_{SI},

This gives a total of 20.48 s for normal performance group reselection and 193.28 s for reduced performance group reselection, allow 20.5 s for normal performance group and 193.3 s for reduced performance group in the test case. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved.

A.4.2.11 E-UTRAN TDD – TDD reselection using an increased number of carriers

A.4.2.11.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter-frequency cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4.

The test scenario comprises of indicating 8 E-UTRA TDD interfrequency cells on 8 different carriers in the neighbour list of cell 1 as given in tables A.4.2.11.1-1 and A.4.2.11.1-2. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2, 3 and 4 which are chosen from the 8 intefrequency layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2, 3 and 4 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test.

Cell 1, 2, 3 and 4 are identified by the UE during time phase T0. Cell 1, cell 2, cell 3 and cell 4 all belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2, 3 or 4. Cells 1, 2, 3 and 4 all have equal absolute priority.

Table A.4.2.11.1-1: General test parameters for TDD-TDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
T0	Active cell		Cell1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2,3,4 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T1
	Neighbour cell		Cell 1, cell 3, cell 4	
T2 end condition	Active cell		Cell 3	UE shall perform reselection to cell 3 during T2
	Neighbour cell		Cell 1, cell 2, cell 4	
T3 end condition	Active cell		Cell4	UE shall perform reselection to cell 4 during T3
	Neighbour cell		Cell 1, cell 2, cell 3	
T4 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T4
	Neighbour cell		Cell 2, cell 3, cell 4	
UE configured E-UTRA RF Channel Number			1, 2,3,4,5,6,7,8,9	Serving cell and eight xDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance
Test eqipment configuration			Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7,8,9	
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211 [16]
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T0		s	(Test equipment frequency selection and configuration time) + 960	T0 is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.
T1		s	25	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	200	T2 need to be defined so that cell re-selection reaction time is taken into account
T3		s	200	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4		s	25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.2.11.1-2: Cell specific test parameters for TDD-TDD inter-frequency cell reselection test case in AWGN

Parameter	Unit	Cell 1					Cell 2					Cell 3				Cell 4			
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	T0	T1	T2	T3	T4	T0	T1	T2
E-UTRA RF Channel number		1					Randomly selected from 2,3,4 such that cell 2 is in the normal performance group					Randomly selected from 5,6,7,8,9 such that cell 3 is in the reduced performance group				Randomly selected from 5,6,7,8,9 such that cell 4 is in the reduced performance group			
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50					5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50					5MHz: N_{RB} = 25 10MHz: N_{RB} = 50				5MHz: N_{RB}= 25 10MHz: $N_{RB,}$ = 50			
OCNG Patterns		5MHz: OP.10 TDD 10MHz: OP.2 TDD					5MHz: OP.10 TDD 10MHz: OP.2 TDD					5MHz: OP.10 TDD 10MHz: OP.2 TDD				5MHz: OP.10 TDD 10MHz: OP.2 TDD			
PBCH_RA	dB	0					0					0				0			
PBCH_RB	dB																		
PSS_RA	dB																		
SSS_RA	dB																		
PCFICH_RB	dB																		
PHICH_RA	dB																		
PHICH_RB	dB																		
PDCCH_RA	dB																		
PDCCH_RB	dB																		
PDSCH_RA	dB																		
PDSCH_RB	dB																		
OCNG_RA Note 1	dB																		
OCNG_RB Note 1	dB																		
Qrxlevmin	dBm	-140					-140					-140				-140			
N_{oc} Note 2	dBm15 kHz	-98					-98					-98				-98			
$\hat{E}_s/N_{oc}$	dB	14	8	8	8	14	8	14	8	8	8	8	8	14	8	8	8	8	8
$\hat{E}_s/I_{ot}$	dB	14	8	8	8	14	8	14	8	8	8	8	8	14	8	8	8	8	8
RSRP Note 3	dBm/15 kHz	-84	-90	-90	-90	-84	-90	-84	-90	-90	-90	-90	-90	-84	-90	-90	-90	-90	-90
$Treselection_{EUTRAN}$	s	0					0					0				0			
Snonintrasearch	dB	62					62					62				62			
Propagation Condition		AWGN					AWGN					AWGN				AWGN			
Antenna Configuration		1x2					1x2					1x2				1x2			
Timing offset to Cell 1		-					3ms					3ms				3ms			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.
Note 3: Es/Iot and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.4.2.11.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.2.11.2-1

Table A.4.2.11.2-1 : Reselection delay requirements

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	20.5
T2	Cell 3 (reduced performance group)	193.3
T3	Cell 4 (reduced performance group)	193.3
T4	Cell 1 (normal performance group)	20.5

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as: $K_{carrier,normal}$ * $T_{evaluate,E\text{-}UTRAN\_Inter}$, + T_{SI} , and to a reduced performance group cell can be expressed as: 6* $K_{carrier,reduced}$ * $T_{evaluate,E\text{-}UTRAN\_Inter}$, + T_{SI},

This gives a total of 20.48 s for normal performance group reselection and 193.28 s for reduced performance group reselection, allow 20.5 s for normal performance group and 193.3 s for reduced performance group in the test case. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved.

A.4.3 E-UTRAN to UTRAN Cell Re-Selection

A.4.3.1 E-UTRAN FDD – UTRAN FDD:

A.4.3.1.1 EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of higher priority

A.4.3.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in clause 4.2.2.5 when the UTRA cell is of higher priority.

The test scenario comprises of one E-UTRA FDD and one UTRA FDD cells as given in tables A.4.3.1.1.1-1, A.4.3.1.1.1-2 and A.4.3.1.1.1-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. E-UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

Table A.4.3.1.1.1-1: General test parameters for E-UTRA FDD- higher priority UTRA FDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	UE is on cell 1 in the initialisation phase, so that reselection to cell 2 occurs during T2
T2 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell 1	
T3 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T3
	Neighbour cell		Cell 2	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	>20	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2		s	85	T2 needs to be defined so that cell re-selection reaction time is taken into account.
T3		s	25	T3 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.1.1.1-2: Cell specific test parameters for cell 1(E-UTRA)

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD		
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA[Note 1]	dB			
OCNG_RB[Note 1]	dB			
Qqualmin for UTRA neighbour cell	dB	-20		
Qrxlevmin for UTRA neighbour cell	dBm	-115		
Qrxlevmin	dBm	-140		
N_{oc}	dBm/15 kHz	-98		
RSRP	dBm/15 KHz	-84	-84	-84
$\hat{E}_s/I_{ot}$	dB	14	14	14
$\hat{E}_s/N_{oc}$	dB	14	14	14
$Treselection_{EUTRAN}$	S	0		
Snonintrasearch	dB	50		
$Thresh_{x, high}$ (Note 2)	dB	40		
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of $Thresh_{x, high}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell

Table A.4.3.1.1.1-3: Cell specific test parameters for cell 2(UTRA)

Parameter	Unit	Cell 2 (UTRA)		
		T1	T2	T3
UTRA RF Channel Number		Channel 2		
CPICH_Ec/Ior	dB	-10		
PCCPCH_Ec/Ior	dB	-12		
SCH_Ec/Ior	dB	-12		
PICH_Ec/Ior	dB	-15		
OCNS_Ec/Ior	dB	-0.941		
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	11	-5
I_{oc}	dBm/3,84 MHz	-70		
CPICH_Ec/Io	dB	-Infinity	-10.33	-16.19
CPICH_RSCP	dBm	-Infinity	-69	-85
Propagation Condition		AWGN		
Qqualmin	dB	-20		
Qrxlevmin	dBm	-115		
QrxlevminEUTRA	dBm	-140		
UE_TXPWR_MAX_RACH	dBm	21		
Treselection	s	0		
Sprioritysearch1	dB	62		
Sprioritysearch2	dB	0		
$Thresh_{serving, low}$	dB	36		
$Thresh_{x, low}$ (Note 1)	dB	50		
Note 1 : his refers to the value of $Thresh_{x, low}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell				

A.4.3.1.1.2 Test Requirements

The cell reselection delay to higher priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluateUTRA\_FDD} + T_{SI\text{-}UTRA}$

Where:

$T_{higher\_priority\_search}$ See clause 4.2.2; 60s is assumed in this test case

$T_{evaluateUTRA\text{-}FDD}$ See Table 4.2.2.5.1-1

$T_{SI\text{-}UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s for higher priority cell search, allow 81 s for higher priority cell reselection in the test case.

A.4.3.1.2 EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of lower priority

A.4.3.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.1 when the UTRA cell is of lower priority.

The test scenario comprises of one UTRA FDD and one E-UTRA FDD cells as given in tables A.4.3.1.2.1-1, A.4.3.1.2.1-2 and A.4.3.1.2.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.1.2.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.1.2.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
Qqualmin for UTRA neighbour cell	dB	-20	
Qrxlevmin for UTRA neighbour cell	dBm	-115	
Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-86	-102
$\hat{E}_s/I_{ot}$	dB	12	-4
$\hat{E}_s/N_{oc}$	dB	12	-4
$Treselection_{EUTRAN}$	s	0	
Snonintrasearch	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (Note 2)	dB	42	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2 : This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell			

Table A.4.3.1.2.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 2	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
OCNS_Ec/Ior	dB	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	13	13
I_{oc}	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67
Propagation Condition		AWGN	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
QrxlevminEUTRA	dBm	-140	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	s	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
$\text{Thresh}_{x,\,high}$ (Note 1)	dB	48	
Note 1 : This refers to the value of $\text{Thresh}_{x,\,high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell			

A.4.3.1.2.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_FDD} + T_{SI\text{-}UTRA}$

Where:

$T_{evaluateUTRA\text{-}FDD}$ See Table 4.2.2.5.1-1

$T_{SI\text{-}UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

A.4.3.1.3 EUTRA FDD-UTRA FDD cell reselection in fading propagation conditions: UTRA FDD is of lower priority

A.4.3.1.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA FDD- UTRA FDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.1 when the UTRA cell is of lower priority, and to verify the robustness of the UE measurement filtering in a fading environment. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

The test scenario comprises of one UTRA FDD and one E-UTRA FDD cells as given in tables A.4.3.1.3.1-1, A.4.3.1.3.1-2 and A.4.3.1.3.1-3. The test consists of four successive time periods, with time duration of T1 T2, T3 and

T4 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.1.3.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T3 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
	Neighbour cell		Cell1	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	<85	T1 need to be defined so that cell re-selection reaction time is taken into account. T1 is terminated when the UE starts to send preambles to cell 1
T2		s	64	The start of T2 is defined as the time when the UE starts to send PRACH preambles to cell 1
T3		s	<25	T3 need to be defined so that cell re-selection reaction time is taken into account. T3 is terminated when the UE starts to send preambles to cell 2
T4		s	64	The start of T4 is defined as the time when the UE starts to send PRACH preambles to cell 2

Table A.4.3.1.3.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1			
		T1	T2	T3	T4
E-UTRA RF Channel number		1			
$BW_{channel}$	MHz	10			
Correlation Matrix and Antenna Configuration		1x2 Low			
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD			
PSS_RA	dB	0			
SSS_RA	dB	0			
PCFICH_RB	dB	0			
PHICH_RA	dB	0			
PHICH_RB	dB	0			
PDCCH_RA	dB	0			
PDCCH_RB	dB	0			
PDSCH_RA	dB	0			
PDSCH_RB	dB	0			
OCNG_RA$^{Note 1}$	dB	0			
OCNG_RB$^{Note 1}$	dB	0			
Qqualmin for UTRA neighbour cell	dB	-20			
Qrxlevmin for UTRA neighbour cell	dBm	-115			
Qrxlevmin	dBm	-140			
N_{oc}	dBm/15 kHz	-104			
RSRP	dBm/15 KHz	-82	-82	-107	-107
$\hat{E}_s/I_{ot}$	dB	22	22	-3	-3
$\hat{E}_s/N_{oc}$	dB	22	22	-3	-3
$Treselection_{EUTRAN}$	s	0			
Snonintrasearch	dB	Not sent			
$Thresh_{serving, low}$	dB	44			
$Thresh_{x, low}$ (Note 2)	dB	42			
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell.					

Table A.4.3.1.3.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)			
		T1	T2	T3	T4
UTRA RF Channel Number		Channel 2			
CPICH_Ec/Ior	dB	-10			
PCCPCH_Ec/Ior	dB	-12			
SCH_Ec/Ior	dB	-12			
PICH_Ec/Ior	dB	-15			
OCNS_Ec/Ior	dB	-0.941			
$\hat{I}_{or}/I_{oc}$	dB	13	13	13	13
I_{oc}	dBm/3,84 MHz	-70			
CPICH_Ec/Io	dB	-10.21	-10.21	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67	-67	-67
Propagation Condition		AWGN			
Qqualmin	dB	-20			
Qrxlevmin	dBm	-115			
QrxlevminEUTRA	dBm	-140			
UE_TXPWR_MAX_RACH	dBm	21			
Treselection	s	0			
Sprioritysearch1	dB	42			
Sprioritysearch2	dB	0			
$Thresh_{x, high}$ (Note 1)	dB	44			
Note 1 : This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell					

A.4.3.1.3.2 Test Requirements

The probability of reselection from cell 1to cell 2 during T2 observed during testing shall be less than 10%

The probability of reselection from cell 2 to cell 1 during T4 observed during testing shall be less than 10%

The cell reselection delay to lower priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2. In order to evaluate reselection delay, the system simulator first needs to verify that the UE is camped on cell 1 at the start of T3

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$

Where:

$T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

A.4.3.1.4 EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of lower priority for 5MHz bandwidth

A.4.3.1.4.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.4.3.1.2.1

The parameters of this test are the same as defined in Subclause A.4.3.1.2.1 except that the values of the parameters in the Table A.4.3.1.4.1-2 will replace the values of the corresponding parameters in A.4.3.1.2.1-2.

This is according to the principle defined in section A.3.7.2.

Table A.4.3.1.4.1-2: Cell specific test parameters for cell 1 (E-UTRA) for 5MHz bandwidth

Parameter	Unit	Cell 1	
		T1	T2
$BW_{channel}$	MHz	5	
OCNG Patterns defined in A.3.2.1.16 (OP.16 FDD)		OP.16 FDD	
Note 1: See Table A.4.3.1.2.1-2 for the other parameters.			

A.4.3.1.4.2 Test Requirements

The test requirements defined in section A.4.3.1.2.1 shall apply to this test case.

A.4.3.1.5 Idle mode FDD to UTRA FDD interRAT reselection

A.4.3.1.5.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA FDD-UTRA FDD inter-RAT cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4.

The test scenario comprises of indicating 8 UTRA FDD interfrequency cells on 6 different carriers in the neighbour list of cell 1 as given in table A.4.3.1.5-1 and cells 2 and 3 as given in table A.4.3.1.5-2. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2 and 3 which are chosen from the 6 inter-RAT layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2 and 3 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test.

Cell 1, 2 and 3 are identified by the UE during time period T0. Cell 1, cell 2 and cell 3 all belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2 or 3. Cells 2 and 3 all have lower absolute priority than cell 1.

Table A.4.3.1.5-1: General test parameters for E-UTRAN FDD- UTRAN FDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
T0	Active cell		Cell 1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2 and 3, and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T1
	Neighbour cell		Cell 1, cell 3	
T2 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T2
	Neighbour cell		Cell 2, cell 3	
T3 end condition	Active cell		Cell 3	UE shall perform reselection to cell 3 during T3
	Neighbour cell		Cell 1, cell 2	
T4 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T4
	Neighbour cell		Cell 2, cell 3	
UE configured E-UTRA RF Channel Number			1	Serving cell and six UTRA FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6 and 7 are indicated to have reduced performance
UE configured UTRA RF Channel Number			2,3,4,5,6,7	
Test eqipment configuration			Cell 1 uses E-UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7	
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T0		s	(test equipment frequency selection and configuration time) + 960	Initialisation time need to be defined so that cell detection time is taken into account.
T1		s	25	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	T2 need to be defined so that cell re-selection reaction time is taken into account
T3		s	200	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4		s	25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.3.1.5-2: Cell specific test parameters for E-UTRAN FDD- UTRAN FDD inter-RAT cell reselection test case in AWGN cell 1 (E-UTRAN)

Parameter	Unit	Cell 1				
		T0	T1	T2	T3	T4
E-UTRA RF Channel number		1				
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50				
Io	dBm/4.5MHz(25RB) dBm/9 Mhz (50RB)	59.06 56.05	64.59 61.58	59.06 56.05	64.59 61.58	59.06 56.05
PDSCH parameters: DL Reference Measurement Channel		OP.16 FDD (5MHz) OP.2 FDD (10MHz) OP.10 TDD(5MHz) OP.2 TDD (10MHz)				
Time offset with respect to cell1		0				
PBCH RA	dB	0				
PBCH RB	dB					
PSS RA	dB					
SSS RA	dB					
PCFICH RB	dB					
PHICH RA	dB					
PHICH RB	dB					
PDCCH RA	dB					
PDCCH RB	dB					
PDSCH RA	dB					
PDSCH RB	dB					
OCNG_RA Note 1	dB					
OCNG_RB Note 1	dB					
Qrxlevmin	dBm	-140				
N_{oc} Note 2	dBm	-98				
RSRP Note 3	dBm	-84	-90	-84	-90	-84
$\hat{E}_s/I_{ot}$	dB	14	8	14	8	14
$\hat{E}_s/N_{oc}$	dB	14	8	14	8	14
$Treselection_{EUTRAN}$	s	0				
Snonintrasearch	dB	62				
Propagation Condition		AWGN				

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.4.3.1.5-3: Cell specific test parameters for cells 2 and 3 (UTRA)

Parameter	Unit	Cell 2					Cell 3				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number		Randomly selected from 1, 2, 3 such that cell 2 is in the normal performance group					Randomly selected from 4, 5, 6 such that cell 3 is in the reduced performance group				
CPICH_Ec/Ior	dB	-10					-10				
PCCPCH_Ec/Ior	dB	-12					-12				
SCH_Ec/Ior	dB	-12					-12				
PICH_Ec/Ior	dB	-15					-15				
OCNS_Ec/Ior	dB	-0.941					0.941				
$\hat{I}_{or}/I_{oc}$	dB	-11	-5	-11	-11	-11	-11	-11	-11	-5	-11
I_{oc}	dBm/3,84 MHz	-70					-70				
CPICH_Ec/Io	dB	-10.33	-16.19	-10.33	-10.33	-10.33	-10.33	-10.33	-10.33	-16.19	-10.33
CPICH_RSCP	dBm	-69	-85	-69	-69	-69	-69	-69	-69	-85	-69
Propagation Condition		AWGN					AWGN				
Qqualmin	dB	-20					-20				
Qrxlevmin	dBm	-115					-115				
QrxlevminEUTRA	dBm	-140					-140				
UE_TXPWR_MAX_RACH	dBm	21					21				
Treselection	s	0					0				
Sprioritysearch1	dB	62					62				
Sprioritysearch2	dB	0					0				
$Thresh_{serving, low}$	dB	36					36				
$Thresh_{x, low}$ (Note 1)	dB	50					50				

A.4.3.1.5.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.3.1.5.2-1

Table A.4.3.1.5.2-1

Time phase	Target cell	Requirement for reselection delay (seconds)
T0	Cell 1	
T1	Cell 2 (normal performance group)	21
T2	Cell 1 (normal performance group)	8
T3	Cell 3 (reduced performance group)	148
T4	Cell 1 (normal performance group)	8

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as: ($N_{UTRA\_carrier,normal}$) * $T_{evaluateUTRA\_FDD}$ + $T_{SI-UTRA}$ and to a reduced performance group cell can be expressed as: 6 * $N_{UTRA\_carrier,reduced}$ * $T_{evaluateUTRA\_FDD}$ + $T_{SI-UTRA}$.

Where:

$T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for normal performance group reselection, allow 21 s, and gives a total of 147.6 s for reduced performance group reselection, allow 148 s for reduced performance group in the test case. For reselections back to cell 1 since only one frequency is configured, the requirement is $T_{evaluate,E-UTRAN\_Inter}$, + T_{SI} = 7.68s, allow 8s.

A.4.3.2 E-UTRAN FDD – UTRAN TDD:

A.4.3.2.1 Test Purpose and Environment

A.4.3.2.1.1 Void

A.4.3.2.1.2 1.28Mcps TDD option

This test is to verify the requirement for the E-UTRA FDD to UTRA TDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.2 when the UTRA cell is of lower priority.

This test scenario comprised of 1 E-UTRA FDD serving cell (Cell 1), and 1 UTRA TDD cell (Cell 2) to be re-selected. Test parameters are given in table A.4.3.2.1.2-1, A.4.3.2.1.2-2, and A.4.3.2.1.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Cell 2 is of lower priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.2.1.2-1: General test parameters for E-UTRA FDD to UTRA (1.28 Mcps TDD OPTION) Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	1.28 Mcps TDD OPTION cell
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	E-UTRA FDD cell
CP length of cell 1			normal	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information		-	Not sent	No additional delays in random access procedure.
Treselection		s	0	
DRX cycle length		s	1,28	
HCS			Not used	
T1		s	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	

Table A.4.3.2.1.2-2: Cell specific test parameters for cell re-selection E-UTRA FDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1	
		T1	**T2**
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
PBCH_RA	dB	0	0
PBCH_RB	dB	0	0
PSS_RA	dB	0	0
SSS_RA	dB	0	0
PCFICH_RB	dB	0	0
PHICH_RA	dB	0	0
PHICH_RB	dB	0	0
PDCCH_RA	dB	0	0
PDCCH_RB	dB	0	0
PDSCH_RA	dB	0	0
PDSCH_RB	dB	0	0
OCNG_RA[Note1]	dB	0	0
OCNG_RB[Note1]	dB	0	0
Qrxlevmin	dBm/15kHz	-140	-140
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-87	-101
$\hat{E}_s/I_{ot}$	dB	11	-3
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	46 (-94dBm)	
$Thresh_{x, low}$ (Note2)	dB	24 (-79dBm)	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note2: This refers to the value of Threshx, low which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell			

Table A.4.3.2.1.2-3: Cell specific test parameters for cell re-selection E-UTRA FDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number (Note1)		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	11	11	11	11
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-72	-72	n.a.	n.a.
Propagation Condition		AWGN			
Qrxlevmin	dBm	-103			
$Qoffset1_{s,n}$	dB	C1, C2: 0			
$Qhyst1_s$	dB	0			
$Thresh_{x, high}$ (Note2)	dB	46 (-94dBm)			
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell					

A.4.3.2.1.3 Void

A.4.3.2.2 Test Requirements

A.4.3.2.2.1 1.28Mcps TDD option

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_TDD} + T_{SI-UTRA}$

Where:

$T_{evaluateUTRA\_TDD}$ 19.2s, See table table 4.2.2.5.2-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s for lower priority cell reselection in the test case.

A.4.3.2.2.2.3 Void

A.4.3.2A E-UTRA FDD to UTRA TDD cell re-selection for IncMon

A.4.3.2A.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA FDD to UTRA TDD inter-RAT cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4. UTRA TDD cells are of lower priority than E-UTRA serving cell.

The test scenario comprises of indicating 7 UTRA TDD inter-RAT cells on 7 different carriers in the neighbour list of cell 1 as given in tables A.4.3.2A.1-1, A.4.3.2A.1-2 and A.4.3.2A.1-3. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3, and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (E-UTRA serving cell), and selects frequencies for cells 2 and 3 which are chosen from the 7 inter-RAT layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2 and 3 shall include the frequency of cell 1 in the normal performance group as well as the other UTRA TDD frequencies configured to the UE in the test.

Cell 1, 2 and 3 are identified by the UE during time phase T0. Cell 1, cell 2 and cell 3 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2 or 3.

Table A.4.3.2A.1-1: General test parameters for E-UTRA FDD to UTRA TDD inter-RAT cell re-selection test case

Parameter		Unit	Value	Comment
T0	Active cell		Cell1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2, 3 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T1
	Neighbour cell		Cell1	
T2 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T2
T3 end condition	Active cell		Cell3	UE shall perform reselection to cell 3 during T3
	Neighbour cell		Cell1	
T4 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 in T4 so that next repetition of test can start from T0
UE configured UTRA RF Channel Number			1, 2, 3, 4, 5, 6, 7	**Seven UTRA TDD carrier frequencies are used in the UE neighbour cell list. Frequencies 4, 5, 6, and 7 are indicated to have reduced performance**
Test eqipment configuration			Cell 1, 2, 3	Cell 1 uses E-UTRA RF channel number 1 Cells 2 is randomly selected to use different frequencies selected from UTRA frequencies 1, 2, 3. Cells 3 is randomly selected to use different frequencies selected from UTRA frequencies 4, 5, 6, 7.
CP length of cell 1			normal	
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211 [16]
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
$T_{reselection}$		s	0	
HCS			Not used	
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T0		s	(Test equipment frequency selection and configuration time) + 960	T0 is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.
T1		s	60	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	T2 need to be defined so that cell re-selection reaction time is taken into account
T3		s	500	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4		s	25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.3.2A.1-2: E-UTRA Cell specific test parameters for E-UTRA FDD to UTRA TDD inter-RAT cell reselection test case in AWGN

Parameter	Unit	Cell 1				
		T0	T1	T2	T3	T4
E-UTRA RF Channel number		1				
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50				
OCNG Patterns		5MHz: OP.16 FDD 10MHz: OP.2 FDD				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA NOTE 1	dB					
OCNG_RB NOTE 1	dB					
N_{oc} NOTE 2	dBm/15kHz	-98				
$\hat{E}_s/N_{oc}$	dB	11	-3	11	-3	11
$\hat{E}_s/I_{ot}$ NOTE 3	dB	11	-3	11	-3	11
RSRP NOTE 3	dBm/15kHz	-87	-101	-87	-101	-87
$Q_{rxlevmin}$	dBm/15kHz	-140				
$S_{nonintrasearch}$	dB	Not sent				
$Thresh_{serving, low}$	dB	46 (-94dBm)				
$Thresh_{x, low}$ NOTE 4	dB	24 (-79dBm)				
Propagation Condition		AWGN				
Antenna Configuration		1x2				

NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.
NOTE 3: E_s/I_{ot} and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
NOTE 4: This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell.

Table A.4.3.2A.1-3: UTRA TDD Cell specific test parameters for E-UTRA FDD to UTRA TDD inter-RAT cell reselection test case in AWGN

Parameter	Unit	Cell 2 (UTRA TDD)									
Timeslot Number		0					DwPTS				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number NOTE 1		Randomly selected from 1, 2, 3 such that cell 2 is in the normal performance group									
PCCPCH_Ec/Ior	dB	-3									
DwPCH_Ec/Ior	dB						0				
OCNS_Ec/Ior	dB	-3									
I_{oc}	dBm/ 1.28 MHz	-80									
$\hat{I}_{or}/I_{oc}$	dB	-3	11	-3	-3	-3	-3	11	-3	-3	-3
PCCPCH RSCP	dBm	-86	-72	-86	-86	-86	n.a.				
Propagation Condition		AWGN									
$Q_{rxlevmin}$	dBm	-103									
$Qoffset1_{s,n}$	dB	C1, C2: 0									
$Qhyst1_s$	dB	0									
$S_{prioritysearch1}$	dB	24 (-79dBm)									
$S_{prioritysearch2}$	dB	0									
$Thresh_{x, high}$ NOTE 2	dB	46 (-94dBm)									
$Ssearch_{E-UTRA}$	dB	Not send									
Time offset to cell1	ms	3									

NOTE 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
NOTE 2: This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell

Table A.4.3.2A.1-4:

Parameter	Unit	Cell 3 (UTRA TDD)									
Timeslot Number		0					DwPTS				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number NOTE 1		Randomly selected from 4, 5, 6, 7 such that cell 3 is in the reduced performance group									
PCCPCH_Ec/Ior	dB	-3									
DwPCH_Ec/Ior	dB						0				
OCNS_Ec/Ior	dB	-3									
I_{oc}	dBm/ 1.28 MHz	-80									
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	11	-3	-3	-3	-3	11	-3
PCCPCH RSCP	dBm	-86	-86	-86	-72	-86	n.a.				
Propagation Condition		AWGN									
$Q_{rxlevmin}$	dBm	-103									
$Qoffset1_{s,n}$	dB	C1, C2: 0									
$Qhyst1_s$	dB	0									
$S_{prioritysearch1}$	dB	24 (-79dBm)									
$S_{prioritysearch2}$	dB	0									
$Thresh_{x, high}$ NOTE 2	dB	46 (-94dBm)									
$Ssearch_{E-UTRA}$	dB	Not send									
Time offset to cell1	ms	3									
Time offset to cell2	μs	3									

NOTE 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
NOTE 2: This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell

A.4.3.2A.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send the SYNCH-UL sequence in the UpPTS on cell 2, 3 for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.3.2A.2-1

Table A.4.3.2A.2-1: Test requirements for E-UTRA FDD to UTRA TDD inter-RAT cell reselection

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	58.9
T3	Cell 3 (reduced performance group)	462.1

The rate of correct cell reselections observed during repeated tests shall be at least 90%, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time.

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as: $N_{UTRA\_carrier\_TDD,normal}$ $*T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$, and to a reduced performance group cell can be expressed as: 6 * $N_{UTRA\_carrier\_TDD,reduced} * T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$,

Where:

$T_{evaluateUTRA\_TDD}$ 19.2s, See Table 4.2.2.5.2-1

T_{SI_UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 3 * 19.2 + 1.28 = 58.88 s for normal performance group reselection and 6 * 4 * 19.2 + 1.28 = 462.08s for reduced performance group reselection, allow 58.9s for normal performance group and 462.1s for reduced performance group in the test case.

Since only one E-UTRA frequency is configured and signal level of UTRA cell is lower than threshold of $S_{prioritysearch}$, the UE shall select back to cell 1 (E-UTRA cell) within $K_{carrier} * T_{evaluateEUTRA} + T_{SI}$ = 19.2 + 1.28 = 20.48s.

A.4.3.3 E-UTRAN TDD – UTRAN FDD:

A.4.3.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA TDD- UTRA FDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.1 when the UTRA cell is of lower priority.

The test scenario comprises of one UTRA FDD and one E-UTRA TDD cells as given in tables A.4.3.3.1-1, A.4.3.3.1-2 and A.4.3.3.1-3. The test consists of two successive time periods, with time duration of T1 andT2 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.3.1-1: General test parameters for EUTRA TDD- lower priority UTRA FDD inter RAT cell re-selection test case

<table>
<tr><th colspan="2">Parameter</th><th>Unit</th><th>Value</th><th>Comment</th></tr>
<tr><td>Initial condition</td><td>Active cell</td><td></td><td>Cell1</td><td>E-UTRAN cell</td></tr>
<tr><td rowspan="2">T1 end condition</td><td>Active cells</td><td></td><td>Cell1</td><td>UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test</td></tr>
<tr><td>Neighbour cell</td><td></td><td>Cell2</td><td></td></tr>
<tr><td rowspan="2">T2 end condition</td><td>Active cell</td><td></td><td>Cell2</td><td>UE shall perform reselection to cell 2 during T2</td></tr>
<tr><td>Neighbour cell</td><td></td><td>Cell1</td><td></td></tr>
<tr><td colspan="2">E-UTRA PRACH configuration</td><td></td><td>53</td><td>As specified in table 5.7.1-3 in TS 36.211</td></tr>
<tr><td colspan="2">Uplink-downlink configuration of cell 1</td><td></td><td>1</td><td>As specified in table 4.2.2 in TS 36.211</td></tr>
<tr><td colspan="2">Special subframe configuration of cell 1</td><td></td><td>6</td><td>As specified in table 4.2.1 in TS 36.211</td></tr>
<tr><td colspan="2">E_UTRA Access Barring Information</td><td>-</td><td>Not Sent</td><td>No additional delays in random access procedure.</td></tr>
<tr><td colspan="2">DRX cycle length</td><td>s</td><td>1.28</td><td>The value shall be used for all cells in the test.</td></tr>
<tr><td colspan="2">T1</td><td>s</td><td>85</td><td>T1 need to be defined so that cell re-selection reaction time is taken into account.</td></tr>
<tr><td colspan="2">T2</td><td>s</td><td>25</td><td>T2 need to be defined so that cell re-selection reaction time is taken into account.</td></tr>
</table>

Table A.4.3.3.1-2: Cell specific test parameters for cell 1(E-UTRA)

Parameter	Unit	Cell 1	
		T1	**T2**
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[NOTE 1]	dB		
OCNG_RB[NOTE 1]	dB		
Qqualmin for UTRA neighbour cell	dB	-20	
Qrxlevmin for UTRA neighbour cell	dBm	-115	
Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-86	-102
$\hat{E}_s/I_{ot}$	dB	12	-4
$\hat{E}_s/N_{oc}$	dB	12	-4
$Treselection_{EUTRAN}$	s	0	
Snonintrasearch	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (NOTE 2)	dB	42	
Propagation Condition		AWGN	
NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. NOTE 2 : This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell			

Table A.4.3.3.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 2	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
OCNS_Ec/Ior	dB	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	13	13
I_{oc}	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67
Propagation Condition		AWGN	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
QrxlevminEUTRA	dBm	-140	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	s	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
$\text{Thresh}_{\text{x, high}}$ (NOTE 1)	dB	48	
NOTE 1 : This refers to the value of $\text{Thresh}_{\text{x, high}}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell			

A.4.3.3.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{\text{evaluateUTRA\_FDD}} + T_{\text{SI-UTRA}}$

Where:

$T_{\text{evaluateUTRA-FDD}}$ See Table 4.2.2.5.1-1

$T_{\text{SI-UTRA}}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

A.4.3.3A Idle mode TDD to UTRA FDD interRAT reselection

A.4.3.3A.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA TDD-UTRA FDD inter-RAT cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4.

The test scenario comprises of indicating 8 UTRA FDD interfrequency cells on 6 different carriers in the neighbour list of cell 1 as given in table A.4.3.3A.1-2 and table A.4.3.3A.1-3 and cells 2 and 3 as given in table A.4.3.3A.1-4. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2 and 3 which are chosen from the 6 inter-RAT layers which are configured in the

UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2 and 3 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test.

Cell 1, 2 and 3 4 are identified by the UE during time period T0. Cell 1, cell 2 and cell 3 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2 or 3. Cells 1, 2 and 3 4 all have lower absolute priority than cell 1.

Table A.4.3.3A.1-1: General test parameters for E-UTRAN TDD- UTRAN FDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
T0	Active cell		Cell 1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2, 3 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T1
	Neighbour cell		Cell 1, cell 3	
T2 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T2
	Neighbour cell		Cell 2, cell 3	
T3 end condition	Active cell		Cell 3	UE shall perform reselection to cell 3 during T3
	Neighbour cell		Cell 1, cell 2	
T4 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T4
	Neighbour cell		Cell 2, cell 3	
UE configured E-UTRA RF Channel Number			1	Serving cell and six UTRA FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6 and 7 are indicated to have reduced performance
UE configured UTRA RF Channel Number			2,3,4,5,6,7	
Test eqipment configuration			Cell 1 uses E-UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7	
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T0		s	(test equipment frequency selection and configuration time) + 960	Initialisation time need to be defined so that cell detection time is taken into account.
T1		s	25	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	T2 need to be defined so that cell re-selection reaction time is taken into account
T3		s	200	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4		s	25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.3.3A.1-2: General test parameters for EUTRA TDD- UTRA FDD inter RAT cell re-selection test case

Parameter	Unit	Value	Comment
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211

Table A.4.3.3A.1-3: Cell specific test parameters for E-UTRAN TDD- UTRAN FDD inter-RAT cell reselection test case in AWGN cell 1 (E-UTRAN)

Parameter	Unit	Cell 1				
		T0	T1	T2	T3	T4
E-UTRA RF Channel number		1				
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50				
Io	dBm/4.5MHz(25RB) dBm/9 Mhz (50RB)	59.06 56.05	64.59 61.58	59.06 56.05	64.59 61.58	59.06 56.05
PDSCH parameters: DL Reference Measurement Channel		OP.16 FDD (5MHz) OP.2 FDD (10MHz) OP.10 TDD(5MHz) OP.2 TDD (10MHz)				
Time offset with respect to cell1		0				
PBCH RA	dB	0				
PBCH RB	dB					
PSS RA	dB					
SSS RA	dB					
PCFICH RB	dB					
PHICH RA	dB					
PHICH RB	dB					
PDCCH RA	dB					
PDCCH RB	dB					
PDSCH RA	dB					
PDSCH RB	dB					
OCNG_RA Note 1	dB					
OCNG_RB Note 1	dB					
Qrxlevmin	dBm	-140				
N_{oc} Note 2	dBm	-98				
RSRP Note 3	dBm	-84	-90	-90	-90	-84
$\hat{E}_s/I_{ot}$	dB	14	8	8	8	14
$\hat{E}_s/N_{oc}$	dB	14	8	8	8	14
$Treselection_{EUTRAN}$	s	0				
Snonintrasearch	dB	62				
Propagation Condition		AWGN				

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.4.3.3A.1-4: Cell specific test parameters for cells 2 and 3 (UTRA)

Parameter	Unit	Cell 2					Cell 3				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number		Randomly selected from 1, 2, 3 such that cell 2 is in the normal performance group					Randomly selected from 4, 5, 6 such that cell 3 is in the reduced performance group				
CPICH_Ec/Ior	dB	-10					-10				
PCCPCH_Ec/Ior	dB	-12					-12				
SCH_Ec/Ior	dB	-12					-12				
PICH_Ec/Ior	dB	-15					-15				
OCNS_Ec/Ior	dB	-0.941					0.941				
$\hat{I}_{or}/I_{oc}$	dB	-11	-5	-11	-11	-11	-11	-11	-11	-5	-11
I_{oc}	dBm/3,84 MHz	-70					-70				
CPICH_Ec/Io	dB	-10.33	-16.19	-10.33	-10.33	-10.33	-10.33	-10.33	-10.36	-16.19	-10.33
CPICH_RSCP	dBm	-69	-85	-69	-69	-69	-69	-69	-69	-85	-69
Propagation Condition		AWGN					AWGN				
Qqualmin	dB	-20					-20				
Qrxlevmin	dBm	-115					-115				
QrxlevminEUTRA	dBm	-140					-140				
UE_TXPWR_MAX_RACH	dBm	21					21				
Treselection	s	0					0				
Sprioritysearch1	dB	62					62				
Sprioritysearch2	dB	0					0				
$Thresh_{serving, low}$	dB	36					36				
$Thresh_{x, low}$ (Note 1)	dB	50					50				

A.4.3.3A.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.3.1.5-1

Table A.4.3.3A.2-1

Time phase	Target cell	Requirement for reselection delay (seconds)
T0	Cell 1	
T1	Cell 2 (normal performance group)	21
T2	Cell 1 (normal performance group)	8
T3	Cell 3 (reduced performance group)	148
T4	Cell 1 (normal performance group)	8

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as: $(N_{UTRA\_carrier,normal}) * T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$ and to a reduced performance group cell can be expressed as: $6 * N_{UTRA\_carrier,reduced} * T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$.

Where:

$T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1

$T_{SI-UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for normal performance group reselection, allow 21 s, and gives a total of 147.6 s for reduced performance group reselection, allow 148 s for reduced performance group in the test case. For reselections back to cell 1 since only one frequency is configured, the requirement is $T_{evaluate,E-UTRAN\_Inter}$, + T_{SI} = 7.68s, allow 8s.

A.4.3.4 E-UTRAN TDD – UTRAN TDD:

A.4.3.4.1 E-UTRA to UTRA TDD cell re-selection: UTRA is of higher priority

A.4.3.4.1.1 Test Purpose and Environment

A.4.3.4.1.1.1 Void

A.4.3.4.1.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRA TDD to UTRA TDD inter-RAT cell re-selection requirements specified in clause 4.2.2.5 when the UTRA cell is of higher priority.

This test scenario comprised of 1 E-UTRA TDD serving cell, and 1 UTRA TDD cell to be re-selected. Test parameters are given in table A.4.3.4.1.1.2-1, A.4.3.4.1.1.2-2, and A.4.3.4.1.1.2-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. E-UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.4.1.1.2-1: General test parameters for E-UTRAN to UTRAN (1.28 Mcps TDD OPTION) Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	UE is on cell 1 in the initialisation phase, so that reselection to cell 2 occurs during T2
T2 end condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell 1	
T3 end condition	Active cell		Cell 1	UE shall perform reselection to cell 1 during T3
	Neighbour cell		Cell 2	
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
PRACH configuration of cell 1			53	As specified in table 4.7.1-3 in TS 36.211
CP length of cell 1			Normal	
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information		-	Not sent	No additional delays in random access procedure.
$T_{reselection}$		s	0	
DRX cycle length		s	1,28	
HCS			Not used	
T1		s	>20	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2		s	85	T2 needs to be defined so that cell re-selection reaction time is taken into account.
T3		s	25	T3 needs to be defined so that cell re-selection reaction time is taken into account.

Table A.4.3.4.1.1.2-2: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
PBCH_RA	dB	0	0	0
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA NOTE 1	dB			
OCNG_RB NOTE 1	dB			
$Q_{rxlevmin}$	dBm/15kHz	-140	-140	-140
N_{oc}	dBm/15kHz	-98		
RSRP	dBm/15kHz	-87	-87	-87
$\hat{E}_s/I_{ot}$	dB	11	11	11
$Thresh_{x, high}$ (NOTE 2)	dB	24(-79dBm)		
$S_{nonintrasearch}$	dB	46		
Propagation Condition		AWGN		
NOTE 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. NOTE 2: This refers to the value of $Thresh_{x, high}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell				

Table A.4.3.4.1.1.2-3: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0			DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number (NOTE 1)		Channel 2					
PCCPCH_Ec/Ior	dB	-3	-3	-3			
DwPCH_Ec/Ior	dB				0	0	0
OCNS_Ec/Ior	dB	-3	-3	-3			
$\hat{I}_{or}/I_{oc}$	dB	-inf	11	-3	-inf	11	-3
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP	dBm	-inf	-72	-86	n.a.		
Propagation Condition		AWGN					
$Q_{rxlevmin}$	dBm	-103					
$Qoffset1_{s,n}$	dB	C1, C2: 0					
$Qhyst1_s$	dB	0					
$S_{nonintrasearch}$	dB	Not sent					
$Thresh_{serving, low}$	dB	24 (-79dBm)					
$Thresh_{x, low}$ (NOTE 2)	dB	46 (-94dBm)					
NOTE 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. NOTE 2: This refers to the value of $Thresh_{x, low}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell							

A.4.3.4.1.1.3 Void

A.4.3.4.1.2 Test Requirements

A.4.3.4.1.2.1 Void

A.4.3.4.1.2.2 1.28 Mpcs TDD option

The cell reselection delay to higher priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search}$ + $T_{evaluateUTRA\_TDD}$ + T_{SI_UTRA},

Where:

$T_{higher\_priority\_search}$ 60s, See clause 4.2.2

$T_{evaluateUTRA\_TDD}$ 19.2s, See Table 4.2.2.5.2-1

T_{SI_UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s, allow 81 s for higher priority cell reselection in the test case.

A.4.3.4.1.2.3 Void

A.4.3.4.2 E-UTRA to UTRA TDD cell re-selection: UTRA is of lower priority

A.4.3.4.2.1 Test Purpose and Environment

A.4.3.4.2.1.1 Void

A.4.3.4.2.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRA TDD to UTRA TDD inter-RAT cell re-selection requirements specified in clause 4.2.2.5 when the UTRA cell is of lower priority.

This test scenario comprised of 1 E-UTRA TDD serving cell (Cell 1), and 1 UTRA TDD cell (Cell 2) to be re-selected. Test parameters are given in table A.4.3.4.2.1.2-1, A.4.3.4.2.1.2-2, and A.4.3.4.2.1.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Cell 2 is of lower priority than cell 1.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

Table A.4.3.4.2.1.2-1: General test parameters for E-UTRAN to UTRAN (1.28 Mcps TDD OPTION) Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN cell
T1 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	1.28 Mcps TDD OPTION cell
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	E-UTRA TDD cell
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
PRACH configuration of cell 1			53	As specified in table 4.7.1-3 in TS 36.211
CP length of cell 1			Normal	
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information		-	Not sent	No additional delays in random access procedure.
Treselection		s	0	
DRX cycle length		s	1,28	
HCS			Not used	
T1		s	85	
T2		s	25	

Table A.4.3.4.2.1.2-2: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA^{Note1}	dB		
OCNG_RB^{Note1}	dB		
Qrxlevmin	dBm/15kHz	-140	-140
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-87	-101
$\hat{E}_s/I_{ot}$	dB	11	-3
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	46 (-94dBm)	
$Thresh_{x, low}$ (Note2)	dB	24 (-79dBm)	
Propagation Condition		AWGN	
Note1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note2: This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell			

Table A.4.3.4.2.1.2-3: Cell specific test parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number (Note1)		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	11	11	11	11
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-72	-72	n.a.	n.a.
Propagation Condition		AWGN			
Qrxlevmin	dBm	-103			
$Qoffset1_{s,n}$	dB	C1, C2: 0			
$Qhyst1_s$	dB	0			
$Thresh_{x,\ high}$ (Note2)	dB	46 (-94dBm)			
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of $Thresh_{\mathbf{x,\ high}}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell					

A.4.3.4.2.1.3 Void

A.4.3.4.2.2 Test Requirements

A.4.3.4.2.2.1 Void

A.4.3.4.2.2.2 1.28 Mpcs TDD option

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\_TDD}$ + T_{SI_UTRA},

Where:

$T_{evaluateUTRA\_TDD}$ 19.2s, See Table 4.2.2.5.2-1

T_{SI_UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s for lower priority cell reselection in the test case.

A.4.3.4.2.2.3 Void

A.4.3.4.3 EUTRA TDD-UTRA TDD cell reselection in fading propagation conditions: UTRA TDD is of lower priority

A.4.3.4.3.1 Test Purpose and Environment

This test is to verify the requirement for the EUTRA TDD- UTRA TDD inter-RAT cell reselection requirements specified in clause 4.2.2.5.2 when the UTRA cell is of lower priority, and to verify the robustness of the UE measurement filtering in a fading environment. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

The test scenario comprises of one UTRA TDD and one E-UTRA TDD cells as given in tables A.4.3.4.3.1-1, A.4.3.4.3.1-2 and A.4.3.4.3.1-3. The test consists of four successive time periods, with time duration of T1 T2, T3 and T4 respectively. Both E-UTRA cell 1 and UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1.

Table A.4.3.4.3.1-1: General test parameters for EUTRA TDD- lower priority UTRA TDD inter RAT cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T3 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
	Neighbour cell		Cell1	
E-UTRA PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
E_UTRA Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	<85	T1 need to be defined so that cell re-selection reaction time is taken into account. T1 is terminated when the UE starts to send preambles to cell 1
T2		s	64	The start of T2 is defined as the time when the UE starts to send PRACH preambles to cell 1
T3		s	<25	T3 need to be defined so that cell re-selection reaction time is taken into account. T3 is terminated when the UE starts to send PRACH preambles to cell 2
T4		s	64	The start of T4 is defined as the time when the UE starts to send PRACH preambles to cell 2

Table A.4.3.4.3.1-2: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1			
		T1	T2	T3	T4
E-UTRA RF Channel number		1			
$BW_{channel}$	MHz	10			
Correlation Matrix and Antenna Configuration		1x2 Low			
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD			
PSS_RA	dB	0			
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA^Note 1	dB				
OCNG_RB^Note 1	dB				
Qrxlevmin for UTRA neighbour cell	dBm	-103			
Qrxlevmin	dBm	-140			
N_{oc}	dBm/15 kHz	-104			
RSRP	dBm/15 KHz	-82	-82	-107	-107
$\hat{E}_s/I_{ot}$	dB	22	22	-3	-3
$\hat{E}_s/N_{oc}$	dB	22	22	-3	-3
$Treselection_{EUTRAN}$	s	0			
Snonintrasearch	dB	Not sent			
$Thresh_{serving, low}$	dB	44			
$Thresh_{x, low}$ (Note 2)	dB	24			
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell.					

Table A.4.3.4.3.1-3: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)							
Timeslot Number		0				DwPTS			
		T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number (Note1)		Channel 2							
PCCPCH_Ec/Ior	dB	-3							
DwPCH_Ec/Ior	dB					0			
OCNS_Ec/Ior	dB	-3							
$\hat{I}_{or}/I_{oc}$	dB	13	13	13	13	13	13	13	13
I_{oc}	dBm/1.28 MHz	-80							
PCCPCH RSCP	dBm	-70	-70	-70	-70	n.a.	n.a.	n.a.	n.a.
Propagation Condition		AWGN							
Qrxlevmin	dBm	-103							
$\text{Qrxlevmin}_{\text{EUTRA}}$	dBm	-140							
UE_TXPWR_MAX_RACH	dBm	21							
Treselection	s	0							
$\text{Thresh}_{\text{x, high}}$ (Note2)	dB	44							
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of $\text{Thresh}_{\text{x, high}}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell									

A.4.3.4.3.2 Test Requirements

The probability of reselection from cell 1 to cell 2 during T2 observed during testing shall be less than 10%

The probability of reselection from cell 2 to cell 1 during T4 observed during testing shall be less than 10%

The cell reselection delay to lower priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequene in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2. In order to evaluate reselection delay, the system simulator first needs to verify that the UE is camped on cell 1 at the start of T3

The cell re-selection delay to lower priority shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{\text{evaluateUTRA\_TDD}} + T_{\text{SI-UTRA}}$

Where:

$T_{\text{evaluateUTRA\_TDD}}$ 19.2s, See Table 4.2.2.5.2-1

$T_{\text{SI-UTRA}}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

A.4.3.4.4 E-UTRA TDD to UTRA TDD cell re-selection for IncMon

A.4.3.4.4.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRA TDD to UTRA TDD inter-RAT cell reselection requirements for increased UE carrier monitoring specified in clause 4.2.2.4. UTRA TDD cells are of lower priority than E-UTRA serving cell.

The test scenario comprises of indicating 7 UTRA TDD inter-RAT cells on 7 different carriers in the neighbour list of cell 1 as given in tables A.4.3.4.4.1-1, A.4.3.4.4.1-2 and A.4.3.4.4.1-3. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3, and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (E-UTRA serving cell), and selects frequencies for cells 2 and 3 which are chosen from the 7 inter-RAT layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2 and 3 shall include the frequency of cell 1 in the normal performance group as well as the other UTRA TDD frequencies configured to the UE in the test.

Cell 1, 2, and 3 are identified by the UE during time phase T0. Cell 1, cell 2, and cell 3 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2 or 3.

Table A.4.3.4.4.1-1: General test parameters for E-UTRA TDD to UTRA TDD inter-RAT cell re-selection test case

Parameter		Unit	Value	Comment
T0	Active cell		Cell1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2, 3 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell		Cell 1	
T1 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T1
	Neighbour cell		Cell1	
T2 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T2
T3 end condition	Active cell		Cell3	UE shall perform reselection to cell 3 during T3
	Neighbour cell		Cell1	
T4 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 in T4 so that next repetition of test can start from T0
UE configured UTRA RF Channel Number			1, 2, 3, 4, 5, 6, 7	**Seven UTRA TDD carrier frequencies are used in the UE neighbour cell list. Frequencies 4, 5, 6, and 7 are indicated to have reduced performance**
Test eqipment configuration			Cell 1, 2, 3	Cell 1 uses E-UTRA RF channel number 1 Cells 2 is randomly selected to use different frequencies selected from UTRA frequencies 1, 2, 3. Cells 3 is randomly selected to use different frequencies selected from UTRA frequencies 4, 5, 6, 7.
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211 [16]
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211 [16]
CP length of cell 1			normal	
PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211 [16]
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
$T_{reselection}$		s	0	
HCS			Not used	
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T0		s	(Test equipment frequency selection and configuration time) + 960	T0 is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.
T1		s	60	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	T2 need to be defined so that cell re-selection reaction time is taken into account
T3		s	500	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4		s	25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.3.4.4.1-2: E-UTRA Cell specific test parameters for E-UTRA TDD to UTRA TDD inter-RAT cell reselection test case in AWGN

Parameter	Unit	Cell 1				
		T0	T1	T2	T3	T4
E-UTRA RF Channel number		1				
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50				
OCNG Patterns		5MHz: OP.10 TDD 10MHz: OP.2 TDD				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note 1	dB					
OCNG_RB Note 1	dB					
N_{oc} Note 2	dBm/15kHz	-98				
$\hat{E}_s/N_{oc}$	dB	11	-3	11	-3	11
$\hat{E}_s/I_{ot}$ Note 3	dB	11	-3	11	-3	11
RSRP Note 3	dBm/15kHz	-87	-101	-87	-101	-87
$Q_{rxlevmin}$	dBm/15kHz	-140				
$S_{nonintrasearch}$	dB	Not sent				
$Thresh_{serving, low}$	dB	46 (-94dBm)				
$Thresh_{x, low}$ Note 4	dB	24 (-79dBm)				
Propagation Condition		AWGN				
Antenna Configuration		1x2				

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.
Note 3: E_s/I_{ot} and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: This refers to the value of $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell.

Table A.4.3.4.4.1-3: UTRA TDD Cell specific test parameters for E-UTRA TDD to UTRA TDD inter-RAT cell reselection test case in AWGN

Parameter	Unit	Cell 2 (UTRA TDD)									
Timeslot Number		0					DwPTS				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number [Note1]		Randomly selected from 1, 2, 3 such that cell 2 is in the normal performance group									
PCCPCH_Ec/Ior	dB	-3									
DwPCH_Ec/Ior	dB						0				
OCNS_Ec/Ior	dB	-3									
I_{oc}	dBm/ 1.28 MHz	-80									
$\hat{I}_{or}/I_{oc}$	dB	-3	11	-3	-3	-3	-3	11	-3	-3	-3
PCCPCH RSCP	dBm	-86	-72	-86	-86	-86	n.a.				
Propagation Condition		AWGN									
$Q_{rxlevmin}$	dBm	-103									
$Qoffset1_{s,n}$	dB	C1, C2: 0									
$Qhyst1_{s}$	dB	0									
$S_{prioritysearch1}$	dB	24 (-79dBm)									
$S_{prioritysearch2}$	dB	0									
$Thresh_{x, low}$ [Note2]	dB	46 (-94dBm)									
$Ssearch_{E-UTRA}$	dB	Not send									
Time offset to cell1	ms	3									
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of $Thresh_{x, low}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell											

Table A.4.3.4.4.1-4:

Parameter	Unit	Cell 3 (UTRA TDD)									
Timeslot Number		0					DwPTS				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number [Note1]		Randomly selected from 4, 5, 6, 7 such that cell 3 is in the reduced performance group									
PCCPCH_Ec/Ior	dB	-3									
DwPCH_Ec/Ior	dB						0				
OCNS_Ec/Ior	dB	-3									
I_{oc}	dBm/ 1.28 MHz	-80									
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	11	-3	-3	-3	-3	11	-3
PCCPCH RSCP	dBm	-86	-86	-86	-72	-86	n.a.				
Propagation Condition		AWGN									
$Q_{rxlevmin}$	dBm	-103									
$Qoffset1_{s,n}$	dB	C1, C2: 0									
$Qhyst1_{s}$	dB	0									
$S_{prioritysearch1}$	dB	24 (-79dBm)									
$S_{prioritysearch2}$	dB	0									
$Thresh_{x, high}$ [Note2]	dB	46 (-94dBm)									
$Ssearch_{E-UTRA}$	dB	Not send									
Time offset to cell1	ms	3									
Time offset to cell2	μs	3									
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell											

A.4.3.4.4.2 Test Requirements

The cell reselection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send the SYNCH-UL sequence in the UpPTS on cell 2, 3 for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target cell.

The reselection delays shall meet the requirements in table A.4.3.4.4.2-1

Table A.4.3.4.4.2-1: Test requirements for E-UTRA TDD to UTRA TDD inter-RAT cell reselection

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	58.9
T3	Cell 3 (reduced performance group)	462.1

The rate of correct cell reselections observed during repeated tests shall be at least 90%, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time.

NOTE: The cell re-selection delay to a normal performance group cell can be expressed as: $N_{UTRA\_carrier\_TDD,normal}$ $*T_{evaluateUTRA\_TDD}$ + T_{SI_UTRA}, and to a reduced performance group cell can be expressed as: 6 * $N_{UTRA\_carrier\_TDD,reduced}$ * $T_{evaluateUTRA\_TDD}$ + T_{SI_UTRA},

Where:

$T_{evaluateUTRA\_TDD}$ 19.2s, See Table 4.2.2.5.2-1

T_{SI_UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 3 * 19.2 + 1.28 = 58.88 s for normal performance group reselection and 6 * 4 * 19.2 + 1.28 = 462.08s for reduced performance group reselection, allow 58.9s for normal performance group and 462.1s for reduced performance group in the test case.

Since only one E-UTRA frequency is configured and signal level of UTRA cell is lower than threshold of $S_{prioritysearch}$, the UE shall select back to cell 1 (E-UTRA cell) within $K_{carrier}$ * $T_{evaluateEUTRA}$ + T_{SI} = 19.2 + 1.28 = 20.48s.

A.4.4 E-UTRAN to GSM Cell Re-Selection

A.4.4.1 E-UTRAN FDD – GSM:

A.4.4.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to GSM cell re-selection delay reported in clause 4.2.2.5.

This scenario implies the presence of 1 E-UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 E-UTRA carrier and 12 GSM cells. Test parameters are given in Table, A.4.4.1-1, A.4.4.1-2, A.4.4.1-3. E-UTRA FDD cell (Cell 1) and GSM cell (cell 2) shall belong to different Location Areas. The test comprises two successive time periods, T1 and T2. During initialization before the start of the test, the UE is camped on cell 1. By the end of T1, the UE has identified BSIC on the GSM BCCH carrier of cell 2 but the signal levels do not meet the reselection criterion during T1. At the start of T2, the signal levels change such that cell 2 satisfies reselection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA FDD layer.

Table A.4.4.1-1: General test parameters for E-UTRA FDD GSM cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase and shall be able to detect and monitor the 4 strongest GSM BCCH carriers in T1 . Cell 1 is an E-UTRA FDD cell.
Final condition	Neighbour cell		Cell2	UE shall perform reselection to cell 2 during T2. Cell 2 is a GSM cell.
E-UTRA RF Channel Number			1	1 E-UTRA FDD carrier frequency
GSM ARFCN			1	12 GSM BCCH carriers are used
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
CP length of cell 1			Normal	
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	35	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	35	T2 need to be defined so that the higher layer search periodicity and cell re-selection reaction time are taken into account.
Propagation channel			AWGN	

Table A.4.4.1-2: Cell-specific test parameters for Cell 1 – E-UTRA FDD cell

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$T_{reselectionEUTRAN}$	s	0	
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (Note 2)	dB	24	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for GSM target cell.

Table A.4.4.1-3: Cell-specific test parameters for Cell 2 – GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-90	-75
RXLEV_ACCESS_MIN	dBm	-105	
MS_TXPWR_MAX_CCH	dBm	24	

A.4.4.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than 26 s + $T_{BCCH,}$ where T_{BCCH} is the maximum time allowed to read BCCH data from GSM cell [8].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as: 4* $T_{measureGSM}$ + T_{BCCH}, where:

$T_{measureGSM}$ See Table 4.2.2.5.3-1 in clause 4.2.2.5.3.

T_{BCCH} Maximum time allowed to read BCCH data from GSM cell [8].
According to [8], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

This gives a total of 25.6 s + T_{BCCH}, allow 26 s + T_{BCCH} in the test case.

A.4.4.2 E-UTRAN TDD – GSM:

A.4.4.2.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to GSM cell re-selection delay reported in clause 4.2.2.5.

This scenario implies the presence of 1 E-UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 E-UTRA carrier and 12 GSM cells. Test parameters are given in Table, A.4.4.2-1, A.4.4.2-2, A.4.4.2-3. E-UTRA TDD cell (Cell 1) and GSM cell (cell 2) shall belong to different Location Areas. The test comprises two successive time periods, T1 and T2. During initialization before the start of the test, the UE is camped on cell 1. By the end of T1, the UE has identified BSIC on the GSM BCCH carrier of cell 2 but the signal levels do not meet the reselection criterion during T1. At the start of T2, the signal levels change such that cell 2 satisfies reselection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA TDD layer.

Table A.4.4.2-1: General test parameters for E-UTRA TDD GSM cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase and shall be able to detect and monitor the 4 strongest GSM BCCH carriers in T1. Cell 1 is an E-UTRA TDD cell.
Final condition	Neighbour cell		Cell2	UE shall perform reselection to cell 2 during T2. Cell 2 is a GSM cell.
E-UTRA RF Channel Number			1	1 E-UTRA TDD carrier frequency
GSM ARFCN			1	12 GSM BCCH carriers are used
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration for cell 1			6	As specified in table 4.2.1 in TS 36.211
PRACH configuration for cell 1			53	As specified in table 5.7.1-3 in TS 36.211
CP length of cell 1			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	35	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	35	T2 need to be defined so that the higher layer search periodicity and cell re-selection reaction time are taken into account.
Propagation channel			AWGN	

Table A.4.4.2-2: Cell-specific test parameters for Cell 1 – E-UTRA TDD cell

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
Qrxlevmin	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$T_{reselectionEUTRAN}$	s	0	
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (Note 2)	dB	24	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for GSM target cell.

Table A.4.4.2-3: Cell-specific test parameters for Cell 2 – GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-90	-75
RXLEV_ACCESS_MIN	dBm	-105	
MS_TXPWR_MAX_CCH	dBm	24	

A.4.4.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than 26 s + $T_{BCCH,}$ where T_{BCCH} is the maximum time allowed to read BCCH data from GSM cell [8].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as: 4* $T_{measureGSM}$ + T_{BCCH}, where:

$T_{measureGSM}$ See Table 4.2.2.5.3-1 in clause 4.2.2.5.3.

T_{BCCH} Maximum time allowed to read BCCH data from GSM cell [8].
According to [8], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

This gives a total of 25.6 s + T_{BCCH}, allow 26 s + T_{BCCH} in the test case.

A.4.5 E-UTRAN to HRPD Cell Re-Selection

A.4.5.1 E-UTRAN FDD – HRPD

A.4.5.1.1 E-UTRAN FDD – HRPD Cell Reselection: HRPD is of Lower Priority

A.4.5.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD- HRPD inter-RAT cell reselection requirements specified in clause 4.2.2.5.4 when the HRPD cell is of lower priority.

The test scenario comprises of one HRPD and one E-UTRAN FDD cells as given in tables A.4.5.1.1.1-1, A.4.5.1.1.1-2 and A.4.5.1.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN FDD cell 1 and HRPD cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.5.1.1.1-1: General Test Parameters for E-UTRAN FDD - lower priority HRPD Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbour cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell is selecting during T2
DRX cycle length		s	1.28	
E-UTRA FDD RF Channel Number			1	Only one FDD carrier frequency is used.
E-UTRA FDD Channel Bandwidth ($BW_{channel}$)		MHz	10	
HRPD RF Channel Number			1	Only one HRPD carrier frequency is used.
E-UTRA FDD PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
T1		s	30	
T2		s	30	

Table A.4.5.1.1.1-2: Cell Specific Test Parameters for E-UTRAN FDD (Cell # 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$Treselection_{EUTRAN}$	S	0	
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
$S_{ServingCell}$	dB	51	38
$Thresh_{serving, low}$	dB	44	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.			

Table A.4.5.1.1.1-3: Cell Specific Test Parameters for HRPD (cell # 2)

Parameter	Unit	Cell 2	
		T1	T2
HRPD RF Channel Number		1	
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21	
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18	
$\hat{I}_{or}/I_{oc}$	dB	0	0
I_{oc}	dBm/ 1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-3	-3
Propagation Condition		AWGN	
$S_{nonServingCell,x}$		-6	
Treselection	s	0	
hrpd-CellReselectionPriority	-	0	
$Thresh_{x, low}$		-14	

A.4.5.1.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateHRPD} + T_{SI-HRPD}$

Where:

$T_{evaluatHRPD}$ See Table 4.2.2.5.4-1

$T_{SI-HRPD}$ Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1704 ms is assumed in this test case.

This gives a total of 20.904 s for the lower priority cell reselection, allow 21 s in the test case.

A.4.5.2 E-UTRAN TDD – HRPD

A.4.5.2.1 E-UTRAN TDD – HRPD Cell Reselection: HRPD is of Lower Priority

A.4.5.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD- HRPD inter-RAT cell reselection requirements specified in clause 4.2.2.5.4 when the HRPD cell is of lower priority.

The test scenario comprises of one HRPD and one E-UTRAN TDD cells as given in tables A.4.5.2.1.1-1, A.4.5.2.1.1-2 and A.4.5.2.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN TDD cell 1 and HRPD cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.5.2.1.1-1: General Test Parameters for E-UTRAN TDD - lower priority HRPD Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbour cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell is selecting during T2
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1			Normal	
DRX cycle length		s	1.28	
E-UTRA TDD RF Channel Number			1	Only one TDD carrier frequency is used.
E-UTRA TDD Channel Bandwidth (BWchannel)		MHz	10	
HRPD RF Channel Number			1	Only one HRPD carrier frequency is used.
E-UTRA TDD PRACH configuration of cell 1			53	As specified in table 4.7.1-3 in TS 36.211
E_UTRA TDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
T1		s	30	
T2		s	30	

Table A.4.5.2.1.1-2: Cell Specific Test Parameters for E-UTRAN TDD (Cell # 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$Treselection_{EUTRAN}$	S	0	
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
$S_{ServingCell}$	dB	51	38
$Thresh_{serving, low}$	dB	44	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.			

Table A.4.5.2.1.1-3: Cell Specific Test Parameters for HRPD (cell # 2)

Parameter	Unit	Cell 2	
		T1	T2
HRPD RF Channel Number		1	
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21	
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18	
$\hat{I}_{or}/I_{oc}$	dB	0	0
I_{oc}	dBm/ 1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-3	-3
Propagation Condition		AWGN	
$S_{nonServingCell,x}$		-6	
Treselection	s	0	
hrpd-CellReselectionPriority	-	0	
$Thresh_{x,\ low}$		-14	

A.4.5.2.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateHRPD} + T_{SI\text{-}HRPD}$

Where:

$T_{evaluatHRPD}$ See Table 4.2.2.5.4-1

$T_{SI\text{-}HRPD}$ Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1704 ms is assumed in this test case.

This gives a total of 20.904 s for the lower priority cell reselection, allow 21 s in the test case.

A.4.6 E-UTRAN to cdma2000 1X Cell Re-Selection

A.4.6.1 E-UTRAN FDD – cdma2000 1X

A.4.6.1.1 E-UTRAN FDD – cdma2000 1X Cell Reselection: cdma2000 1X is of Lower Priority

A.4.6.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD- cdma2000 1X inter-RAT cell reselection requirements specified in clause 4.2.2.5.5 when the cdma2000 1X cell is of lower priority.

The test scenario comprises of one cdma2000 1X and one E-UTRAN FDD cells as given in tables A.4.6.1.1.1-1, A.4.6.1.1.1-2 and A.4.6.1.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN FDD cell 1 and cdma2000 1X cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.6.1.1.1-1: General Test Parameters for E-UTRAN FDD - lower priority cdma2000 1X Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbour cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell is selecting during T2
DRX cycle length		s	1.28	
E-UTRA FDD RF Channel Number			1	Only one FDD carrier frequency is used.
E-UTRA FDD Channel Bandwidth ($BW_{channel}$)		MHz	10	
cdma2000 1X RF Channel Number			1	Only one cdma2000 1X carrier frequency is used.
E-UTRA FDD PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA FDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
T1		s	30	
T2		s	30	

Table A.4.6.1.1.1-2: Cell Specific Test Parameters for E-UTRAN FDD (Cell # 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$Treselection_{EUTRAN}$	S	0	
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
$S_{ServingCell}$	dB	51	38
$Thresh_{serving, low}$	dB	44	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.4.6.1.1.1-3: Cell Specific Test Parameters for cdma2000 1X (cell # 2)

Parameter	Unit	Cell 2	
		T1	T2
cdma2000 1X RF Channel Number		1	
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7	
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16	
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12	
$\hat{I}_{or}/I_{oc}$	dB	0	0
I_{oc}	dBm/ 1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	-10	-10
Propagation Condition		AWGN	
$S_{nonServingCell,x}$		-20	
Treselection	s	0	
oneXRTT-CellReselectionPriority	-	0	
$Thresh_{x,\ low}$		-28	

A.4.6.1.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluatecdma2000\ 1X} + T_{SI\text{-}cdma2000\ 1X}$

Where:

$T_{evaluatcdma2000\ 1X}$ See Table 4.2.2.5.5-1

$T_{SI\text{-}cdma2000\ 1X}$ Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

A.4.6.2 E-UTRAN TDD – cdma2000 1X

A.4.6.2.1 E-UTRAN TDD –cdma2000 1X Cell Reselection: cdma2000 1X is of Lower Priority

A.4.6.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD- cdma2000 1X inter-RAT cell reselection requirements specified in clause 4.2.2.5.5 when the cdma2000 1X cell is of lower priority.

The test scenario comprises of one cdma2000 1X and one E-UTRAN TDD cells as given in tables A.4.6.2.1.1-1, A.4.6.2.1.1-2 and A.4.6.2.1.1-3.

The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both E-UTRAN TDD cell 1 and cdma2000 1X cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

Table A.4.6.2.1.1-1: General Test Parameters for E-UTRAN TDD - lower priority cdma2000 1X Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbour cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell is selecting during T2
DRX cycle length		s	1.28	
E-UTRA TDD RF Channel Number			1	Only one TDD carrier frequency is used.
E-UTRA TDD Channel Bandwidth ($BW_{channel}$)		MHz	10	
cdma2000 1X RF Channel Number			1	Only one cdma2000 1X carrier frequency is used.
E-UTRA TDD PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
E_UTRA TDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
T1		s	30	
T2		s	30	

Table A.4.6.2.1.1-2: Cell Specific Test Parameters for E-UTRAN TDD (Cell # 1)

Parameter	Unit	Cell 1	
		T1	**T2**
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 KHz	-89	-102
$\hat{E}_s/I_{ot}$	dB	9	-4
$\hat{E}_s/N_{oc}$	dB	9	-4
$Treselection_{EUTRAN}$	S	0	
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
$\mathbf{S_{ServingCell}}$	dB	51	38
$Thresh_{serving, low}$	dB	44	
Propagation Condition		AWGN	

Note 1: CNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Iterference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.4.6.2.1.1-3: Cell Specific Test Parameters for cdma2000 1X (cell # 2)

Parameter	Unit	Cell 2	
		T1	T2
cdma2000 1X RF Channel Number		1	
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7	
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16	
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12	
$\hat{I}_{or}/I_{oc}$	dB	0	0
I_{oc}	dBm/ 1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	-10	-10
Propagation Condition		AWGN	
$S_{nonServingCell,x}$		-20	
Treselection	s	0	
oneXRTT-CellReselectionPriority	-	0	
$Thresh_{x,\,low}$		-28	

A.4.6.2.1.2 Test Requirements

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluatecdma2000\ 1X} + T_{SI\text{-}cdma2000\ 1X}$

Where:

$T_{evaluatcdma2000\ 1X}$ See Table 4.2.2.5.5-1

$T_{SI\text{-}cdma2000\ 1X}$ Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

A.5 E-UTRAN RRC CONNECTED Mode Mobility

A.5.1 E-UTRAN Handover

A.5.1.1 E-UTRAN FDD - FDD Intra frequency handover

A.5.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD intra frequency handover requirements specified in clause 5.1.2.1.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.5.1.1.1-1 and A.5.1.1.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.1.1-1: General test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells			3 ms	Asynchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	- Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.5.1.1.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.1.2.1.2.

This gives a total of 50 ms.

A.5.1.2 E-UTRAN TDD - TDD Intra frequency handover

A.5.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD intra frequency handover requirements specified in clause 5.2.2.4.

The test scenario comprises of 1 E-UTRA TDD carrier and 2 cells as given in tables A.5.1.2.1-1 and A.5.1.2.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.2.1-1: General test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCHPHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells			3 μs	Synchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Cell 1</th><th colspan="3">Cell 2</th></tr>
<tr><th>T1</th><th>T2</th><th>T3</th><th>T1</th><th>T2</th><th>T3</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td colspan="3">1</td><td colspan="3">1</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="3">10</td><td colspan="3">10</td></tr>
<tr><td>OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)</td><td></td><td>OP.1 TDD</td><td>OP.1 TDD</td><td>OP.2 TDD</td><td>OP.2 TDD</td><td>OP.2 TDD</td><td>OP.1 TDD</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td colspan="3" rowspan="13">0</td><td colspan="3" rowspan="13">0</td></tr>
<tr><td>PBCH_RB</td><td>dB</td></tr>
<tr><td>PSS_RA</td><td>dB</td></tr>
<tr><td>SSS_RA</td><td>dB</td></tr>
<tr><td>PCFICH_RB</td><td>dB</td></tr>
<tr><td>PHICH_RA</td><td>dB</td></tr>
<tr><td>PHICH_RB</td><td>dB</td></tr>
<tr><td>PDCCH_RA</td><td>dB</td></tr>
<tr><td>PDCCH_RB</td><td>dB</td></tr>
<tr><td>PDSCH_RA</td><td>dB</td></tr>
<tr><td>PDSCH_RB</td><td>dB</td></tr>
<tr><td>OCNG_RA Note 1</td><td>dB</td></tr>
<tr><td>OCNG_RB Note 1</td><td>dB</td></tr>
<tr><td>$\hat{E}_s/I_{ot}$</td><td>dB</td><td>8</td><td>-3.3</td><td>-3.3</td><td>-Infinity</td><td>2.36</td><td>2.36</td></tr>
<tr><td>N_{oc} Note 2</td><td>dBm/15 KHz</td><td colspan="6">-98</td></tr>
<tr><td>$\hat{E}_s/N_{oc}$</td><td>dB</td><td>8</td><td>8</td><td>8</td><td>-Infinity</td><td>11</td><td>11</td></tr>
<tr><td>RSRP Note 3</td><td>dBm/15 KHz</td><td>-90</td><td>-90</td><td>-90</td><td>- Infinity</td><td>-87</td><td>-87</td></tr>
<tr><td>Propagation Condition</td><td></td><td colspan="6">AWGN</td></tr>
<tr><td colspan="8">Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</td></tr>
</table>

A.5.1.2.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.2.2.4.2.

This gives a total of 50 ms.

A.5.1.3 E-UTRAN FDD – FDD Inter frequency handover

A.5.1.3.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD inter-frequency handover requirements specified in clause 5.1.2.1.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.5.1.3.1-1 and A.5.1.3.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.3.1-1: General test parameters for E-UTRAN FDD-FDD Inter frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF channel number			1, 2	Two FDD carriers are used
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
TimeToTrigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			DRX_L	As specified in clause A.3.3
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between cells			3 ms	Asynchronous cells
Gap pattern configuration Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Inter frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.1.3.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.1.2.1.2.

This gives a total of 50 ms.

A.5.1.4 E-UTRAN TDD – TDD Inter frequency handover

A.5.1.4.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD inter frequency handover requirements specified in clause 5.2.2.4.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables Table A.5.1.4.1-1 and Table A.5.1.4.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the

UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

Table A.5.1.4.1-1: General test parameters for E-UTRAN TDD-TDD Inter frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id			1	As specified in TS 36.133 clause 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
E-UTRA RF channel number			1, 2	Two TDD carriers are used
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
DRX			DRX_L	As specified in clause A.3.3
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells			3 μs	Synchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Inter frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{oc}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-infinity	-91	-91
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.1.4.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.2.2.4.2.

This gives a total of 50 ms.

A.5.1.5 E-UTRAN FDD – FDD Inter frequency handover: unknown target cell

A.5.1.5.1 Test Purpose and Environment

This test is to verify the FDD-FDD inter-frequency handover requirements for the case when the target cell is unknown as specified in clause 5.1.2.1.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.5.1.5.1-1 and A.5.1.5.1-2. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and start to transmit the PRACH to Cell 2.

A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.5.1-1: General test parameters for the E-UTRAN FDD-FDD Inter frequency handover test case when the target cell is unknown

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF channel number			1, 2	Two FDD carriers are used
Channel Bandwidth ($BW_{channel}$)		MHz	10	
DRX			OFF	Non-DRX test
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between cells			3 ms	Asynchronous cells
T1		s	≤5	
T2		s	1	

Table A.5.1.5.1-2: Cell specific test parameters for the E-UTRAN FDD-FDD Inter frequency handover test case when the target cell is unknown

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
N_{oc} Note 2	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-91
Propagation Condition		AWGN			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.5.1.5.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 130 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms, which is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 115 ms in the test. See clause 5.1.2.1.2

This gives a total of 130 ms.

A.5.1.6 E-UTRAN TDD – TDD Inter frequency handover; unknown Target Cell

A.5.1.6.1 Test Purpose and Environment

This test is to verify the TDD-TDD inter-frequency handover requirements for the case when the target cell is unknown as specified in clause 5.2.2.4.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables A.5.1.6.1-1 and A.5.1.6.1-2. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1, T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.6.1-1: General test parameters for the E-UTRAN TDD-TDD Inter-Frequency handover test case when the target cell is unknown

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF channel number			1, 2	Two TDD carriers
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells			3 μs	Synchronous cells
Gap pattern configuration			-	No gap pattern configured
T1		s	≤5	
T2		s	1	

Table A.5.1.6.1-2: Cell specific test parameters for the E-UTRAN TDD-TDD Inter frequency handover test case when the target cell is unknown

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0		0	
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-93
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	5
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-93
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	5
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.1.6.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 130 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms, which is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 115 ms in the test. See clause 5.2.2.4.2

This gives a total of 130 ms.

A.5.1.7 E-UTRAN FDD – TDD Inter frequency handover

A.5.1.7.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-TDD inter frequency handover requirements specified in clause 5.2.2.2.

The test scenario comprises of one E-UTRA FDD cell and one E-UTRA TDD cell as given in tables Table A.5.1.7.1-1 , Table A.5.1.7.1-2 and Table A.5.1.7.1-3. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

Table A.5.1.7.1-1: General test parameters for E-UTRAN FDD-TDD Inter frequency handover test case

Parameter		Unit	Value	Comment
Cell 1 PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
Cell 1 PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Cell 2 PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
Cell 2 PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id			0	As specified in TS 36.133 clause 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Cell 1 E-UTRA RF channel number			1	One FDD carrier is used
Cell 2 E-UTRA RF channel number			2	One TDD carrier is used
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
DRX			DRX_L	As specified in clause A.3.3
CP length			Normal	
E-UTRA TDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 2.
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 2
E-UTRA TDD PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells			3 ms	Asynchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.7.1-2: Cell specific test parameters for E-UTRAN FDD (cell #1) in E-UTRAN FDD-TDD Inter frequency handover test case

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	4	4	4
N_{oc} Note 2	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	4	4	4
RSRP Note 3	dBm/15 KHz	-94	-94	-94
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

Table A.5.1.7.1-3: Cell specific test parameters for E-UTRAN TDD (cell #2) in E-UTRAN FDD-TDD Inter frequency handover test case

Parameter	Unit	Cell 2		
		T1	T2	T3
E-UTRA RF Channel number		2		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	-Infinity	7	7
N_{oc} Note 2	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-Infinity	-91	-91
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.				

A.5.1.7.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.2.2.4.2.

This gives a total of 50 ms.

A.5.1.8 E-UTRAN TDD – FDD Inter frequency handover

A.5.1.8.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-FDD inter-frequency handover requirements specified in clause 5.2.2.3.

The test scenario comprises of one E-UTRA TDD cell and one E-UTRA FDD cell as given in tables Table A.5.1.8.1-1, Table A.5.1.8.1-2 and Table A.5.1.8.1-3. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.5.1.8.1-1: General test parameters for E-UTRAN TDD-FDD Inter frequency handover test case

Parameter		Unit	Value	Comment
Cell 1 PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
Cell 1 PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Cell 2 PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
Cell 2 PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
Cell 1 E-UTRA RF channel number			1	One TDD carrier is used
Cell 2 E-UTRA RF channel number			2	One FDD carrier is used
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
TimeToTrigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			DRX_L	As specified in clause A.3.3
E-UTRA FDD PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA FDD Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between cells			3 ms	Asynchronous cells
Gap pattern configuration Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.8.1-2: Cell specific test parameters for E-UTRAN TDD (cell #1) in E-UTRAN TDD-FDD Inter frequency handover test case

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	4	4	4
N_{oc} Note 2	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	4	4	4
RSRP Note 3	dBm/15 KHz	-94	-94	-94
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

Table A.5.1.8.1-3: Cell specific test parameters for E-UTRAN FDD (cell #2) in E-UTRAN TDD-FDD Inter frequency handover test case

Parameter	Unit	Cell 2		
		T1	T2	T3
E-UTRA RF Channel number		2		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	-Infinity	7	7
N_{oc} Note 2	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-Infinity	-91	-91
Propagation Condition	AWGN			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.				

A.5.1.8.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.1.2.1.2.

This gives a total of 50 ms.

A.5.1.9 E-UTRAN FDD - FDD Intra frequency handover for 5MHz bandwidth

A.5.1.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.5.1.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.5.1.9.1-1 and A.5.1.9.1-2 will replace the values of corresponding parameters in Tables A.5.1.1.1-1 and A.5.1.1.1-2.

Table A.5.1.9.1-1: General test parameters for E-UTRAN FDD-FDD intra frequency handover test case, 5MHz

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	5	
Note 1: See Table A.5.1.1.1-1 for other general test parameters. Note 2: This test is performed according to the principle defined in section A.3.7.2			

Table A.5.1.9.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case, 5MHz

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	5			5		
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.15 FDD	OP.15 FDD	OP.16 FDD	OP.16 FDD	OP.16 FDD	OP.15 FDD
Note 1: See Table A.5.1.1.1-2 for other cell-specific test parameters.							

A.5.1.9.2 Test Requirements

The requirements defined in section A.5.1.1.2 shall apply to this test case.

A.5.1.10 E-UTRAN FDD - FDD Intra frequency handover for UE category 0

A.5.1.10.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD intra frequency handover requirements specified in clause 5.1.2.1.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.5.1.10.1-1 and A.5.1.10.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.10.1-1: General test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.13 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells			3 ms	Asynchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.10.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB	0			0		
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	- Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.5.1.10.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.1.2.1.2.

This gives a total of 50 ms.

A.5.1.11 E-UTRAN HD - FDD Intra frequency handover for UE category 0

A.5.1.11.1 Test Purpose and Environment

This test is to verify the requirement for the HD-FDD intra frequency handover requirements specified in clause 5.2.2.5.

The test scenario comprises of 1 E-UTRA FDD carrier and 2 cells as given in tables A.5.1.11.1-1 and A.5.1.11.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.11.1-1: General test parameters for E-UTRAN HD-FDD intra frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.1 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells			3 ms	Asynchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.11.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	- Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.1.11.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.2.2.5.2.

This gives a total of 50 ms.

A.5.1.12 E-UTRAN TDD - TDD Intra frequency handover for UE category 0

A.5.1.12.1 Test Purpose and Environment

This test is to verify the requirement for the TDD-TDD intra frequency handover requirements specified in clause 5.2.2.4.

The test scenario comprises of 1 E-UTRA TDD carrier and 2 cells as given in tables A.5.1.12.1-1 and A.5.1.12.1-2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

E-UTRAN shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.5.1.12.1-1: General test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.12 TDD	As specified in clause A.3.1.1.5
PCFICH/PDCCHPHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells			3 μs	Synchronous cells
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.1.12.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Intra frequency handover test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-87	-87
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.5.1.12.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 50 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 15 ms and is specified in clause 11.2 in TS 36.331 [2].

$T_{interrupt}$ = 35 ms in the test; $T_{interrupt}$ is defined in clause 5.2.2.4.2.

This gives a total of 50 ms.

A.5.2 E-UTRAN Handover to other RATs

A.5.2.1 E-UTRAN FDD – UTRAN FDD Handover

A.5.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to UTRAN FDD handover requirements specified in clause 5.3.1.

The test parameters are given in Tables A.5.2.1.1-1, A.5.2.1.1-2 and A.5.2.1.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.1.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
Final condition	Active cell		Cell 2	UTRAN cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (UTRAN FDD) measurement quantity			CPICH Ec/N0	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	Absolute UTRAN CPICH Ec/Io threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
UTRA RF Channel Number			1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification period			False	
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.2.1.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	0	0	0
N_{oc}	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	0	0	0
RSRP Note 2	dBm/15 KHz	-98	-98	-98
Io Note 2	dBm/9 MHz	-67.21	-67.21	-67.21
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.2.1.1-3: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)		
		T1	T2	T3
CPICH_Ec/Ior	dB	-10		
PCCPCH_Ec/Ior	dB	-12		
SCH_Ec/Ior	dB	-12		
PICH_Ec/Ior	dB	-15		
DCH_Ec/Ior	dB	N/A	N/A	Note 1
OCNS_Ec/Ior	dB	-0.941	0.941	Note 2
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-1.8
I_{oc}	dBm/3,84 MHz	-70	-70	-70
CPICH_Ec/Io	dB	-infinity	-14	-14
Propagation Condition		AWGN		
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.				

A.5.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 190 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.1.1.1.

$T_{interrupt}$ = 140 ms in the test; $T_{interrupt}$ is defined in clause 5.3.1.1.2.

This gives a total of 190 ms.

A.5.2.2 E-UTRAN TDD - UTRAN FDD Handover

A.5.2.2.1 Test Purpose and Environment

This test is to verify the E-UTRAN TDD – UTRAN FDD handover requirements specified in clause 5.3.1.

The test scenario comprises of one E-UTRAN TDD cell and one UTRAN FDD cell as given in the tables A.5.2.2.1-1, A5.2.2.1-2 and A.5.2.2.1-3. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At start of time duration T1, the UE does not have any timing information of cell 2. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before the start of T2 to enable the monitoring of UTRAN FDD. A neighbouring cell list, including the UTRAN cell (cell2), shall be sent to the UE before T2 starts. During the time T2 cell 2 becomes detectable and the UE is expected to detect and send the measurement report. A RRC message implying handover shall be sent to the UE during T2, after the UE has reported event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.2.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD handover

Parameter		Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
	Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Final conditions	Active cell		Cell 2	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1
E-UTRAN TDD measurement quantity			RSRP	
Inter-RAT (UTRA FDD) measurement quantity			CPICH Ec/Io	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	UTRAN FDD CPICH Ec/Io threshold for event B2
Hysteresis		dB	0	
DRX			OFF	No DRX configured.
Time to Trigger		ms	0	
Filter coefficient			0	
CP length			Normal	Applicable to cell 1
Gap pattern configuration Id			0	As specified in Table 8.1.2.1-1; to start before T2 starts
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
UTRA RF Channel Number			1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell list before T2.
Post-verification period			False	Post verification is not used.
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.2.2.1-2: Cell specific test parameters for E-UTRAN TDD (cell 1) for handover to UTRAN FDD (cell # 2)

Parameter	Unit	Cell 1 (E-UTRAN)		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD
PBCH_RA	dB	0		
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note 1				
OCNG_RB Note 1				
RSRP	dBm/15 kHz	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	0	0	0
$\hat{E}_s/N_{oc}$	dB	0	0	0
N_{oc}	dBm/15 kHz	-98		
Io Note 2	dBm/9 MHz	-67.21	-67.21	-67.21
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.2.2.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

Parameter	Unit	Cell 1 (UTRA)		
		T1	T2	T3
CPICH_Ec/Ior	dB	-10		
PCCPCH_Ec/Ior	dB	-12		
SCH_Ec/Ior	dB	-12		
PICH_Ec/Ior	dB	-15		
DPCH_Ec/Ior	dB	N/A	N/A	Note 1
OCNS	dB	-0.941	-0.941	Note 2
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-1.8
I_{oc}	dBm/3.84 MHz	-70		
CPICH_Ec/Io	dB	-infinity	-14	-14
Propagation Condition		AWGN		
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.				

A.5.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 190 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in clause 5.1.1.1.1.

$T_{interrupt}$ = 140 ms in the test; $T_{interrupt}$ is defined in clause 5.3.1.1.2.

This gives a total of 190 ms.

A.5.2.3 E-UTRAN FDD- GSM Handover

A.5.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN to GSM cell handover delay specified in clause 5.3.3.

The test parameters are given in Table A.5.2.3.1 -1, A.5.2.3.1 -2 and A.5.2.3.1 -3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 shall be used. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

The RRC message implying handover to cell 2 shall be sent to the UE during period T2, after the UE has reported Event B1. The start of T3 is defined as the end of last E-UTRAN TTI containing the RRC message implying handover.

The requirements are also applicable for a UE not requiring measurement gap, in which case no measurement gap pattern should be sent for the parameters specified in Table A.5.2.3.1-1.

Table A.5.2.3.1 -1: General test parameters for E-UTRAN FDD-GSM handover

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Gap Pattern Id			1	As specified in TS 36.133 section8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Inter-RAT measurement quantity			GSM Carrier RSSI	
Threshold other system		dBm	-80	Absolute GSM carrier RSSI threshold for event B1.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
T1		s	20	
T2		s	7	
T3		s	1	

Table A. A.5.2.3.1 - 2: Cell Specific Parameters for Handover from E- UTRAN FDD to GSM cell case (cell 1)

Parameter	Unit	Cell 1	
		T1, T2	**T3**
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0	
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB		
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
$\hat{E}_s/I_{ot}$	dB	4	
N_{oc} Note 2	dBm/15 kHz	-98 (AWGN)	
$\hat{E}_s/N_{oc}$	dB	4	
RSRP Note 3	dBm/15kHz	-94	
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.3.1 - 3: Cell Specific Parameters for Handover from E-UTRAN FDD to GSM cell case (cell 2)

Parameter	Unit	Cell 2 (GSM)	
		T1	**T2, T3**
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-85	-75

A.5.2.3.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 100 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{Handover\ delay}$ = 90 ms (Table 5.3.3.2.1-1) + T_{offset} + T_{UL}

T_{offset} : Equal to 4.65 ms, GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T_{UL}: Equal to 4.65 ms, the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 99.3 ms, allow 100 ms in the test case.

A.5.2.4 E-UTRAN TDD - UTRAN TDD Handover

A.5.2.4.1 Test Purpose and Environment

A.5.2.4.1.1 Void

A.5.2.4.1.2 1.28 Mcps TDD option

This test is to verify the requirement for E-UTRAN TDD to UTRAN TDD handover requirements specified in clause 5.3.2.

The test scenario comprises of 1 E-UTRA TDD cell and 1 UTRA TDD cell as given in tables Table A.5.2.4.1.2-1, Table A.5.2.4.1.2-2, and Table A.5.2.4.1.2-3. Gap pattern configuration #0 as defined in table 8.1.2.1-1 is provided.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively.

E-UTRAN shall send a RRC message implying handover to UE. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The end of the last TTI containing handover message is begin of T3 duration.

Table A.5.2.4.1.2-1: General test parameters for E-UTRA TDD to UTRA(1.28 Mcps TDD OPTION) handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	E-UTRA TDD cell
	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Final conditions	Active cell		Cell 2	
Gap Pattern Id			0	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1			Normal	
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information			Not Sent	No additional delays in random access procedure.
Assigned Sub-Channel Number			1	No additional delays in random access procedure due to ASC.
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Thresh1		dBm	-93	E-UTRA event B2 threshold
Thresh2		dBm	-80	UTRA event B2 threshold
T1		s	5	
T2		s	≤10	
T3		s	1	

Table A.5.2.4.1.2-2: Cell specific test parameters for E-UTRA TDD to UTRA TDD handover test case (cell 1)

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD
PBCH_RA	dB	0	0	0
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	13	-3	-3
$\hat{E}_s/N_{oc}$	dB	13	-3	-3
N_{oc}	dBm/15kHz	-98		
RSRP Note 2	dBm/15kHz	-85	-101	-101
SCH_RP Note 2	dBm/15 kHz	-85	-101	-101
Io Note 2	dBm/9MHz	-57.01	-68.45	-68.45
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves

Table A.5.2.4.1.2-3: Cell specific test parameters for cell search E-UTRA to UTRA case (cell 2)

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0			DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number Note 21		Channel 2					
PCCPCH_Ec/Ior	dB	-3					
DwPCH_Ec/Ior	dB				0		
OCNS_Ec/Ior	dB	-3					
$\hat{I}_{or}/I_{oc}$	dB	-3	11	11	-3	11	11
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP Note 2	dBm	-86	-72	-72	n.a.		
Io Note 2	dBm/1.28 MHz	-78.24	-68.67	-68.67			
Propagation Condition		AWGN					

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
Note 2: PCCPCH_RSCP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.2.4.1.3 Void

A.5.2.4.2 Test Requirements

A.5.2.4.2.1 Void

A.5.2.4.2.2 1.28 Mcps TDD option

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 120 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.2.2.1.

$T_{interrupt}$ is defined in clause 5.3.2.2.2. $T_{interrupt}$ = 70 ms in the test as following:

$T_{interrupt1}= T_{offset}+T_{UL}+30*F_{SFN}+20$ ms

T_{offset} = 10 ms; T_{UL} = 10 ms; and F_{SFN} = 1 for UE decoding SFN.

This gives a total of 120 ms.

A.5.2.4.2.3 Void

A.5.2.5 E-UTRAN FDD – UTRAN TDD Handover

A.5.2.5.1 Test Purpose and Environment

A.5.2.5.1.1 Void

A.5.2.5.1.2 1.28 Mcps TDD option

This test is to verify the requirement for the E-UTRAN FDD to UTRAN TDD handover requirements specified in clause 5.3.2.

The test scenario comprises of two cells, E-UTRA TDD cell1 and UTRA TDD cell2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #1 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring. The test parameters are given in Tables A.5.2.5.1-1, A.5.2.5.1-2 and A.5.2.5.1-3.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.2.5.1.2-1: General test parameters for E-UTRA FDD to UTRA (1.28 Mcps TDD option) handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRA FDD cell
	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Final conditions	Active cell		Cell 2	
Gap Pattern Id			1	As specified in TS 36.133 clause 8.1.2.1.
E-UTRAN FDD measurement quantity			RSRP	
UTRAN TDD measurement quantity			RSCP	
CP length of cell 1			Normal	
Access Barring Information			Not Sent	No additional delays in random access procedure.
Assigned Sub-Channel Number			1	No additional delays in random access procedure due to ASC.
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Thresh1		dBm	-93	Absolute E-UTRAN RSRP threshold for event B2
Thresh2		dBm	-80S	Absolute UTRAN RSCP threshold for event B2
T1		s	5	
T2		s	≤ 10	
T3		s	1	

Table A.5.2.5.1.2-2: Cell specific test parameters for E-UTRAN FDD to UTRAN (1.28 Mcps TDD option) handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/N_{oc}$	dB	13	-3	-3
N_{oc}	dBm/15 kHz	-98		
$\hat{E}_s/I_{ot}$	dB	13	-3	-3
RSRP Note 2	dBm/15 KHz	-85	-101	-101
Io Note 2	dBm/9MHz	-57.01	-68.45	-68.45
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves

Table A.5.2.5.1.2-3: Cell specific test parameters for E-UTRAN FDD to UTRAN (1.28 Mcps TDD option) handover test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0			DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number Note 21		Channel 2					
PCCPCH_Ec/Ior	dB	-3					
DwPCH_Ec/Ior	dB				0		
OCNS_Ec/Ior	dB	-3					
$\hat{I}_{or}/I_{oc}$	dB	-3	11	11	-3	11	11
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP Note 2	dBm	-86	-72	-72	n.a.		
Io Note 2	dBm/1.28 MHz	-78.24	-68.67	-68.67			
Propagation Condition		AWGN					

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
Note 2: PCCPCH_RSCP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.5.2.5.1.3 Void

A.5.2.5.2 Test Requirements

A.5.2.5.2.1 Void

A.5.2.5.2.2 1.28 Mcps TDD option

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 120 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.2.2.1.

$T_{interrupt}$ is defined in clause 5.3.2.2.2. $T_{interrupt}$ = 70 ms in the test as following:

$T_{interrupt1}= T_{offset}+T_{UL}+30*F_{SFN}+20$ ms

T_{offset} = 10 ms; T_{UL} = 10 ms; and F_{SFN} = 1 for UE decoding SFN.

This gives a total of 120 ms.

A.5.2.5.2.3 Void

A.5.2.6 E-UTRAN TDD - GSM Handover

A.5.2.6.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN to GSM cell handover delay specified in clause 5.3.3.

The test parameters are given in Table A.5.2.6.1-1, A.5.2.6.1-2 and A.5.2.6.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 shall be used. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

The RRC message implying handover to cell 2 shall be sent to the UE during period T2, after the UE has reported Event B1. The start of T3 is defined as the end of last E-UTRAN TTI containing the RRC message implying handover.

The requirements are also applicable for a UE not requiring measurement gap, in which case no measurement gap pattern should be sent for the parameters specified in Table A.5.2.6.1-1.

Table A.5.2.6.1-1: General test parameters for E-UTRAN TDD toGSM neighbours handover test case in AWGN propagation condition

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id			1	As specified in TS 36.133 clause 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1			Normal	
Inter-RAT measurement quantity			GSM Carrier RSSI	
E-UTRA RF Channel Number			1	E-UTRA RF Channel Number
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	E-UTRA Channel Bandwidth ($BW_{channel}$)
Threshold other system		dBm	-80	Absolute GSM carrier RSSI threshold for event B1.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
T1		s	20	
T2		s	7	
T3		s	1	

Table A.5.2.6.1-2: Cell Specific Parameters for Handover E- UTRAN TDD to GSM handover test case

Parameter	Unit	Cell 1	
		T1, T2	T3
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB		
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
$\hat{E}_s/N_{oc}$	dB	4	
N_{oc} Note 2	dBm/15 kHz	-98 (AWGN)	
$\hat{E}_s/I_{ot}$	dB	4	
RSRP Note 3	dBm/15kHz	-94	
Propagation Condition		AWGN	
NOTE 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. NOTE 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.2.6.1-3: Cell Specific Parameters for Handover E-UTRAN to GSM cell case (cell 2)

Parameter	Unit	Cell 2 (GSM)	
		T1	T2, T3
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-85	-75

A.5.2.6.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 100 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{Handover\ delay}$ = 90 ms (Table 5.3.3.2.1-1) + T_{offset} + T_{UL}

T_{offset}: Equal to 4.65 ms, GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T_{UL}: Equal to 4.65 ms, the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 99.3 ms, allow 100 ms in the test case.

A.5.2.7 E-UTRAN FDD – UTRAN FDD Handover; Unknown Target Cell

A.5.2.7.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to UTRAN FDD handover requirements for the case when the target cell is unknown as specified in clause 5.3.1.

The test parameters are given in Tables A.5.2.7.1-1, A.5.2.7.1-2 and A.5.2.7.1-3. The test consists of two successive time periods, with time durations of T1, T2. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.7.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
Final condition	Active cell		Cell 2	UTRAN cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (UTRAN FDD) measurement quantity			CPICH Ec/N0	
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
UTRA RF Channel Number			1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification period			False	
T1		s	≤5	
T2		s	1	

Table A.5.2.7.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	0	0
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	0	0
RSRP Note 3	dBm/15 KHz	-98	-98
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.7.1-3: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)	
		T1	T2
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DCH_Ec/Ior	dB	Note 1	
OCNS_Ec/Ior	dB	Note 2	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8
I_{oc}	dBm/3,84 MHz	-70	-70
CPICH_Ec/Io	dB	-infinity	-14
Propagation Condition	AWGN		

Note 1: The DPCH level is controlled by the power control loop
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.

A.5.2.7.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 290 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay is 50ms. See clause 5.3.1.1.1.

$T_{interrupt}$ is 240ms. See clause 5.3.1.1.2.

This gives a total of 290ms in the test case.

A.5.2.8 E-UTRAN FDD - GSM Handover; Unknown Target Cell

A.5.2.8.1 Test Purpose and Environment

This test is to verify the E-UTRAN FDD to GSM handover requirements for the case when the target GSM cell is unknown as specified in clause 5.3.3.

The test parameters are given in Table A.5.2.8.1-1, A.5.2.8.1-2 and A.5.2.8.1-3 below. The test consists of two successive time periods, with time duration of T1, T2 respectively. At the start of time duration T1, the UE will not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.8.1-1: General test parameters for E-UTRAN FDD to GSM handover test case; unknown target cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Gap Pattern Id			None	No measurement gaps shall be provided.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
DRX			OFF	No DRX configured
T1		s	7	
T2		s	1	

Table A.5.2.8.1 - 2: Cell specific parameters for cell # 1 in E-UTRAN FDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 1	
		T1	T2
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0	
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB		
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
$\hat{E}_s/I_{ot}$	dB	4	
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	
RSRP Note 3	dBm/15 kHz	-94	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.2.8.1-3: Cell specific parameters for cell # 2 in E-UTRAN FDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-Infinity	-75

A.5.2.8.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 200 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{Handover\ delay}$ = 190 ms (Table 5.3.3.2.1-1) + T_{offset} + T_{UL}

T_{offset}: Equal to 4.65 ms is the GSM timing uncertainty from the time when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T_{UL}: Equal to 4.65 ms is the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 199.3 ms, allow 200 ms in the test case.

A.5.2.9 E-UTRAN TDD - GSM Handover; Unknown Target Cell

A.5.2.9.1 Test Purpose and Environment

This test is to verify the E-UTRAN TDD to GSM handover requirements for the case when the target GSM cell is unknown as specified in clause 5.3.3.

The test parameters are given in Table A.5.2.9.1 -1, A.5.2.9.1 -2 and A.5.2.9.1 -3 below. The test consists of two successive time periods, with time duration of T1, T2 respectively. At the start of time duration T1, the UE will not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

Table A.5.2.9.1-1: General test parameters for E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id			None	No measurement gaps shall be provided.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
DRX			OFF	No DRX configured
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
T1		s	7	
T2		s	1	

Table A.5.2.9.1 - 2: Cell specific parameters for cell # 1 in E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 1	
		T1	T2
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB		
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
$\hat{E}_s/I_{ot}$	dB	4	
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	
RSRP Note 3	dBm/15 kHz	-94	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.2.9.1 - 3: Cell specific parameters for cell # 2 in E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-Infinity	-75

A.5.2.9.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 200 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{Handover\ delay}$ = 190 ms (Table 5.3.3.2.1-1) + T_{offset} + T_{UL}

T_{offset}: Equal to 4.65 ms is the GSM timing uncertainty from the time when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T_{UL}: Equal to 4.65 ms is the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 199.3 ms, allow 200 ms in the test case.

A.5.2.10 E-UTRAN TDD to UTRAN TDD handover: unknown target cell

A.5.2.10.1 Test Purpose and Environment

This test is to verify the requirement for E-UTRAN TDD to UTRAN TDD handover requirements specified in clause 5.3.2 when the target UTRAN TDD cell is unknown.

The test scenario comprises of 1 E-UTRAN TDD cell and 1 UTRAN TDD cell as given in tables A.5.2.10.1-1, A.5.2.10.1-2, and A.5.2.10.1-3. No gap pattern is configured in the test case.

The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, a RRC message implying handover to UTRA 1.28Mcps TDD cell shall be sent to the UE. The end of the last TTI containing handover message is the beginning of T2 duration.

Table A.5.2.10.1-1: General test parameters for E-UTRAN TDD to unknown UTRAN TDD cell handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD cell
Final conditions	Active cell		Cell 2	UTRA 1.28Mcps TDD cell
CP length of cell 1			Normal	
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
Time offset between cells			3 ms	Asynchronous cells
Access Barring Information			Not Sent	No additional delays in random access procedure.
Assigned Sub-Channel Number			1	No additional delays in random access procedure due to ASC.
TimeToTrigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
T1		s	5	During T1, cell 2 shall be powered off, and during the off time the physical layer cell identity shall be changed.
T2		s	1	

Table A.5.2.10.1-2: Cell specific test parameters for E-UTRAN TDD to unknown UTRAN TDD cell handover test case (cell 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
BWchannel	MHz	10	
OCNG Patterns defined in TS36.133 A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RANote 1	dB		
OCNG_RBNote 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	3
$\hat{E}_s/N_{oc}$	dB	3	3
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-95	-95
SCH_RP	dBm/15 kHz	-95	-95
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.2.10.1-3: Cell specific test parameters for E-UTRAN TDD to unknown UTRAN TDD cell test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number[Note1]		Channel 2			
PCCPCH_Ec/Ior	dB	-3			
DwPCH_Ec/Ior	dB			0	
OCNS_Ec/Ior	dB	-3			
$\hat{I}_{or}/I_{oc}$	dB	-infinity	13	-infinity	13
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-infinity	-70	n.a.	
Propagation Condition		AWGN			
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note2: P-CCPCH RSCP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.5.2.10.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 280 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.2.2.1.

$T_{interrupt}$ is defined in clause 5.3.2.2.2. $T_{interrupt}$ = 230 ms in the test as following:

$T_{interrupt1} = T_{offset} + T_{UL} + 30 * F_{SFN} + 180$ ms

T_{offset} = 10 ms; T_{UL} = 10 ms; and F_{SFN} = 1 for UE decoding SFN.

This gives a total of 280 ms.

A.5.2.10A E-UTRAN FDD – UTRAN FDD Multicarrier Handover with two target cells

A.5.2.10A.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to UTRAN FDD handover requirements specified in clause 5.3.1 in a 2 cell multicarrier configuration. It is applicable to UEs that support DC-HSDPA, DB-DC-HSDPA and which do not support 3C-HSDPA or 4C-HSDPA.

The test parameters are given in Tables A.5.2.10A.1-1, A.5.2.10A.1-2 and A.5.2.10A.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 and cell 3 become detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover to cell 2 and cell 3 shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target Primary Serving HS-DSCH cell and cell 3 as the target Secondary Serving HS-DSCH cell.

Table A.5.2.10A.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
Final condition	Active cell		Cell 2 and cell 3	UTRAN cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (UTRAN FDD) measurement quantity			CPICH Ec/Io	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	Absolute UTRAN CPICH Ec/Io threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
UTRA RF Channel Number			1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification period			False	
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.2.10A.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	0	0	0
N_{oc}	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	0	0	0
RSRP Note 2	dBm/15 KHz	-98	-98	-98
Io Note 2	dBm/9 MHz	-67.21	-67.21	-67.21
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.2.10A.1-3: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD multi carrier handover test case (cell 2 and cell 3)

		Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1			Channel 2		
Cell type		Primary Serving HS-DSCH Cell			Secondary Serving HS-DSCH Cell		
CPICH_Ec/Ior	dB	-10			-10		
PCCPCH_Ec/Ior	dB	-12			-12		
SCH_Ec/Ior	dB	-12			-12		
PICH_Ec/Ior	dB	-15			-15		
HS-SCCH_Ec/Ior	dB	-13			-13		
HS_DPDCH_Ec/Ior	dB	-10			-10		
DPCH_Ec/Ior	dB	Note 1			N/A		
OCNS		Note 2			-2.02		
$\hat{I}_{or}/I_{oc}$	dB	-Inf	-1.8	-1.8	-Inf	-1.8	-1.8
I_{oc}	dBm/3.84 MHz	-70					
Propagation Condition		AWGN			AWGN		
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or} Note 3: The UE shall be scheduled continuously with HS-DSCH data during T3 using both cell 2 and cell 3							

A.5.2.10A.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 210 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.1.1.1.

$T_{interrupt}$ = 160 ms in the test; $T_{interrupt}$ is defined in clause 5.3.1.1.2.

This gives a total of 210 ms.

A.5.2.10B E-UTRAN TDD – UTRAN FDD Multicarrier Handover with two target cells

A.5.2.10B.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to UTRAN FDD handover requirements specified in clause 5.3.1 in a 2 cell multicarrier configuration. It is applicable to UEs that support DC-HSDPA, DB-DC-HSDPA and which do not support 3C-HSDPA or 4C-HSDPA.

The test parameters are given in Tables A.5.2.10B.1-1, A.5.2.10B.1-2 and A.5.2.10B.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 and cell 3 become detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover to cell 2 and cell 3 shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target Primary Serving HS-DSCH cell and cell 3 as the target Secondary Serving HS-DSCH cell.

Table A.5.2.10B.1-1: General test parameters for E-UTRAN TDD to UTRAN FDD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
	Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Final conditions	Active cell		Cell 2 and cell 3	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1
E-UTRAN TDD measurement quantity			RSRP	
Inter-RAT (UTRA FDD) measurement quantity			CPICH Ec/Io	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	UTRAN FDD CPICH Ec/Io threshold for event B2
Hysteresis		dB	0	
DRX			OFF	No DRX configured.
Time to Trigger		ms	0	
Filter coefficient			0	
CP length			Normal	Applicable to cell 1
Gap pattern configuration Id			0	As specified in Table 8.1.2.1-1; to start before T2 starts
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
UTRA RF Channel Number			1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size			12	UTRA cells on UTRA RF channel 1 provided in the cell list before T2.
Post-verification period			False	Post verification is not used.
T1		s	5	
T2		s	≤5	
T3		s	1	

Table A.5.2.10B.1-2: Cell specific test parameters for E-UTRAN TDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRAN)		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD
PBCH_RA	dB	0		
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note 1				
OCNG_RB Note 1				
RSRP	dBm/15 kHz	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	0	0	0
$\hat{E}_s/N_{oc}$	dB	0	0	0
N_{oc}	dBm/15 kHz	-98		
Io Note 2	dBm/9 MHz	-67.21	-67.21	-67.21
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.2.10B.1-3: Cell specific test parameters for E-UTRAN TDD to UTRAN FDD multi carrier handover test case (cell 2 and cell 3)

		Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1			Channel 2		
Cell type		Primary Serving HS-DSCH Cell			Secondary Serving HS-DSCH Cell		
CPICH_Ec/Ior	dB	-10			-10		
PCCPCH_Ec/Ior	dB	-12			-12		
SCH_Ec/Ior	dB	-12			-12		
PICH_Ec/Ior	dB	-15			-15		
HS-SCCH_Ec/Ior	dB	-13			-13		
HS_DPDCH_Ec/Ior	dB	-10			-10		
DPCH_Ec/Ior	dB	Note 1			N/A		
OCNS		Note 2			-2.02		
$\hat{I}_{or}/I_{oc}$	dB	-Inf	-1.8	-1.8	-Inf	-1.8	-1.8
I_{oc}	dBm/3.84 MHz	-70					
Propagation Condition		AWGN			AWGN		

Note 1: The DPCH level is controlled by the power control loop
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}
Note 3: The UE shall be scheduled continuously with HS-DSCH data during T3 using both cell 2 and cell 3

A.5.2.10B.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 210 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in clause 5.3.1.1.1.

$T_{interrupt}$ = 160 ms in the test; $T_{interrupt}$ is defined in clause 5.3.1.1.2.

This gives a total of 210 ms.

A.5.2.11 E-UTRAN FDD – UTRAN FDD Handover for 5MHz Bandwidth

A.5.2.11.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.5.2.1.1.

The parameters of this test are the same as defined in Subclause A.5.2.1.1 except that the values of the parameters in the Table A.5.2.11.1-1 will replace the values of the corresponding parameters in A.5.2.1.1-1, and the values of the parameters in the Table A.5.2.11.1-2 will replace the values of the corresponding parameters in A.5.2.1.1-2.

Table A.5.2.11.1-1: General test parameters for E-UTRAN FDD to UTRAN FDD handover test case for 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1
E-UTRA Channel Bandwidth (BWchannel)	MHz	5	

Note 1: See Table A.5.2.1.1-1 for other general test parameters.
Note 2: This test is according to the principle defined in section A.3.7.2.

Table A.5.2.11.1-2: Cell specific test parameters for E-UTRAN FDD to UTRAN FDD handover test case (cell 1)

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	**T2**	**T3**
$BW_{channel}$	MHz	5		
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.15 FDD	OP.15 FDD	OP.16 FDD
Io Note 2	dBm/4.5 MHz	-70.22	-70.22	-70.22
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 3: See Table A.5.2.1.1-2 for other cell specific test parameters.				

A.5.2.11.2 Test Requirements

The test requirements defined in section A.5.2.1.2 shall apply to this test case.

A.5.3 E-UTRAN Handover to Non-3GPP RATs

A.5.3.1 E-UTRAN FDD – HRPD Handover

A.5.3.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to HRPD handover requirements specified in clause 5.4.1.

The test parameters are given in Tables A.5.3.1.1-1, A.5.3.1.1-2 and A.5.3.1.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.1.1-1: General test parameters for E-UTRAN FDD to HRPD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (HRPD) measurement quantity			CDMA2000 HRPD Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
HRPD RF Channel Number			1	One HRPD carrier frequency is used.
HRPD neighbour cell list size			8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		s	5	
T2		s	≤10	
T3		s	1	

Table A.5.3.1.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to HRPD cell # 2

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc} Note 2	dBm/15 kHz	-98		
RSRP Note 3	dBm/15 KHz	-98	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0	0
$\hat{E}_s/I_{ot}$	dB	0	0	0
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.3.1.1-3: Cell specific test parameters for HRPD (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (HRPD)		
		T1	**T2**	**T3**
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21		
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
I_{oc}	dBm/1.2288 MHz	-55		
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3	-3
Propagation Condition		AWGN		

A.5.3.1.2 Test Requirements

The UE shall start transmission of the reverse control channel in HRPD to Cell 2 less than 127 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in clause 5.4.1.1.1.

$T_{interrupt}$ = 76.66 ms in the test; $T_{interrupt}$ is defined in clause 5.4.1.1.2.

This gives a total of 126.66 ms, allow 127 ms in the test.

A.5.3.2 E-UTRAN FDD – cdma2000 1X Handover

A.5.3.2.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to cdma2000 1X handover requirements specified in clause 5.4.2.

The test parameters are given in Tables A.5.3.2.1-1, A.5.3.2.1-2 and A.5.3.2.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.2.1-1: General test parameters for E-UTRAN FDD to cdma2000 1X handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurement quantity			RSRP	
Inter-RAT (cdma2000 1X) measurement quantity			CDMA2000 1xRTT Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
cdma2000 1X RF Channel Number			1	One HRPD carrier frequency is used.
cdma2000 1X neighbour cell list size			8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		s	5	
T2		s	≤10	
T3		s	1	

Table A.5.3.2.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to cdma2000 1X cell # 2

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc} Note 2	dBm/15 kHz	-98		
RSRP Note 3	dBm/15 KHz	-98	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0	0
$\hat{E}_s/I_{ot}$	dB	0	0	0
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table A.5.3.2.1-3: Cell specific test parameters for cdma2000 1X (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (cdma2000 1X)		
		T1	**T2**	**T3**
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7		
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16		
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
I_{oc}	dBm/1.2288 MHz	-55		
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10	-10
Propagation Condition		AWGN		

A.5.3.2.2 Test Requirements

The UE shall start transmission of the reverse control channel in cdma2000 1X to Cell 2 less than 300 ms from the beginning of time period T3.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 130 ms, which is specified in clause 5.4.2.1.1.

$T_{interrupt}$ = 170 ms in the test; $T_{interrupt}$ is defined in clause 5.4.2.1.2.

This gives a total of 300 ms.

A.5.3.3 E-UTRAN FDD – HRPD Handover; Unknown Target Cell

A.5.3.3.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to HRPD handover requirements for the case when the target HRPD cell is unknown as specified in clause 5.4.1.

The test parameters are given in Tables A.5.3.3.1-1, A.5.3.3.1-2 and A.5.3.3.1-3. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. During time period T1, message containing Information Element *systemTimeInfo* as defined in clause 6.3.1 of TS 36.331 [2] shall be sent by the System Simulator (SS). No gap patterns are configured in the test case. No HRPD neighbour cell list shall be provided to the UE.

A RRC message implying handover to the unknown HRPD cell shall be sent to the UE towards the end of the time period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.3.1-1: General test parameters for E-UTRAN FDD to HRPD handover test case; unknown target HRPD cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
HRPD RF Channel Number			1	One HRPD carrier frequency is used.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		s	≤5	
T2		s	1	

Table A.5.3.3.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to unknown HRPD cell # 2

Parameter	Unit	Cell 1 (E-UTRAN FDD)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0
$\hat{E}_s/I_{ot}$	dB	0	0
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.3.3.1-3: Cell specific test parameters for unknown HRPD (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (HRPD)	
		T1	T2
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21	
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3
Propagation Condition		AWGN	

A.5.3.3.2 Test Requirements

The UE shall start transmission of the reverse control channel in HRPD to Cell 2 less than 127 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay is expressed as: RRC procedure delay + $T_{interrupt}$, where:

$T_{interrupt}$ also includes time to detect HRPD cell; see clause 5.4.1.1.2

This gives a total of 126.66 ms, allow 127 ms in the test case.

A.5.3.4 E-UTRAN FDD – cdma2000 1X Handover; Unknown Target cell

A.5.3.4.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN FDD to cdma2000 1X handover requirements for the case when the target cdma2000 1X cell is unknown as specified in clause 5.4.2.

The test parameters are given in Tables A.5.3.4.1-1, A.5.3.4.1-2 and A.5.3.4.1-3. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. During time period T1, message containing Information Element *systemTimeInfo* as defined in clause 6.3.1 of TS 36.331 [2] shall be sent by the System Simulator (SS). No gap patterns are configured in the test case. No cdma2000 1X neighbour cell list shall be provided to the UE.

A RRC message implying handover to the unknown cdma2000 1X cell shall be sent to the UE towards the end of the time period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.2.1-1: General test parameters for E-UTRAN FDD to cdma2000 1X handover test case; unknown target cdma2000 1X cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
cdma2000 1X RF Channel Number			1	One HRPD carrier frequency is used.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		s	≤5	
T2		s	1	

Table A.5.3.2.1-2: Cell specific test parameters for E-UTRAN FDD cell#1 for handover to unknown cdma2000 1X cell # 2

Parameter	Unit	Cell 1 (E-UTRAN FDD)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0
$\hat{E}_s/I_{ot}$	dB	0	0
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.5.3.2.1-3: Cell specific test parameters for unknown cdma2000 1X (cell # 2) for handover from E-UTRAN FDD cell (cell #1)

Parameter	Unit	Cell 2 (cdma2000 1X)	
		T1	T2
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7	
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16	
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10
Propagation Condition		AWGN	

A.5.3.4.2 Test Requirements

The UE shall start transmission of the reverse control channel in cdma2000 1X to Cell 2 less than 300 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay is expressed as: RRC procedure delay + $T_{interrupt}$, where:

$T_{interrupt}$ also includes time to detect cdma2000 1X cell; see clause 5.4.2.1.2

This gives a total of 300 ms.

A.5.3.5 E-UTRAN TDD – HRPD Handover

A.5.3.5.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to HRPD handover requirements specified in clause 5.4.1.

The test parameters are given in Tables A.5.3.5.1-1, A.5.3.5.1-2 and A.5.3.5.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.5.1-1: General test parameters for E-UTRAN TDD to HRPD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbouring cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN TDD measurement quantity			RSRP	
Inter-RAT (HRPD) measurement quantity			CDMA2000 HRPD Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
HRPD RF Channel Number			1	One HRPD carrier frequency is used.
HRPD neighbour cell list size			8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		s	5	
T2		s	≤10	
T3		s	1	

Table A.5.3.5.1-2: Cell specific test parameters for E-UTRAN TDD cell#1 for handover to HRPD cell # 2

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in TS36.133 A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc} Note 2	dBm/15 kHz	-98		
RSRP Note 3	dBm/15 KHz	-98	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0	0
$\hat{E}_s/I_{ot}$	dB	0	0	0
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.3.5.1-3: Cell specific test parameters for HRPD (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

Parameter	Unit	Cell 2 (HRPD)		
		T1	T2	T3
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21		
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
I_{oc}	dBm/1.2288 MHz	-55		
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3	-3
Propagation Condition		AWGN		

A.5.3.5.2 Test Requirements

The UE shall start transmission of the reverse control channel in HRPD to Cell 2 less than 127 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms, which is specified in clause 5.4.1.1.1.

$T_{interrupt}$ = 76.66 ms in the test; $T_{interrupt}$ is defined in clause 5.4.1.1.2.

This gives a total of 126.66 ms, allow 127 ms in the test.

A.5.3.6 E-UTRAN TDD – cdma2000 1X Handover

A.5.3.6.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN TDD to cdma2000 1X handover requirements specified in clause 5.4.2.

The test parameters are given in Tables A.5.3.6.1-1, A.5.3.6.1-2 and A.5.3.6.1-3. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

Table A.5.3.6.1-1: General test parameters for E-UTRAN TDD to cdma2000 1X handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Gap Pattern Id			0	As specified in Table 8.1.2.1-1 started before T2 starts
E-UTRAN TDD measurement quantity			RSRP	
Inter-RAT (cdma2000 1X) measurement quantity			CDMA2000 1xRTT Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2000		dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
cdma2000 1X RF Channel Number			1	One cdma2000 1X carrier frequency is used.
cdma2000 1X neighbour cell list size			8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1		S	5	
T2		S	≤10	
T3		S	1	

Table A.5.3.6.1-2: Cell specific test parameters for E-UTRAN TDD cell#1 for handover to cdma2000 1X cell # 2

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc} Note 2	dBm/15 kHz	-98		
RSRP Note 3	dBm/15 KHz	-98	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0	0
$\hat{E}_s/I_{ot}$	dB	0	0	0
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.5.3.6.1-3: Cell specific test parameters for cdma2000 1X (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

Parameter	Unit	Cell 2 (cdma2000 1X)		
		T1	T2	T3
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7		
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16		
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0	0
I_{oc}	dBm/1.2288 MHz	-55		
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10	-10
Propagation Condition		AWGN		

A.5.3.6.2 Test Requirements

The UE shall start transmission of the reverse control channel in cdma2000 1X to Cell 2 less than 300 ms from the beginning of time period T3.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 130 ms, which is specified in clause 5.4.2.1.1.

$T_{interrupt}$ = 170 ms in the test; $T_{interrupt}$ is defined in clause 5.4.2.1.2.

This gives a total of 300 ms.

A.6 RRC Connection Control

A.6.1 RRC Re-establishment

A.6.1.1 E-UTRAN FDD Intra-frequency RRC Re-establishment

A.6.1.1.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.1.1-1 and table A.6.1.1.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.1.1-1: General test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		s	5	
T2		ms	200	
T3		s	3	

Table A.6.1.1.1-2: Cell specific test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.1.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known E-UTRA FDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 1

T_{search} = 100 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN FDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

A.6.1.2 E-UTRAN FDD Inter-frequency RRC Re-establishment

A.6.1.2.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD inter-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.1.2-1 and table A.6.1.1.2-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of radio link failure. At the start of time period T3, cell 2, which is the neighbour cell, is activated.

Table A.6.1.2.1-1: General test parameters for E-UTRAN FDD inter-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number (cell 1)			1	
E-UTRA RF Channel Number (cell 2)			2	
E-UTRA FDD inter-frequency carrier list size			1	2 E-UTRA FDD carrier frequencies in total: 1 intra-frequency and 1 inter-frequency
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	5000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		s	5	
T2		ms	200	
T3		s	5	

Table A.6.1.2.1-2: Cell specific test parameters for E-UTRAN FDD inter-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	-Infinity	-Infinity	-Infinity	-Infinity	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	-Infinity	-Infinity	- Infinity	- Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-Infinity	-Infinity	- Infinity	-Infinity	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.2.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown E-UTRA FDD inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 2

T_{search} = 800 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN FDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 2945 ms, allow 3 s in the test case.

A.6.1.3 E-UTRAN TDD Intra-frequency RRC Re-establishment

A.6.1.3.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA TDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.3.1-1 and table A.6.1.3.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.3.1-1: General test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells		μs	3	Synchronous cells
T1		s	5	
T2		ms	200	
T3		s	3	

Table A.6.1.3.1-2: Cell specific test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.3.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known E-UTRA TDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 1

T_{search} = 100 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN TDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

A.6.1.4 E-UTRAN TDD Inter-frequency RRC Re-establishment

A.6.1.4.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA TDD inter-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.4.1-1 and table A.6.1.4.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of radio link failure. At the start of time period T3, cell 2, which is the neighbour cell, is activated.

Table A.6.1.4.1-1: General test parameters for E-UTRAN TDD inter-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number (cell 1)			1	
E-UTRA RF Channel Number (cell 2)			2	
E-UTRA TDD inter-frequency carrier list size			1	2 E-UTRA TDD carrier frequencies in total: 1 intra-frequency and 1 inter-frequency
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	5000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells		μs	3	Synchronous cells
T1		s	5	
T2		ms	200	
T3		s	5	

Table A.6.1.4.1-2: Cell specific test parameters for E-UTRAN TDD inter-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB	0			0		
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	-Infinity	-Infinity	-Infinity	-Infinity	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	-Infinity	-Infinity	- Infinity	- Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-Infinity	-Infinity	- Infinity	-Infinity	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.4.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown E-UTRA TDD inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 2

T_{search} = 800 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN TDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 2945 ms, allow 3 s in the test case.

A.6.1.5 E-UTRAN FDD Intra-frequency RRC Re-establishment for 5MHz bandwidth

A.6.1.5.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.6.1.1.1.

The parameters of this test are the same as defined in Subclause A.6.1.1.1 except that the values of the parameters in the Table A.6.1.5.1-1 will replace the values of the corresponding parameters in A.6.1.1.1-1, and the values of the parameters in the Table A.6.1.5.1-2 will replace the values of the corresponding parameters in A.6.1.1.1-2.

Table A.6.1.5.1-1: General test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case for 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	5	
Note 1: See Table A.6.1.1.1-1 for the other parameters. Note 2: This test is according to the principle defined in section A.3.7.2.			

Table A.6.1.5.1-2: Cell specific test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case for 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	5			5		
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)		OP.15 FDD	OP.15 FDD	OP.16 FDD	OP.16 FDD	OP.16 FDD	OP.15 FDD
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: See Table A.6.1.5.1-2 for the other parameters.							

A.6.1.5.2 Test Requirements

The test requirements defined in section A.6.1.1.2 shall apply to this test case.

A.6.1.6 E-UTRAN FD-FDD Intra-frequency RRC Re-establishment for UE category 0

A.6.1.6.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.6.1-1 and table A.6.1.6.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.6.1-1: General test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.13 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		s	5	
T2		ms	200	
T3		s	3	

Table A.6.1.6.1-2: Cell specific test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.6.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known E-UTRA FDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 1

T_{search} = 100 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN FDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

A.6.1.7 E-UTRAN HD-FDD Intra-frequency RRC Re-establishment for UE category 0

A.6.1.7.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA FDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.7.1-1 and table A.6.1.7.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.7.1-1: General test parameters for E-UTRAN HD-FDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.1 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			4	As specified in table 5.7.1-2 in TS 36.211
Time offset between cells		ms	3	Asynchronous cells
T1		s	5	
T2		ms	200	
T3		s	3	

Table A.6.1.7.1-2: Cell specific test parameters for E-UTRAN HD-FDD intra-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.7.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known E-UTRA FDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 1

T_{search} = 100 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN FDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

A.6.1.8 E-UTRAN TDD Intra-frequency RRC Re-establishment for UE category 0

A.6.1.8.1 Test Purpose and Environment

The purpose is to verify that the E-UTRA TDD intra-frequency RRC re-establishment delay is within the specified limits. These tests will verify the requirements in clause 6.1.2.

The test parameters are given in table A.6.1.8.1-1 and table A.6.1.8.1-2 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.6.1.8.1-1: General test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.12 TDD	As specified in clause A.3.1.1.5
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells		μs	3	Synchronous cells
T1		s	5	
T2		ms	200	
T3		s	3	

Table A.6.1.8.1-2: Cell specific test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.							
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.							
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.6.1.8.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known E-UTRA TDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-}establish\_delay} = T_{UL\_grant} + T_{UE\_re\text{-}establish\_delay}.$$

Where:

T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$T_{UE\_re\text{-}establish\_delay}$ = 50 ms + N_{freq}* T_{search} + T_{SI} + T_{PRACH}

N_{freq} = 1

T_{search} = 100 ms

T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 for the target E-UTRAN TDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, allow 1.5 s in the test case.

A.6.2 Random Access

A.6.2.1 E-UTRAN FDD – Contention Based Random Access Test

A.6.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.1.1-1 and A.6.2.1.1-2.

Table A.6.2.1.1-1: General test parameters for FDD contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern Note 1		OP.1/2 FDD Note 1	As defined in A.3.2.1.1/2.
PDSCH parameters Note 4		DL Reference Measurement Channel R.0 FDD Note 4	As defined in A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As defined in A.3.1.2.1.
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in TS 36.101.
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter. Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.			

Table A.6.2.1.1-2: RACH-Configuration parameters for FDD contention based random access test

Field	Value	Comment
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
mac-ContentionResolutionTimer	sf48	48 sub-frames
maxHARQ-Msg3Tx	4	
Note: For further information see Clause 6.3.2 in TS 36.331.		

A.6.2.1.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.1.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.1.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.1.2.2 No Random Access Response Reception

To test the UE behavior specified in subclause 6.2.2.1.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.1.2.3 Receiving a NACK on msg3

To test the UE behavior specified in subclause 6.2.2.1.3 the System Simulator shall NACK *all* UE msg3 following a successful Random Access Response.

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ re-transmissions is reached.

A.6.2.1.2.4 Reception of an Incorrect Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element *not* matching the CCCH SDU transmitted in msg3 uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

A.6.2.1.2.5 Reception of a Correct Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.

The UE shall send ACK if the Contention Resolution is successful.

A.6.2.1.2.6 Contention Resolution Timer expiry

To test the UE behavior specified in Subclause 6.2.2.1.6 the System Simulator shall *not* send a response to a msg3.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

A.6.2.2 E-UTRAN FDD – Non-Contention Based Random Access Test

A.6.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.2.1-1 and A.6.2.2.1-2.

Table A.6.2.2.1-1: General test parameters for FDD non-contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern		OP.1 FDD	As defined in A.3.2.1.1.
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As defined in A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As defined in A.3.1.2.1.
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in TS 36.101.
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.			

Table A.6.2.2.1-2: RACH-Configuration parameters for FDD non-contention based random access test

Field	Value	Comment
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
Note: For further information see Clause 6.3.2 in TS 36.331.		

A.6.2.2.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.2.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.2.2.2 No Random Access Response Reception

To test the UE behavior specified in subclause 6.2.2.2.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.3 E-UTRAN TDD – Contention Based Random Access Test

A.6.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.3.1-1 and A.6.2.3.1-2.

Table A.6.2.3.1-1: General test parameters for TDD contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number	-	1	
$BW_{channel}$	MHz	10	
OCNG Pattern Note 1	-	OP.1/2 TDD Note 1	As defined in A.3.2.2.1/2.
PDSCH parameters Note 4	-	DL Reference Measurement Channel R.0 TDD Note 4	As defined in A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters	-	DL Reference Measurement Channel R.6 TDD	As defined in A.3.1.2.2.
Special subframe configuration	-	6	As specified in table 4.2-1 in TS 36.211.
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in TS 36.211.
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in TS 36.101.
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter. Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.			

Table A.6.2.3.1-2: RACH-Configuration parameters for TDD contention based random access test

Field	Value	Comment
numberOfRA-Preambles	n52	
sizeOfRA-PreamblesGroupA	n52	No group B.
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
mac-ContentionResolutionTimer	sf48	48 sub-frames
maxHARQ-Msg3Tx	4	
Note: For further information see Clause 6.3.2 in TS 36.331.		

A.6.2.3.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.3.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.1.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.3.2.2 No Random Access Response reception

To test the UE behavior specified in Subclause 6.2.2.1.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.3.2.3 Receiving a NACK on msg3

To test the UE behavior specified in Subclause 6.2.2.1.3 the System Simulator shall NACK *all* UE msg3 following a successful Random Access Response.

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ re-transmissions is reached.

A.6.2.3.2.4 Reception of an Incorrect Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element *not* matching the CCCH SDU transmitted in msg3 uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

A.6.2.3.2.5 Reception of a Correct Message over Temporary C-RNTI

To test the UE behavior specified in Subclause 6.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.

The UE shall send ACK if the Contention Resolution is successful.

A.6.2.3.2.6 Contention Resolution Timer expiry

To test the UE behavior specified in Subclause 6.2.2.1.6 the System Simulator shall *not* send a response to a msg3.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

A.6.2.4 E-UTRAN TDD – Non-Contention Based Random Access Test

A.6.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test a single cell is used. The test parameters are given in tables A.6.2.4.1-1 and A.6.2.4.1-2.

Table A.6.2.4.1-1: General test parameters for TDD non-contention based random access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number	-	1	
$BW_{channel}$	MHz	10	
OCNG Pattern	-	OP.1 TDD	As defined in A.3.2.2.1.
PDSCH parameters	-	DL Reference Measurement Channel R.0 TDD	As defined in A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters	-	DL Reference Measurement Channel R.6 TDD	As defined in A.3.1.2.2.
Special subframe configuration	-	6	As specified in table 4.2-1 in TS 36.211.
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in TS 36.211.
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in TS 36.101.
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in TS 36.211.
Backoff Parameter Index	-	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.			

Table A.6.2.4.1-2: RACH-Configuration parameters for TDD non-contention based random access test

Field	Value	Comment
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
Note: For further information see Clause 6.3.2 in TS 36.331.		

A.6.2.4.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.4.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.4.2.2 No Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.5 E-UTRAN FDD – Contention Based Random Access Test for 5MHz bandwidth

A.6.2.5.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.6.2.1.1.

The parameters of this test are the same as defined in Subclause A.6.2.1.1 except that the values of the parameters in the Table A.6.2.5.1-1 will replace the values of the corresponding parameters in A.6.2.1.1-1

Table A.6.2.5.1-1: General test parameters for FDD contention based random access test for 5MHz bandwidth

Parameter	Unit	Value	Comments
$BW_{channel}$	MHz	5	
OCNG Pattern Note 1		OP.15/16 FDD Note 1	As defined in A.3.2.1.15/16.
PDSCH parameters Note 2		DL Reference Measurement Channel R.5 FDD Note 2	As defined in A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As defined in A.3.1.2.1.
Io Note 2	dBm/4.5 MHz	-68.5	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel. Note 2: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required. Note 3: See Table A.6.2.1.1-1 for the other parameters. Note 4: This test is according to the principle defined in section A.3.7.2.			

A.6.2.5.2 Test Requirements

The test requirements defined in section A.6.2.1.2 shall apply to this test case.

A.6.2.6 E-UTRAN FDD – Non-contention Based Random Access Test for 5MHz bandwidth

A.6.2.6.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.6.2.2.1.

The parameters of this test are the same as defined in Subclause A.6.2.2.1except that the values of the parameters in the Table A.6.2.6.1-1will replace the values of the corresponding parameters in A.6.2.2.1-1

Table A.6.2.6.1-1: General test parameters for FDD non-contention based random access test for 5MHz bandwidth

Parameter	Unit	Value	Comments
$BW_{channel}$	MHz	5	
OCNG Pattern Note 1		OP.15 FDD Note 1	As defined in A.3.2.1.15.
PDSCH parameters Note 2		DL Reference Measurement Channel R.5 FDD Note 2	As defined in A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As defined in A.3.1.2.1.
Io Note 2	dBm/4.5 MHz	-68.5	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter Note 3: See Table A.6.2.2.1-1 for the other parameters. Note 4: This test is according to the principle defined in section A.3.7.2.			

A.6.2.6.2 Test Requirements

The test requirements defined in section A.6.2.2.2 shall apply to this test case.

A.6.2.7 E-UTRAN FDD – Non-Contention Based Random Access Test For SCell

A.6.2.7.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure, for the SCell, is according to the requirements and that the PRACH power settings and timing, for the SCell, are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell and SCell are different timing advance group. Cell 1 is in the primary Timing Advance Group (pTAG) and Cell 2 is in the secondary Timing Advance Group (sTAG). The purpose of the PCell is to allow the SCell to be configured and to handle the Random Access Response which takes place on PCell. The test parameters are given in tables A.6.2.7.1-1 and A.6.2.7.1-2.

Table A.6.2.7.1-1: General test parameters for FDD non-contention based random access test

Parameter	Unit	Cell 1	Cell 2	Comments
E-UTRA RF Channel Number		1	2	
$BW_{channel}$	MHz	10	10	
Active PCell		Cell 1		Primary cell of RF channel number 1.
Active SCell			Cell 2	Secondary cell of RF channel number 2.
TAG configuration		pTAG	sTAG	pTAG+sTAG configures Cell 1 and Cell 2 to separate TAGs
OCNG Pattern		OP.1 FDD	OP.1 FDD	As defined in A.3.2.1.11.
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	DL Reference Measurement Channel R.0 FDD	As defined in A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	DL Reference Measurement Channel R.6 FDD	As defined in A.3.1.2.1.
PBCH_RA	dB	0	0	
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	3	3	
N_{oc}	dBm/15 KHz	-98	-98	
$\hat{E}_s/N_{oc}$	dB	3	3	
Io Note 2	dBm/9 MHz	-65.5	-65.5	
RSRP Note 3	dBm/15 KHz	-95	-95	
referenceSignalPower	dBm/15 KHz	-5	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted power ($P_{\text{CMAX,c}}$)	dBm	23	23	As defined in clause 6.2.5 in TS 36.101.
PRACH Configuration Index	-	4	4	As defined in table 5.7.1-2 in TS 36.211.
Backoff Parameter Index	-	2	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.				

Table A.6.2.7.1-2: RACH-Configuration parameters for FDD non-contention based random access test

Field	Value	Comment
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
Note: For further information see Clause 6.3.2 in TS 36.331.		

A.6.2.7.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.7.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit, on Cell 1, the PCell, a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator, on Cell 2. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.7.2.2 No Random Access Response Reception

To test the UE behavior specified in subclause 6.2.2.2.2 the System Simulator shall transmit, on Cell 1, the PCell, a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator on Cell 2. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.7.2.3 Stop Preamble transmission if maximum number of preamble transmission counter has been reached

To test the UE behavior specified in Subclause 6.2.2 the System Simulator shall transmit, in response to the first 6 preambles, a Random Access Response *not* corresponding to the transmitted Random Access Preamble on Cell 1, the PCell. The UE shall stop transmitting preambles after 6 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.8 E-UTRAN TDD – Non-Contention Based Random Access Test For SCell

A.6.2.8.1 Test Purpose and Environment

This test is applicable for UE supporting the optional capability of Multiple Timing Advance.

The purpose of this test is to verify that the behavior of the random access procedure, for the SCell, is according to the requirements and that the PRACH power settings and timing, for the SCell, are within specified limits. This test will verify the requirements in Clause 6.2.2 and Clause 7.1.2 in an AWGN model.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell and SCell are different timing advance group. Cell 1 is in the primary Timing Advance Group (pTAG) and Cell 2 is in the secondary Timing Advance Group (sTAG). The purpose of the PCell is to allow the SCell to be configured and to handle the Random Access Response which takes place on PCell. The test parameters are given in tables A.6.2.8.1-1 and A.6.2.8.1-2.

Table A.6.2.8.1-1: General test parameters for TDD non-contention based random access test

Parameter	Unit	Cell 1	Cell 2	Comments
E-UTRA RF Channel Number	-	1	1	
$BW_{channel}$	MHz	10	10	
Active PCell		Cell 1		Primary cell of RF channel number 1.
Active SCell			Cell 2	Secondary cell of RF channel number 2.
TAG configuration		pTAG	sTAG	pTAG+sTAG configures Cell 1 and Cell 2 to separate TAGs
OCNG Pattern	-	OP.1 TDD	OP.1 TDD	As defined in A.3.2.2.1.
PDSCH parameters	-	DL Reference Measurement Channel R.0 TDD	DL Reference Measurement Channel R.0 TDD	As defined in A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters	-	DL Reference Measurement Channel R.6 TDD	DL Reference Measurement Channel R.6 TDD	As defined in A.3.1.2.2.
Special subframe configuration	-	6	6	As specified in table 4.2-1 in TS 36.211.
Uplink-downlink configuration	-	1	1	As specified in table 4.2-2 in TS 36.211.
PBCH_RA	dB	0	0	
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	3	3	
N_{oc}	dBm/15 KHz	-98	-98	
$\hat{E}_s/N_{oc}$	dB	3	3	
Io Note 2	dBm/9 MHz	-65.5	-65.5	
RSRP Note 3	dBm/15 KHz	-95	-95	
referenceSignalPower	dBm/15 KHz	-5	-5	As defined in clause 6.3.2 in TS 36.331.
Configured UE transmitted power ($P_{CMAX,c}$)	dBm	23	23	As defined in clause 6.2.5 in TS 36.101.
PRACH Configuration Index	-	53	53	As defined in table 5.7.1-3 in TS 36.211.
Backoff Parameter Index	-	2	2	As defined in table 7.2-1 in TS 36.321.
Propagation Condition	-	AWGN	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.				

Table A.6.2.8.1-2: RACH-Configuration parameters for TDD non-contention based random access test

Field	Value	Comment
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
Note: For further information see Clause 6.3.2 in TS 36.331.		

A.6.2.8.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.6.2.8.2.1 Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.1 the System Simulator shall transmit, on Cell 1, the PCell, a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator, on Cell 2. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.8.2.2 No Random Access Response Reception

To test the UE behavior specified in Subclause 6.2.2.2.2 the System Simulator shall transmit, on Cell 1, the PCell, a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator, on Cell 2. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.2.8.2.3 Stop Preamble transmission if maximum number of preamble transmission counter has been reached

To test the UE behavior specified in Subclause 6.2.2 the System Simulator shall transmit, in response to the first 6 preambles, a Random Access Response *not* corresponding to the transmitted Random Access Preamble on Cell 1, the PCell. The UE shall stop transmitting preambles after 6 preambles.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Subclause 6.2.2. The power of the first preamble shall be -22 dBm with an accuracy specified in clause 6.3.5.1.1 of TS 36.101 [5]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.5.2.1 of TS 36.101 [5].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Subclause 7.1.2.

A.6.3 RRC Connection Release with Redirection

A.6.3.1 Redirection from E-UTRAN FDD to UTRAN FDD

A.6.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct performing the RRC connection release with redirection to the target UTRAN FDD cell. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements in clause 6.3.2.1.

The test parameters are given in Tables A.6.3.1.1-1, A.6.3.1.1-2 and A.6.3.1.1-3 below. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "*RRCConnectionRelease*" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

Table A.6.3.1.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN FDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
UTRA FDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the "*RRCConnectionRelease*" message from the E-UTRAN
T1	s	≤5	
T2	s	1	

Table A.6.3.1.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.6.3.1.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2	
		T1	T1
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io Note 3	dB	-∞	-13
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: This gives an SCH Ec/Io of -15dB			

A.6.3.1.2 Test Requirements

The UE shall start to transmit random access to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRAN FDD observed during repeated tests shall be at least 90%.

NOTE: The Re-establishment delay in this case can be expressed as

$$T_{connection\_release\_redirect\_UTRA\ FDD} = T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ FDD} + T_{SI\text{-}UTRA\ FDD} + T_{RA}$$

where

$T_{RRC\_procedure\_delay}$ = 110 ms

$T_{identify\text{-}UTRA\ FDD}$ = 500 ms

$T_{SI\text{-}UTRA\ FDD}$ = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. 0 ms is assumed in this test case.

T_{RA} = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 650 ms.

A.6.3.2 Redirection from E-UTRAN TDD to UTRAN FDD

A.6.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct performing the RRC connection release with redirection to the target UTRAN FDD cell. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements in clause 6.3.2.1.

The test parameters are given in Tables A.6.3.2.1-1, A.6.3.2.1-2 and A.6.3.2.1-3 below. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "*RRCConnectionRelease*" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of the T2,

Table A.6.3.2.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN TDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
UTRA FDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the "*RRCConnectionRelease*" message from the E-UTRAN
T1	s	≤5	
T2	s	1	

Table A.6.3.2.1-2: Cell specific test parameters for cell #1 E-UTRAN TDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.6.3.2.1-3: Cell specific test parameters for cell #2 E-UTRAN TDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io Note 3	dB	-∞	-13
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: This gives an SCH Ec/Io of -15dB			

A.6.3.2.2 Test Requirements

The UE shall start to transmit random access to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA FDD observed during repeated tests shall be at least 90%.

NOTE: The Re-establishment delay in this case can be expressed as

$$T_{connection\_release\_redirect\_UTRA\ FDD} = T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ FDD} + T_{SI\text{-}UTRA\ FDD} + T_{RA}$$

where

$T_{RRC\_procedure\_delay}$ = 110 ms

$T_{identify\text{-}UTRA\ FDD}$ = 500 ms

$T_{SI\text{-}UTRA\ FDD}$ = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. 0 ms is assumed in this test case.

T_{RA} = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 650 ms.

A.6.3.3 Redirection from E-UTRAN FDD to GERAN when System Information is provided

A.6.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target GERAN cell within $T_{connection\_release\_redirect\_GERAN}$. This test will partly verify the RRC connection release with redirection to GERAN requirements in clause 6.3.2.2.

The test parameters are given in Tables A.6.3.3.1-1, A.6.3.3.1-2 and A.6.3.3.1-3 below. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "*RRCConnectionRelease*", is received by the UE from cell 1. The "*RRCConnectionRelease*" message shall contain all the relevant system information of cell 2.

Table A.6.3.3.1-1: General test parameters for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including ARFCN 1	GSM cells are provided in the "*RRCConnectionRelease*" message.
T1	s	5	
T2	s	2	

Table A.6.3.3.1-2: Cell specific test parameters for E-UTRA FDD cell (cell #1) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
BWchannel	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RANote 1	dB		
OCNG_RBNote 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.6.3.3.1-3: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.6.3.3.2 Test Requirements

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 1120 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to GERAN" observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{connection\_release\_redirect\_ GERAN} = T_{RRC\_procedure\_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$

$T_{RRC\_procedure\_delay}$ = 110 ms, which is the time for processing the received message "*RRCConnectionRelease*.

$T_{identify\text{-}GERAN}$ = 1000 ms, which is the time for identifying the target GERAN cell.

$T_{SI-GERAN}$ = 0; UE does not have to read the system information of the GERAN cell since all relevant SI is provided to the UE in the "*RRCConnectionRelease*" message.

T_{RA} = 10 ms, which is about 2 GSM frames (2*4.65 ms) to account for the GSM timing uncertainty.

A.6.3.4 Redirection from E-UTRAN TDD to GERAN when System Information is provided

A.6.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target GERAN cell within $T_{connection\_release\_redirect\_GERAN}$. This test will partly verify the RRC connection release with redirection to GERAN requirements in clause 6.3.2.2.

The test parameters are given in Tables A.6.3.4.1-1, A.6.3.4.1-2 and A.6.3.4.1-3 below. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "*RRCConnectionRelease*", is received by the UE from cell 1. The "*RRCConnectionRelease*" message shall contain all the relevant system information of cell 2.

Table A.6.3.4.1-1: General test parameters for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including ARFCN 1	GSM cells provided in the "*RRCConnectionRelease*" message.
T1	s	5	
T2	s	2	

Table A.6.3.4.1-2: Cell specific test parameters for E-UTRA TDD cell (cell #1) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.6.3.4.1-3: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.6.3.4.2 Test Requirements

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 1120 ms from the beginning of time period T2.

The rate of correct “RRC connection release with redirection to GERAN” observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{connection\_release\_redirect\_ GERAN} = T_{RRC\_procedure\_delay} + T_{identify-GERAN} + T_{SI-GERAN} + T_{RA}$

$T_{RRC\_procedure\_delay}$ = 110 ms, which is the time for processing the received message “*RRCConnectionRelease*.

$T_{identify-GERAN}$ = 1000 ms, which is the time for identifying the target GERAN cell.

A.6.3.5 E-UTRA TDD RRC connection release redirection to UTRA TDD

A.6.3.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target UTRA TDD cell within $T_{connection\_release\_redirect\_UTRA\ TDD}$. This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in clause 6.3.2.3.

The test parameters are given in table A.6.3.5.1-1, table A.6.3.5.1-2, and table A.6.3.5.1-3. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "*RRCConnectionRelease*" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "*RRCConnectionRelease*", is received by the UE from cell 1. The "*RRCConnectionRelease*" message shall contain all the relevant system information of Cell 2.

Table A.6.3.5.1-1: General test parameters for E-UTRA TDD RRC connection release redirection to UTRA TDD

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	Applicable to cell 1
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
Uplink-downlink configuration of cell 1		1	As specified in table 4.2-2 in TS 36.211
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the "*RRCConnectionRelease*" message from the E-UTRAN
T1	s	5	
T2	s	1	

Table A.6.3.5.1-2: Cell specific test parameters for cell 1 in E-UTRA TDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.5.1-3: Cell specific test parameters for cell 2 in E-UTRA TDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number[Note1]		Channel 1			
PCCPCH_Ec/Ior	dB	-4.77	-4.77		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior[Note2]	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP [Note3]	dBm	-inf	-76.77	n.a.	n.a.
PCCPCH_Ec/Io [Note3]	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io [Note3]	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition		AWGN			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: P-CCPCH RSRP, PCCPCH_Ec/Io and DwPCH_Ec/Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.6.3.5.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as: $T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ TDD} + T_{SI\text{-}UTRA\ TDD} + T_{RA}$, where:

$T_{RRC\_procedure\_delay}$ = 110 ms, which is specified in clause 6.3.2.3.

$T_{identify\text{-}UTRA\ TDD}$ = 500 ms; which is defined in clause 6.3.2.3.

$T_{SI\text{-}UTRA\ TDD}$ = 0 ms, UE does not have to read the system information of the UTRAN TDD since all relevant SI is provided to the UE in the "*RRCConnectionRelease*" message.

T_{RA} = 40ms. This is the additional delay caused by the random access procedure

It gives a total delay of 650 ms.

A.6.3.6 E-UTRA FDD RRC connection release redirection to UTRA TDD

A.6.3.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target UTRA TDD cell within $T_{connection\_release\_redirect\_UTRA\ TDD}$. This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in clause 6.3.2.3.

The test parameters are given in table A.6.3.6.1-1, table A.6.3.6.1-2, and table A.6.3.6.1-3. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "*RRCConnectionRelease*" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "*RRCConnectionRelease*", is received by the UE from cell 1. The "*RRCConnectionRelease*" message shall contain all the relevant system information of Cell 2.

Table A.6.3.6.1-1: General test parameters for E-UTRA FDD RRC connection release redirection to UTRA TDD

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the "*RRCConnectionRelease*" message from the E-UTRAN
T1	s	5	
T2	s	1	

Table A.6.3.6.1-2: Cell specific test parameters for cell 1 in E-UTRA FDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.6.1-3: Cell specific test parameters for cell 2 in E-UTRA FDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number Note1		Channel 1			
PCCPCH_Ec/Ior	dB	-4.77	-4.77		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior Note2	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
PCCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition		AWGN			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: P-CCPCH RSRP, PCCPCH_Ec/Io and DwPCH_Ec/Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A. 6.3.6.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as: $T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ TDD} + T_{SI\text{-}UTRA\ TDD} + T_{RA}$, where:

$T_{RRC\_procedure\_delay}$ = 110 ms, which is specified in clause 6.3.2.3.

$T_{identify\text{-}UTRA\ TDD}$ = 500 ms; which is defined in clause 6.3.2.3.

$T_{SI\text{-}UTRA\ TDD}$ = 0 ms, UE does not have to read the system information of the UTRAN TDD since all relevant SI is provided to the UE in the "*RRCConnectionRelease*" message.

T_{RA} = 40ms. This is the additional delay caused by the random access procedure.

This gives a total delay of 650 ms.

A.6.3.7 E-UTRA TDD RRC connection release redirection to UTRA TDD without SI provided

A.6.3.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target UTRA TDD cell within $T_{connection\_release\_redirect\_UTRA\ TDD}$. This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in clause 6.3.2.3.

The test parameters are given in table A.6.3.7.1-1, table A.6.3.7.1-2, and table A.6.3.7.1-3. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "*RRCConnectionRelease*" message not containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "*RRCConnectionRelease*", is received by the UE from Cell 1.

Table A.6.3.7.1-1: General test parameters for E-UTRA TDD RRC connection release redirection to UTRA TDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	Applicable to cell 1
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		none	No explicit neighbour list is provided to the UE
T1	s	5	
T2	s	2	

Table A.6.3.7.1-2: Cell specific test parameters for cell 1 in E-UTRA TDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.7.1-3: Cell specific test parameters for cell 2 in E-UTRA TDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number Note1		Channel 1			
PCCPCH_Ec/Ior	dB	-4.77	-4.77		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior Note2	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
PCCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition		AWGN			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: P-CCPCH RSRP, PCCPCH_Ec/Io and DwPCH_Ec/Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.6.3.7.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 1930 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as: $T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ TDD} + T_{SI\text{-}UTRA\ TDD} + T_{RA}$, where:

$T_{RRC\_procedure\_delay}$ = 110 ms, which is specified in clause 6.3.2.3.

$T_{identify\text{-}UTRA\ TDD}$ = 500 ms; which is defined in clause 6.3.2.3.

$T_{SI\text{-}UTRA\ TDD}$: Maximum repetition period of relevant system info blocks that need to be received by the UE during RRC connection release redirection to UTRA TDD cell. 1280 ms is assumed in this test case.

T_{RA} = 40ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

A.6.3.8 E-UTRA FDD RRC connection release redirection to UTRA TDD without SI provided

A.6.3.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target UTRA TDD cell within $T_{connection\_release\_redirect\_UTRA\ TDD}$. This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in clause 6.3.2.3.

The test parameters are given in table A.6.3.8.1-1, table A.6.3.8.1-2, and table A.6.3.8.1-3. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "*RRCConnectionRelease*" message not containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "*RRCConnectionRelease*", is received by the UE from Cell 1.

Table A.6.3.8.1-1: General test parameters for E-UTRA FDD RRC connection release redirection to UTRA TDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	Applicable to cell 1
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		none	No explicit neighbour list is provided to the UE
T1	S	5	
T2	S	2	

Table A.6.3.8.1-2: Cell specific test parameters for cell 1 in E-UTRA FDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.6.3.8.1-3: Cell specific test parameters for cell 2 in E-UTRA FDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number[Note1]		Channel 1			
PCCPCH_Ec/Ior	dB	-4.77	-4.77		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior[Note2]	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP [Note3]	dBm	-inf	-76.77	n.a.	n.a.
PCCPCH_Ec/Io [Note3]	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io [Note3]	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition		AWGN			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: P-CCPCH RSRP, PCCPCH_Ec/Io and DwPCH_Ec/Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.6.3.8.2 Test Requirements

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 1930 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as: $T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ TDD} + T_{SI\text{-}UTRA\ TDD} + T_{RA}$, where:

$T_{RRC\_procedure\_delay}$ = 110 ms, which is specified in clause 6.3.2.3.

$T_{identify\text{-}UTRA\ TDD}$ = 500 ms; which is defined in clause 6.3.2.3.

$T_{SI\text{-}UTRA\ TDD}$: Maximum repetition period of relevant system info blocks that need to be received by the UE during RRC connection release redirection to UTRA TDD cell. 1280 ms is assumed in this test case.

T_{RA} = 40ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

A.6.3.9 Redirection from E-UTRAN FDD to UTRAN FDD without System Information

A.6.3.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct performing the RRC connection release with redirection to the target UTRAN FDD cell. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements in clause 6.3.2.1.

The test parameters are given in Tables A.6.3.9.1-1, A.6.3.9.1-2 and A.6.3.9.1-3 below. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "*RRCConnectionRelease*" message not containing any system information of Cell 2 shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

Table A.6.3.9.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN FDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
UTRA FDD cell list size		None	No explicit neighbour list is provided to the UE
T1	s	≤5	
T2	s	2	

Table A.6.3.9.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.9.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2	
		T1	T1
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io Note 3	dB	-∞	-13
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: This gives an SCH Ec/Io of -15dB			

A.6.3.9.2 Test Requirements

The UE shall start to send random access to the target UTRA FDD cell (Cell 2) less than 1930 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to UTRAN" observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this case can be expressed as

$$T_{connection\_release\_redirect\_UTRA\ FDD} = T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRA\ FDD} + T_{SI\text{-}UTRA\ FDD} + T_{RA}$$

where

$T_{RRC\_procedure\_delay}$ = 110 ms

$T_{identify\text{-}UTRA\ FDD}$ = 500 ms

$T_{SI\text{-}UTRA\ FDD}$ = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. Since no SI is provided, 1280 ms is assumed in this test case.

T_{RA} = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 1930 ms.

A.6.3.10 Redirection from E-UTRAN FDD to GERAN when System Information is not provided

A.6.3.10.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target GERAN cell within $T_{connection\_release\_redirect\_GERAN}$. This test will partly verify the RRC connection release with redirection to GERAN requirements in clause 6.3.2.2.

The test parameters are given in Tables A.6.3.10.1-1, A.6.3.10.1-2 and A.6.3.10.1-3 below. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "*RRCConnectionRelease*", is received by the UE from cell 1. The "*RRCConnectionRelease*" message shall not contain any system information of cell 2.

Table A.6.3.10.1-1: General test parameters for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including ARFCN 1	Only the list of GERAN carrier frequencies is provided in the "*RRCConnectionRelease*" message.
T1	s	≤5	
T2	s	4	

Table A.6.3.10.1-2: Cell specific test parameters for E-UTRA FDD cell (cell #1) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.6.3.10.1-3: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.6.3.10.2 Test Requirements

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 3020 ms from the beginning of time period T2.

The rate of correct “RRC connection release with redirection to GERAN” observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{connection\_release\_redirect\_ GERAN} = T_{RRC\_procedure\_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$

$T_{RRC\_procedure\_delay}$ = 110 ms, which is the time for processing the received message “*RRCConnectionRelease*.

$T_{identify\text{-}GERAN}$ = 1000 ms, which is the time for identifying the target GERAN cell.

$T_{SI\text{-}GERAN}$ = 1900 ms, which is the maximum time allowed to read BCCH data from the target GERAN cell.

T_{RA} = 10 ms, which is about 2 GSM frames (2*4.65 ms) to account for the GSM timing uncertainty.

A.6.3.11 Redirection from E-UTRAN TDD to GERAN when System Information is not provided

A.6.3.11.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target GERAN cell within $T_{connection\_release\_redirect\_GERAN}$. This test will partly verify the RRC connection release with redirection to GERAN requirements in clause 6.3.2.2.

The test parameters are given in Tables A.6.3.11.1-1, A.6.3.11.1-2 and A.6.3.11.1-3 below. No measurement gaps are configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, “*RRCConnectionRelease*”, is received by the UE from cell 1. The “*RRCConnectionRelease*” message shall not contain any system information of cell 2.

Table A.6.3.11.1-1: General test parameters for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including ARFCN 1	Only the list of GERAN carrier frequencies is provided in the "*RRCConnectionRelease*" message.
T1	s	≤5	
T2	s	4	

Table A.6.3.11.1-2: Cell specific test parameters for E-UTRA TDD cell (cell #1) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.6.3.11.1-3: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.6.3.11.2 Test Requirements

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 3020 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to GERAN" observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$T_{connection\_release\_redirect\_ GERAN} = T_{RRC\_procedure\_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$

$T_{RRC\_procedure\_delay}$ = 110 ms, which is the time for processing the received message "*RRCConnectionRelease*.

$T_{identify\text{-}GERAN}$ = 1000 ms, which is the time for identifying the target GERAN cell.

$T_{SI\text{-}GERAN}$ = 1900 ms, which is the maximum time allowed to read BCCH data from the target GERAN cell.

T_{RA} = 10 ms, which is about 2 GSM frames (2*4.65 ms) to account for the GSM timing uncertainty.

A.6.3.12 E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided

A.6.3.12.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRAN TDD to the target UTRAN FDD cell within $T_{connection\_release\_redirect\_UTRAN\ FDD}$. This test will partly verify the RRC connection release with redirection to UTRAN FDD requirements in clause 6.3.2.1.

The test parameters are given in table A.6.3.12.1-1, table A.6.3.12.1-2, and table A.6.3.12.1-3. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "*RRCConnectionRelease*" message not containing any system information of Cell 2 shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message, "*RRCConnectionRelease*", is received by the UE from Cell 1.

Table A.6.3.12.1-1: General test parameters for E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active cell		Cell 1	Cell 1 is on E-UTRAN RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRAN RF channel number 1.
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is used.
E-UTRAN Channel Bandwidth ($BW_{channel}$)	MHz	10	
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length		Normal	Applicable to cell 1
UTRAN RF Channel Number		1	One UTRAN TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRAN FDD cell list size		None	No explicit neighbour list is provided to the UE
T1	s	≤5	
T2	s	2	

Table A.6.3.12.1-2: Cell specific test parameters for cell 1 in E-UTRAN TDD RRC connection release redirection to UTRAN FDD test without SI provided

Parameter	Unit	Cell 1	
		T1	T2
E-UTRAN RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.6.3.12.1-3: Cell specific test parameters for cell 2 in E-UTRAN TDD RRC connection release redirection to UTRAN FDD test without SI provided

Parameter	Unit	Cell 2	
		T1	T1
UTRAN RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io Note 3	dB	-∞	-13
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: This gives an SCH Ec/Io of -15dB			

A.6.3.12.2 Test Requirements

The UE shall start to send random access to the target UTRAN FDD cell (Cell 2) less than 1930 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRAN FDD observed during repeated tests shall be at least 90%.

NOTE: The time delay can be expressed as: $T_{RRC\_procedure\_delay} + T_{identify\text{-}UTRAN\ FDD} + T_{SI\text{-}UTRAN\ FDD} + T_{RA}$, where:

$T_{RRC\_procedure\_delay}$ = 110 ms, which is specified in clause 6.3.2.1.

$T_{identify\text{-}UTRAN\ FDD}$ = 500 ms; which is defined in clause 6.3.2.1.

$T_{SI\text{-}UTRAN\ FDD}$: Maximum repetition period of relevant system info blocks that need to be received by the UE during RRC connection release redirection to UTRAN FDD cell. 1280 ms is assumed in this test case.

T_{RA} = 40ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

A.7 Timing and Signalling Characteristics

A.7.1 UE Transmit Timing

A.7.1.1 E-UTRAN FDD – UE Transmit Timing Accuracy Tests

A.7.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2.

For this test a single cell is used. Table A.7.1.1.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.1.1-2.

Table A.7.1.1.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Parameter	Unit	Value			
		Test 1	Test 2	Test 3	Test 4
E-UTRA RF Channel Number		1	1	1	1
Channel Bandwidth ($BW_{channel}$)	MHz	10	10	1.4	10
DRX cycle	ms	N/A	80 Note5	N/A	640 Note5
PDCCH/PCFICH/PHICH Reference measurement channel Note1		R.6 FDD	R.6 FDD	R.8 FDD	R.6 FDD
OCNG Pattern Note2		OP.2 FDD	OP.2 FDD	OP.4 FDD	OP.2 FDD
PBCH_RA	dB	0	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
OCNG_RA Note3					
OCNG_RB Note3					
N_{oc}	dBm/15 kHz	-98	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	3	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3	3
Io Note4	dBm/9 MHz	-65.5	-65.5	N/A	-65.5
	dBm/1.08 MHz	N/A	N/A	-74.7	N/A
Propagation condition	-	AWGN	AWGN	AWGN	AWGN

Note 1: For the reference measurement channels, see clause A.3.1.
Note 2: For the OCNG pattern, see clause A.3.2.
Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: Io level has been derived from other parameters for information purpose. It is not a settable parameter.
Note 5: DRX related parameters are defined in Table A.7.1.1.1-3.

Table A.7.1.1.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Field	Value				Comment
	Test 1	Test 2	Test 3	Test 4	
srsBandwidthConfiguration	bw5	bw5	bw7	bw5	
srsSubframeConfiguration	sc1	sc3	sc1	sc3	
ackNackSrsSimultaneousTransmission	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	N/A	N/A	N/A	N/A	Not applicable for FDD
srsBandwidth	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	0	77	0	317	SRS periodicity of 2ms, 80 ms and 320ms for Test 1, 2 and 4, respectively.
transmissionComb	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	No cyclic shift
SRS-AntennaPort	an1				Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.					

Table A.7.1.1.1-3: drx-Configuration to be used in UE Transmit Timing Accuracy Test 2 and Test 4 for E-UTRAN FDD

Field	Value		Comment
	Test 2	Test 4	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf640	
shortDRX	disable	disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

A.7.1.1.2 Test Requirements

For parameters specified in Tables A.7.1.1.1-1 and A.7.1.1.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 10MHz channel bandwidth, the test sequence shall be carried out in RRC_CONNECTED for both non-DRX (for Test1) and DRX with a cycle length of 80 ms or a cycle length of 640 ms (Tests 2 and 4, respectively):

a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+64\times T_S$ (for Test 1 and Test 2) or $+32\times T_S$ (for Test 4) compared to that in (a).

c) The test system shall verify that for Test 1 the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offset is within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. Skip this step for Test 2 and Test 4.

d) The test system shall verify that the UE transmit timing offset stays within $N_{TA} \times T_S \pm 12 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. For test 2 and test 4 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

For the 1.4MHz channel bandwidth, the test sequence shall be carried out in RRC_CONNECTED for non-DRX (Test 3):

a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within $N_{TA} \times T_S \pm 24 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+128 \times T_S$ (approximately +4μs) compared to that in (a).

c) The test system shall verify that the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offset is within $N_{TA} \times T_S \pm 24 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

d) The test system shall verify that the UE transmit timing offset stays within $N_{TA} \times T_S \pm 24 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

A.7.1.2 E-UTRAN TDD - UE Transmit Timing Accuracy Tests

A.7.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2.

For this test a single cell is used. Table A.7.1.2.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.2.1-2.

Table A.7.1.2.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Parameter	Unit	Value			
		Test 1	Test 2	Test 3	Test 4
E-UTRA RF Channel Number		1	1	1	1
Channel Bandwidth ($BW_{channel}$)	MHz	10	10	1.4	10
Special subframe configuration[Note1]		6	6	6	6
Uplink-downlink configuration[Note2]		1	1	1	1
DRX cycle	ms	N/A	80[Note7]	N/A	640[Note7]
PDCCH/PCFICH/PHICH Reference measurement channel[Note3]		R.6 TDD	R.6 TDD	R.8 TDD	R.6 TDD
OCNG Pattern[Note4]		OP.2 TDD	OP.2 TDD	OP.4 TDD	OP.2 TDD
PBCH_RA	dB	0	0	0	0
PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA[Note5] OCNG_RB[Note5]		0	0	0	0
N_{oc}	dBm/15 kHz	-98	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	3	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3	3
Io[Note6]	dBm/9 MHz	-65.5	-65.5	N/A	-65.5
	dBm/1.08 MHz	N/A	N/A	-74.7	N/A
Propagation condition	-	AWGN	AWGN	AWGN	AWGN

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: For the reference measurement channels, see clause A.3.1.
Note 4: For the OCNG pattern, see clause A.3.2.
Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 6: Io level has been derived from other parameters for information purpose. It is not a settable parameter.
Note 7: DRX related parameters are defined in Table A.7.1.2.1-3.

Table A.7.1.2.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Field	Value				Comment
	Test 1	Test 2	Test 3	Test 4	
srsBandwidthConfiguration	bw5	bw5	bw7	bw5	
srsSubframeConfiguration	sc3	sc3	sc3	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	FALSE	FALSE	FALSE	FALSE	
srsBandwidth	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	85	15	325	SRS periodicity of 10, 80, 10 and 320 ms for Test 1, 2, 3 and 4 respectively.
transmissionComb	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	No cyclic shift
SRS-AntennaPort	an1				Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.					

Table A.7.1.2.1-3: DRX Configuration to be used in UE Transmit Timing Accuracy Test 2 and Test 4 for E-UTRAN TDD

Field	Value		Comment
	Test 2	Test 4	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	Sf640	
shortDRX	disable	disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

A.7.1.2.2 Test Requirements

For parameters specified in Tables A.7.1.2.1-1 and A.7.1.2.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 10MHz channel bandwidth, the test sequence shall be carried out in RRC_CONNECTED for both non-DRX (for Test1) and DRX with a cycle length of 80 ms or a cycle length of 640 ms (Tests 2 and 4, respectively):

a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+64\times T_S$ (for Test 1 and Test 2) or $+32\times T_S$ (for Test 4) compared to that in (a).

c) The test system shall verify that for test 1 the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offset is within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. Skip this step for test 2 and test 4.

d) The test system shall verify that the UE transmit timing offset stays within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1. For test 2 and test 4 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

For the 1.4MHz channel bandwidth, the test sequence shall be carried out in RRC_CONNECTED for non-DRX (Test 3):

a) After a connection is set up with the cell, the test system shall verify that the UE transmit timing offset is within $(N_{TA} +624)\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+128\times T_S$ (approximately +4μs) compared to that in (a).

c) The test system shall verify that the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offset is within $(N_{TA} +624)\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

d) The test system shall verify that the UE transmit timing offset stays within $(N_{TA} +624)\times T_S \pm 24\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

A.7.1.3 E-UTRAN FDD – UE Transmit Timing Accuracy Tests for SCell

A.7.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. Both PCell and SCell are in the primary Timing Advance Group (pTAG). Table A.7.1.3.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.3.1-2.

Table A.7.1.3.1-1: General test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Parameter	Unit	Cell 1			Cell 2		
		Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1	1	1	2	2	2
Channel Bandwidth ($BW_{channel}$)	MHz	20	20	20	20	20	20
Active PCell		Cell 1	Cell 1	Cell 1			
Active SCell					Cell 2	Cell 2	Cell 2
TAG configuration		pTAG	pTAG	pTAG	pTAG	pTAG	pTAG
DRX cycle	ms	N/A	80[Note5]	640[Note5]	N/A	80[Note5]	640[Note5]
PDCCH/PCFICH/PHICH Reference measurement channel[Note1]		R.10 FDD	R.10 FDD	R.10 FDD	R.10 FDD	R.10 FDD	R.10 FDD
OCNG Pattern[Note2]		OP.12 FDD	OP.12 FDD	OP.12 FDD	OP.12 FDD	OP.12 FDD	OP.12 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA[Note3] OCNG_RB[Note3]	dB	0	0	0	0	0	0
N_{oc}	dBm/15 kHz	-98	-98	-98	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	3	3	3	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3	3	3	3
Io[Note4]	dBm/18 MHz	-62.5	-62.5	-62.5	-62.5	-62.5	-62.5
Propagation condition	-	AWGN	AWGN	AWGN	AWGN	AWGN	AWGN

Note 1: For the reference measurement channels, see clause A.3.1.
Note 2: For the OCNG pattern, see clause A.3.2.
Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: Io level has been derived from other parameters for information purpose. It is not a settable parameter.
Note 5: DRX related parameters are defined in Table A.7.1.3.1-3.

Table A.7.1.3.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN FDD

Field	Cell 1			Cell 2			Comment
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	
srsBandwidthConfiguration	bw5	bw5	bw5	bw5	bw5	bw5	
srsSubframeConfiguration	sc1	sc3	sc3	sc1	sc3	sc3	
ackNackSrsSimultaneousTransmission	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	N/A	N/A	N/A	N/A	N/A	N/A	Not applicable for FDD
srsBandwidth	0	0	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	0	77	317	0	77	317	SRS periodicity of 2ms, 80 ms and 320ms for Test 1, 2 and 3, respectively.
transmissionComb	0	0	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	cs0	cs0	No cyclic shift
srsAntennaPort	an1	an1	an1	an1	an1	an1	Number of SRS antenna ports
NOTE: For further information see clause 6.3.2 in TS 36.331.							

Table A.7.1.3.1-3: drx-Configuration to be used in UE Transmit Timing Accuracy Test 2 and Test 3 for E-UTRAN FDD

Field	Test 2		Test 3		Comment
	Cell 1	Cell 2	Cell 1	Cell 2	
onDurationTimer	psf1	psf1	psf1	psf1	
drx-InactivityTimer	psf1	psf1	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf80	Sf640	Sf640	
shortDRX	disable	disable	disable	Disable	
NOTE: For further information see clause 6.3.2 in TS 36.331.					

A.7.1.3.2 Test Requirements

For parameters specified in Tables A.7.1.3.1-1, and A.7.1.3.1-2 the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

The test sequence shall be carried out in RRC_CONNECTED for both non-DRX (for Test 1) and DRX with a cycle length of 80 ms or a cycle length of 640 mss(Test 2 and 3, respectively):

a) After the SCell (Cell 2) is activated, the test system shall verify that the UE transmit timing offsets of both PCell and SCell are within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1).

b) The test system adjusts the downlink transmit timing for the PCell (Cell 1) by $+64\times T_S$ (for Test 1 and Test 2) or $+32\times T_S$ (for Test 3) compared to that in (a).

c) The test system shall verify that for Test 1 the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offsets of both PCell and SCell are within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1). Skip this step for Test 2 and Test 3.

d) The test system shall verify that the UE transmit timing offsets of both PCell and SCell stay within $N_{TA} \times T_S \pm 12 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1). For test 2 and test 3 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

A.7.1.4 E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell

A.7.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. Both PCell and SCell are in the primary Timing Advance Group (pTAG). Table A.7.1.4.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.4.1-2.

Table A.7.1.4.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Parameter	Unit	Cell 1			Cell 2		
		Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1	1	1	2	2	2
Channel Bandwidth ($BW_{channel}$)	MHz	20	20	20	20	20	20
E-UTRA RF Channel Number		1	1	1	2	2	2
Active PCell		Cell 1	Cell 1	Cell 1			
Active SCell					Cell 2	Cell 2	Cell 2
TAG configuration		pTAG	pTAG	pTAG	pTAG	pTAG	pTAG
Special subframe configuration[Note1]		6	6	6	6	6	6
Uplink-downlink configuration[Note2]		1	1	1	1	1	1
DRX cycle	ms	OFF	80[Note7]	640[Note7]	OFF	80[Note7]	640[Note7]
PDCCH/PCFICH/PHICH Reference measurement channel[Note3]		R.10 TDD	R.10 TDD	R.10 TDD	R.10 TDD	R.10 TDD	R.10 TDD
OCNG Pattern[Note4]		OP.8 TDD	OP.8 TDD	OP.8 TDD	OP.8 TDD	OP.8 TDD	OP.8 TDD
PBCH_RA	dB	0	0	0	0	0	0
PBCH_RB		0	0	0		0	0
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA							
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
OCNG_RA[Note5]							
OCNG_RB[Note5]							
N_{oc}	dBm/15 kHz	-98	-98	-98	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	3	3	3	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3	3	3	3
Io[Note6]	dBm/18 MHz	-62.5	-62.5	-62.5	-62.5	-62.5	-62.5
Propagation condition	-	AWGN	AWGN	AWGN	AWGN	AWGN	AWGN

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: For the reference measurement channels, see clause A.3.1.
Note 4: For the OCNG pattern, see clause A.3.2.
Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 6: Io level has been derived from other parameters for information purpose. It is not a settable parameter.
Note 7: DRX related parameters are defined in Table A.7.1.4.1-3.

Table A.7.1.4.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Field	Cell 1			Cell 2			Comment
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	
srsBandwidthConfiguration	bw5	bw5	bw5	bw5	bw5	bw5	
srsSubframeConfiguration	sc3	sc3	sc3	sc3	sc3	sc3	Once every 5 subframes
ackNackSrsSimultaneous Transmission	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	
srsBandwidth	0	0	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	85	325	15	85	325	SRS periodicity of 10, 80 ms and 320ms for Test 1, 2 and 3, respectively.
transmissionComb	0	0	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	cs0	cs0	No cyclic shift
srsAntennaPort	an1	an1	an1	an1	an1	an1	Number of SRS antenna ports
Note: For further information see clause 6.3.2 in TS 36.331.							

Table A.7.1.4.1-3: DRX Configuration to be used in UE Transmit Timing Accuracy Test 2 and Test 3 for E-UTRAN TDD

Field	Test 2		Test 3		Comment
	Cell 1	Cell 2	Cell 1	Cell 2	
onDurationTimer	psf1	psf1	psf1	psf1	
drx-InactivityTimer	psf1	psf1	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf80	Sf640	Sf640	
shortDRX	disable	disable	disable	disable	
Note: For further information see clause 6.3.2 in TS 36.331.					

A.7.1.4.2 Test Requirements

For parameters specified in Tables A.7.1.4.1-1 and A.7.1.4.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

The test sequence shall be carried out in RRC_CONNECTED for both non-DRX (for Test 1) and DRX with a cycle length of 80 ms or a cycle length of 640 ms (Test 2 and 3, respectively):

a) After the SCell (Cell 2) is activated, the test system shall verify that the UE transmit timing offsets of both PCell and SCell are within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1).

b) The test system adjusts the downlink transmit timing for the PCell (Cell 1) by $+64\times T_S$ (for Test 1 and Test 2) or $+32\times T_S$ (for Test 3) compared to that in (a).

c) The test system shall verify that for test 1 the adjustment step size and the adjustment rate shall be according to the requirements in clause 7.1.2 until the UE transmit timing offsets of both PCell and SCell are within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1). Skip this step for test 2 and test 3.

d) The test system shall verify that the UE transmit timing offsets of both PCell and SCell stay within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of PCell (Cell 1). For test 2 and test 3 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

A.7.1.4A E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell for 20 MHz + 10 MHz

A.7.1.4A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.1.4.1.

The parameters of this test are the same as defined in Subclause A.7.1.4.1 except that the values of the parameters in the Table A.7.1.4A.1-1 will replace the values of the corresponding parameters in A.7.1.4.1-1. Parameters used for the sounding reference symbol configuration and DRX configuration are unchanged from table A.7.1.4.1-2 and table A.7.1.4.1-3.

Table A.7.1.4A.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD for 20 MHz +10 MHz

Parameter	Unit	Cell 1			Cell 2		
		Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
Channel Bandwidth ($BW_{channel}$)	MHz	20	20	20	10	10	10
PDCCH/PCFICH/PHICH Reference measurement channel Note3		R.10 TDD	R.10 TDD	R.10 TDD	R.6 TDD	R.6 TDD	R.6 TDD
OCNG Pattern Note4		OP.8 TDD	OP.8 TDD	OP.8 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
Io Note6	dBm/18 MHz	-62.5	-62.5	-62.5	N/A	N/A	N/A
	dBm/9 MHz	N/A	N/A	N/A	-65.5	-65.5	-65.5

A.7.1.4A.2 Test Requirements

The test requirements defined in section A.7.1.4.2 shall apply to this test case.

A.7.1.5 E-UTRAN FDD – UE Transmit Timing Accuracy Tests for 5MHz Bandwidth

A.7.1.5.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.1.1.1.

The parameters of this test are the same as defined in Subclause A.7.1.1.1 except that the values of the parameters in Test 1 in the Table A.7.1.5.1-1 will replace the values of the corresponding parameters in A.7.1.1.1-1. Only Test 1 is defined for the 5MHz bandwidth.

Table A.7.1.5.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN FDD for 5MHz bandwidth

Parameter	Unit	Value
		Test 1
Channel Bandwidth ($BW_{channel}$)	MHz	5
PDCCH/PCFICH/PHICH Reference measurement channel Note1		R.11 FDD
OCNG Pattern Note2		OP.16 FDD
Io Note4	dBm/4.5 MHz	-68.5
Note 1: For the reference measurement channels, see clause A.3.1. Note 2: For the OCNG pattern, see clause A.3.2. Note 3: See Table A.7.1.1.1-1 for the other parameters. Note 4: This test is according to the principle defined in section A.3.7.2.		

A.7.1.5.2 Test Requirements

The test requirements defined in section A.7.1.1.2 shall apply to this test case.

A.7.1.6 E-UTRAN FDD – UE Transmit Timing Accuracy Tests for SCell in sTAG

A.7.1.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits for SCell in sTAG. This test will verify the requirements in clause 7.1.2.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell is in the Primary Timing Advance Group (pTAG) and Scell is in the secondary Timing Advance Group (sTAG). Table A.7.1.6.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing for Scell in sTAG is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.6.1-2.

Table A.7.1.6.1-1: General test Parameters for UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN FDD

Parameter	Unit	Cell 1		Cell 2	
		Test 1	Test 2	Test 1	Test 2
E-UTRA RF Channel Number		1	1	2	2
Channel Bandwidth ($BW_{channel}$)	MHz	10	10	10	10
Active PCell		Cell 1	Cell 1		
Active SCell				Cell 2	Cell 2
TAG configuration		pTAG	pTAG	sTAG	sTAG
DRX cycle	ms	OFF	80[Note5]	OFF	80[Note5]
PDCCH/PCFICH/PHICH Reference measurement channel[Note1]		R.6 FDD	R.6 FDD	R.6 FDD	R.6 FDD
OCNG Pattern[Note2]		OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA[Note3] OCNG_RB[Note3]	dB	0	0	0	0
N_{oc}	dBm/15 kHz	-98	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	3	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3	3
Io[Note4]	dBm/9 MHz	-65.5	-65.5	-65.5	-65.5
Propagation condition	-	AWGN	AWGN	AWGN	AWGN

Note 1: For the reference measurement channels, see clause A.3.1.
Note 2: For the OCNG pattern, see clause A.3.2.
Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: Io level has been derived from other parameters for information purpose. It is not a settable parameter.
Note 5: DRX related parameters are defined in Table A.7.1.6.1-3.

Table A.7.1.6.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN FDD

Field	Cell 1		Cell 2		Comment
	Test 1	Test 2	Test 1	Test 2	
srsBandwidthConfiguration	bw5	bw5	bw5	bw5	
srsSubframeConfiguration	sc3	sc3	sc3	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	FALSE	FALSE	FALSE	FALSE	
srsBandwidth	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	85	15	85	SRS periodicity of 10 and 80 ms for Test 1 and 2, respectively.
transmissionComb	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	No cyclic shift
srsAntennaPort	an1	an1	an1	an1	Number of SRS antenna ports
Note: For further information see clause 6.3.2 in TS 36.331.					

Table A.7.1.6.1-3: drx-Configuration to be used in Test 2 of UE Transmit Timing Accuracy for SCell in sTAG for E-UTRAN FDD

Field	Cell 1	Cell 2	Comment
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf80	
shortDRX	disable	disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

A.7.1.6.2 Test Requirements

For parameters specified in Tables A.7.1.6.1-1, and A.7.1.6.1-2 the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate for Scell in sTAG shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For Test1 and Test2, the test sequence shall be carried out in RRC_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms:

a) After the SCell (Cell 2) is activated, the test system shall verify that the UE transmit timing offsets for SCell in sTAG are within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of the activated Scell.

b) The test system adjusts the downlink transmit timing for the activated Scell (Cell 2) by $+64\times T_S$ (approximately +2µs) compared to that in (a).

c) The test system shall verify that for Test 1 the adjustment step size and the adjustment rate for Scell in sTAG shall be according to the requirements in clause 7.1.2 until the UE transmit timing offsets of SCell within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of the activated SCell (Cell 2). Skip this step for Test 2.

d) The test system shall verify that the UE transmit timing offsets of the SCell in sTAG stay within $N_{TA}\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of the activated SCell (Cell 2).

A.7.1.7 E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG

A.7.1.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE is capable of following the frame timing change of the connected eNode B and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits for SCell in sTAG. This test will verify the requirements in clause 7.1.2.

For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell is in the Primary Timing Advance Group (pTAG) and Scell is in the secondary Timing Advance Group (sTAG). Table A.7.1.7.1-1 defines the strength of the transmitted signals and the propagation condition. The transmit timing for Scell in sTAG is verified by the UE transmitting SRS using the configuration defined in Table A.7.1.7.1-2.

Table A.7.1.7.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN TDD

Parameter	Unit	Cell 1		Cell 2	
		Test 1	Test 2	Test 1	Test 2
E-UTRA RF Channel Number		1	1	2	2
Channel Bandwidth ($BW_{channel}$)	MHz	10	10	10	10
E-UTRA RF Channel Number		1	1	2	2
Active PCell		Cell 1	Cell 1		
Active SCell				Cell 2	Cell 2
TAG configuration		pTAG	pTAG	sTAG	sTAG
Special subframe configuration[Note1]		6	6	6	6
Uplink-downlink configuration[Note2]		1	1	1	1
DRX cycle	ms	OFF	80[Note7]	OFF	80[Note7]
PDCCH/PCFICH/PHICH Reference measurement channel[Note3]		R.6 TDD	R.6 TDD	R.6 TDD	R.6 TDD
OCNG Pattern[Note4]		OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	0	0	0	0
PBCH_RB		0	0		0
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
OCNG_RA[Note5]					
OCNG_RB[Note5]					
N_{oc}	dBm/15 kHz	-98	-98	-98	-98
$\hat{E}_s/I_{ot}$	dB	3	3	3	3
$\hat{E}_s/N_{oc}$	dB	3	3	3	3
Io[Note6]	dBm/9 MHz	--65.5	--65.5	--65.5	--65.5
Propagation condition	-	AWGN	AWGN	AWGN	AWGN

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: For the reference measurement channels, see clause A.3.1.
Note 4: For the OCNG pattern, see clause A.3.2.
Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 6: Io level has been derived from other parameters for information purpose. It is not a settable parameter.
Note 7: DRX related parameters are defined in Table A.7.1.7.1-3.

Table A.7.1.7.1-2: Sounding Reference Symbol Configuration to be used in UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN TDD

Field	Cell 1		Cell 2		Comment
	Test 1	Test 2	Test 1	Test 2	
srsBandwidthConfiguration	bw5	bw5	bw5	bw5	
srsSubframeConfiguration	sc3	sc3	sc3	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	FALSE	FALSE	FALSE	
srsMaxUpPTS	FALSE	FALSE	FALSE	FALSE	
srsBandwidth	0	0	0	0	No hopping
srsHoppingBandwidth	hbw0	hbw0	hbw0	hbw0	
frequencyDomainPosition	0	0	0	0	
duration	TRUE	TRUE	TRUE	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	85	15	85	SRS periodicity of 10 and 80 ms for Test 1 and 2, respectively.
transmissionComb	0	0	0	0	
cyclicShift	cs0	cs0	cs0	cs0	No cyclic shift
srsAntennaPort	an1	an1	an1	an1	Number of SRS antenna ports
Note: For further information see clause 6.3.2 in TS 36.331.					

Table A.7.1.7.1-3: DRX Configuration to be used in Test 2 of UE Transmit Timing Accuracy for SCell in sTAG for E-UTRAN TDD

Field	Cell 1	Cell 2	Comment
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf80	
shortDRX	disable	disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

A.7.1.7.2 Test Requirements

For parameters specified in Tables A.7.1.7.1-1 and A.7.1.7.1-2, the initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate for Scell in sTAG shall be within the limits defined in clause 7.1.2.

The following sequence of events shall be used to verify that the requirements are met.

For Test 1 and Test 2, the test sequence shall be carried out in RRC_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms:

a) After the SCell (Cell 2) is activated, the test system shall verify that the UE transmit timing offsets for Scell in sTAG are within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of the activated SCell (Cell 2).

b) The test system adjusts the downlink transmit timing for the activated Scell (Cell 2) by $+64\times T_S$ (approximately +2µs) compared to that in (a).

c) The test system shall verify that for test 1 the adjustment step size and the adjustment rate for Scell in sTAG shall be according to the requirements in clause 7.1.2 until the UE transmit timing offsets of SCell are within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of the activated SCell(Cell 2). Skip this step for test 2.

d) The test system shall verify that the UE transmit timing offsets of the SCell in sTAG stay within $(N_{TA} + 624)\times T_S \pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of the activated Scell (Cell 2).

A.7.1.7A E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG for 20MHz +20MHz

A.7.1.7A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.1.7. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.1.7B.1.1-1 will replace the values of corresponding parameters in Tables A.7.1.7.1-1.

Table A.7.1.7A.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN TDD with 20MHz +20MHz bandwidth

Parameter	Unit	Cell 1		Cell 2	
		Test 1	Test 2	Test 1	Test 2
E-UTRA RF Channel Number		1	1	2	2
Channel Bandwidth ($BW_{channel}$)	MHz	20	20	20	20
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.7 TDD	R.7 TDD	R.7 TDD	R.7 TDD
OCNG Pattern defined in A.3.2.2		OP.8 TDD	OP.8 TDD	OP.8 TDD	OP.8 TDD
Io^{Note1}	dBm/18 MHz	-62.5	-62.5	-62.5	-62.5
Note 1: Io level has been derived from other parameters for information purpose. It is not a settable parameter.					

A.7.1.7A.2 Test Requirements

The test requirements defined in section A.7.1.7.2 shall apply to these test cases.

A.7.1.7B E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG for 20MHz +10MHz

A.7.1.7B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.1.7. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.1.7B.1-1 will replace the values of corresponding parameters in Tables A.7.1.7.1-1.

Table A.7.1.7B.1-1: Test Parameters for UE Transmit Timing Accuracy Tests for Scell in sTAG for E-UTRAN TDD with 20MHz +10MHz bandwidth

Parameter	Unit	Cell 1		Cell 2	
		Test 1	**Test 2**	**Test 1**	**Test 2**
E-UTRA RF Channel Number		1	1	2	2
Channel Bandwidth ($BW_{channel}$)	MHz	20	20	10	10
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.7 TDD	R.7 TDD	R.6 TDD	R.6 TDD
OCNG Pattern defined in A.3.2.2		OP.8 TDD	OP.8 TDD	OP.2 TDD	OP.2 TDD
Io^{Note1}	dBm/18 MHz	-62.5	-62.5	-	-
	dBm/9 MHz	-	-	-65.5	-65.5
Note 1: Io level has been derived from other parameters for information purpose. It is not a settable parameter.					

A.7.1.7B.2 Test Requirements

The test requirements defined in section A.7.1.7.2 shall apply to these test cases.

A.7.1.8 Void

A.7.1.8.1 Void

Table A.7.1.8.1-1: Void

A.7.1.8.2 Void

A.7.1.9 Void

A.7.1.8.1 Void

Table A.7.1.9.1-1: Void

A.7.1.8.2 Void

A.7.2 UE Timing Advance

A.7.2.1 E-UTRAN FDD – UE Timing Advance Adjustment Accuracy Test

A.7.2.1.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN FDD Timing Advance adjustment accuracy requirements, defined in clause 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.1.1-1, A.7.2.1.1-2, and A.7.2.1.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.1.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element, as specified in Clause 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements, with Timing Advance Command value specified in table A.7.2.1.1-2. This value shall result in changes of the timing advance used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.1.1-1: General Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Timing Advance Command (T_A) value during T1		31	N_{TA} = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	N_{TA} = 128
DRX		OFF	
T1	s	5	
T2	s	5	

Table A.7.2.1.1-2: Cell specific Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test

Parameter	Unit	Value	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note1]	dB		
OCNG_RB[Note1]	dB		
Timing Advance Command (T_A)		31	39
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
Io[Note2]	dBm/9 MHz	-65.5	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.			

Table A.7.2.1.1-3: Sounding Reference Symbol Configuration for E-UTRAN FDD Transmit Timing Accuracy Test

Field	Value	Comment
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	Not applicable for E-UTRAN FDD
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	7	SRS periodicity of 10.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.		

A.7.2.1.2 Test Requirements

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

A.7.2.2 E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test

A.7.2.2.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN TDD Timing Advance adjustment accuracy requirements, defined in clause 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.2.1-1, A.7.2.2.1-2, and A.7.2.2.1-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.2.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element, as specified in Clause 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements, with Timing Advance Command value specified in table A.7.2.1.1-2. This value shall result in changes of the timing advance used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.2.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Timing Advance Command (T_A) value during T1		31	N_{TA} = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	N_{TA} = 128
DRX		OFF	
T1	s	5	
T2	s	5	

Table A.7.2.2.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

Parameter	Unit	Value	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Special subframe configuration[Note1]		6	
Uplink-downlink configuration[Note2]		1	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	**0**	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note3]	dB		
OCNG_RB[Note3]	dB		
Timing Advance Command (T_A)		31	39
$\hat{E}_s/I_{ot}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	**3**	
Io[Note4]	dBm/9 MHz	-65.5	
Propagation Condition		AWGN	
Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211. Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211. Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 4: Io level has been derived from other parameters for information purpose. It is not a settable parameter.			

Table A.7.2.2.1-3: Sounding Reference Symbol Configuration for E-UTRAN TDD Transmit Timing Accuracy Test

Field	Value	Comment
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	
srsBandwidth	bw0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	SRS periodicity of 10ms.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.		

A.7.2.2.2 Test Requirements

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

A.7.2.3 E-UTRAN FDD – UE Timing Advance Adjustment Accuracy Test for 5MHz

A.7.2.3.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.2.1.1.

The parameters of this test are the same as defined in Subclause A.7.2.1.1 except that the values of the parameters in the Table A.7.2.3.1-1 will replace the values of the corresponding parameters in A.7.2.1.1-1, table A.7.2.3.1-2 will replace the values of the corresponding parameters in A.7.2.1.1-2. Parameters used for the sounding reference symbol configuration are unchanged from table A.7.2.1.1-3.

Table A.7.2.3.1-1: General Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test for 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1
Note 1: For the reference measurement channels, see clause A.3.1. Note 2: See Table A.7.2.1.1-1 for the other parameters. Note 3: This test is according to the principle defined in section A.3.7.2			

Table A.7.2.3.1-2: Cell specific Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test for 5MHz bandwidth

Parameter	Unit	Value	
		T1	T2
$BW_{channel}$	MHz	5	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD)		OP.15 FDD	
Io^{Note2}	dBm/4.5 MHz	-68.5	
Note 1: For the reference measurement channels, see clause A.3.2. Note 2: See Table A.7.2.1.1-2 for the other parameters.			

A.7.2.3.2 Test Requirements

The test requirements defined in section A.7.2.1.2 shall apply to this test case.

A.7.2.4 E-UTRAN FDD – UE Timing Advance Adjustment Accuracy Test for SCell in sTAG

A.7.2.4.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN FDD Timing Advance adjustment accuracy requirements, defined in clause 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.4.1-1, A.7.2.4.1-2, and A.7.2.4.1-3. For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell is in the primary Timing Advance Group (pTAG) and SCell is in the secondary Timing Advance Group (sTAG). The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands for sTAG are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.4.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured for SCell in sTAG.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element for sTAG, as specified in Clause 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance for sTAG used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements for sTAG, with Timing Advance Command value specified in table A.7.2.4.1-2. This value shall result in changes of the timing advance for sTAG used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.4.1-1: General Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test for SCell in sTAG

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Timing Advance Command (T_A) value during T1		31	N_{TA} = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	N_{TA} = 128
DRX		OFF	
T1	s	5	
T2	s	5	

Table A.7.2.4.1-2: Cell specific Test Parameters for E-UTRAN FDD Timing Advance Accuracy Test for SCell in sTAG

Parameter	Unit	Value			
		Cell1		Cell2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Active PCell		Cell1	Cell1		
Active SCell				Cell2	Cell2
TAG configuration		pTAG	pTAG	sTAG	sTAG
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD		OP.1 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note1	dB				
OCNG_RB Note1	dB				
Timing Advance Command (T_A)		/	/	31	39
$\hat{E}_s/I_{ot}$	dB	3		3	
N_{oc}	dBm/15 KHz	-98		-98	
$\hat{E}_s/N_{oc}$	dB	3		3	
Io Note2	dBm/9 MHz	-65.5		-65.5	
Propagation Condition		AWGN		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.					

Table A.7.2.4.1-3: Sounding Reference Symbol Configuration for E-UTRAN FDD Transmit Timing Accuracy Test for SCell in sTAG

Field	Value	Comment
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	Not applicable for E-UTRAN FDD
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	7	SRS periodicity of 10.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.		

A.7.2.4.2 Test Requirements

The UE shall apply the signalled Timing Advance value for SCell in sTAG to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy for SCell in STAG shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

A.7.2.5 E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test for Scell in sTAG

A.7.2.5.1 Test Purpose and Environment

The purpose of the test is to verify E-UTRAN TDD Timing Advance adjustment accuracy requirements, defined in clause 7.3.2.2, in an AWGN model.

The test parameters are given in tables A.7.2.5.1-1, A.7.2.5.1-2, and A.7.2.5.1-3. For this test two cells are used. Cell 1 is PCell and Cell 2 is SCell. PCell is in the primary Timing Advance Group (pTAG) and SCell is in the secondary Timing Advance Group (sTAG). The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands for sTAG are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.7.2.5.1-3, are sent from the UE and received by the test equipment, but only for SCell. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured for SCell in sTAG.

During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element for sTAG, as specified in Clause 6.1.3.5 in TS 36.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2.3 in TS 36.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements for sTAG, with Timing Advance Command value specified in table A.7.2.5.1-2. This value shall result in changes of the timing advance on SCell used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3.2.1, the UE adjusts its uplink timing at sub-frame n+6 for a timing advance command received in sub-frame n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 36.321, shall be configured so that it does not expire in the duration of the test.

Table A.7.2.5.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Timing Advance Command (T_A) value during T1		31	N_{TA} = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	N_{TA} = 128
DRX		OFF	
T1	s	5	
T2	s	5	

Table A.7.2.5.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG

Parameter	Unit	Value			
		Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Active PCell		Cell1			
Active SCell				Cell2	
TAG configuration		pTAG		sTAG	
Special subframe configuration[Note1]		6		6	
Uplink-downlink configuration[Note2]		1		1	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD		OP.1 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA[Note3]	dB				
OCNG_RB[Note3]	dB				
Timing Advance Command (T_A)				31	39
$\hat{E}_s/I_{ot}$	dB	3		3	
N_{oc}	dBm/15 KHz	-98		-98	
$\hat{E}_s/N_{oc}$	dB	3		3	
Io[Note4]	dBm/9 MHz	-65.5		-65.5	
Propagation Condition		AWGN		AWGN	

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: Io level has been derived from other parameters for information purpose. It is not a settable parameter.

Table A.7.2.5.1-3: Sounding Reference Symbol Configuration for E-UTRAN TDD Transmit Timing Accuracy Test for SCell in sTAG

Field	Value	Comment
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc3	Once every 5 subframes
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	
srsBandwidth	bw0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	15	SRS periodicity of 10ms.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.		

A.7.2.5.2 Test Requirements

The UE shall apply the signalled Timing Advance value for SCell in sTAG to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The Timing Advance adjustment accuracy for SCell in sTAG shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

A.7.2.5A E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test for Scell in sTAG for 20 MHz +20 MHz

A.7.2.5A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.2.5.1.

The parameters of this test are the same as defined in Subclause A.7.2.5.1 except that the values of the parameters in the Table A.7.2.5A.1-1 will replace the values of the corresponding parameters in A.7.2.5.1-1, table A.7.2.5A.1-2 will replace the values of the corresponding parameters in A.7.2.5.1-2. Parameters used for the sounding reference symbol configuration are unchanged from table A.7.2.5.1-3.

Table A.7.2.5A.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG for 20 MHz +20 MHz

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD	As specified in clause A.3.1.2.2

Table A.7.2.5A.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG for 20 MHz +20 MHz

Parameter	Unit	Value			
		Cell 1		Cell 2	
		T1	T2	T1	T2
$BW_{channel}$	MHz	20		20	
OCNG Patterns defined in A.3.2.2		OP.7 TDD		OP.7 TDD	
Io^{Note4}	dBm/18 MHz	-62.5		-62.5	

A.7.2.5A.2 Test Requirements

The test requirements defined in section A.7.2.5.2 shall apply to this test case.

A.7.2.5B E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test for Scell in sTAG for 20 MHz +10 MHz

A.7.2.5B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.2.5.1.

The parameters of this test are the same as defined in Subclause A.7.2.5.1 except that the values of the parameters in the Table A.7.2.5B.1-1 will replace the values of the corresponding parameters in A.7.2.5.1-1, table A.7.2.5B.1-2 will replace the values of the corresponding parameters in A.7.2.5.1-2. Parameters used for the sounding reference symbol configuration are unchanged from table A.7.2.5.1-3.

Table A.7.2.5B.1-1: General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG for 20 MHz +10 MHz

Parameter	Unit	Value	Comment
PDSCH parameters		For Cell 1: DL Reference Measurement Channel R.3 TDD For Cell 2: DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		For Cell 1: DL Reference Measurement Channel R.10 TDD For Cell 2: DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2

Table A.7.2.5B.1-2: Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test for SCell in sTAG for 20 MHz +10 MHz

Parameter	Unit	Value			
		Cell 1		Cell 2	
		T1	T2	T1	T2
$BW_{channel}$	MHz	20		10	
OCNG Patterns defined in A.3.2.2		OP.7 TDD		OP.1 TDD	
Io^{Note4}	dBm/18 MHz	-62.5		N/A	
	dBm/9 MHz	N/A		-65.5	

A.7.2.5B.2 Test Requirements

The test requirements defined in section A.7.2.5.2 shall apply to this test case.

A.7.3 Radio Link Monitoring

In the following section, any uplink signal transmitted by the UE is used for detecting the In-/Out-of-Sync state of the UE. In terms of measurement, the uplink signal is verified on the basis of the UE output power:

For intra-band contiguous carrier aggregation, transmit OFF power is measured as the mean power per component carrier.

For UE with multiple transmit antennas, transmit OFF power is measured as the mean power at each transmit connector.

- UE output power higher than Transmit OFF power -50 dBm (as defined in TS 36.101 [5]) means uplink signal
- UE output power equal to or less than Transmit OFF power -50 dBm (as defined in TS 36.101 [5]) means no uplink signal.

A.7.3.1 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

A.7.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.1.1-1, A.7.3.1.1-2 and A.7.3.1.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.1.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.1.1-1: General test parameters for E-UTRAN FDD out-of-sync testing

Parameter		Unit	Value				Comment
			Test 1	Test 2	Test 3	Test 4	
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	R.6 FDD	R.7 FDD	As specified in section A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	As specified in section A.3.2.1.2.
Active cell			Cell 1	Cell 1	Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	Normal	
E-UTRA RF Channel Number			1	1	1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	10	10	
Correlation Matrix and Antenna Configuration			1x2	2x2	1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	8	8	
	ρ_A, ρ_B		0	-3	0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	
DRX			OFF	OFF	OFF	OFF	
Layer 3 filtering			*Enabled*	*Enabled*	*Enabled*	*Enabled*	*Counters: N310 = 1; N311 = 1*
T310 timer		*ms*	*0*	*0*	*0*	*0*	*T310 is disabled*
T311 timer		ms	1000	1000	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	2	2	2	Minimum CQI reporting periodicity
Propagation channel			AWGN	AWGN	ETU 70 Hz	ETU 70 Hz	.
T1		s	1	1	1	1	
T2		s	0.4	0.4	0.4	0.4	
T3		s	0.5	0.5	0.5	0.5	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.							

Table A.7.3.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Test 1</th><th colspan="3">Test 2</th></tr>
<tr><th>T1</th><th>T2</th><th>T3</th><th>T1</th><th>T2</th><th>T3</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td colspan="3">1</td><td colspan="3">1</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="3">10</td><td colspan="3">10</td></tr>
<tr><td>Antenna Configuration</td><td></td><td colspan="3">1x2</td><td colspan="3">2x2</td></tr>
<tr><td>OCNG Pattern defined in A.3.2.1 (FDD)</td><td></td><td colspan="3">OP.2 FDD</td><td colspan="3">OP.2 FDD</td></tr>
<tr><td>ρ_A, ρ_B</td><td></td><td colspan="3">0</td><td colspan="3">-3</td></tr>
<tr><td>PCFICH_RB</td><td>dB</td><td colspan="3">4</td><td colspan="3">1</td></tr>
<tr><td>PDCCH_RA</td><td>dB</td><td colspan="3">4</td><td colspan="3">1</td></tr>
<tr><td>PDCCH_RB</td><td>dB</td><td colspan="3">4</td><td colspan="3">1</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td colspan="3" rowspan="10">0</td><td colspan="3" rowspan="10">-3</td></tr>
<tr><td>PBCH_RB</td><td>dB</td></tr>
<tr><td>PSS_RA</td><td>dB</td></tr>
<tr><td>SSS_RA</td><td>dB</td></tr>
<tr><td>PHICH_RA</td><td>dB</td></tr>
<tr><td>PHICH_RB</td><td>dB</td></tr>
<tr><td>PDSCH_RA</td><td>dB</td></tr>
<tr><td>PDSCH_RB</td><td>dB</td></tr>
<tr><td>OCNG_RA Note 1</td><td>dB</td></tr>
<tr><td>OCNG_RB Note 1</td><td>dB</td></tr>
<tr><td>SNR Note 6</td><td>dB</td><td>-4.7</td><td>-9.5</td><td>-13.5</td><td>-4.7</td><td>-9.5</td><td>-13.5</td></tr>
<tr><td>N_{oc}</td><td>dBm/15 kHz</td><td colspan="3">-98</td><td colspan="3">-98</td></tr>
<tr><td>Propagation condition</td><td></td><td colspan="3">AWGN</td><td colspan="3">AWGN</td></tr>
<tr><td colspan="8">Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.1.1-1.</td></tr>
</table>

Table A.7.3.1.1-3: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 3 and # 4

Parameter	Unit	Test 3			Test 4		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		1x2 Low			2x2 Low		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD			OP.2 FDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	4			1		
PDCCH_RB	dB	4			1		
PBCH_RA	dB	0			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
SNR Note 6	dB	-1.4	-5.5	-11.5	-2.3	-6.2	-12.2
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			ETU 70 Hz		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.1.1-1.

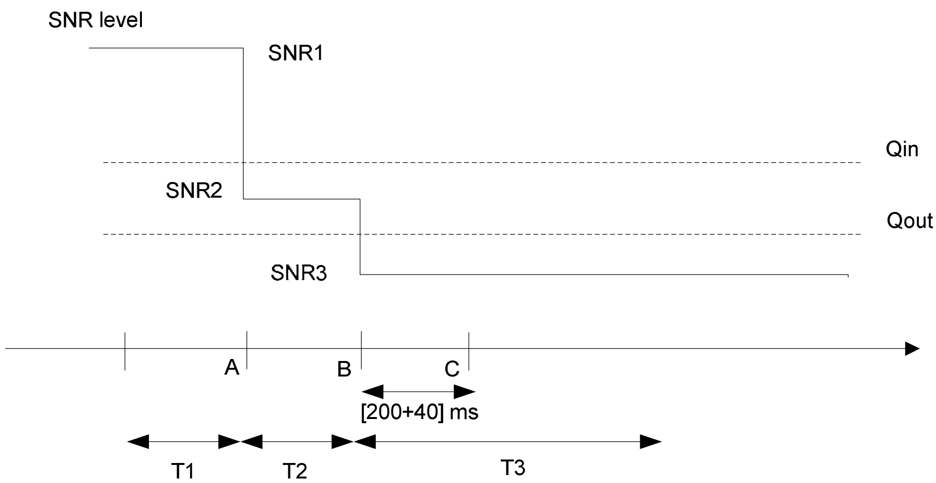


Figure A.7.3.1.1-1 SNR variation for out-of-sync testing

A.7.3.1.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.2 E-UTRAN FDD Radio Link Monitoring Test for In-sync

A.7.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.2.1-1 and A.7.3.2.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.2.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.2.1-1: General test parameters for E-UTRAN FDD in-sync testing

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 FDD	OP.2 FDD	As specified in clause A.3.2.1.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF Channel Number			1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	
Correlation Matrix and Antenna Configuration			1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters (Note 1)	DCI format		1C	1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE		0	-3	
	Ratio of PCFICH to RS EPRE		4	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	
DRX			OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	2000	T310 is enabled

T311 timer	ms	1000	1000	T311 is enabled
Periodic CQI reporting mode		PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity	ms	2	2	Minimum CQI reporting periodicity
Propagation channel		ETU 70 Hz	ETU 70 Hz	
T1	s	0.5	0.5	
T2	s	0.4	0.4	
T3	s	1.46	1.46	
T4	s	0.4	0.4	
T5	s	1	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1					Test 2				
		T1	**T2**	**T3**	**T4**	**T5**	**T1**	**T2**	**T3**	**T4**	**T5**
E-UTRA RF Channel Number		1					1				
$BW_{channel}$	MHz	10					10				
Correlation Matrix and Antenna Configuration		1x2 Low					2x2 Low				
OCNG Pattern defined in A.3.2.1 (FDD)		**OP.2 FDD**					**OP.2 FDD**				
ρ_A, ρ_B		0					-3				
PCFICH_RB	dB	4					1				
PDCCH_RA	dB	0					-3				
PDCCH_RB	dB	0					-3				
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB	**0**					**-3**				
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA Note 1	dB										
OCNG_RB Note 1	dB										
SNR Note 6	dB	-1.4	-5.5	-11.5	-6.4	-1.4	-2.3	-6.2	-12.2	-7.3	-2.3
N_{oc}	dBm/15 kHz	-98					-98				
Propagation condition		ETU 70 Hz					ETU 70 Hz				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.2.1-1.

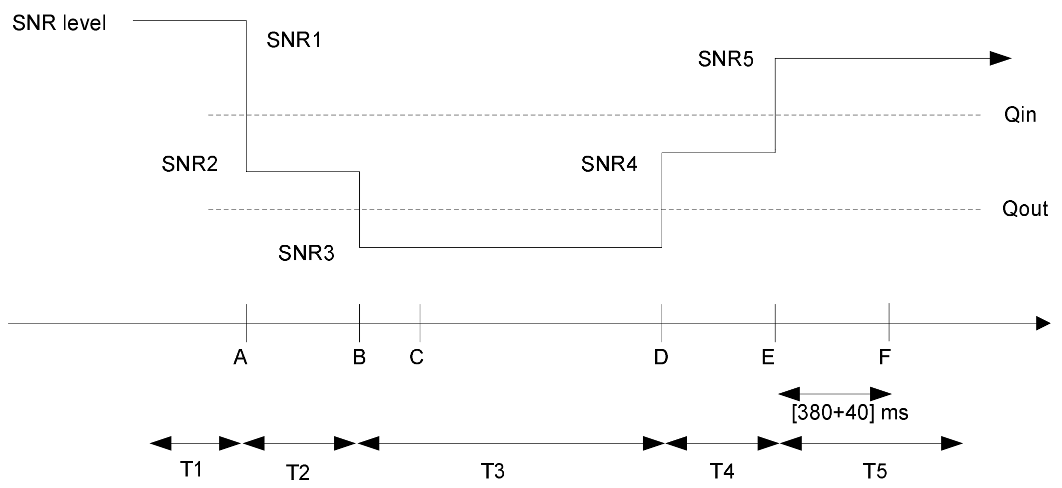


Figure A.7.3.2.1-1 SNR variation for in-sync testing

A.7.3.2.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.3 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync

A.7.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.3.1-1, A.7.3.3.1-2 and A.7.3.3.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.3.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.3.1-1: General test parameters for E-UTRAN TDD out-of-sync testing

Parameter		Unit	Value				Comment
			Test 1	Test 2	Test 3	Test 4	
PCFICH/PDCCH/PHICH parameters			R.6 TDD	R.7 TDD	R.6 TDD	R.7 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1	Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	Normal	
E-UTRA RF Channel Number			1	1	1	1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	10	10	
Correlation Matrix and Antenna Configuration			1x2	2x2	1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	8	8	
	ρ_A, ρ_B		0	-3	0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	
DRX			OFF	OFF	OFF	OFF	
Layer 3 filtering			*Enabled*	*Enabled*	*Enabled*	*Enabled*	*Counters: N310 = 1; N311 = 1*
T310 timer		*ms*	*0*	*0*	*0*	*0*	*T310 is disabled*
T311 timer		ms	1000	1000	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	1	1	1	Minimum CQI reporting periodicity
Propagation channel			AWGN	AWGN	ETU 70 Hz	ETU 70 Hz	.
T1		s	1	1	1	1	
T2		s	0.4	0.4	0.4	0.4	
T3		s	0.5	0.5	0.5	0.5	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.							

Table A.7.3.3.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Antenna Configuration		1x2			2x2		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD			OP.2 TDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	4			1		
PDCCH_RB	dB	4			1		
PBCH_RA	dB	0			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 3]	dB						
OCNG_RB[Note 3]	dB						
SNR [Note 8]	dB	-5.1	-9.1	-13.1	-5.2	-9.2	-13.2
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		AWGN			AWGN		

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.3.1-1.

Table A.7.3.3.1-3: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 3 and # 4

Parameter	Unit	Test 3			Test 4		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		1x2 Low			2x2 Low		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in A.3.2.2 (TDD)		**OP.2 TDD**			**OP.2 TDD**		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	4			1		
PDCCH_RB	dB	4			1		
PBCH_RA	dB	**0**			**-3**		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 3]	dB						
OCNG_RB[Note 3]	dB						
SNR[Note 8]	dB	-1.4	-5.3	-11.3	-2.3	-5.9	-11.9
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			ETU 70 Hz		

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.3.1-1.

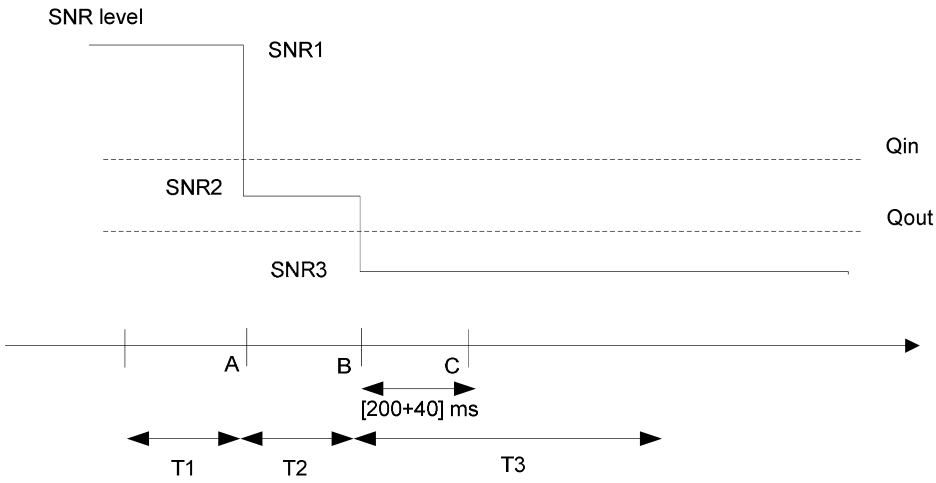


Figure A.7.3.3.1-1. SNR variation for out-of-sync testing

A.7.3.3.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.4 E-UTRAN TDD Radio Link Monitoring Test for In-sync

A.7.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.4.1-1 and A.7.3.4.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.4.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.4.1-1: General test parameters for E-UTRAN TDD in-sync testing

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			R.6 TDD	R.7 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF Channel Number			1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	
Correlation Matrix and Antenna Configuration			1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters (Note 1)	DCI format		1C	1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE		0	-3	
	Ratio of PCFICH to RS EPRE		4	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	
DRX			OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	2000	T310 is enabled

T311 timer	ms	1000	1000	T311 is enabled
Periodic CQI reporting mode		PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity	ms	1	1	Minimum CQI reporting periodicity
Propagation channel		ETU 70 Hz	ETU 70 Hz	
T1	s	0.5	0.5	
T2	s	0.4	0.4	
T3	s	1.46	1.46	
T4	s	0.4	0.4	
T5	s	1	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.4.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1					Test 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					1				
$BW_{channel}$	MHz	10					10				
Correlation Matrix and Antenna Configuration		1x2 Low					2x2 Low				
Special subframe configuration[Note1]		6					6				
Uplink-downlink configuration[Note2]		1					1				
OCNG Pattern defined in A.3.2.2 (TDD)		**OP.2 TDD**					**OP.2 TDD**				
ρ_A, ρ_B		0					-3				
PCFICH_RB	dB	4					1				
PDCCH_RA	dB	0					-3				
PDCCH_RB	dB	0					-3				
PBCH_RA	dB	**0**					**-3**				
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA[Note 3]	dB										
OCNG_RB[Note 3]	dB										

SNR [Note 8]	dB	-1.4	-5.3	-11.3	-6.4	-1.4	-2.3	-5.9	-11.9	-7.3	-2.3
N_{oc}	dBm/15 kHz	-98					-98				
Propagation condition		ETU 70 Hz					ETU 70 Hz				
Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211. Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211. Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1. Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1. Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs. Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.4.1-1.											

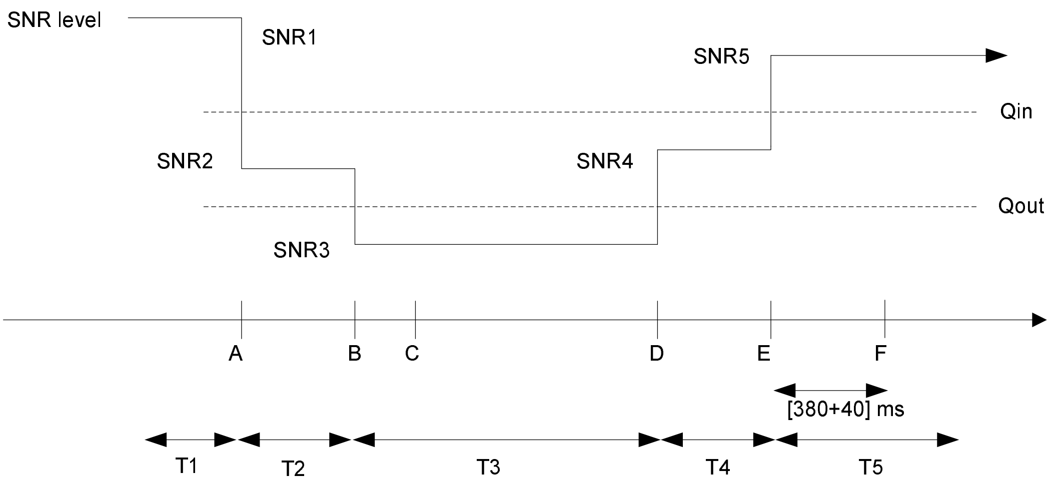


Figure A.7.3.4.1-1. SNR variation for in-sync testing

A.7.3.4.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.5 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

A.7.3.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.5.1-1, A.7.3.5.1-2, A.7.3.5.1-3 and A.7.3.5.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.5.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.5.1-1: General test parameters for E-UTRAN FDD out-of-sync tests in DRX

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Value</th><th rowspan="2">Comment</th></tr>
<tr><th>Test 1</th><th>Test 2</th></tr>
<tr><td colspan="2">PCFICH/PDCCH/PHICH parameters</td><td></td><td>R.7 FDD</td><td>R.6 FDD</td><td>As specified in clause A.3.1.2.1.
None of the PDCCH are intended for the UE under test</td></tr>
<tr><td colspan="2">OCNG parameters</td><td></td><td>OP.2 FDD</td><td>OP.2 FDD</td><td>As specified in clause A.3.2.1.2.</td></tr>
<tr><td colspan="2">Active cell</td><td></td><td>Cell 1</td><td>Cell 1</td><td>Cell 1 is on E-UTRA RF channel number 1</td></tr>
<tr><td colspan="2">CP length</td><td></td><td>Normal</td><td>Normal</td><td></td></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>1</td><td>One E-UTRA FDD carrier frequency is used.</td></tr>
<tr><td colspan="2">E-UTRA Channel Bandwidth (BWchannel)</td><td>MHz</td><td>10</td><td>10</td><td></td></tr>
<tr><td colspan="2">Correlation Matrix and Antenna Configuration</td><td></td><td>2x2 Low</td><td>1x2</td><td>Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2</td></tr>
<tr><td rowspan="6">Out of sync transmission parameters (Note 1)</td><td>DCI format</td><td></td><td>1A</td><td>1A</td><td>As defined in clause 5.3.3.1.3 in TS 36.212</td></tr>
<tr><td>Number of Control OFDM symbols</td><td></td><td>2</td><td>2</td><td rowspan="5">Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.</td></tr>
<tr><td>Aggregation level</td><td>CCE</td><td>8</td><td>8</td></tr>
<tr><td>ρA, ρB</td><td></td><td>-3</td><td>0</td></tr>
<tr><td>Ratio of PDCCH to RS EPRE</td><td>dB</td><td>1</td><td>4</td></tr>
<tr><td>Ratio of PCFICH to RS EPRE</td><td>dB</td><td>1</td><td>4</td></tr>
<tr><td colspan="2">DRX cycle</td><td>ms</td><td>40</td><td>1280</td><td>See Table A.7.3.5.1-3</td></tr>
<tr><td colspan="2">Layer 3 filtering</td><td></td><td>Enabled</td><td>Enabled</td><td>Counters:
N310 = 1; N311 = 1</td></tr>
<tr><td colspan="2">T310 timer</td><td>ms</td><td>0</td><td>0</td><td>T310 is disabled</td></tr>
<tr><td colspan="2">T311 timer</td><td>ms</td><td>1000</td><td>1000</td><td>T311 is enabled</td></tr>
<tr><td colspan="2">Periodic CQI reporting mode</td><td></td><td>PUCCH 1-0</td><td>PUCCH 1-0</td><td>As defined in table 7.2.2-1 in TS 36.213.</td></tr>
<tr><td colspan="2">CQI reporting periodicity</td><td>ms</td><td>2</td><td>2</td><td>Minimum CQI reporting periodicity</td></tr>
<tr><td colspan="2">Propagation channel</td><td></td><td>ETU 70 Hz</td><td>AWGN</td><td>.</td></tr>
<tr><td colspan="2">T1</td><td>s</td><td>4</td><td>32</td><td></td></tr>
<tr><td colspan="2">T2</td><td>s</td><td>1.6</td><td>12.8</td><td></td></tr>
<tr><td colspan="2">T3</td><td>s</td><td>1.8</td><td>13</td><td></td></tr>
<tr><td colspan="6">Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.</td></tr>
</table>

Table A.7.3.5.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2 in DRX

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x2 Low			1x2		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD			OP.2 FDD		
ρ_A, ρ_B		-3			0		
PCFICH_RB	dB	1			4		
PDCCH_RA	dB	1			4		
PDCCH_RB	dB	1			4		
PBCH_RA	dB	-3			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note1	dB						
OCNG_RB Note1	dB						
SNR Note 6	dB	-2.3	-6.2	-12.2	-4.7	-9.5	-13.5
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			AWGN		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.5.1-1.

Table A.7.3.5.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.7.3.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD out-of-sync testing

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	infinity	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

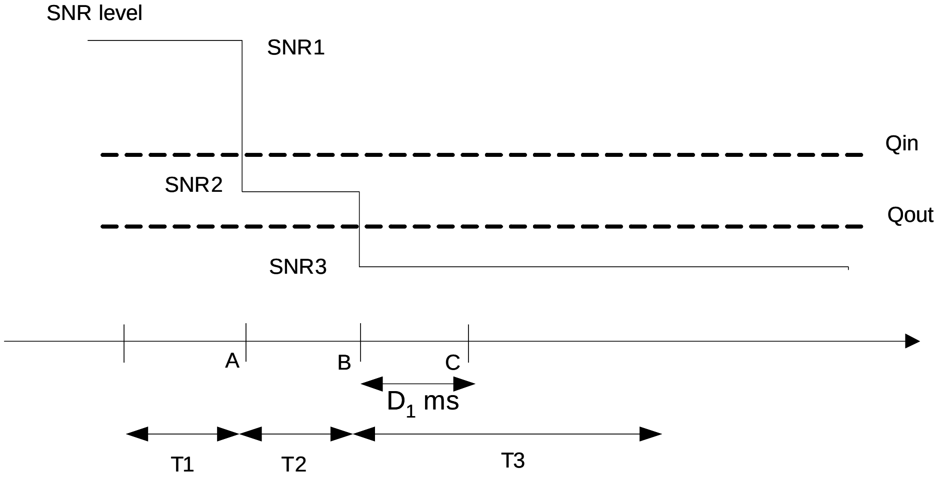


Figure A.7.3.5.1-1 SNR variation for out-of-sync testing in DRX

A.7.3.5.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In test 1 and test 2 during the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

In test 1 the UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 900 ms after the start of time duration T3).

In test 2 the UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 6500 ms after the start of time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.6 E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX

A.7.3.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.6.1-1, A.7.3.6.1-2, A.7.3.6.1-3 and A.7.3.6.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.6.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.6.1-1: General test parameters for E-UTRAN FDD in-sync test in DRX

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.6 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 FDD	As specified in clause A.3.2.1.2.
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
Antenna Configuration			1x2	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle		ms	40	See Table A.7.3.6.1-3
Layer 3 filtering			*Enabled*	*Counters: N310 = 1; N311 = 1*
T310 timer		*ms*	*2000*	*T310 is enabled*
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
Propagation channel			AWGN	
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.6.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring test # 1 in DRX

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
Antenna Configuration		1x2				
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD				
ρ_A, ρ_B		0				
PCFICH_RB	dB	4				
PDCCH_RA	dB	0				
PDCCH_RB	dB	0				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note1	dB					
OCNG_RB Note1	dB					
SNR Note 8	dB	-4.7	-9.5	-13.5	-8.7	-4.7
N_{oc}	dBm/15 kHz	-98				
Propagation condition		AWGN				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.6.1-1.

Table A.7.3.6.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.6.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD out-of-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

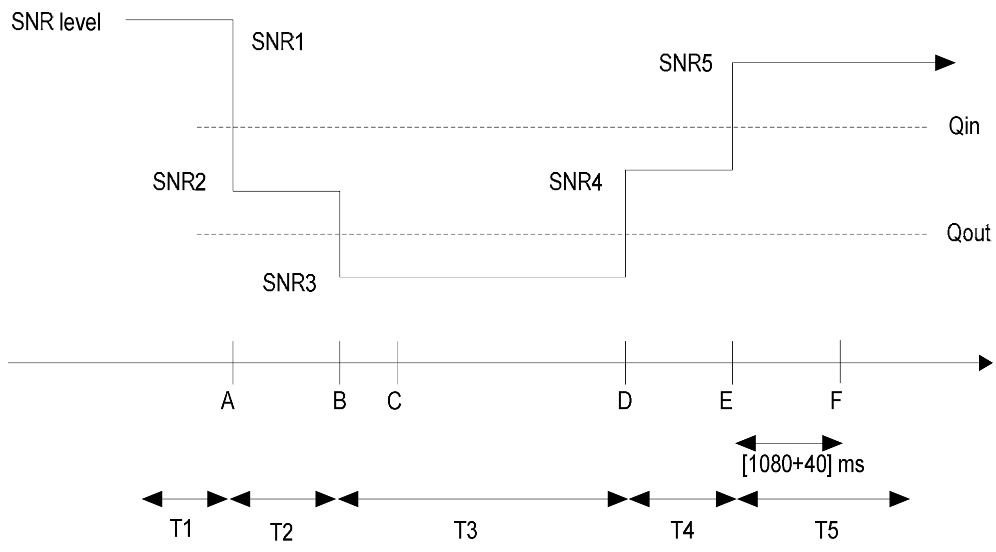


Figure A.7.3.6.1-1 SNR variation for in-sync testing in DRX

A.7.3.6.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.7 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

A.7.3.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.7.1-1, A.7.3.7.1-2, A.7.3.7.1-3 and A.7.3.7.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.7.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.7.1-1: General test parameters for E-UTRAN TDD out-of-sync tests in DRX

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			R.7 TDD	R.6 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF Channel Number			1	1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	10	
Correlation Matrix and Antenna Configuration			2x2 Low	1x2	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρA, ρB		-3	0	
	Ratio of PDCCH to RS EPRE	dB	1	4	
	Ratio of PCFICH to RS EPRE	dB	1	4	
DRX cycle		ms	40	1280	See Table A.7.3.7.1-3
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	T310 is disabled
T311 timer		ms	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	1	Minimum CQI reporting periodicity
Propagation channel			ETU 70 Hz	AWGN	.
T1		s	4	32	
T2		s	1.6	12.8	
T3		s	1.8	13	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.					

Table A.7.3.7.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2 in DRX

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x2 Low			1x2		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD			OP.2 TDD		
ρ_A, ρ_B		-3			0		
PCFICH_RB	dB	1			4		
PDCCH_RA	dB	1			4		
PDCCH_RB	dB	1			4		
PBCH_RA	dB	-3			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note3]	dB						
OCNG_RB[Note3]	dB						
SNR [Note 8]	dB	-2.3	-5.9	-11.9	-5.1	-9.1	-13.1
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			AWGN		

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.7.1-1.

Table A.7.3.7.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync tests

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.7.3.7.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD out-of-sync testing

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	infinity	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

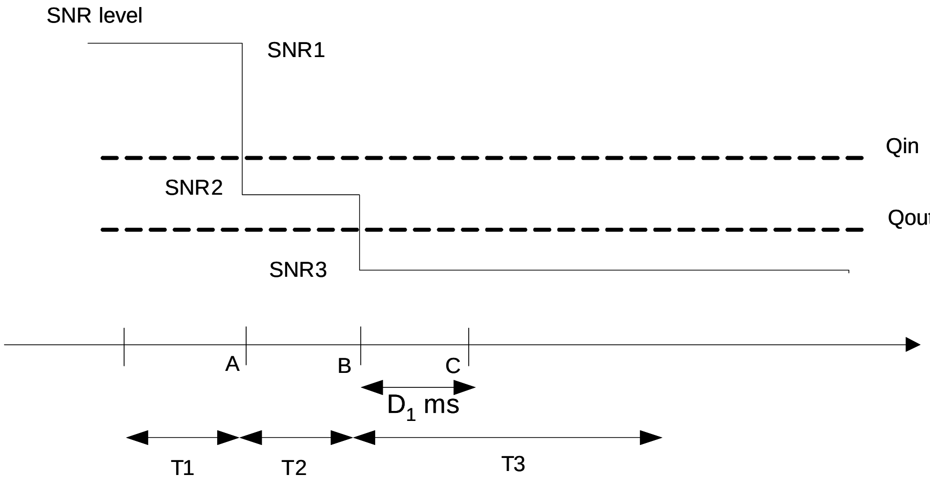


Figure A.7.3.7.1-1 SNR variation for out-of-sync testing in DRX

A.7.3.7.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In test 1 and test 2 during the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

In test 1 the UE shall stop transmitting uplink signal no later than time point C (D_1 = 900 ms after the start of time duration T3).

In test 2 the UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 6500 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.8 E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX

A.7.3.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.8.1-1, A.7.3.8.1-2, A.7.3.8.1-3 and A.7.3.8.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.8.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.8.1-1: General test parameters for E-UTRAN TDD in-sync test in DRX

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.6 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
Antenna Configuration			1x2	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle		ms	40	See Table A.7.3.8.1-3
Layer 3 filtering			*Enabled*	*Counters: N310 = 1; N311 = 1*
T310 timer		*ms*	*2000*	*T310 is enabled*
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
Propagation channel			AWGN	
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.8.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring test # 1 in DRX

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
Antenna Configuration		1x2				
Special subframe configuration[Note1]		6				
Uplink-downlink configuration[Note2]		1				
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD				
ρ_A, ρ_B		0				
PCFICH_RB	dB	4				
PDCCH_RA	dB	0				
PDCCH_RB	dB	0				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA[Note3]	dB					
OCNG_RB[Note3]	dB					
SNR [Note 8]	dB	-5.1	-9.1	-13.1	-9.1	-5.1
N_{oc}	dBm/15 kHz	-98				
Propagation condition		AWGN				

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.8.1-1.

Table A.7.3.8.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync tests

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.8.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD out-of-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

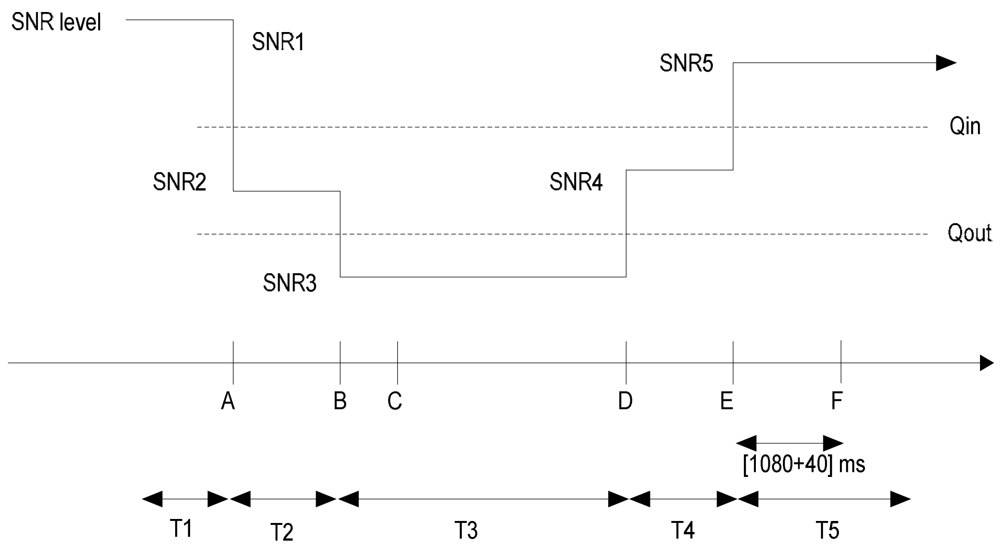


Figure A.7.3.8.1-1 SNR variation for in-sync testing in DRX

A.7.3.8.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.9 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction and Non-MBSFN ABS

A.7.3.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.9.1-1 and A.7.3.9.1-2 below. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.9.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in the aggressor Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.9.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS

<table>
<tr><th colspan="2">Parameter</th><th>Unit</th><th>Value</th><th>Comment</th></tr>
<tr><td colspan="2">PCFICH/PDCCH/PHICH parameters</td><td></td><td>R.9.FDD</td><td>As specified in clause A.3.1.2.1.
None of the PDCCH are intended for the UE under test</td></tr>
<tr><td colspan="2">OCNG parameters</td><td></td><td>OP.6 FDD</td><td>As specified in clause A.3.2.1.6.</td></tr>
<tr><td colspan="2">Serving cell (PCell)</td><td></td><td>Cell 1</td><td>Cell 1 is on E-UTRA RF channel number 1</td></tr>
<tr><td colspan="2">Neighbor cell</td><td></td><td>Cell 2</td><td>Aggressor cell on E-UTRA RF channel number 1</td></tr>
<tr><td colspan="2">Neighbor cell ABS configuration</td><td></td><td>Non-MBSFN ABS</td><td>As defined in Table A.3.4.1.2-1</td></tr>
<tr><td colspan="2">CP length</td><td></td><td>Normal</td><td></td></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>One E-UTRA FDD carrier frequency is used.</td></tr>
<tr><td colspan="2">E-UTRA Channel Bandwidth ($BW_{channel}$)</td><td>MHz</td><td>10</td><td></td></tr>
<tr><td colspan="2">Correlation Matrix and Antenna Configuration</td><td></td><td>2x2 Low</td><td>Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2</td></tr>
<tr><td rowspan="6">Out of sync transmission parameters (Note 1)</td><td>DCI format</td><td></td><td>1A</td><td>As defined in clause 5.3.3.1.3 in TS 36.212</td></tr>
<tr><td>Number of Control OFDM symbols</td><td></td><td>3</td><td rowspan="5">Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.</td></tr>
<tr><td>Aggregation level</td><td>CCE</td><td>8</td></tr>
<tr><td>ρ_A, ρ_B</td><td></td><td>-3</td></tr>
<tr><td>Ratio of PDCCH to RS EPRE</td><td>dB</td><td>1</td></tr>
<tr><td>Ratio of PCFICH to RS EPRE</td><td>dB</td><td>1</td></tr>
<tr><td colspan="2">DRX</td><td></td><td>OFF</td><td></td></tr>
<tr><td colspan="2">Layer 3 filtering</td><td></td><td>Enabled</td><td>Counters:: N310 = 1; N311 = 1</td></tr>
<tr><td colspan="2">T310 timer</td><td>ms</td><td>0</td><td>T310 is disabled</td></tr>
<tr><td colspan="2">T311 timer</td><td>ms</td><td>1000</td><td>T311 is enabled</td></tr>
<tr><td colspan="2">Periodic CQI reporting mode</td><td></td><td>PUCCH 1-0</td><td>As defined in table 7.2.2-1 in TS 36.213.</td></tr>
<tr><td colspan="2">CQI reporting periodicity</td><td>ms</td><td>2</td><td>Minimum CQI reporting periodicity</td></tr>
<tr><td colspan="2">Time offset between cells</td><td></td><td>3 μs</td><td>Synchronous cells</td></tr>
<tr><td colspan="2">T1</td><td>s</td><td>1</td><td></td></tr>
<tr><td colspan="2">T2</td><td>s</td><td>0.4</td><td></td></tr>
<tr><td colspan="2">T3</td><td>s</td><td>0.5</td><td></td></tr>
<tr><td colspan="2">Physical cell ID PCI</td><td></td><td>(PCI_{cell1}-PCI_{cell2})mod3 != 0</td><td>Cell IDs are chosen such that CRS from cells 1 and 2 do not overlap in frequency</td></tr>
<tr><td colspan="2">ABS pattern</td><td></td><td>'10000000100000001000 00001000000010000000'</td><td>FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.</td></tr>
<tr><td colspan="2">Time domain measurement resource restriction pattern</td><td></td><td>'10000000100000001000 00001000000010000000'</td><td>Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.</td></tr>
<tr><td colspan="5">Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel</td></tr>
</table>

Table A.7.3.9.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x2 Low			2x2 Low		
OCNG Pattern defined in A.3.2.1.6 (FDD)		OP.6 FDD			OP.6 FDD		
ρ_A, ρ_B		-3			-3		
PCFICH_RB	dB	1			Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-1.		
PDCCH_RA	dB	1					
PDCCH_RB	dB	1					
PBCH_RA	dB	-3					
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note1	dB						
OCNG_RB Note1	dB						
SNR Note 6	dB	-1.3	-5.4	-12.4	5		
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 30 Hz			ETU 30 Hz		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.
Note 6: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3. 9.1-1.

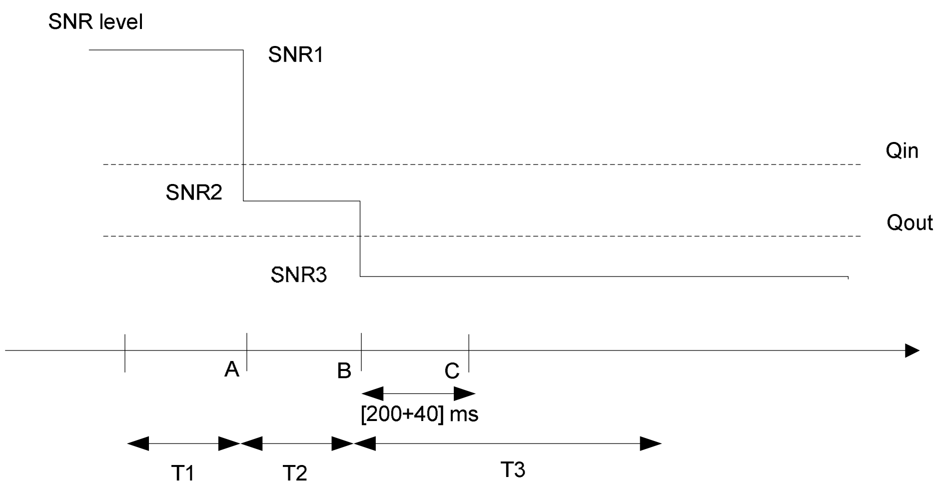


Figure A.7.3.9.1-1 SNR variation for out-of-sync testing

A.7.3.9.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.10 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

A.7.3.10.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.10.1-1 and A.7.3.10.1-2 below. There are two cells, cell 1 is the serving cell and cell 2 is the neigbhor aggressor cell. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.10.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Non-MBSFN ABS pattern is configured in Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.10.1-1: General test parameters for E-UTRAN TDD out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS

<table>
<tr><th colspan="2">Parameter</th><th>Unit</th><th>Value</th><th>Comment</th></tr>
<tr><td colspan="2">PCFICH/PDCCH/PHICH parameters</td><td></td><td>R.9 TDD</td><td>As specified in clause A.3.1.2.2.
None of the PDCCH are intended for the UE under test</td></tr>
<tr><td colspan="2">OCNG parameters</td><td></td><td>OP.2 TDD</td><td>As specified in clause A.3.2.2.2.</td></tr>
<tr><td colspan="2">Serving cell</td><td></td><td>Cell 1</td><td>Cell 1 is on E-UTRA RF channel number 1</td></tr>
<tr><td colspan="2">Neighbor cell</td><td></td><td>Cell 2</td><td>Cell 2 is the aggressor cell on E-UTRA RF channel number 1</td></tr>
<tr><td colspan="2">Neighbor cell ABS configuration</td><td></td><td>Non-MBSFN ABS</td><td>As defined in Table A.3.4.1.2-1</td></tr>
<tr><td colspan="2">CP length</td><td></td><td>Normal</td><td></td></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>One E-UTRA TDD carrier frequency is used.</td></tr>
<tr><td colspan="2">E-UTRA Channel Bandwidth ($BW_{channel}$)</td><td>MHz</td><td>10</td><td></td></tr>
<tr><td colspan="2">Correlation Matrix and Antenna Configuration</td><td></td><td>2x2 Low</td><td>Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2</td></tr>
<tr><td rowspan="6">Out of sync transmission parameters (Note 1)</td><td>DCI format</td><td></td><td>1A</td><td>As defined in clause 5.3.3.1.3 in TS 36.212</td></tr>
<tr><td>Number of Control OFDM symbols</td><td></td><td>3</td><td rowspan="5">Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.</td></tr>
<tr><td>Aggregation level</td><td>CCE</td><td>8</td></tr>
<tr><td>ρ_A, ρ_B</td><td></td><td>-3</td></tr>
<tr><td>Ratio of PDCCH to RS EPRE</td><td>dB</td><td>1</td></tr>
<tr><td>Ratio of PCFICH to RS EPRE</td><td>dB</td><td>1</td></tr>
<tr><td colspan="2">Physical cell ID PCI</td><td></td><td>(PCI_{cell1}-PCI_{cell2})mod3 != 0</td><td>Cell IDs are chosen such that CRS from cells 1 and 2 do not overalp in frequency.</td></tr>
<tr><td colspan="2">ABS pattern</td><td></td><td>10000000001000000000</td><td>TDD ABS Pattern Info IE is configured in Cell 2 as defined in clause 9.2.54 in TS 36.423 [28].
The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10.
No MBSFN subframes are cofigured in the ABS subframes.</td></tr>
<tr><td colspan="2">Time domain measurement resource restriction pattern</td><td></td><td>10000000001000000000</td><td>MeasSubframePattern IE is configured in UE for serving cell measurement as defined in clause 6.3.6 in TS 36.331.</td></tr>
<tr><td colspan="2">DRX</td><td></td><td>OFF</td><td></td></tr>
<tr><td colspan="2">Layer 3 filtering</td><td></td><td>Enabled</td><td>Counters:
N310 = 1; N311 = 1</td></tr>
<tr><td colspan="2">T310 timer</td><td>ms</td><td>0</td><td>T310 is disabled</td></tr>
<tr><td colspan="2">T311 timer</td><td>ms</td><td>1000</td><td>T311 is enabled</td></tr>
<tr><td colspan="2">Periodic CQI reporting mode</td><td></td><td>PUCCH 1-0</td><td>As defined in table 7.2.2-1 in TS 36.213.</td></tr>
<tr><td colspan="2">CQI reporting periodicity</td><td>ms</td><td>1</td><td>Minimum CQI reporting periodicity</td></tr>
<tr><td colspan="2">Time offset between cells</td><td>μs</td><td>3</td><td></td></tr>
<tr><td colspan="2">Propagation channel</td><td></td><td>ETU30</td><td></td></tr>
<tr><td colspan="2">T1</td><td>s</td><td>1</td><td></td></tr>
<tr><td colspan="2">T2</td><td>s</td><td>0.4</td><td></td></tr>
<tr><td colspan="2">T3</td><td>s</td><td>0.5</td><td></td></tr>
<tr><td colspan="5">Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.</td></tr>
</table>

Table A.7.3.10.1-2: Cell specific test parameters for E-UTRAN TDD for out-of-sync radio link monitoring under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x2 Low			2x2 Low		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD			OP.2 TDD		
ρ_A, ρ_B		-3			-3		
PCFICH_RB	dB	1			Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-1.		
PDCCH_RA	dB	1					
PDCCH_RB	dB	1					
PBCH_RA	dB	-3					
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 3]	dB						
OCNG_RB[Note 3]	dB						
SNR [Note 8]	dB	-1.3	-5.4	-12.4	5		
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU30			ETU30		

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2 and T3 of active cell is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.10.1-1.

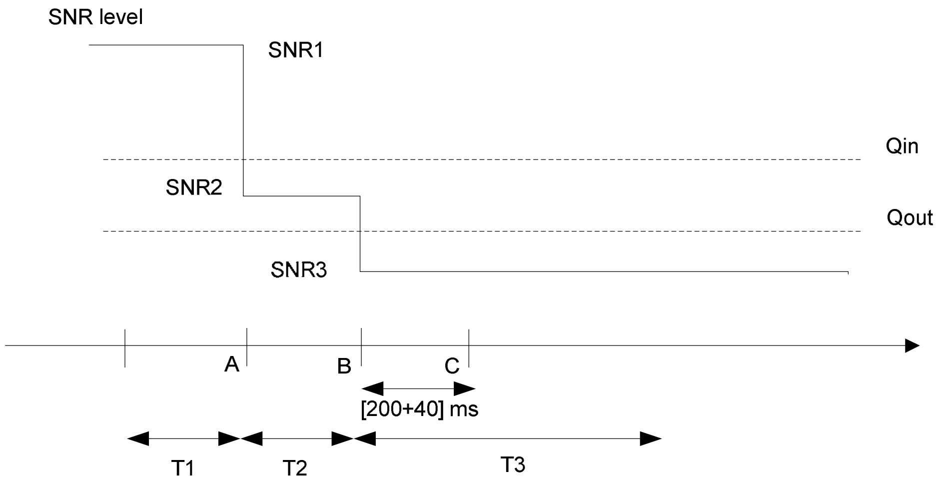


Figure A.7.3.10.1-1 SNR variation in active cell for out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS

A.7.3.10.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.11 E-UTRAN FDD Radio Link Monitoring Test for In-sync for Non-MBSFN ABS

A.7.3.11.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.11.1-1 and A.7.3.11.1-2 below. There are two cells in the test: Cell 1 is the Active cell and Cell 2 is the Neighbor cell. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.11.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.11.1-1: General test parameters for E-UTRAN FDD in-sync testing under time domain measurement resource restriction

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.9 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.6 FDD	As specified in clause A.3.2.1.6.
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cell			Cell 2	Cell 2 is on E-UTRA RF channel number 1; Cell 2 generates interference over restricted resources.
Neighbor cell ABS configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.2-2
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters for the active cell (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	-3	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters for active cell (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
Time offset between cells		μs	3	
Propagation channel			ETU30	
T1		s	0.5	
T2		s	0.4	

T3	s	1.46	
T4	s	0.4	
T5	s	1	
Physical cell ID PCI		$(PCI_{cell1}-PCI_{cell2})mod3 \neq 0$	Cell IDs are chosen such that CRS from cells 1 and 2 do not overalp in frequency
ABS pattern		'1000000010000000100000001000000010000000'	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.
Time domain measurement resource restriction pattern		'1000000010000000100000001000000010000000'	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.			

Table A.7.3.11.1-2: Cell specific test parameters for E-UTRAN FDD for in-sync radio link monitoring under time domain measurement resource restriction

Parameter	Unit	Cell 1					Cell 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					1				
$BW_{channel}$	MHz	10					10				
Correlation Matrix and Antenna Configuration		2x2 Low					2x2 Low				
PCFICH/PDCCH/PHICH parameters		R.9 FDD					R.9 FDD				
Number of Control OFDM symbols		3					3				
OCNG Pattern defined in A.3.2.1.6 (FDD)		OP.6 FDD					OP.6 FDD				
ρ_A, ρ_B		-3					-3				
PCFICH_RB	dB	1					Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.				
PDCCH_RA	dB	-3									
PDCCH_RB	dB	-3									
PBCH_RA	dB	-3									
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA Note 1	dB										
OCNG_RB Note 1	dB										
SNR Note 6	dB	-1.3	-5.4	-12.4	-7.3	-1.3	5				
N_{oc}	dBm/15 kHz	-98					-98				
Propagation condition		ETU30					ETU30				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 of the active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.11.1-1.

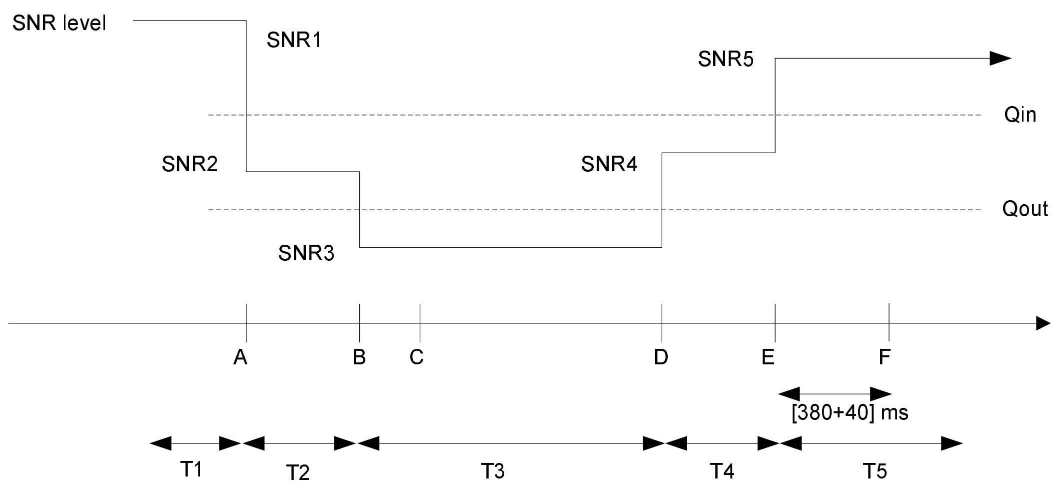


Figure A.7.3.11.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction

A.7.3.11.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.12 E-UTRAN TDD Radio Link Monitoring Test for In-sync for Non-MBSFN ABS

A.7.3.12.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.12.1-1 and A.7.3.12.1-2 below. There are two cells in the test: Cell 1 is the Active cell and Cell 2 is the Neighbor cell. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.12.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Non-MBSFN ABS pattern is configured in the aggressor Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.12.1-1: General test parameters for E-UTRAN TDD in-sync testing under time domain measurement resource restriction

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.9 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	As specified in clause A.3.2.2.2.
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cell			Cell 2	Cell 2 is on E-UTRA RF channel number 1; Cell 2 generates interference over restricted resources.
Neighbor cell ABS configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.2-2
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters for the active cell (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	-3	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters for active cell (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
Time offset between cells		μs	3	
Propagation channel			ETU30	

T1	s	0.5	
T2	s	0.4	
T3	s	1.46	
T4	s	0.4	
T5	s	1	
Physical cell ID PCI		$(PCI_{cell1}-PCI_{cell2})mod3 \mathrel{!=} 0$	Cell IDs are chosen such that CRS from cells 1 and 2 do not overalp in frequency
ABS pattern		1000000000 1000000000	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.
Time domain measurement resource restriction pattern		1000000000 1000000000	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2. Configured in Cell 1.
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.			

Table A.7.3.12.1-2: Cell specific test parameters for E-UTRAN TDD for in-sync radio link monitoring under time domain measurement resource restriction

Parameter	Unit	Cell 1					Cell 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					1				
$BW_{channel}$	MHz	10					10				
Correlation Matrix and Antenna Configuration		2x2 Low					2x2 Low				
Special subframe configuration[Note1]		6					6				
Uplink-downlink configuration[Note2]		1					1				
PCFICH/PDCCH/PHICH parameters		R.9 TDD					R.9 TDD				
Number of Control OFDM symbols		3					3				
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD					OP.2 TDD				
ρ_A, ρ_B		-3					-3				
PCFICH_RB	dB	1					Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.				
PDCCH_RA	dB	-3									
PDCCH_RB	dB	-3									
PBCH_RA	dB	-3									
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA[Note 3]	dB										
OCNG_RB[Note 3]	dB										
SNR [Note 8]	dB	-1.3	-5.4	-12.4	-7.3	-1.3	5				
N_{oc}	dBm/15 kHz	-98					-98				
Propagation condition		ETU30					ETU30				

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2, T3, T4 and T5 of active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.12.1-1.

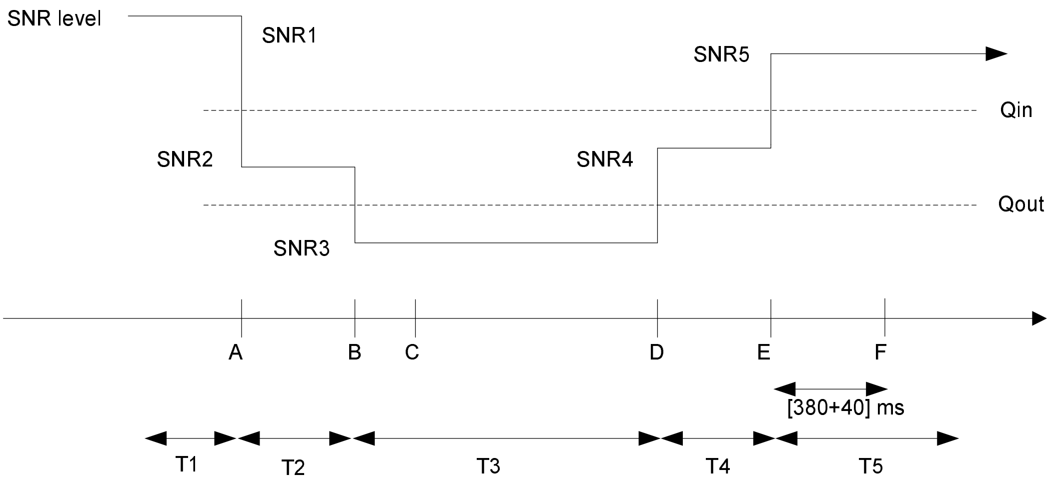


Figure A.7.3.12.1-1 SNR variation in active cell for in-sync testing under time domain measurement resource restriction

A.7.3.12.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.13 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with MBSFN ABS

A.7.3.13.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.13.1-1 and A.7.3.13.1-2 below. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.13.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in the aggressor Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.13.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under time domain measurement resource restriction with MBSFN ABS

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.9.FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.6 FDD for the serving cell (Cell 1) OP.9 FDD for the neighbour cell (Cell 2)	As specified in clause A.3.2.1.6 and A.3.2.1.9 respectively
Serving cell (PCell)			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cell			Cell 2	Aggressor cell on E-UTRA RF channel number 1
Neighbor cell ABS configuration			MBSFN ABS	As defined in Table A.3.4.2.2-1
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		3	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters:: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
Time offset between cells			3 μs	Synchronous cells
T1		s	1	
T2		s	0.4	
T3		s	0.5	
Physical cell ID PCI			(PCI_{cell1}-PCI_{cell2}) mod 3 = 0, PCI_{cell1} not equal to PCI_{cell2}	Cell IDs are chosen such that CRS from cells 1 and 2 overlap in frequency
ABS pattern			'0100000010000000100000000010000001000000'	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are cofigured in the ABS subframes.
Time domain measurement resource restriction pattern			'0100000010000000100000000010000001000000'	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePattern-Serv-r10 as defined in TS 36.331, clause 6.3.2.
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel				

Table A.7.3.13.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x2 Low			2x2 Low		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.6 FDD			OP.9 FDD		
ρ_A, ρ_B		-3			-3		
PCFICH_RB	dB	1			Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.2-1.		
PDCCH_RA	dB	1					
PDCCH_RB	dB	1					
PBCH_RA	dB	-3					
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note1]	dB						
OCNG_RB[Note1]	dB						
SNR [Note 6]	dB	-1.3	-5.4	-12.4	5		
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 30 Hz			ETU 30 Hz		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.
Note 6: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.13.1-1.

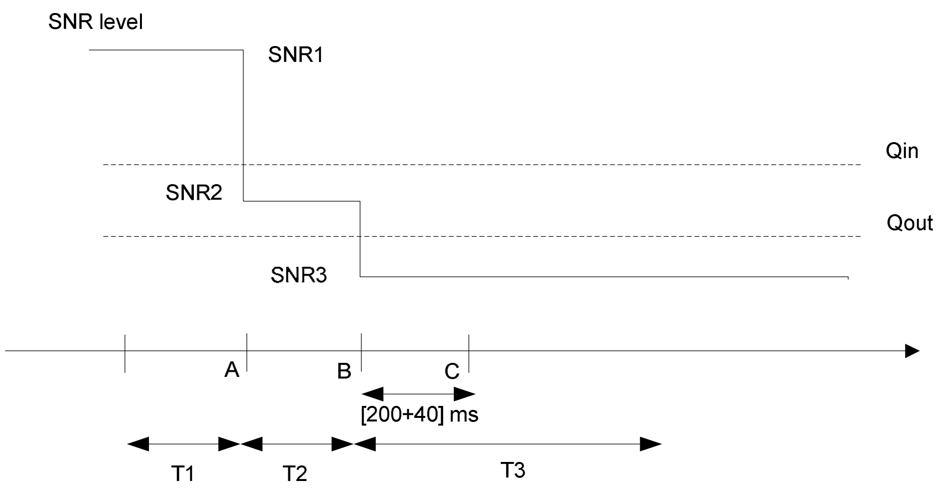


Figure A.7.3.13.1-1 SNR variation for out-of-sync testing

A.7.3.13.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.14 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with MBSFN ABS

A.7.3.14.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.14.1-1 and A.7.3.14.1-2 below. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.14.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in the aggressor Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.14.1-1: General test parameters for E-UTRAN TDD out-of-sync testing under time domain measurement resource restriction with MBSFN ABS

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.9.TDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD for the serving cell (Cell 1) OP.6 TDD for the neighbour cell (Cell 2)	As specified in clause A.3.2.2.2 and A.3.2.2.6 respectively
Serving cell (PCell)			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cell			Cell 2	Aggressor cell on E-UTRA RF channel number 1
Neighbor cell ABS configuration			MBSFN ABS	As defined in Table A.3.4.2.2-1
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		3	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters:: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
Time offset between cells			3 μs	Synchronous cells
T1		s	1	
T2		s	0.4	
T3		s	0.5	
Physical cell ID PCI			(PCI_{cell1}-PCI_{cell2}) mod 3 = 0, PCI_{cell1} not equal to PCI_{cell2}	Cell IDs are chosen such that CRS from cells 1 and 2 overlap in frequency
ABS pattern			'00001000000000100000'	MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. All ABS subframes are MBSFN subframes.
Time domain measurement resource restriction pattern			'00001000000000100000'	Time-domain measurement resource restriction pattern for serving cell measurements signalled to the UE in message measSubframePattern-Serv-r10 as defined in TS 36.331, clause 6.3.2.
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel				

Table A.7.3.14.1-2: Cell specific test parameters for E-UTRAN TDD for out-of-sync radio link monitoring under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
Correlation Matrix and Antenna Configuration		2x2 Low			2x2 Low		
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD			OP.6 TDD		
ρ_A, ρ_B		-3			-3		
PCFICH_RB	dB	1			Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.2-1.		
PDCCH_RA	dB	1					
PDCCH_RB	dB	1					
PBCH_RA	dB	-3					
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note3]	dB						
OCNG_RB[Note3]	dB						
SNR [Note 7,8]	dB	-1.3	-5.4	-12.4	5		
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 30 Hz			ETU 30 Hz		

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink subframe configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.
Note 8: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.7.3.14.1-1.

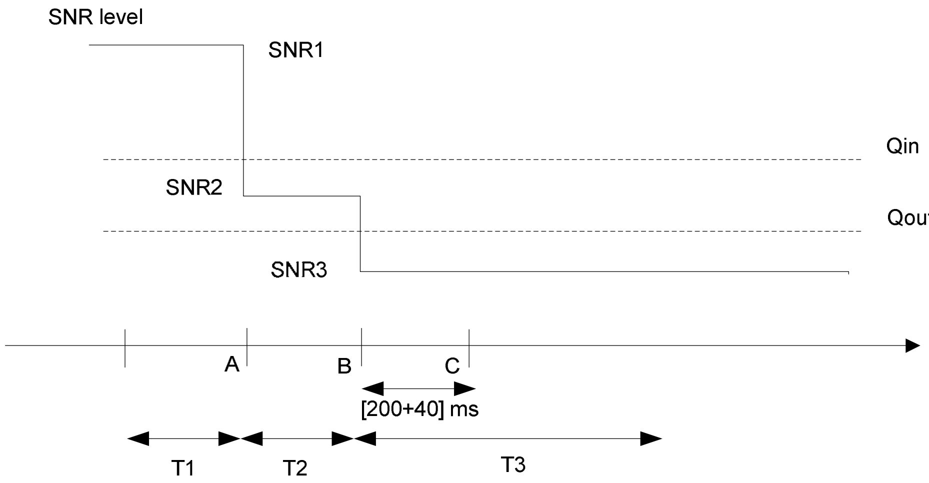


Figure A.7.3.14.1-1 SNR variation for out-of-sync testing

A.7.3.14.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.15 E-UTRAN FDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resource Restriction with MBSFN ABS

A.7.3.15.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.15.1-1 and A.7.3.15.1-2 below. There are two cells, cell 1 is the serving cell and cell 2 is the neighbour aggressor cell. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.15.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.15.1-1: General test parameters for E-UTRAN FDD in-sync testing under time domain measurement resource restriction with MBSFN ABS

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.9 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
Serving cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbour cell			Cell 2	Cell 2 is the aggressor cell on E-UTRA RF channel number 1
Neighbour cell ABS configuration			MBSFN ABS	As defined in Table A.3.4.2.2-2
OCNG parameters for Cell 1			OP.6 FDD	As specified in clause A.3.2.1.6.
OCNG parameters for Cell 2			OP.9 FDD	As specified in clause A.3.2.1.9.
CP length			Normal	
Neighbor cell ABS configuration			MBSFN ABS	
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	-3	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
Physical cell ID PCI			(PCI_{cell1}-PCI_{cell2}) mod 3 = 0, PCIcell1 not equal to PCIcell2	Cell IDs are chosen such that CRS from cells 1 and 2 overlap in frequency.
ABS pattern			0100000010000000100000000010000001000000	FDD ABS Pattern Info IE is configured in Cell 2 as defined in clause 9.2.54 in TS 36.423 [28]. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. All ABS subframes are MBSFN subframes.
Time domain measurement			010000001000000010000	MeasSubframePattern IE is

resource restriction pattern		0000010000001000000	configured in UE for serving cell measurement as defined in clause 6.3.6 in TS 36.331.
DRX		OFF	
Layer 3 filtering		Enabled	Counters: N310 = 1; N311 = 1
T310 timer	ms	2000	T310 is enabled
T311 timer	ms	1000	T311 is enabled
Periodic CQI reporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity	ms	2	Minimum CQI reporting periodicity
Time offset between cells	μs	3	
Propagation channel		ETU30	
T1	s	0.5	
T2	s	0.4	
T3	s	1.46	
T4	s	0.4	
T5	s	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.			

Table A.7.3.15.1-2: Cell specific test parameters for E-UTRAN FDD for in-sync radio link monitoring under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Cell 1					Cell 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					1				
$BW_{channel}$	MHz	10					10				
Correlation Matrix and Antenna Configuration		2x2 Low					2x2 Low				
OCNG Pattern defined in A.3.2.1 (FDD)		OP.6 FDD					OP.9 FDD				
ρ_A, ρ_B		-3					-3				
PCFICH_RB	dB	1					Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.2-2.				
PDCCH_RA	dB	-3									
PDCCH_RB	dB	-3									
PBCH_RA	dB	-3									
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA Note 1	dB										
OCNG_RB Note 1	dB										
SNR Note 6	dB	-1.3	-5.4	-12.4	-7.3	-1.3	5				
N_{oc}	dBm/15 kHz	-98					-98				
Propagation condition		ETU30					ETU30				
Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1. Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1. Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs. Note 6: The SNR in time periods T1, T2, T3, T4 and T5 of the active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.15.1-1.											

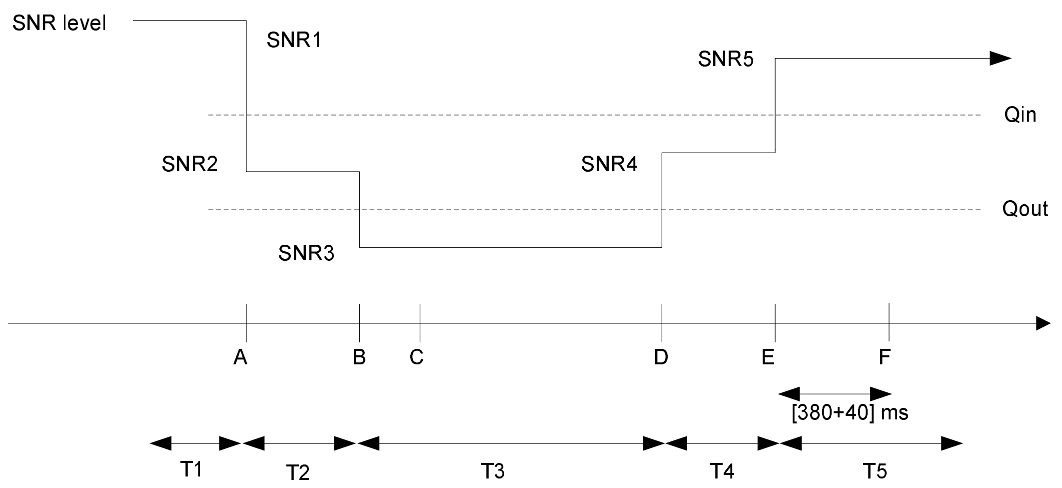


Figure A.7.3.15.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction with MBSFN ABS

A.7.3.15.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.16 E-UTRAN TDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resource Restriction with MBSFN ABS

A.7.3.16.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction when CRS assistance information is not provided. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.16.1-1 and A.7.3.16.1-2 below. There are two cells, cell 1 is the serving cell and cell 2 is the neighbour aggressor cell. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.15.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

MBSFN ABS pattern is configured in Cell 2 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing serving cell measurements. The patterns shall be configured prior to the start of T1.

Table A.7.3.16.1-1: General test parameters for E-UTRAN TDD in-sync testing under time domain measurement resource restriction with MBSFN ABS

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.9 TDD	As specified in clause A.3.1.2.2. None of the PDCCH are intended for the UE under test
Serving cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbour cell			Cell 2	Cell 2 is the aggressor cell on E-UTRA RF channel number 1
Neighbour cell ABS configuration			MBSFN ABS	As defined in Table A.3.4.2.2-2
OCNG parameters for Cell 1			OP.2 TDD	As specified in clause A.3.2.2.2.
OCNG parameters for Cell 2			OP.6 TDD	As specified in clause A.3.2.2.6.
CP length			Normal	
Neighbor cell ABS configuration			MBSFN ABS	
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	-3	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
Physical cell ID PCI			$(PCI_{cell1}-PCI_{cell2})$ mod 3 = 0, PCIcell1 not equal to PCIcell2	Cell IDs are chosen such that CRS from cells 1 and 2 overlap in frequency.
ABS pattern			00001000000000100000	TDD ABS Pattern Info IE is configured in Cell 2 as defined in clause 9.2.54 in TS 36.423 [28]. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. All ABS subframes are MBSFN subframes.
Time domain measurement			00001000000000100000	MeasSubframePattern IE is

resource restriction pattern			configured in UE for serving cell measurement as defined in clause 6.3.6 in TS 36.331.
DRX		OFF	
Layer 3 filtering		Enabled	Counters: N310 = 1; N311 = 1
T310 timer	ms	2000	T310 is enabled
T311 timer	ms	1000	T311 is enabled
Periodic CQI reporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity	ms	1	Minimum CQI reporting periodicity
Time offset between cells	μs	3	
Propagation channel		ETU30	
T1	s	0.5	
T2	s	0.4	
T3	s	1.46	
T4	s	0.4	
T5	s	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.			

Table A.7.3.16.1-2: Cell specific test parameters for E-UTRAN TDD for in-sync radio link monitoring under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Cell 1					Cell 2				
		T1	**T2**	**T3**	**T4**	**T5**	**T1**	**T2**	**T3**	**T4**	**T5**
E-UTRA RF Channel Number		1					1				
$BW_{channel}$	MHz	10					10				
Correlation Matrix and Antenna Configuration		2x2 Low					2x2 Low				
Special subframe configuration[Note1]		6					6				
Uplink-downlink configuration[Note2]		1					1				
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD					OP.6 TDD				
ρ_A, ρ_B		-3					-3				
PCFICH_RB	dB	1					Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.2-2.				
PDCCH_RA	dB	-3									
PDCCH_RB	dB	-3									
PBCH_RA	dB	-3									
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA[Note 1]	dB										
OCNG_RB[Note 1]	dB										
SNR [Note 8]	dB	-1.3	-5.4	-12.4	-7.3	-1.3	5				
N_{oc}	dBm/15 kHz	-98					-98				
Propagation condition		ETU30					ETU30				

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2, T3, T4 and T5 of the active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.16.1-1.

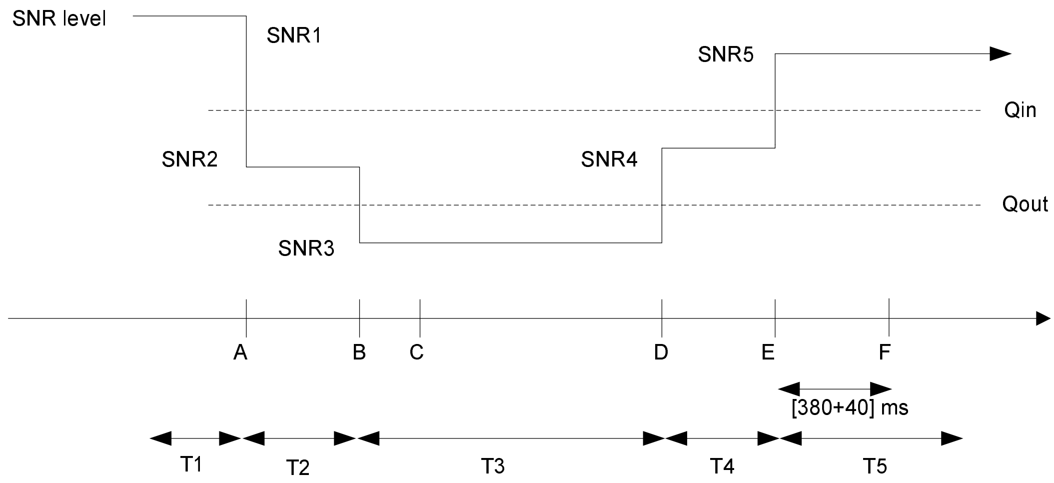


Figure A.7.3.16.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction with MBSFN ABS

A.7.3.16.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.17 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.7.3.17.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.17.1-1 and A.7.3.17.1-2 below. There are three active cells in the test: Cell 1 is the PCell cell and Cell 2 and 3 are the neighbour cells. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.17.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing Pcell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2 and T3 in this test. The non-MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.17.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under time domain measurement resource restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.7 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.6 FDD	As specified in section A.3.2.1.6.
PCell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbor cells			Cell 2 and Cell 3	Both of aggressor cells on E-UTRA RF channel number 1
Neighbor cell ABS configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.2-1
CP length			Normal	
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters:: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
Time offset between cells		µs	Cell 2 time offset with respect to Cell 1: 3 Cell 3 time offset with respect to Cell 1: 2	Three synchronous cells
Frequency shift between cells		Hz	Cell 2 frequency shift with respect to Cell 1: 300 Cell 3 frequency shift with respect to Cell 1: -100	
T1		s	1	
T2		s	0.4	
T3		s	0.5	
Physical cell IDs			$(PCI_{cell1}-PCI_{cell2})$mod3 = 0 $(PCI_{cell1}-PCI_{cell3})$mod3!= 0 PCI_{cell1} not equal to PCI_{cell2}	Cell PCIs are selected so that all conditions are met
ABS pattern			'1000000010000000100000001000000010000000'	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes. Configured in both Cell 2 and Cell 3 prior to the start of T1.

Time domain measurement resource restriction pattern			'10000000100000001000 00001000000010000000'	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.
CRS assistance information	physCellId		see PCI conditions above	The CRS assistance information is provided for Cell 2 and Cell 3 in *CRS-AssistanceInfo*. It includes a single *MBSFN-SubframeConfig* element with subframe allocation *oneFrame*='000000'
	antennaPortsCount		an2	
	mbsfn-SubframeConfigList		*oneFrame* = '000000'	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel				

Table A.7.3.17.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring under time domain measurement resource restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter	Unit	Cell 1			Cell 2	Cell 3
		T1	T2	T3	T1-T3	T1-T3
E-UTRA RF Channel Number		1			1	1
$BW_{channel}$	MHz	10			10	10
Correlation Matrix and Antenna Configuration		2x2 Low			2x2 Low	2x2 Low
OCNG Pattern defined in A.3.2.1.6 (FDD)		OP.6 FDD			OP.6 FDD	OP.6 FDD
ρ_A, ρ_B		-3			-3	-3
PCFICH_RB	dB	1			Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-1.	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-1.
PDCCH_RA	dB	1				
PDCCH_RB	dB	1				
PBCH_RA	dB	-3				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA[Note1]	dB					
OCNG_RB[Note1]	dB					
SNR [Note 6]	dB	-1.5	-5.2	-13.7	4	2
N_{oc}	dBm/15 kHz	-98			-98	-98
Propagation condition		ETU 30 Hz			ETU 30 Hz	ETU 30 Hz
Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1. Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1. Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 5: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs. Note 6: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.17.1-1.						

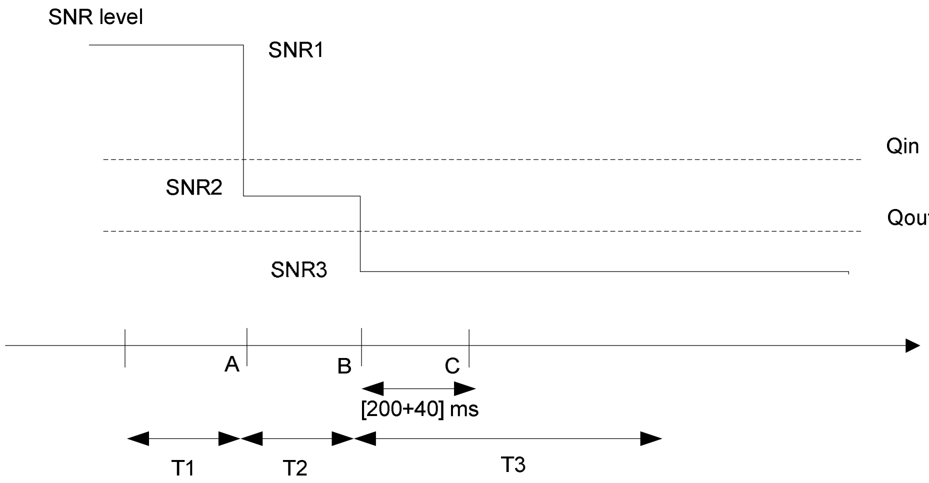


Figure A.7.3.17.1-1 SNR variation for out-of-sync testing

A.7.3.17.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.18 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.7.3.18.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.18.1-1 and A.7.3.18.1-2 below. There are three active cells in the test: Cell 1 is the PCell cell and Cell 2 and 3 are the neighbour cells. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.18.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing Pcell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2 and T3 in this test. The non-MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.18.1-1: General test parameters for E-UTRAN TDD out-of-sync testing under time domain measurement resource restriction with CRS Assistance Information and Non-MBSFN ABS

<table>
<tr><th colspan="2">Parameter</th><th>Unit</th><th>Value</th><th>Comment</th></tr>
<tr><td colspan="2">PCFICH/PDCCH/PHICH parameters</td><td></td><td>R.7.TDD</td><td>As specified in clause A.3.1.2.2.
None of the PDCCH are intended for the UE under test</td></tr>
<tr><td colspan="2">OCNG parameters</td><td></td><td>OP.2 TDD</td><td>As specified in clause A.3.2.2.2</td></tr>
<tr><td colspan="2">PCell</td><td></td><td>Cell 1</td><td>Cell 1 is on E-UTRA RF channel number 1</td></tr>
<tr><td colspan="2">Neighbor cells</td><td></td><td>Cell 2 and Cell 3</td><td>Both of aggressor cells on E-UTRA RF channel number 1</td></tr>
<tr><td colspan="2">Neighbor cell ABS configuration</td><td></td><td>Non-MBSFN ABS</td><td>As defined in Table A.3.4.1.2-1</td></tr>
<tr><td colspan="2">CP length</td><td></td><td>Normal</td><td></td></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>One E-UTRA TDD carrier frequency is used.</td></tr>
<tr><td colspan="2">E-UTRA Channel Bandwidth ($BW_{channel}$)</td><td>MHz</td><td>10</td><td></td></tr>
<tr><td colspan="2">Correlation Matrix and Antenna Configuration</td><td></td><td>2x2 Low</td><td>Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2</td></tr>
<tr><td rowspan="6">Out of sync transmission parameters (Note 1)</td><td>DCI format</td><td></td><td>1A</td><td>As defined in clause 5.3.3.1.3 in TS 36.212</td></tr>
<tr><td>Number of Control OFDM symbols</td><td></td><td>2</td><td rowspan="5">Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.</td></tr>
<tr><td>Aggregation level</td><td>CCE</td><td>8</td></tr>
<tr><td>ρ_A, ρ_B</td><td></td><td>-3</td></tr>
<tr><td>Ratio of PDCCH to RS EPRE</td><td>dB</td><td>1</td></tr>
<tr><td>Ratio of PCFICH to RS EPRE</td><td>dB</td><td>1</td></tr>
<tr><td colspan="2">DRX</td><td></td><td>OFF</td><td></td></tr>
<tr><td colspan="2">Layer 3 filtering</td><td></td><td>Enabled</td><td>Counters:: N310 = 1; N311 = 1</td></tr>
<tr><td colspan="2">T310 timer</td><td>ms</td><td>0</td><td>T310 is disabled</td></tr>
<tr><td colspan="2">T311 timer</td><td>ms</td><td>1000</td><td>T311 is enabled</td></tr>
<tr><td colspan="2">Periodic CQI reporting mode</td><td></td><td>PUCCH 1-0</td><td>As defined in table 7.2.2-1 in TS 36.213.</td></tr>
<tr><td colspan="2">CQI reporting periodicity</td><td>ms</td><td>1</td><td>Minimum CQI reporting periodicity</td></tr>
<tr><td colspan="2">Time offset between cells</td><td>μs</td><td>Cell 2 time offset with respect to Cell 1: 3
Cell 3 time offset with respect to Cell 1: 2</td><td>Three synchronous cells</td></tr>
<tr><td colspan="2">Frequency shift between cells</td><td>Hz</td><td>Cell 2 frequency shift with respect to Cell 1: 300
Cell 3 frequency shift with respect to Cell 1: -100</td><td></td></tr>
<tr><td colspan="2">T1</td><td>s</td><td>1</td><td></td></tr>
<tr><td colspan="2">T2</td><td>s</td><td>0.4</td><td></td></tr>
<tr><td colspan="2">T3</td><td>s</td><td>0.5</td><td></td></tr>
<tr><td colspan="2">Physical cell IDs</td><td></td><td>$(PCI_{cell1}-PCI_{cell2})mod3 = 0$
$(PCI_{cell1}-PCI_{cell3})mod3 != 0$
PCI_{cell1} not equal to PCI_{cell2}</td><td>Cell PCIs are selected so that all conditions are met</td></tr>
<tr><td colspan="2">ABS pattern</td><td></td><td>'00001000000000100000'</td><td>TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the PCell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes.
Configured in both Cell 2 and Cell 3 prior to the start of T1.</td></tr>
</table>

Time domain measurement resource restriction pattern			'00001000000000100000'	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.
CRS assistance information	physCellId		see PCI conditions above	The CRS assistance information is provided for Cell 2 only in *CRS-AssistanceInfo*. It includes a single *MBSFN-SubframeConfig* element with subframe allocation *oneFrame*='000000'
	antennaPortsCount		an2	
	mbsfn-SubframeConfigList		*oneFrame* = '000000'	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel				

Table A.7.3.18.1-2: Cell specific test parameters for E-UTRAN TDD for out-of-sync radio link monitoring under time domain measurement resource restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter	Unit	Cell 1			Cell 2	Cell 3
		T1	T2	T3	T1-T3	T1-T3
E-UTRA RF Channel Number		1			1	1
$BW_{channel}$	MHz	10			10	10
Special subframe configuration[Note1]		6			6	6
Uplink-downlink configuration[Note2]		1			1	1
Correlation Matrix and Antenna Configuration		2x2 Low			2x2 Low	2x2 Low
OCNG Pattern defined in A.3.2.2.2 (TDD)		OP.2 TDD			OP.2 TDD	OP.2 TDD
ρ_A, ρ_B		-3			-3	-3
PCFICH_RB	dB	1			Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-1.	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-1.
PDCCH_RA	dB	1				
PDCCH_RB	dB	1				
PBCH_RA	dB	-3				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA[Note1]	dB					
OCNG_RB[Note1]	dB					
SNR [Note 6]	dB	-1.5	-5.2	-13.7	4	2
N_{oc}	dBm/15 kHz	-98			-98	-98
Propagation condition		ETU 30 Hz			ETU 30 Hz	ETU 30 Hz

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink subframe configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.
Note 8: The SNR in the restricted measurement subframes during time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.7.3.18.1-1.

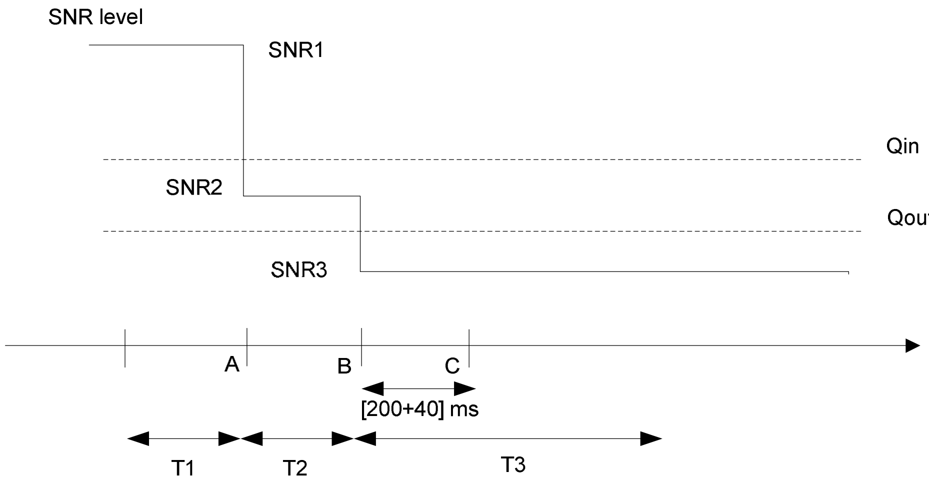


Figure A.7.3.18.1-1 SNR variation for out-of-sync testing

A.7.3.18.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.19 E-UTRAN FDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resouce Restriction with CRS assistance information and Non-MBSFN ABS

A.7.3.19.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.19.1-1 and A.7.3.19.1-2 below. There are three active cells in the test: Cell 1 is the PCell cell and Cell 2 and 3 are the neighbour cells. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.19.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing PCell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2, T3, T4 and T5 in this test. The Non-MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.19.1-1: General test parameters for E-UTRAN FDD in-sync radio link monitoring test

Parameter		Unit	Value			Comment
			Test 1			
			Cell 1	Cell 2	Cell 3	
PCFICH/PDCCH/PHICH parameters			R.9 FDD	R.9 FDD	R.9 FDD	As specified in section A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.6 FDD	OP.6 FDD	OP.6 FDD	As specified in section A.3.2.1.6.
Active cell			PCell	Neighbor Cell	Neighbor Cell	Cell 1, Cell 2 and Cell 3 are on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	
E-UTRA RF Channel Number			1	1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	10	
Correlation Matrix and Antenna Configuration			2x2 Low	2x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Neighbor Cell ABS configuration			N/A	Non-MBSFN ABS		As defined in Table A.3.4.1.2-2
ABS Pattern			N/A	'100000001 0000000100 0 0000100000 0010000000 '	'100000001 0000000100 0 0000100000 0010000000 '	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes. Configured in both Cell 2 and Cell 3 prior to the start of T1.
Time domain measurement resource restriction pattern			'100000001 0000000100 0000010000 0001000000 0'	N/A	N/A	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.
CRS assistant information	physCellId		N/A	see PCI conditions below	see PCI conditions below	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation oneFrame='000000'
	antennaPorts Count			an2	an2	
	mbsfn-SubframeConfigList			oneFrame = '000000'	oneFrame = '000000'	
Time offset between cells (With respect to Cell 1)		us	0	3	2	
Frequency shift between cells (With respect to Cell 1)		Hz	0	300	-100	
Physical Cell ID			PCI_{cell1}	(PCI_{cell1}-PCI_{cell2}) mod3 = 0, PCI_{cell1} not equal to	(PCI_{cell1}-PCI_{cell3}) mod3! = 0	Cell PCIs are selected so that all conditions are met

				PCI_{cell2}		
In sync transmission parameters (Note 1)		DCI format	1C	1C	1C	
In sync transmission parameters (Note 1)	Number of Control OFDM symbols		3	3	3	As defined in section 5.3.3.1.4 in TS 36.212
	Aggregation level	CCE	4	4	4	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively.
	ρ_A, ρ_B		-3	-3	-3	
	Ratio of PDCCH to RS EPRE		-3	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.		
	Ratio of PCFICH to RS EPRE		1			
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	1A	
	Number of Control OFDM symbols		3	3	3	As defined in section 5.3.3.1.3 in TS 36.212
	Aggregation level	CCE	8	8	8	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	ρ_A, ρ_B		-3	-3	-3	
	Ratio of PDCCH to RS EPRE	dB	1	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.		
	Ratio of PCFICH to RS EPRE	dB	1			
DRX			OFF	OFF	OFF	
Layer 3 filtering			Enabled	Disable	Disable	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	N/A		T310 is enabled
T311 timer		ms	1000			T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0			As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2			Minimum CQI reporting periodicity
T1		s	0.5	N/A		
T2		s	0.4			
T3		s	1.46			
T4		s	0.4			
T5		s	1			
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.						

Table A.7.3.19.1-2: Cell specific test parameters for E-UTRAN FDD in-sync radio link monitoring test

Parameter	Unit	Test 1						
		Cell1					Cell2	Cell3
		T1	T2	T3	T4	T5	T1-T5	T1-T5
E-UTRA RF Channel Number		1					1	1
$BW_{channel}$	MHz	10					10	10
Correlation Matrix and Antenna Configuration		2x2 Low					2x2 Low	2x2 Low
PCFICH/PDCCH/PHICH parameters		R.9 FDD					R.9 FDD	R.9 FDD
OCNG Pattern defined in A.3.2.1 (FDD)		OP.6 FDD					OP.6 FDD	OP.6 FDD
ρ_A, ρ_B		-3					-3	-3
PCFICH_RB	dB	1					Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.	
PDCCH_RA	dB	-3						
PDCCH_RB	dB							
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA Note 1	dB							
OCNG_RB Note 1	dB							
SNR Note 6	dB	-1.5	-5.2	-13.7	-8.6	-1.5	4	2
N_{oc}	dBm/15 kHz	-98					-98	-98
Propagation condition	Hz	ETU 30					ETU 30	ETU 30

Note 1: OCNG shall be used such that the resources in cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.19.1-1.

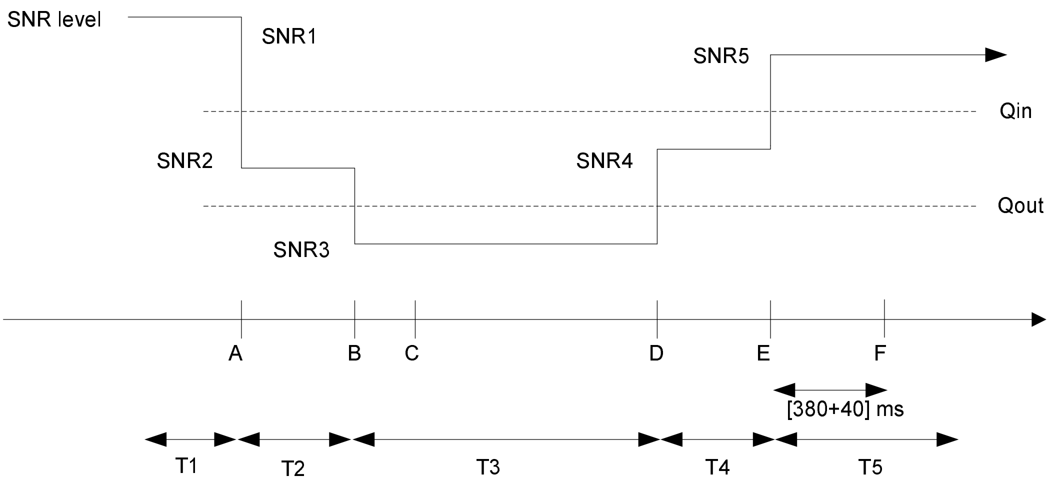


Figure A.7.3.19.1-1 SNR variation for in-sync testing

A.7.3.19.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.20 E-UTRAN TDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resouce Restriction with CRS assistance information and Non-MBSFN ABS

A.7.3.20.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.20.1-1 and A.7.3.20.1-2 below. There are three active cells in the test: Cell 1 is the PCell and Cell 2 and 3 are the Neighbor cells. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.20.1-1 shows the variation of the downlink SNR in the PCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Non-MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing PCell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2, T3, T4 and T5 in this test. The Non-MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.20.1-1: General test parameters for E-UTRAN TDD in-sync radio link monitoring test

Parameter		Unit	Value			Comment
			Test 1			
			Cell 1	Cell 2	Cell 3	
PCFICH/PDCCH/PHICH parameters			R.9 TDD	R.9 TDD	R.9 TDD	As specified in section A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.2 TDD	OP.2 TDD	As specified in section A.3.2.2.2.
Active cell			PCell	Neighbor Cell	Neighbor Cell	Cell 1, Cell 2 and Cell 3 are on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	
E-UTRA RF Channel Number			1	1	1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	10	
Correlation Matrix and Antenna Configuration			2x2 Low	2x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Neighbor Cell ABS configuration			N/A	Non-MBSFN ABS		As defined in Table A.3.4.1.2-1
ABS Pattern			N/A	'000010000 0000010000 0'	'000010000 0000010000 0'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2 and Cell 3. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes.
Time domain measurement resource restriction pattern			'000010000 0000010000 0'	N/A	N/A	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.
CRS assistant information	physCellId		N/A	see PCI conditions below	see PCI conditions below	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation oneFrame='000000'
	antennaPorts Count			an2	an2	
	mbsfn-SubframeConfigList			oneFrame = '000000'	oneFrame = '000000'	
Time offset from Cell 1		us	0	3	2	
Frequency offset		Hz	0	300	-100	
Physical Cell ID			PCI_{cell1}	(PCI_{cell1}-PCI_{cell2}) mod3 = 0, PCI_{cell1} not equal to PCI_{cell2}	(PCI_{cell1}-PCI_{cell3}) mod3! = 0	Cell PCIs are selected so that all conditions are met

In sync transmission parameters (Note 1)	DCI format		1C	1C	1C	As defined in section 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		3	3	3	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	4	
	ρ_A, ρ_B		-3	-3	-3	
	Ratio of PDCCH to RS EPRE		-3	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.		
	Ratio of PCFICH to RS EPRE		1			
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		3	3	3	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	8	
	ρ_A, ρ_B		-3	-3	-3	
	Ratio of PDCCH to RS EPRE	dB	1	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.		
	Ratio of PCFICH to RS EPRE	dB	1			
DRX			OFF	OFF	OFF	
Layer 3 filtering			Enabled	Disable	Disable	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	N/A		T310 is enabled
T311 timer		ms	1000			T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0			As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1			Minimum CQI reporting periodicity
T1		s	0.5	N/A		
T2		s	0.4			
T3		s	1.46			
T4		s	0.4			
T5		s	1			
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.						

Table A.7.3.20.1-2: Cell specific test parameters for E-UTRAN TDD in-sync radio link monitoring test

Parameter	Unit	Test 1						
		Cell1					Cell2	Cell3
		T1	T2	T3	T4	T5	T1-T5	T1-T5
E-UTRA RF Channel Number		1					1	1
$BW_{channel}$	MHz	10					10	10
Correlation Matrix and Antenna Configuration		2x2 Low					2x2 Low	2x2 Low
Special subframe configuration Note 1		6					6	6
Uplink-downlink configuration Note 2		1					1	1
PCFICH/PDCCH/PHICH parameters		R.9 TDD					R.9 TDD	R.9 TDD
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD					OP.2 TDD	OP.2 TDD
ρ_A, ρ_B		-3					-3	-3
PCFICH_RB	dB	1					Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.	
PDCCH_RA	dB	-3						
PDCCH_RB	dB							
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA Note 3	dB							
OCNG_RB Note 3	dB							
SNR Note 8	dB	-1.5	-5.2	-13.7	-8.6	-1.5	4	2
N_{oc}	dBm/15 kHz	-98					-98	-98
Propagation condition	Hz	ETU 30					ETU 30	ETU 30

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2, T3, T4 and T5 of active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.20.1-1.

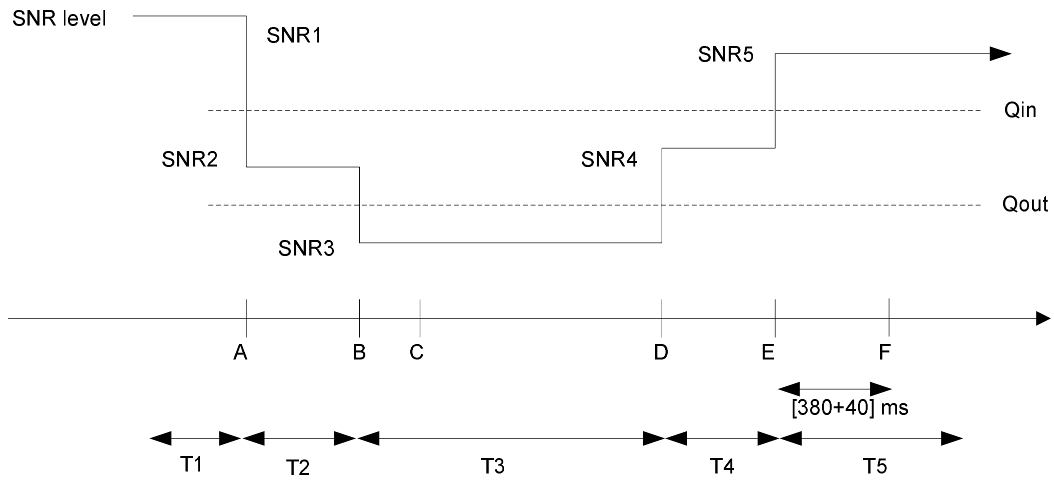


Figure A.7.3.20.1-1 SNR variation for in-sync testing

A.7.3.20.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.21 E-UTRAN FDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resouce Restriction with CRS assistance information and MBSFN ABS

A.7.3.21.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information and MBSFN ABS. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.21.1-1 and A.7.3.21.1-2 below. There are three active cells in the test: Cell 1 is the PCell cell and Cell 2 and 3 are the neighbour cells. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.21.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing PCell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2, T3, T4 and T5 in this test. The MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.21.1-1: General test parameters for E-UTRAN FDD in-sync radio link monitoring test

Parameter		Unit	Value			Comment
			Test 1			
			Cell 1	Cell 2	Cell 3	
PCFICH/PDCCH/PHICH parameters			R.9 FDD	R.9 FDD	R.9 FDD	As specified in section A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.6 FDD	OP.9 FDD	OP.9 FDD	As specified in section A.3.2.1.
Active cell			PCell	Neighbor Cell	Neighbor Cell	Cell 1, Cell 2 and Cell 3 are on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	
E-UTRA RF Channel Number			1	1	1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	10	
Correlation Matrix and Antenna Configuration			2x2 Low	2x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Neighbor Cell ABS configuration			N/A	MBSFN ABS		As defined in Table A.3.4.2.2-2
ABS Pattern			N/A	'010000001 0000000100 0000000100 0000100000 0'	'010000001 0000000100 0000000100 0000100000 0'	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. MBSFN subframes are cofigured in the ABS subframes configured in Cell 2 and Cell 3 prior to the start of T1.
Time domain measurement resource restriction pattern			'010000001 0000000100 0000000100 0000100000 0'	N/A	N/A	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.
CRS assistance information	physCellId		N/A	see PCI conditions below	see PCI conditions below	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation fourFrames = '100001000100000100001000'
	antennaPorts Count			an2	an2	
	mbsfn-SubframeConfigList			fourFrames = '100001000 1000001000 01000'	fourFrames = '100001000 1000001000 01000'	
Time offset between cells (With respect to Cell 1)		us	0	3	2	
Frequency shift between cells (With respect to Cell 1)		Hz	0	300	-100	
Physical Cell ID			PCI_{cell1}	$(PCI_{cell1}-PCI_{cell2})$ mod3 = 0,	$(PCI_{cell1}-PCI_{cell3})$ mod3 != 0	Cell PCIs are selected so that all conditions are met

				PCI_{cell1} not equal to PCI_{cell2}		
In sync transmission parameters (Note 1)		DCI format	1C	1C	1C	
In sync transmission parameters (Note 1)	Number of Control OFDM symbols		3	3	3	As defined in section 5.3.3.1.4 in TS 36.212
	Aggregation level	CCE	4	4	4	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively.
	ρ_A, ρ_B		-3	-3	-3	
	Ratio of PDCCH to RS EPRE		-3	Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.2-2.		
	Ratio of PCFICH to RS EPRE		1			
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	1A	
	Number of Control OFDM symbols		3	3	3	As defined in section 5.3.3.1.3 in TS 36.212
	Aggregation level	CCE	8	8	8	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	ρ_A, ρ_B		-3	-3	-3	
	Ratio of PDCCH to RS EPRE	dB	1	Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.2-2.		
	Ratio of PCFICH to RS EPRE	dB	1			
DRX			OFF	OFF	OFF	
Layer 3 filtering			Enabled	Disable	Disable	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	N/A		T310 is enabled
T311 timer		ms	1000			T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0			As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2			Minimum CQI reporting periodicity
T1		s	0.5	N/A		
T2		s	0.4			
T3		s	1.46			
T4		s	0.4			
T5		s	1			
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.						

Table A.7.3.21.1-2: Cell specific test parameters for E-UTRAN FDD in-sync radio link monitoring test

Parameter	Unit	Test 1						
		Cell1					Cell2	Cell3
		T1	T2	T3	T4	T5	T1-T5	T1-T5
E-UTRA RF Channel Number		1					1	1
$BW_{channel}$	MHz	10					10	10
Correlation Matrix and Antenna Configuration		2x2 Low					2x2 Low	2x2 Low
PCFICH/PDCCH/PHICH parameters		R.9 FDD					R.9 FDD	R.9 FDD
OCNG Pattern defined in A.3.2.1 (FDD)		OP.6 FDD					OP.9 FDD	OP.9 FDD
ρ_A, ρ_B		-3					-3	-3
PCFICH_RB	dB	1					Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.2-2.	
PDCCH_RA	dB	-3						
PDCCH_RB	dB							
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA Note 1	dB							
OCNG_RB Note 1	dB							
SNR Note 6	dB	-1.5	-5.2	-13.7	-8.6	-1.5	4	2
N_{oc}	dBm/15 kHz	-98					-98	-98
Propagation condition	Hz	ETU 30					ETU 30	ETU 30

Note 1: OCNG shall be used such that the resources in cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.21.1-1.

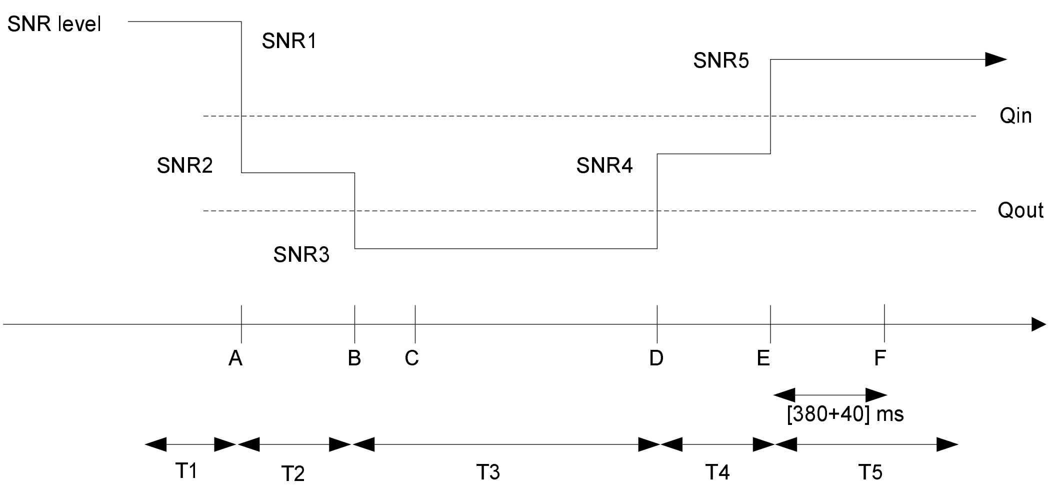


Figure A.7.3.21.1-1 SNR variation for in-sync testing

A.7.3.21.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.22 E-UTRAN TDD Radio Link Monitoring Test for In-sync under Time Domain Measurement Resouce Restriction with CRS assistance information and MBSFN ABS

A.7.3.22.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell under time domain measurement resource restriction with CRS assistance information. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.22.1-1 and A.7.3.22.1-2 below. There are three active cells in the test: Cell 1 is the PCell and Cell 2 and 3 are the Neighbor cells. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.22.1-1 shows the variation of the downlink SNR in the PCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

MBSFN ABS pattern is configured in both Cell 2 and Cell 3 in this test. The UE is configured by higher layers with a time domain measurement restriction pattern for performing PCell measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2 and Cell 3, which shall be valid during T1, T2, T3, T4 and T5 in this test. The MBSFN ABS pattern, the time domain measurement resource restriction pattern and the CRS assistance information shall be configured prior to the start of T1.

Table A.7.3.22.1-1: General test parameters for E-UTRAN TDD in-sync radio link monitoring test

Parameter		Unit	Value			Comment
			Test 1			
			Cell 1	Cell 2	Cell 3	
PCFICH/PDCCH/PHICH parameters			R.9 TDD	R.9 TDD	R.9 TDD	As specified in section A.3.1.2.2. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.2 TDD	OP.6 TDD	OP.6 TDD	As specified in section A.3.2.2.
Active cell			PCell	Neighbor Cell	Neighbor Cell	Cell 1, Cell 2 and Cell 3 are on E-UTRA RF channel number 1
CP length			Normal	Normal	Normal	
E-UTRA RF Channel Number			1	1	1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	10	10	
Correlation Matrix and Antenna Configuration			2x2 Low	2x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Neighbor Cell ABS configuration			N/A	MBSFN ABS		As defined in Table A.3.4.2.2-1
ABS Pattern			N/A	'000010000 0000010000 0'	'000010000 0000010000 0'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2 and Cell 3 The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod 20 = 0, where x is the size of the bit string (20) divided by 10. MBSFN subframes are configured in the ABS subframes.
Time domain measurement resource restriction pattern			'000010000 0000010000 0'	N/A	N/A	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePatternPCell-r10 as defined in TS 36.331, clause 6.3.2.
CRS assistance information	physCellId		N/A	see PCI conditions below	see PCI conditions below	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation fourFrames = '010000100001000010000000'
	antennaPorts Count			an2	an2	
	mbsfn-SubframeConfigList			fourFrames = '010000100 0010000100 00000'	fourFrames = '010000100 0010000100 00000'	
Time offset from Cell 1		us	0	3	2	
Frequency offset		Hz	0	300	-100	
Physical Cell ID			PCI_{cell1}	(PCI_{cell1}-PCI_{cell2}) mod3 = 0, PCI_{cell1} not equal to	(PCI_{cell1}-PCI_{cell3}) mod3 != 0	Cell PCIs are selected so that all conditions are met

				PCI_{cell2}		
In sync transmission parameters (Note 1)	DCI format		1C	1C	1C	As defined in section 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	2	2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	4	
	ρ_A, ρ_B		-3	-3	-3	
	Ratio of PDCCH to RS EPRE		-3	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.		
	Ratio of PCFICH to RS EPRE		1			
Out of sync transmission parameters (Note 1)	DCI format		1A	1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	8	
	ρ_A, ρ_B		-3	-3	-3	
	Ratio of PDCCH to RS EPRE	dB	1	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-2.		
	Ratio of PCFICH to RS EPRE	dB	1			
DRX			OFF	OFF	OFF	
Layer 3 filtering			Enabled	Disable	Disable	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	N/A		T310 is enabled
T311 timer		ms	1000			T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0			As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1			Minimum CQI reporting periodicity
T1		s	0.5	N/A		
T2		s	0.4			
T3		s	1.46			
T4		s	0.4			
T5		s	1			
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.						

Table A.7.3.22.1-2: Cell specific test parameters for E-UTRAN TDD in-sync radio link monitoring test

Parameter	Unit	Test 1						
		Cell1					Cell2	Cell3
		T1	T2	T3	T4	T5	T1-T5	T1-T5
E-UTRA RF Channel Number		1					1	1
$BW_{channel}$	MHz	10					10	10
Correlation Matrix and Antenna Configuration		2x2 Low					2x2 Low	2x2 Low
Special subframe configuration Note 1		6					6	6
Uplink-downlink configuration Note 2		1					1	1
PCFICH/PDCCH/PHICH parameters		R.9 TDD					R.9 TDD	R.9 TDD
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD					OP.6 TDD	OP.6 TDD
ρ_A, ρ_B		-3					-3	-3
PCFICH_RB	dB	1					Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.2-1.	
PDCCH_RA	dB	-3						
PDCCH_RB	dB							
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PHICH_RA	dB							
PHICH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA Note 3	dB							
OCNG_RB Note 3	dB							
SNR Note 8	dB	-1.5	-5.2	-13.7	-8.6	-1.5	4	2
N_{oc}	dBm/15 kHz	-98					-98	-98
Propagation condition	Hz	ETU 30					ETU 30	ETU 30

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2, T3, T4 and T5 of active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.22.1-1.

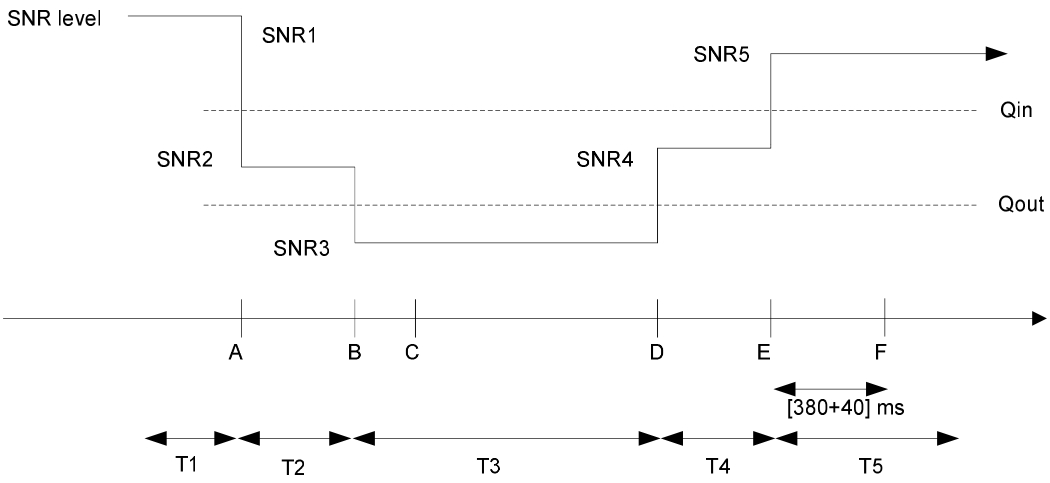


Figure A.7.3.22.1-1 SNR variation for in-sync testing

A.7.3.22.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.23 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync for 5MHz Bandwidth

A.7.3.23.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.7.3.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.3.23.1-1 and A.7.3.23.1-2 will replace the values of corresponding parameters in Test 4 in Tables A.7.3.1.1-1 and A.7.3.1.1-2. Only Test 4 is defined for the 5MHz bandwidth.

Table A.7.3.23.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under 5MHz Bandwidth

Parameter		Unit	Value	Comment
			Test 4	
PCFICH/PDCCH/PHICH parameters			R.12 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
OCNG parameters			OP.16 FDD	As specified in clause A.3.2.1.16.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	5	
Out of sync transmission parameters (Note 1)	Number of Control OFDM Symbols		3	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel. Note 2: See Table A.7.3.1.1-1 for other general test parameters. Note 3: This test is according to the principle defined in section A.3.7.2.				

Table A.7.3.23.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring test #4 under 5MHz Bandwidth

Parameter	Unit	Test 4		
		T1	T2	T3
$BW_{channel}$	MHz	5		
OCNG Pattern defined in A.3.2.1.16 (FDD)		OP.16 FDD		
SNR Note 6	dB	-2.3	-5.7	-12.2
Note 1: See Table A.7.3.1.1-2 for other cell specific test parameters.				

A.7.3.23.2 Test Requirements

The requirements defined in section A.7.3.1.2 shall apply to this test case.

A.7.3.24 E-UTRAN FDD Radio Link Monitoring Test for In-sync for 5MHz Bandwidth

A.7.3.24.1 Test Purpose and Environment

The purpose of this test case is the same as for the Test 2 defined in subclause A.7.3.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.3.24.1-1 and A.7.3.24.1-2 will replace the values of corresponding parameters in Tables A.7.3.2.1-1 and A.7.3.2.1-2.

Table A.7.3.24.1-1: General test parameters for E-UTRAN FDD in-sync testing

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.12 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	5	
In sync transmission parameters (Note 1)	Number of Control OFDM symbols		3	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
Out of sync transmission parameters (Note 1)	Number of Control OFDM symbols		3	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
Note 1: See Table A.7.3.2.1-1 for other general test parameters. Note 2: This test is performed according to the principle defined in section A.3.7.2				

Table A.7.3.24.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring test

Parameter	Unit	T1	T2	T3	T4	T5
$BW_{channel}$	MHz	5				
OCNG Pattern defined in A.3.2.1.16 (FDD)		OP.16 FDD				
SNR	dB	-2.3	-5.7	-12.2	-7.3	-2.3
Propagation condition		ETU 70 Hz				
Note 1: See Table A.7.3.2.1-2 for other general test parameters.						

A.7.3.24.2 Test Requirements

The requirements defined in section A.7.3.2.2 shall apply to this test case.

A.7.3.25 E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX for 5MHz Bandwidth

A.7.3.25.1 Test Purpose and Environment

The purpose of this test case is the same as for the Test 2 defined in subclause A.7.3.6. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.7.3.25.1-1 and A.7.3.25.1-2 will replace the values of corresponding parameters in Tables A.7.3.6.1-1 and A.7.3.6.1-2.

Table A.7.3.25.1-1: General test parameters for E-UTRAN FDD in-sync testing

Parameter		Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters			R.12 FDD	As specified in clause A.3.1.2.1. None of the PDCCH are intended for the UE under test
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	5	
In sync transmission parameters (Note 1)	Number of Control OFDM symbols		3	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
Out of sync transmission parameters (Note 1)	Number of Control OFDM symbols		3	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
Note 1: See Table A.7.3.6.1-1 for other general test parameters. Note 2: This test is performed according to the principle defined in section A.3.7.2				

Table A.7.3.25.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring test

Parameter	Unit	T1	T2	T3	T4	T5
$BW_{channel}$	MHz	5				
OCNG Pattern defined in A.3.2.1.16 (FDD)		OP.16 FDD				
SNR	dB	-2.3	-5.7	-12.2	-7.3	-2.3
Propagation condition		AWGN				
Note 1: See Table A.7.3.6.1-2 for other general test parameters.						

A.7.3.25.2 Test Requirements

The requirements defined in section A.7.3.6.2 shall apply to this test case.

A.7.3.26 E-UTRAN FD-FDD Radio Link Monitoring Test for Out-of-sync for UE Category 0

A.7.3.26.1 Test Purpose and Environment

The purpose of this test is to verify that the FD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.26.1-1, A.7.3.26.1-2 and A.7.3.26.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.26.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.26.1-1: General test parameters for E-UTRAN FD-FDD out-of-sync testing for UE Category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		s	1	
T2		s	0.4	
T3		s	0.5	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.26.1-2: Cell specific test parameters for E-UTRAN FD-FDD (cell # 1) for out-of-sync radio link monitoring tests for UE Category 0

Parameter	Unit	Test 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
PCFICH/PDCCH/PHICH parameters defined in A.3.1.2.1		R.7 FDD		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD		
ρ_A, ρ_B		-3		
PCFICH_RB	dB	1		
PDCCH_RA	dB	4		
PDCCH_RB	dB	4		
PBCH_RA	dB	-3		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc}	dBm/15 kHz	-98		
SNR Note 6	dB	-2.1	-6.9	-12.9
Propagation condition		ETU 70Hz		
Correlation Matrix and Antenna Configuration		2x1 Low		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.26.1-1.

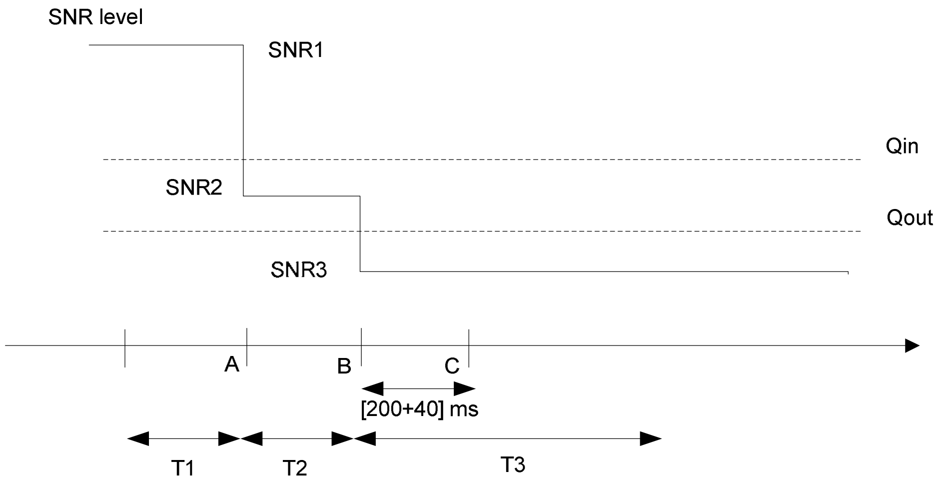


Figure A.7.3.26.1-1: SNR variation for out-of-sync testing

A.7.3.26.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.27 E-UTRAN FD-FDD Radio Link Monitoring Test for In-sync for UE Category 0

A.7.3.27.1 Test Purpose and Environment

The purpose of this test is to verify that the FD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN FD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.27.1-1 and A.7.3.27.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.27.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

Table A.7.3.27.1-1: General test parameters for E-UTRAN FD-FDD in-sync testing for UE Category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		s	0.5	
T2		s	0.4	
T3		s	1.46	
T4		s	0.4	
T5		s	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.27.1-2: Cell specific test parameters for E-UTRAN FD-FDD (cell # 1) for in-sync radio link monitoring test for UE Category 0

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
PCFICH/PDCCH/PHICH parameters defined in clause A.3.1.2.1		R.7 FDD				
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD				
ρ_A, ρ_B		-3				
PCFICH_RB	dB	1				
PDCCH_RA	dB	1				
PDCCH_RB	dB	1				
PBCH_RA	dB	-3				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note 1	dB					
OCNG_RB Note 1	dB					
N_{oc}	dBm/15 kHz	-98				
SNR Note 6	dB	-2.1	-6.9	-12.9	-7.1	-2.1
Propagation condition		ETU 70Hz				
Correlation Matrix and Antenna Configuration		2x1 Low				
Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1. Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1. Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs. Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.27.1-1.						

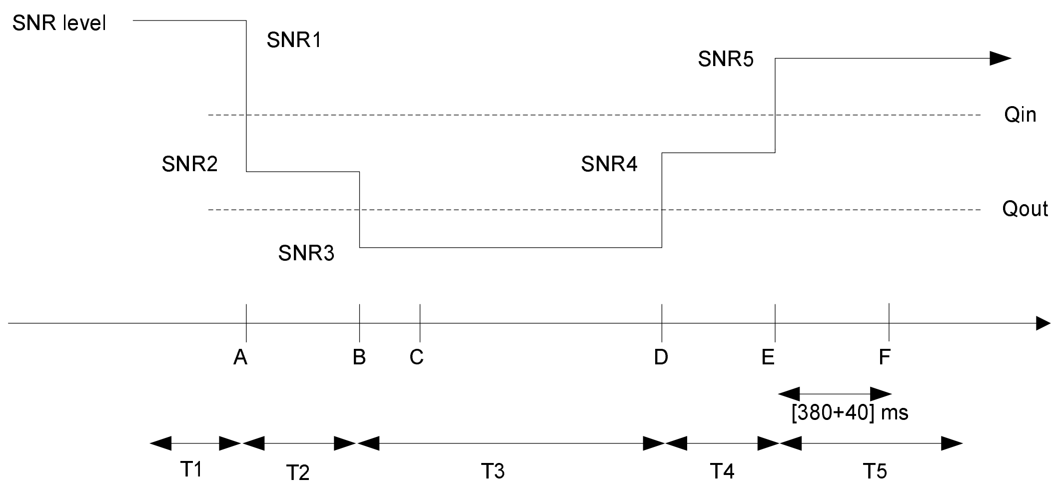


Figure A.7.3.27.1-1: SNR variation for in-sync testing

A.7.3.27.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.28 E-UTRAN FD-FDD Radio Link Monitoring Test for Out-of-sync in DRX for UE category 0

A.7.3.28.1 Test Purpose and Environment

The purpose of this test is to verify that the FD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN FD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.28.1-1, A.7.3.28.1-2, A.7.3.28.1-3 and A.7.3.28.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.28.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.28.1-1: General test parameters for E-UTRAN FD-FDD out-of-sync tests in DRX for UE category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
CP length			Normal	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle		ms	1280	See Table A.7.3.28.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		s	32	
T2		s	12.8	
T3		s	13	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.28.1-2: Cell specific test parameters for E-UTRAN FD-FDD (cell # 1) for out-of-sync radio link monitoring tests in DRX for UE category 0

Parameter	Unit	Test 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
PCFICH/PDCCH/PHICH parameters defined in clause A.3.1.2.1		R.7 FDD		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD		
ρ_A, ρ_B		-3		
PCFICH_RB	dB	1		
PDCCH_RA	dB	4		
PDCCH_RB	dB	4		
PBCH_RA	dB	-3		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA^Note1	dB			
OCNG_RB^Note1	dB			
N_{oc}	dBm/15 kHz	-98		
SNR ^Note 6	dB	-6.1	-10.0	-14.0
Propagation condition		AWGN		
Correlation Matrix and Antenna Configuration		2x1		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.28.1-1.

Table A.7.3.28.1-3: DRX-Configuration for E-UTRAN FD-FDD out-of-sync tests for UE category 0

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.7.3.28.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FD-FDD out-of-sync testing for UE category 0

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

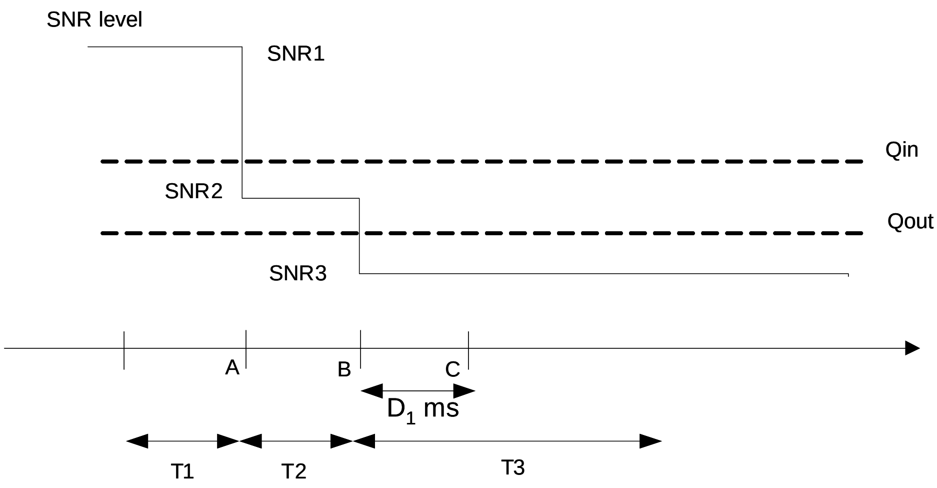


Figure A.7.3.28.1-1: SNR variation for out-of-sync testing in DRX

A.7.3.28.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 6500 ms after the start of time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.29 E-UTRAN FD-FDD Radio Link Monitoring Test for In-sync in DRX for UE Category 0

7.3.29.1 Test Purpose and Environment

The purpose of this test is to verify that the FD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN FD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables 7.3.29.1-1, 7.3.29.1-2, 7.3.29.1-3 and 7.3.29.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.29.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table 7.3.29.1-1: General test parameters for E-UTRAN FD-FDD in-sync test in DRX for UE category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE		1	
	Ratio of PCFICH to RS EPRE		1	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle		ms	40	See Table 7.3.29.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table 7.3.29.1-2: Cell specific test parameters for E-UTRAN FD-FDD (cell # 1) for in-sync radio link monitoring test in DRX for UE category 0

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
PCFICH/PDCCH/PHICH parameters defined in clause A.3.1.2.1		R.7 FDD				
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD				
ρ_A, ρ_B		-3				
PCFICH_RB	dB	1				
PDCCH_RA	dB	1				
PDCCH_RB	dB	1				
PBCH_RA	dB	-3				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note1	dB					
OCNG_RB Note1	dB					
N_{oc}	dBm/15 kHz	-98				
SNR Note 8	dB	-6.1	-10.0	-14.0	-10.1	-6.1
Propagation condition		AWGN				
Correlation Matrix and Antenna Configuration		2x1				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure 7.3.29.1-1.

Table 7.3.29.1-3: DRX-Configuration for E-UTRAN FD-FDD out-of-sync tests for UE category 0

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table 7.3.29.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FD-FDD out-of-sync testing for UE category 0

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

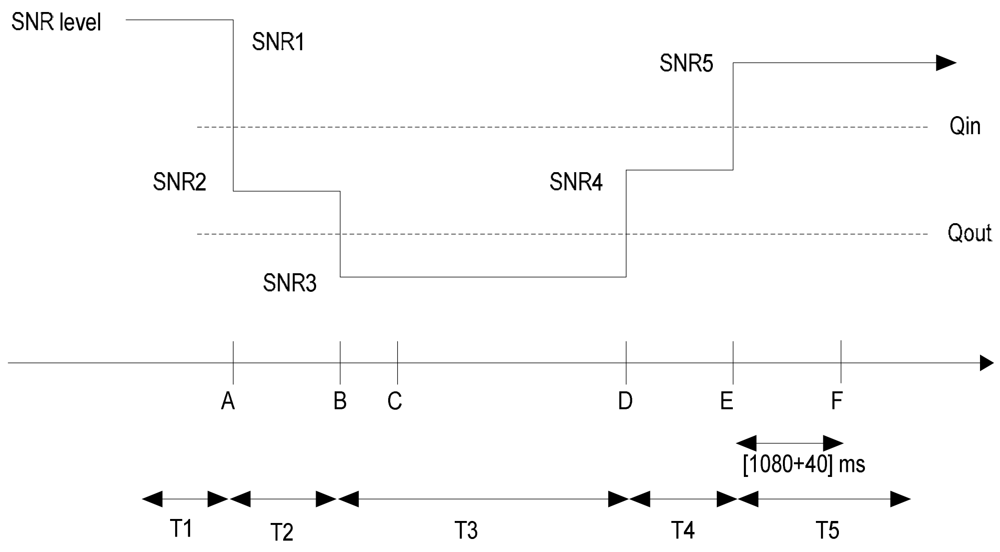


Figure 7.3.29.1-1: SNR variation for in-sync testing in DRX

7.3.29.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.30 E-UTRAN HD-FDD Radio Link Monitoring Test for Out-of-sync for UE Category 0

A.7.3.30.1 Test Purpose and Environment

The purpose of this test is to verify that the HD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN HD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.30.1-1, A.7.3.30.1-2 and A.7.3.30.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.30.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of [TBD] ms.

Table A.7.3.30.1-1: General test parameters for E-UTRAN HD-FDD out-of-sync testing for UE Category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	[TBD]	Minimum CQI reporting periodicity
T1		s	1	
T2		s	0.4	
T3		s	0.5	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.30.1-2: Cell specific test parameters for E-UTRAN HD-FDD (cell # 1) for out-of-sync radio link monitoring for UE Category 0

Parameter	Unit	Test 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
PCFICH/PDCCH/PHICH parameters defined in section A.3.1.2.3		R.4 HD-FDD		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD		
ρ_A, ρ_B		-3		
PCFICH_RB	dB	1		
PDCCH_RA	dB	4		
PDCCH_RB	dB	4		
PBCH_RA	dB	-3		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc}	dBm/15 kHz	-98		
SNR Note 6	dB	-1.2	-6.0	-12.0
Propagation condition		ETU 70Hz		
Correlation Matrix and Antenna Configuration		2x1 Low		

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.30.1-1.

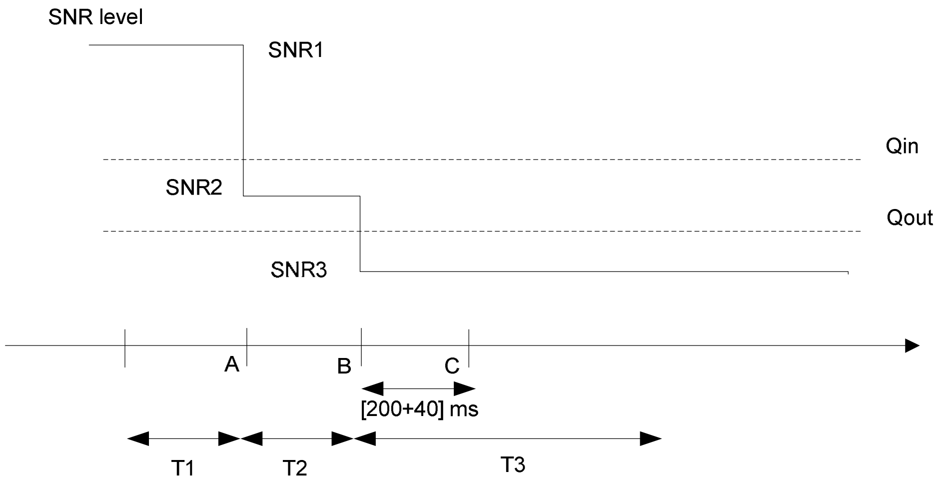


Figure A.7.3.30.1-1: SNR variation for out-of-sync testing

A.7.3.30.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.31 E-UTRAN HD-FDD Radio Link Monitoring Test for In-sync for UE Category 0

A.7.3.31.1 Test Purpose and Environment

The purpose of this test is to verify that the HD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN HD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.31.1-1 and A.7.3.31.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.31.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of [TBD] ms.

Table A.7.3.31.1-1: General test parameters for E-UTRAN HD-FDD in-sync testing

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	[TBD]	Minimum CQI reporting periodicity
T1		s	0.5	
T2		s	0.4	
T3		s	1.46	
T4		s	0.4	
T5		s	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.31.1-2: Cell specific test parameters for E-UTRAN HD-FDD (cell # 1) for in-sync radio link monitoring test for UE category 0

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
PCFICH/PDCCH/PHICH parameters defined in clause A.3.1.2.3		R.4 HD-FDD				
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD				
ρ_A, ρ_B		-3				
PCFICH_RB	dB	1				
PDCCH_RA	dB	1				
PDCCH_RB	dB	1				
PBCH_RA	dB	-3				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note 1	dB					
OCNG_RB Note 1	dB					
N_{oc}	dBm/15 kHz	-98				
SNR Note 6	dB	-1.2	-6.0	-12.0	-6.2	-1.2
Propagation condition		ETU 70Hz				
Correlation Matrix and Antenna Configuration		2x1 low				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.31.1-1.

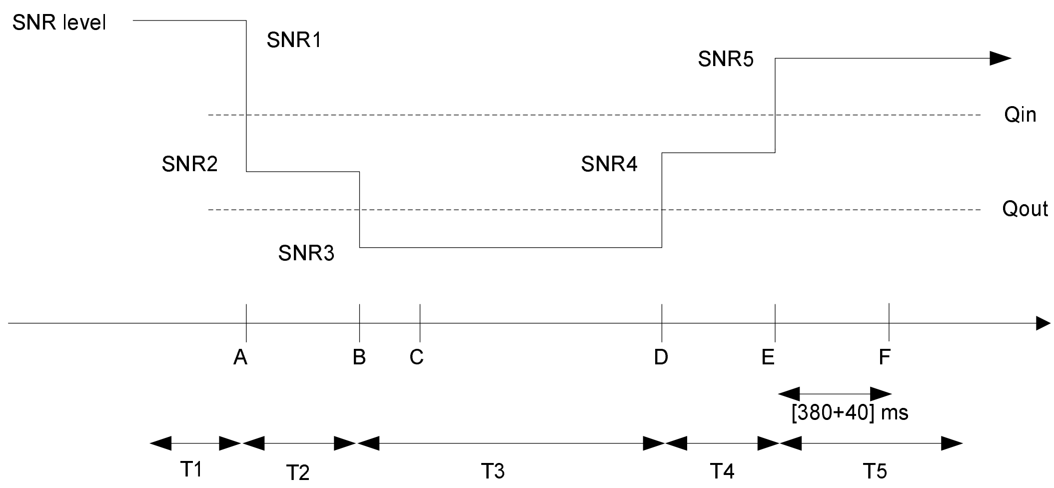


Figure A.7.3.31.1-1: SNR variation for in-sync testing

A.7.3.31.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.32 E-UTRAN HD-FDD Radio Link Monitoring Test for Out-of-sync in DRX for UE category 0

A.7.3.32.1 Test Purpose and Environment

The purpose of this test is to verify that the HD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN HD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.32.1-1, A.7.3.32.1-2, A.7.3.32.1-3 and A.7.3.32.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.32.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 5ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.32.1-1: General test parameters for E-UTRAN HD-FDD out-of-sync tests in DRX for UE category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
CP length			Normal	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle		ms	1280	See Table A.7.3.32.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	5	Minimum CQI reporting periodicity
T1		s	32	
T2		s	12.8	
T3		s	13	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.32.1-2: Cell specific test parameters for E-UTRAN HD-FDD (cell # 1) for out-of-sync radio link monitoring tests in DRX for UE category 0

Parameter	Unit	Test 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
PCFICH/PDCCH/PHICH parameters specified in clause A.3.1.2.3		R.4 HD-FDD		
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD		
ρ_A, ρ_B		-3		
PCFICH_RB	dB	1		
PDCCH_RA	dB	4		
PDCCH_RB	dB	4		
PBCH_RA	dB	-3		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note1	dB			
OCNG_RB Note1	dB			
N_{oc}	dBm/15 kHz	-98		
SNR Note 6	dB	-5.4	-9.5	-13.5
Propagation condition		AWGN		
Correlation Matrix and Antenna Configuration		2x1		
Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1. Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1. Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs. Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.32.1-1.				

Table A.7.3.32.1-3: DRX-Configuration for E-UTRAN HD-FDD out-of-sync test for UE category 0

Field	Value	Comment
onDurationTimer	psf5	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.7.3.32.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN HD-FDD out-of-sync testing for UE category 0

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

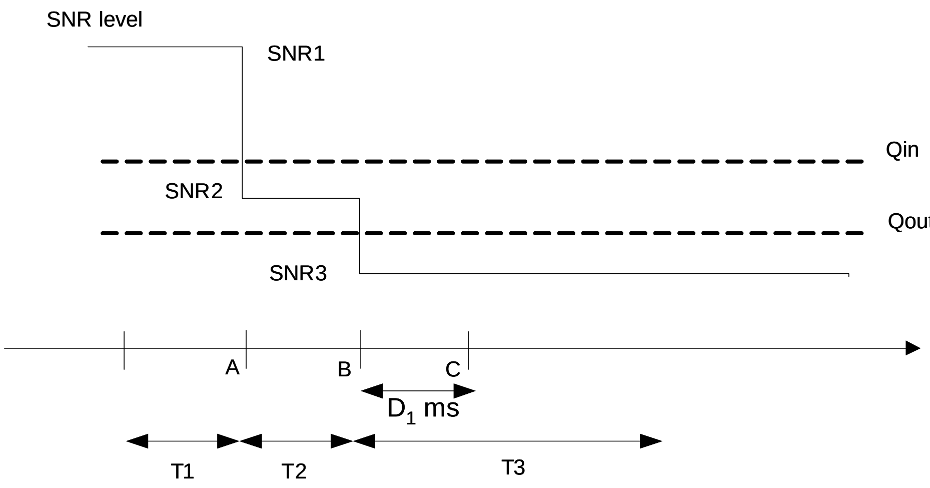


Figure A.7.3.32.1-1: SNR variation for out-of-sync testing in DRX

A.7.3.32.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 6500 ms after the start of time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.33 E-UTRAN HD-FDD Radio Link Monitoring Test for In-sync in DRX for UE Category 0

A.7.3.33.1 Test Purpose and Environment

The purpose of this test is to verify that the HD-FDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN HD-FDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.33.1-1, A.7.3.33.1-2, A.7.3.33.1-3 and A.7.3.33.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.33.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.33.1-1: General test parameters for E-UTRAN HD-FDD in-sync test in DRX for UE category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause7.11.1 and Table 7.11.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle		ms	40	See Table A.7.3.33.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	5	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.33.1-2: Cell specific test parameters for E-UTRAN HD-FDD (cell # 1) for in-sync radio link monitoring test in DRX for UE category 0

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
PCFICH/PDCCH/PHICH parameters specified in clause A.3.1.2.3		R.4 HD-FDD				
OCNG Pattern defined in A.3.2.1 (FDD)		OP.2 FDD				
ρ_A, ρ_B		-3				
PCFICH_RB	dB	1				
PDCCH_RA	dB	1				
PDCCH_RB	dB	1				
PBCH_RA	dB	-3				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note1	dB					
OCNG_RB Note1	dB					
N_{oc}	dBm/15 kHz	-98				
SNR Note 6	dB	-5.4	-9.5	-13.5	-9.4	-5.4
Propagation condition		AWGN				
Correlation Matrix and Antenna Configuration		2x1				

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.33.1-1.

Table A.7.3.33.1-3: DRX-Configuration for E-UTRAN HD-FDD out-of-sync test for UE category 0

Field	Value	Comment
onDurationTimer	psf5	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.33.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN HD-FDD out-of-sync testing for UE category 0

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

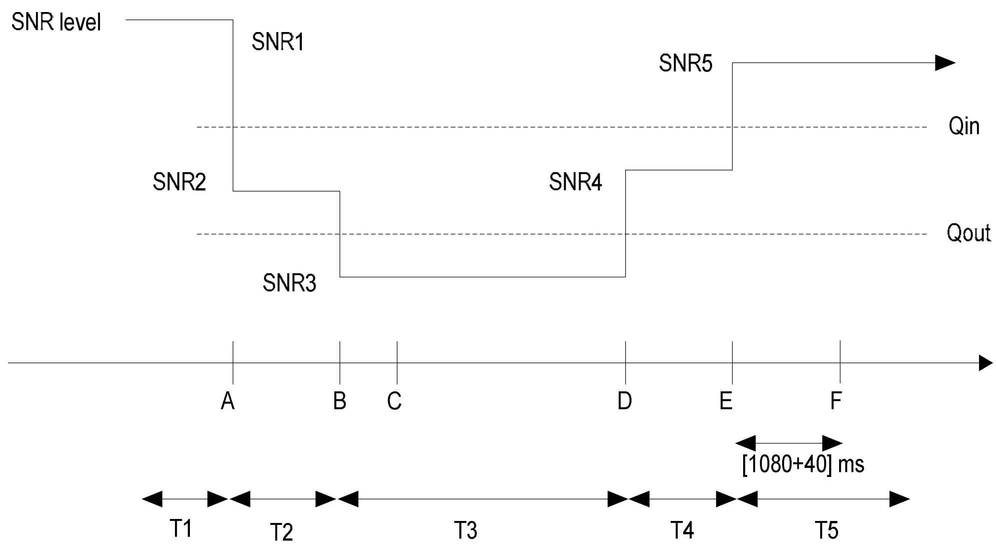


Figure A.7.3.33.1-1: SNR variation for in-sync testing in DRX

A.7.3.33.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.34 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync for UE Category 0

A.7.3.34.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.34.1-1, A.7.3.34.1-2 and A.7.3.34.1-3 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.34.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.34.1-1: General test parameters for E-UTRAN TDD out-of-sync testing for UE Category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
T1		s	1	
T2		s	0.4	
T3		s	0.5	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.34.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring for UE Category 0

Parameter	Unit	Test 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
Special subframe configuration Note 1		6		
Uplink-downlink configuration Note 1		1		
PCFICH/PDCCH/PHICH parameters defined in section A.3.1.2.2		R.7 TDD		
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD		
ρ_A, ρ_B		-3		
PCFICH_RB	dB	1		
PDCCH_RA	dB	4		
PDCCH_RB	dB	4		
PBCH_RA	dB	-3		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 2	dB			
OCNG_RB Note 2	dB			
N_{oc}	dBm/15 kHz	-98		
SNR Note 7	dB	-1.6	-5.9	-11.9
Propagation condition		ETU 70Hz		
Correlation Matrix and Antenna Configuration		2x1 Low		

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 4: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 5: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 6: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 7: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.34.1-1.

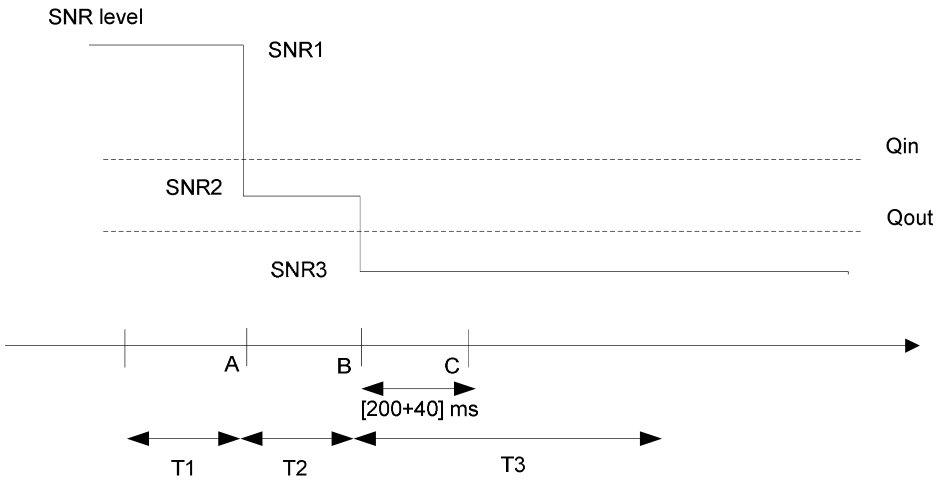


Figure A.7.3.34.1-1: SNR variation for out-of-sync testing

A.7.3.34.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.35 E-UTRAN TDD Radio Link Monitoring Test for In-sync for UE category 0

A.7.3.35.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.35.1-1 and A.7.3.35.1-2 below. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.35.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

Table A.7.3.35.1-1: General test parameters for E-UTRAN TDD in-sync testing

Parameter		Unit	Value Test 1	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
T1		s	0.5	
T2		s	0.4	
T3		s	1.46	
T4		s	0.4	
T5		s	1	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.35.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring test

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
Special subframe configuration Note 1		6				
Uplink-downlink configuration Note 1		1				
PCFICH/PDCCH/PHICH parameters defined in section A.3.1.2.2		R.7 TDD				
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD				
ρ_A, ρ_B		-3				
PCFICH_RB	dB	1				
PDCCH_RA	dB	1				
PDCCH_RB	dB	1				
PBCH_RA	dB	-3				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note 2	dB					
OCNG_RB Note 2	dB					
N_{oc}	dBm/15 kHz	-98				
SNR Note 7	dB	-1.6	-5.9	-11.9	-6.6	-1.6
Propagation condition		ETU 70Hz				
Correlation Matrix and Antenna Configuration		2x1 low				

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 4: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 5: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 6: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 7: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.35.1-1.

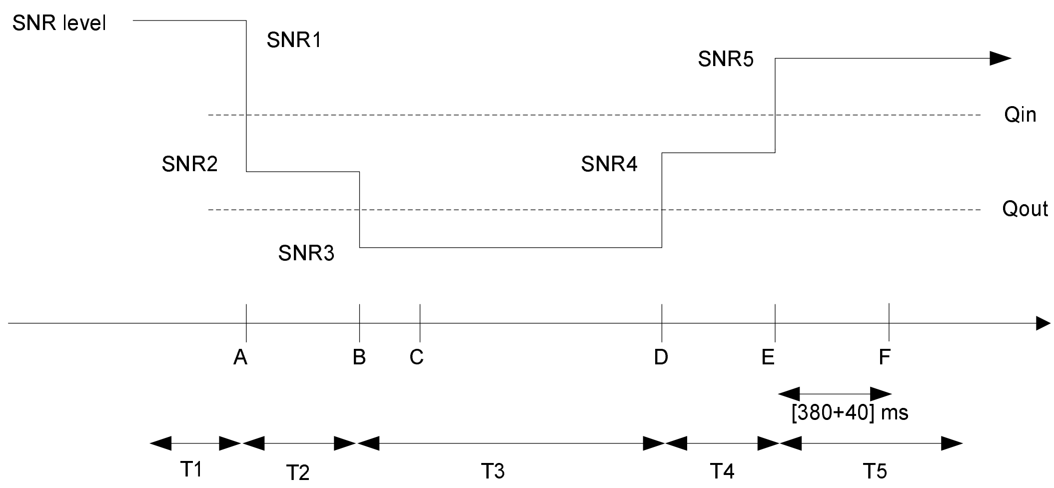


Figure A.7.3.35.1-1: SNR variation for in-sync testing

A.7.3.35.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.36 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX for UE category 0

A.7.3.36.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.36.1-1, A.7.3.36.1-2, A.7.3.36.1-3 and A.7.3.36.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.3.36.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.36.1-1: General test parameters for E-UTRAN TDD out-of-sync test in DRX for UE category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	10	
CP length			Normal	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle		ms	1280	See Table A.7.3.36.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
T1		s	32	
T2		s	12.8	
T3		s	13	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.36.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring test in DRX for UE category 0

Parameter	Unit	Test 2		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	10		
Special subframe configuration Note 1		6		
Uplink-downlink configuration Note 1		1		
PCFICH/PDCCH/PHICH parameters defined in section A.3.1.2.2		R.7 TDD		
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD		
ρ_A, ρ_B		-3		
PCFICH_RB	dB	1		
PDCCH_RA	dB	4		
PDCCH_RB	dB	4		
PBCH_RA	dB	-3		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note2	dB			
OCNG_RB Note2	dB			
N_{oc}	dBm/15 kHz	-98		
SNR Note 7	dB	-5.6	-9.6	-13.6
Propagation condition		AWGN		
Correlation Matrix and Antenna Configuration		2x1		

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 4: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 5: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 6: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 7: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.36.1-1.

Table A.7.3.36.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync test for UE category 0

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.7.3.36.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD out-of-sync testing for UE category 0

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

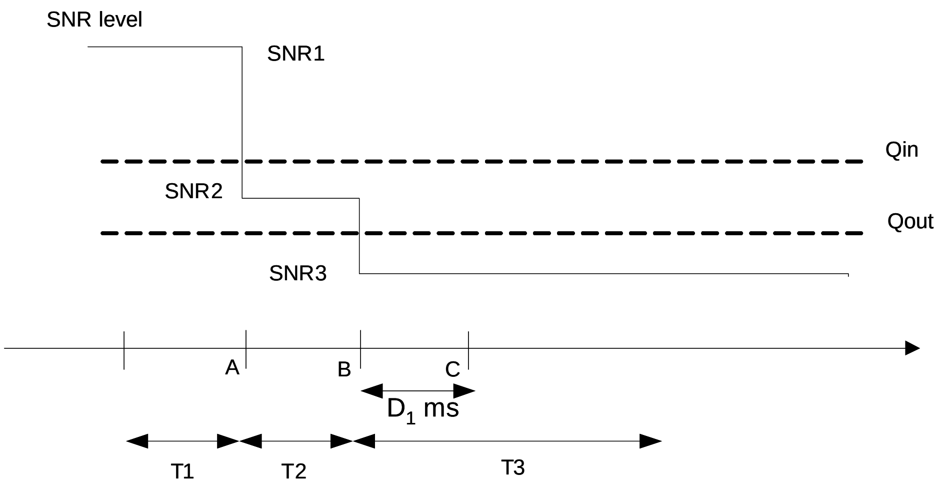


Figure A.7.3.36.1-1: SNR variation for out-of-sync testing in DRX

A.7.3.36.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (duration D_1 = 6500 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.37 E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX for UE category 0

A.7.3.37.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD category 0 UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.11.

The test parameters are given in Tables A.7.3.37.1-1, A.7.3.37.1-2, A.7.3.37.1-3 and A.7.3.37.1-4. There is one cell (cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.37.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.37.1-1: General test parameters for E-UTRAN TDD in-sync test in DRX for UE category 0

Parameter		Unit	Value	Comment
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
E-UTRA RF Channel Number			1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	10	
CP length			Normal	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.11.1 and Table 7.11.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle		ms	40	See Table A.7.3.37.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.37.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for in-sync radio link monitoring test in DRX for UE category 0

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
Special subframe configuration Note 1		6				
Uplink-downlink configuration Note 1		1				
PCFICH/PDCCH/PHICH parameters defined in section A.3.1.2.2		R.7 TDD				
OCNG Pattern defined in A.3.2.2 (TDD)		OP.2 TDD				
ρ_A, ρ_B		-3				
PCFICH_RB	dB	1				
PDCCH_RA	dB	1				
PDCCH_RB	dB	1				
PBCH_RA	dB	-3				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA Note2	dB					
OCNG_RB Note2	dB					
N_{oc}	dBm/15 kHz	-98				
SNR Note 7	dB	-5.6	-9.6	-13.6	-9.6	-5.6
Propagation condition		AWGN				
Correlation Matrix and Antenna Configuration		2x1				

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 4: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 5: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 6: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 7: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.37.1-1.

Table A.7.3.37.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync test for UE category 0

Field	Value	Comment
onDurationTimer	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table A.7.3.37.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD out-of-sync testing for UE category 0

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

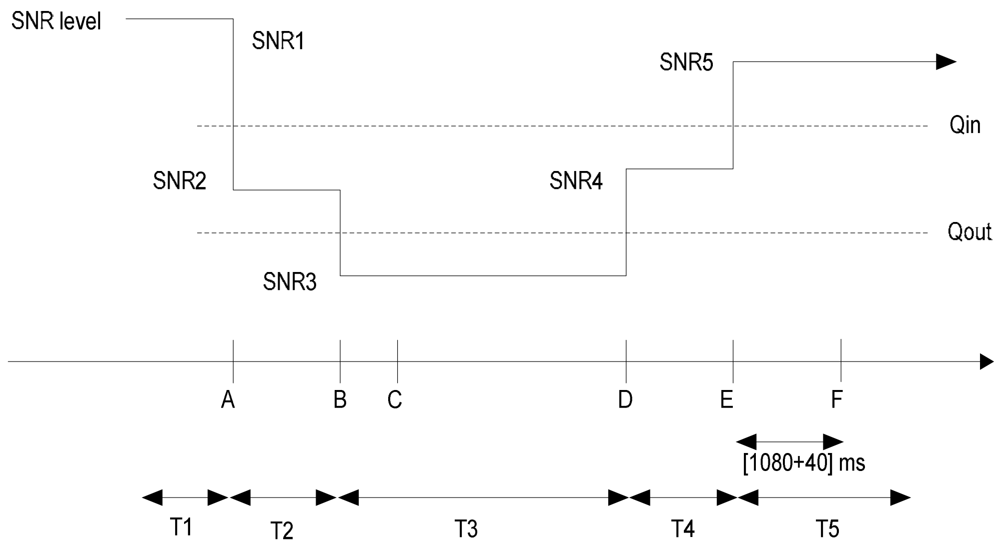


Figure A.7.3.37.1-1: SNR variation for in-sync testing in DRX

A.7.3.37.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.38 E-UTRAN FDD-FDD DC Radio Link Monitoring Test for Out-of-sync in DRX in synchronous DC

A.7.3.38.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.38.1-1, A.7.3.38.1-2, A.7.3.38.1-3, and A.7.3.38.1-4. There are two cells, cell 1 is PCell and cell 2 is PSCell, in the test. The test consists of three successive time periods with time duration of T1, T2 and T3 respectively. Figure A.7.3.38.1-1 shows the variation of the downlink SNR in the PCell and PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.38.1-1: General test parameters for E-UTRAN FDD out-of-sync tests in DRX in synchronous dual connectivity

Parameter		Unit	Value	Comment
Active cell			Cell 1 Cell 2	Cell 1 is PCell on E-UTRA RF channel number 1, and cell 2 is PSCell on E-UTRA RF channel number 2
CP length			Normal	
E-UTRA RF Channel Number			1, 2	Two E-UTRA FDD carrier frequencies are used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	5, 10, 20	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		5MHz: 3 10MHz: 2 20MHz: 2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle on cell 1		ms	640	See Table A.7.3.38.1-3
DRX cycle on cell 2		ms	40	See Table A.7.3.38.1-3
Timing offset between cell 1 and cell 2		μs	33	For synchronous dual connectivity
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1; N313 = 1; N314 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	0	T313 is disabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.8	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.38.1-2: Cell specific test parameters for E-UTRAN FDD out-of-sync radio link monitoring in DRX in synchronous dual connectivity

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	5, 10, 20			5, 10, 20		
Correlation Matrix and Antenna Configuration		2x2 Low			2x2 Low		
PCFICH/PDCCH/PHICH parameters None of the PDCCH are intended for the UE under test		5MHz: R.12 FDD 10MHz: R.7 FDD 20MHz: R.13 FDD			5MHz: R.12 FDD 10MHz: R.7 FDD 20MHz: R.13 FDD		
OCNG Pattern		5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
ρA, ρB		-3			-3		
PCFICH_RB	dB	1			1		
PDCCH_RA	dB	1			1		
PDCCH_RB	dB	1			1		
PBCH_RA	dB	-3			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note1	dB						
OCNG_RB Note1	dB						
SNR Note 6 (5MHz bandwidth)	dB	-2.3	-2.3	-2.3	-2.3	-5.7	-12.2
SNR Note 6 (10MHz bandwidth)	dB	-2.3	-2.3	-2.3	-2.3	-6.2	-12.2
SNR Note 6 (20MHz bandwidth)	dB	-2.9	-2.9	-2.9	-2.9	-6.8	-12.8
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			ETU 70 Hz		
Time offset to cell1	μs	-			33		

Note 1: OCNG shall be used such that the resources in cell 1 and cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2, and T3 are denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.38.1-1.

Table A.7.3.38.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests in synchronous dual connectivity

Field	Value		Comment
	Cell 1	Cell 2	
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	Sf640	Sf40	
shortDRX	disable	disable	

Table A.7.3.38.1-4: TimeAlignmentTimer -Configuration for E-UTRAN FDD out-of-sync testing in synchronous dual connectivity

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section 10.1 in TS 36.213.

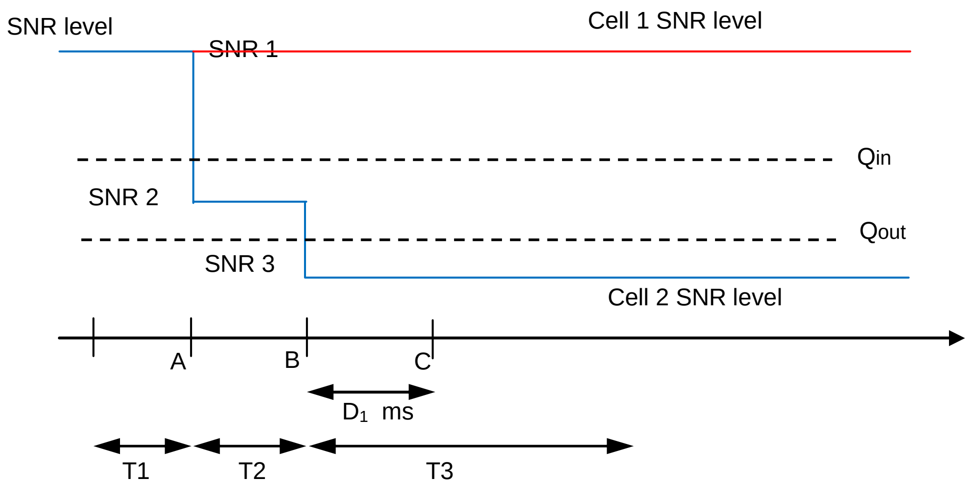


Figure A.7.3.38.1-1 SNR variation for out-of-sync testing in DRX

A.7.3.38.2 Test Requirements

The UE behaviour during time durations T1, T2, and T3 shall be as follows:

During time durations T1, T2 and T3, the UE shall transmit uplink signal at least in all subframes configured for CQI transmission on Cell1.

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe on Cell2.

The UE shall stop transmitting uplink signal no later than time point C (duration D1 = 900 ms after the start of time duration T3) on PSCell.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.39 E-UTRAN FDD-FDD DC Radio Link Monitoring Test for Out-of-sync in DRX in asynchronous DC

A.7.3.39.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used in asynchronous dual connectivity. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in section 7.6.

The test parameters are given in Tables A.7.3.39.1-1, A.7.3.39.1-2, A.7.3.39.1-3 and A.7.3.39.1-4. There are two cells in the test. Cell 1 is PCell in MCG and cell 2 is PSCell in SCG. Before the test starts the UE is connected to cell 1 on radio channel 1 and to cell 2 on radio channel 2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. The downlink SNR in cell 1 keeps constant in the test. Figure A.7.3.39.1-1 shows the variation of the downlink SNR in the cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2 in asynchronous dual connectivity. For both cells, the UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

Table A.7.3.39.1-1: General test parameters for E-UTRAN FDD out-of-sync in DRX

Parameter		Unit	Value	Comment
Active cells			Cell 1 and cell 2	Cell 1 (PCell) is on E-UTRA RF channel number 1 and cell 2 (PSCell) is on E-UTRA RF channel number 2
CP length			Normal	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		5MHz: 3 10MHz: 2 20MHz: 2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle in cell 1		ms	640	See Table A.7.3.39.1-3
DRX cycle in cell 2		ms	40	See Table A.7.3.39.1-3
Layer 3 filtering			Enabled	*Counters:* *N310 = 1; N311 = 1;* *N313 = 1; N314 = 1;*
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	0	T313 is disabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.8	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel. Note 2: The test parameters in the table apply to both cell 1 and cell 2 unless specified otherwise. Note 3: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.6.11.				

Table A.7.3.39.1-2: Cell specific test parameters for E-UTRAN FDD for out-of-sync radio link monitoring in DRX

Parameter		Unit	Cell 1 (PCell)			Cell 2 (PSCell)		
			T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number			1			2		
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	5, 10, 20			5, 10, 20		
PCFICH/PDCCH/PHICH parameters. None of the PDCCH are intended for the UE under test.			5MHz: R.12 FDD 10MHz: R.7 FDD 20MHz: R.13 FDD			5MHz: R.12 FDD 10MHz: R.7 FDD 20MHz: R.13 FDD		
Correlation Matrix and Antenna Configuration			2x2 Low			2x2 Low		
OCNG Pattern defined in A.3.2.1 (FDD)			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
ρ_A, ρ_B			-3			-3		
PCFICH_RB		dB	1			1		
PDCCH_RA		dB	1			1		
PDCCH_RB		dB	1			1		
PBCH_RA		dB	-3			-3		
PBCH_RB		dB						
PSS_RA		dB						
SSS_RA		dB						
PHICH_RA		dB						
PHICH_RB		dB						
PDSCH_RA		dB						
PDSCH_RB		dB						
OCNG_RA Note1		dB						
OCNG_RB Note1		dB						
SNR Note 6	5MHz $BW_{channel}$	dB	-2.3	-2.3	-2.3	-2.3	-5.7	-12.2
	10MHz $BW_{channel}$	dB	-2.3	-2.3	-2.3	-2.3	-6.2	-12.2
	20MHz $BW_{channel}$	dB	-2.9	-2.9	-2.9	-2.9	-6.8	-12.8
N_{oc}		dBm/15 kHz	-98			-98		
Propagation condition			ETU 70 Hz			ETU 70 Hz		
Receive time offset to cell1 Note 7		μs	-			500		

Note 1: OCNG shall be used such that the resources in Cell 1 and Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.39.1-1.
Note 7: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.7.3.39.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Value		Comment
	Cell 1	Cell 2	
onDurationTimer	psf2	psf2	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf640	sf40	
shortDRX	disable	disable	

Table A.7.3.39.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD out-of-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

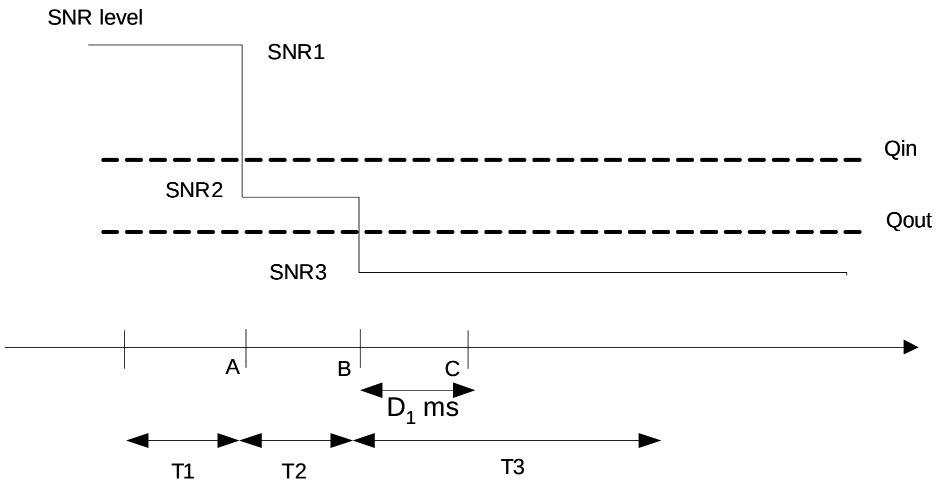


Figure A.7.3.39.1-1 SNR variation for out-of-sync test in DRX

A.7.3.39.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In the test, during time durations T1, T2 and T3, the UE shall transmit uplink signal on cell 1 at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

In the test, during the period from time point A to time point B the UE shall transmit uplink signal on cell 2 at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

In the test, the UE shall stop transmitting uplink signal on cell 2 no later than time point C (duration D_1 = 900 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.40 E-UTRAN TDD-TDD DC Radio Link Monitoring Test for Out-of-sync in DRX in synchronous DC

A.7.3.40.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.40.1-1, A.7.3.40.1-2, A.7.3.40.1-3, and A.7.3.40.1-4. There are two cells, cell 1 is PCell and cell 2 is PSCell, in the test. The test consists of three successive time periods with time duration of T1, T2 and T3 respectively. Figure A.7.3.40.1-1 shows the variation of the downlink SNR in the PCell and PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.40.1-1: General test parameters for E-UTRAN TDD out-of-sync tests in DRX in synchronous dual connectivity

Parameter		Unit	Value	Comment
Active cell			Cell 1 Cell 2	Cell 1 is PCell on E-UTRA RF channel number 1, and cell 2 is PSCell on E-UTRA RF channel number 2
CP length			Normal	
E-UTRA RF Channel Number			1, 2	Two E-UTRA TDD carrier frequencies are used.
E-UTRA Channel Bandwidth (BWchannel)		MHz	5, 10, 20	
Correlation Matrix and Antenna Configuration			2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.101 [5] Annex B.2.3.2
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		5MHz: 3 10MHz: 2 20MHz: 2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρA, ρB		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX cycle on cell 1		ms	640	See Table A.7.3.40.1-3
DRX cycle on cell 2		ms	40	See Table A.7.3.40.1-3
Timing offset between cell 1 and cell 2		μs	33	For synchronous dual connectivity
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1; N313 = 1; N314 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	0	T313 is disabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.8	
Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.				

Table A.7.3.40.1-2: Cell specific test parameters for E-UTRAN TDD out-of-sync radio link monitoring in DRX in synchronous dual connectivity

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	5, 10, 20			5, 10, 20		
Correlation Matrix and Antenna Configuration		2x2 Low			2x2 Low		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
PCFICH/PDCCH/PHICH parameters None of the PDCCH are intended for the UE under test		5MHz: R.12 TDD 10MHz: R.7 TDD 20MHz: R.13 TDD			5MHz: R.12 TDD 10MHz: R.7 TDD 20MHz: R.13 TDD		
OCNG Pattern		5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
ρA, ρB		-3			-3		
PCFICH_RB	dB	1			1		
PDCCH_RA	dB	1			1		
PDCCH_RB	dB	1			1		
PBCH_RA	dB	-3			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note3]	dB						
OCNG_RB[Note3]	dB						
SNR [Note 8] (5MHz bandwidth)	dB	-1.6	-1.6	-1.6	-1.6	-5.2	-11.9
SNR [Note 8] (10MHz bandwidth)	dB	-2.3	-2.3	-2.3	-2.3	-5.9	-11.9
SNR [Note 8] (20MHz bandwidth)	dB	-3.0	-3.0	-3.0	-3.0	-6.6	-12.6
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		ETU 70 Hz			ETU 70 Hz		
Time offset to cell1	μs	-			33		

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.3.40.1-1.

Table A.7.3.40.1-3: DRX-Configuration for E-UTRAN TDD out-of-sync tests in synchronous dual connectivity

Field	Value		Comment
	Cell 1	Cell 2	
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	Sf640	Sf40	
shortDRX	disable	disable	

Table A.7.3.26.1-4: TimeAlignmentTimer -Configuration for E-UTRAN FDD out-of-sync testing in synchronous dual connectivity

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section 10.1 in TS 36.213.

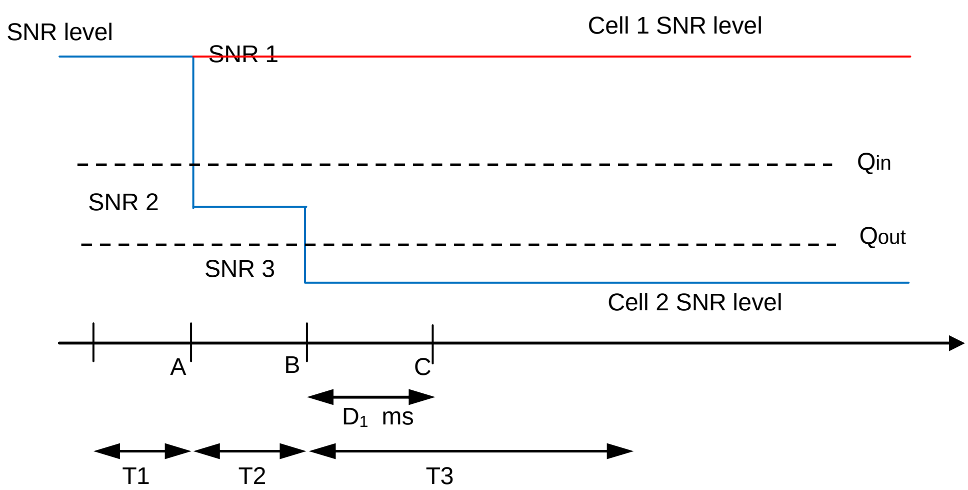


Figure A.7.3.40.1-1 SNR variation for out-of-sync testing in DRX

A.7.3.40.2 Test Requirements

The UE behaviour during time durations T1, T2, and T3 shall be as follows:

During time durations T1, T2 and T3, the UE shall transmit uplink signal at least in all subframes configured for CQI transmission on Cell1.

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe on Cell2.

The UE shall stop transmitting uplink signal no later than time point C (duration D1 = 900 ms after the start of time duration T3) on PSCell.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.41 E-UTRAN FDD-FDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

A.7.3.41.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used in dual connectivity. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.41.1-1, A.7.3.41.1-2, A.7.3.41.1-3 and A.7.3.41.1-4. There are two cells, cell 1 is PCell and cell 2 is PSCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.41.1-1 shows the variation of the downlink SNR in the PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration for PCell and PSCell is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.41.1-1: General test parameters for E-UTRAN FDD-FDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two E-UTRA FDD carrier frequency are used.
Active cell			Cell 1, Cell 2	Cell 1 is PCell on E-UTRA RF channel number 1, and cell 2 is PSCell on E-UTRA RF channel number 2
CP length			Normal	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	For 10MHz and 20MHz channel BW
	Number of Control OFDM symbols		3	For 5MHz channel BW
	Aggregation level	CCE	4	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-2 respectively.
	ρA, ρB		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	For 10MHz and 20MHz channel BW
	Number of Control OFDM symbols		3	For 5MHz channel BW
	Aggregation level	CCE	8	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	ρA, ρB		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle on Cell 1		ms	640	See Table A.7.3.41.1-3
DRX cycle on Cell 2		ms	40	See Table A.7.3.41.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1, N313 = 1, N314 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	2000	T313 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel. Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.				

Table A.7.3.41.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Parameter	Unit	Cell 1(PCell)	Cell 2 (PSCell)				
		T1 ~ T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1	2				
$BW_{channel}$	MHz	5: $N_{RB,c}$ = 25 10: $N_{RB,c}$ = 50 20: $N_{RB,c}$ = 100	5: $N_{RB,c}$ = 25 10: $N_{RB,c}$ = 50 20: $N_{RB,c}$ = 100				
PCFICH/PDCCH/PHICH parameters defined in A.3.1.2.1		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				
OCNG Pattern defined in A.3.2.1 (FDD)		5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD				
ρ_A, ρ_B		0	0				
PCFICH_RB	dB	4	4				
PDCCH_RA	dB	0	0				
PDCCH_RB	dB	0	0				
PBCH_RA	dB	0	0				
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note1]	dB						
OCNG_RB[Note1]	dB						
SNR [Note 6] 5MHz $BW_{channel}$	dB	-2.3	-2.3	-5.7	-12.2	-7.3	-2.3
SNR [Note 6] 10MHz $BW_{channel}$	dB	-4.7	-4.7	-9.5	-13.5	-8.7	-4.7
SNR [Note 6] 20MHz $BW_{channel}$	dB	-4.7	-4.7	-9.5	-13.5	-8.7	-4.7
N_{oc}	dBm/15 kHz	-98					
Propagation condition		AWGN	AWGN				
Correlation Matrix and Antenna Configuration		1x2	1x2				
Receive time offset to cell1 [Note 7]	μs	-	33				

Note 1: OCNG shall be used such that the resources in cell 1 and cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR of cell 2 in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.41.1-1.
Note 7: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.7.3.41.1-3: DRX-Configuration for E-UTRAN FDD-FDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Field	Value		Comment
	Cell 1	Cell 2	
onDurationTimer	psf2	psf2	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf640	sf40	
shortDRX	disable	disable	

Table A.7.3.41.1-4: TimeAlignmentTimer -Configuration for E-UTRAN FDD-FDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

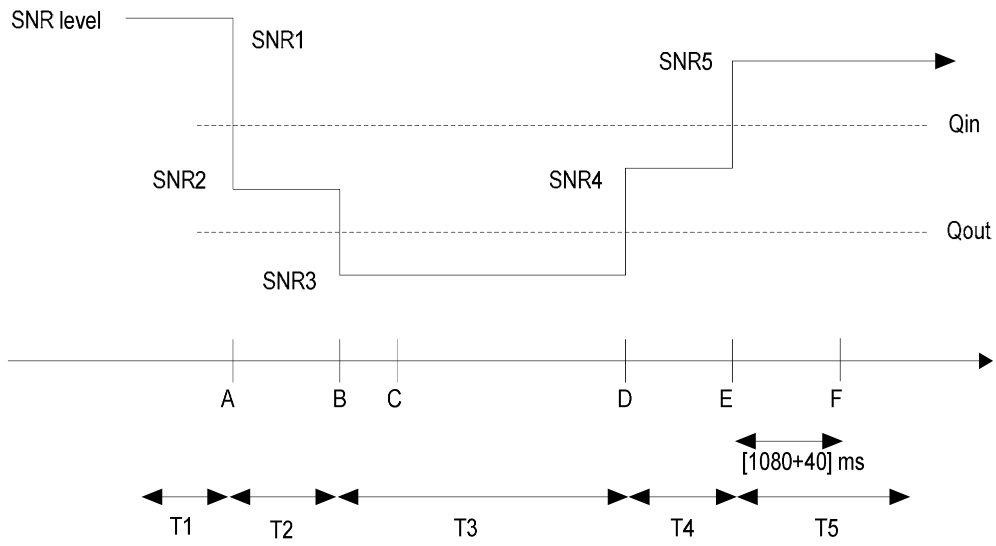


Figure A.7.3.41.1-1 SNR variation of cell 2 (PSCell) for in-sync testing in DRX

A.7.3.41.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0) on PCell and PSCell.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.42 E-UTRAN FDD-FDD DC Radio Link Monitoring Test for In-sync in DRX in asynchronous DC

A.7.3.42.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used in asynchronous dual connectivity. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.42.1-1, A.7.3.42.1-2, A.7.3.42.1-3 and A.7.3.42.1-4. There are two cells in the test. Cell 1 is PCell in MCG and cell 2 is PSCell in SCG. Before the test starts the UE is connected to cell 1 on radio channel 1 and to cell 2 on radio channel 2. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. The downlink SNR in cell 1 keeps constant in the test. Figure A.7.3.42.1-1 shows the variation of the downlink SNR in cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2 in asynchronous dual connectivity. For both cell 1 and cell 2, the UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.42.1-1: General test parameters for E-UTRAN FDD in-sync test in DRX

Parameter		Unit	Value	Comment
Active cells			Cell 1 and cell 2	Cell 1 (PCell) is on E-UTRA RF channel number 1 and cell 2 (PSCell) is on E-UTRA RF channel number 2
CP length			Normal	
Antenna Configuration			1x2	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		5MHz: 3 10MHz: 2 20MHz: 2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle in cell 1		ms	640	See Table A.7.3.42.1-3
DRX cycle in cell 2		ms	40	See Table A.7.3.42.1-3
Layer 3 filtering			*Enabled*	*Counters:* *N310 = 1; N311 = 1;* *N313 = 1; N314 = 1*
T310 timer		*ms*	*2000*	*T310 is enabled*
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	2000	T313 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel. Note 2: The parameters in the table apply to both cell 1 and cell 2 unless defined otherwise. Note 3: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.6.11.				

Table A.7.3.42.1-2: Cell specific test parameters for E-UTRAN FDD for in-sync radio link monitoring in DRX

Parameter		Unit	Cell 1 (PCell)	Cell 2 (PSCell)				
			T1 ~ T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number			1	2				
E-UTRA Channel Bandwidth ($BW_{channel}$)		MHz	5, 10, 20	5, 10, 20				
PCFICH/PDCCH/PHICH parameters. None of the PDCCH are intended for the UE under test.			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				
OCNG Pattern			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD				
ρ_A, ρ_B			0	0				
PCFICH_RB		dB	4	4				
PDCCH_RA		dB	0	0				
PDCCH_RB		dB	0	0				
PBCH_RA		dB	0	0				
PBCH_RB		dB						
PSS_RA		dB						
SSS_RA		dB						
PHICH_RA		dB						
PHICH_RB		dB						
PDSCH_RA		dB						
PDSCH_RB		dB						
OCNG_RA Note1		dB						
OCNG_RB Note1		dB						
SNR Note 6	5MHz $BW_{channel}$	dB	-2.3	-2.3	-5.7	-12.2	-7.3	-2.3
	10MHz $BW_{channel}$	dB	-4.7	-4.7	-9.5	-13.5	-8.7	-4.7
	20MHz $BW_{channel}$	dB	-4.7	-4.7	-9.5	-13.5	-8.7	-4.7
N_{oc}		dBm/15 kHz	-98					
Propagation condition			AWGN					
Receive time offset to cell1 Note 7		μs	-	500				

Note 1: OCNG shall be used such that the resources in cell 1 and cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 6: The SNR of cell 2 in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.6.1-1.
Note 7: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells..

Table A.7.3.42.1-3: DRX-Configuration for E-UTRAN FDD out-of-sync tests

Field	Cell 1	Cell 2	Comment
onDurationTimer	psf2	psf2	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf640	sf40	
shortDRX	disable	disable	

Table A.7.3.42.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD out-of-sync testing

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

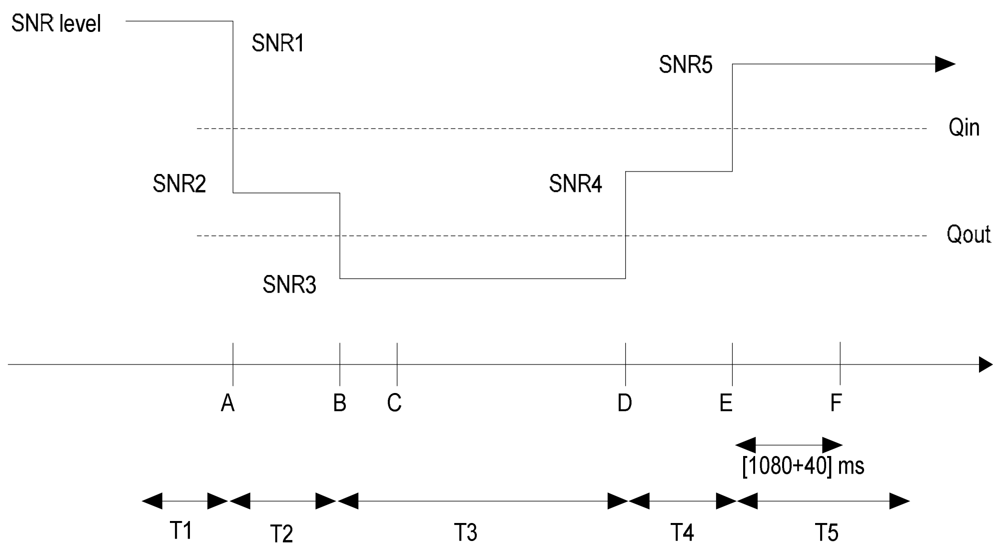


Figure A.7.3.42.1-1 Cell 2 SNR variation for in-sync testing in DRX

A.7.3.42.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal on cell 2 at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.3.43 E-UTRAN TDD-TDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

A.7.3.43.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used in dual connectivity. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in clause 7.6.

The test parameters are given in Tables A.7.3.43.1-1, A.7.3.43.1-2, A.7.3.43.1-3 and A.7.3.43.1-4. There are two cells, cell 1 is PCell and cell 2 is PSCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.3.43.1-1 shows the variation of the downlink SNR in the PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms. In the test, DRX configuration for PCell and PSCell is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.7.3.43.1-1: General test parameters for E-UTRAN TDD-TDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two E-UTRA TDD carrier frequency are used.
Active cell			Cell 1, Cell 2	Cell 1 is PCell on E-UTRA RF channel number 1, and cell 2 is PSCell on E-UTRA RF channel number 2
CP length			Normal	
In sync transmission parameters (Note 1)	DCI format		1C	As defined in clause 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	For 10MHz and 20MHz channel BW
	Number of Control OFDM symbols		3	For 5MHz channel BW
	Aggregation level	CCE	4	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-2 respectively.
	ρA, ρB		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Note 1)	DCI format		1A	As defined in clause 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	For 10MHz and 20MHz channel BW
	Number of Control OFDM symbols		3	For 5MHz channel BW
	Aggregation level	CCE	8	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in clause 7.6.1 and Table 7.6.1-1 respectively.
	ρA, ρB		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle on Cell 1		ms	640	See Table A.7.3.43.1-3
DRX cycle on Cell 2		ms	40	See Table A.7.3.43.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1, N313 = 1, N314 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
T313 timer		ms	2000	T313 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	Minimum CQI reporting periodicity
T1		s	4	
T2		s	1.6	
T3		s	1.46	
T4		s	0.4	
T5		s	4	
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel. Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.				

Table A.7.3.43.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Parameter		Unit	Cell 1(PCell)	Cell 2 (PSCell)				
			T1 ~ T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number			1	2				
$BW_{channel}$		MHz	5: $N_{RB,c}$ = 25 10: $N_{RB,c}$ = 50 20: $N_{RB,c}$ = 100	5: $N_{RB,c}$ = 25 10: $N_{RB,c}$ = 50 20: $N_{RB,c}$ = 100				
Special subframe configuration Note1			6	6				
Uplink-downlink configuration Note2			1	1				
PCFICH/PDCCH/PHICH parameters defined in A.3.1.2.1			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD				
OCNG Pattern defined in A.3.2.1 (FDD)			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD				
ρ_A, ρ_B			0	0				
PCFICH_RB		dB	4	4				
PDCCH_RA		dB	0	0				
PDCCH_RB		dB	0	0				
PBCH_RA		dB	0	0				
PBCH_RB		dB						
PSS_RA		dB						
SSS_RA		dB						
PHICH_RA		dB						
PHICH_RB		dB						
PDSCH_RA		dB						
PDSCH_RB		dB						
OCNG_RA Note1		dB						
OCNG_RB Note1		dB						
SNR Note 6	5MHz $BW_{channel}$	dB	-5.1	-5.1	-9.1	-13.1	-9.1	-5.1
	10MHz $BW_{channel}$		-5.1	-5.1	-9.1	-13.1	-9.1	-5.1
	20MHz $BW_{channel}$		-5.1	-5.1	-9.1	-13.1	-9.1	-5.1
N_{oc}		dBm/15 kHz	-98					
Propagation condition			AWGN	AWGN				
Correlation Matrix and Antenna Configuration			1x2	1x2				
Receive time offset to cell1 Note 9		µs	-	33				

Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.
Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.
Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.43.1-1.
Note 9: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.7.3.43.1-3: DRX-Configuration for E-UTRAN TDD-TDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Field	Value		Comment
	Cell 1	Cell 2	
onDurationTimer	psf2	psf2	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf640	sf40	
shortDRX	disable	disable	

Table A.7.3.43.1-4: TimeAlignmentTimer -Configuration for E-UTRAN TDD-TDD Radio Link Monitoring Test for In-sync in DRX in synchronous dual connectivity

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

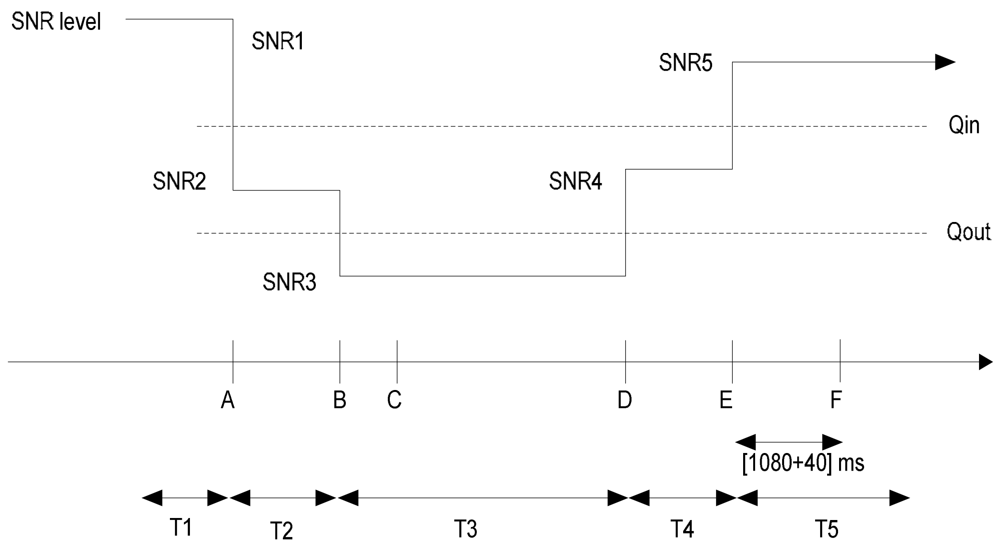


Figure A.7.3.43.1-1 SNR variation of cell 2 (PSCell) for in-sync testing in DRX

A.7.3.43.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0) on PCell and PSCell.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.4 Interruption for Dual Connectivity

A.7.4.1 E-UTRAN FDD-FDD DC interruption at transitions between active and non-active during DRX in synchronous DC

A.7.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that when PCell is in non-DRX and PSCell is in DRX, PCell interruptions due to transitions from active to non-active and from non-active to active during PSCell DRX the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for FDD PCell in dual connectivity requirements in clause 7.12.2.

The test parameters are given in Table A.7.4.1.1-1, A.7.4.1.1-2 and A.7.4.1.1-3 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. PCell is continuously scheduled in DL while PSCell is not scheduled and has DRX configured. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Cell1 shall be configured as PCell and Cell2 shall be configured as PSCell. Prior to start of T1 the DRX inactivity timer for the PSCell have already expired. During T1 the UE shall be continuously scheduled on PCell while not scheduled on PSCell.

Table A.7.4.1.1-1: General test parameters for E-UTRAN FDD-FDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test.
Active PCell		Cell1	PCell on RF channel number 1.
Configured PSCell		Cell2	PSCell on RF channel number 2.
CP length		Normal	
DRX		ON	DRX related parameters are defined in Table A.8.23.4.1-3
Measurement gap pattern Id		OFF	
T1	s	10	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: A UE capable of both synchronous and asynchronous DC operations is only required to pass this test case in accordance with the principle defined in section A.3.11.			

Table A.7.4.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Parameter	Unit	Cell1	Cell2
		T1	T1
E-UTRA RF Channel Number		1	2
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.TBD FDD 10MHz: R.3 FDD 20MHz: R.6 FDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns		5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_PB	dB		
PDCCH_RA	dB		
PDCCH_PB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 KHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	19	19
$\hat{E}_s/I_{ot}$	dB	19	19
RSRP Note 3	dBm/15 KHz	-82	-82
SCH_RP Note 3	dBm/15 KHz	-82	-82
Io Note 3	dBm/Ch BW	-54.16 +10log ($N_{RB,c}$ /50)	-54.16 +10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN	AWGN
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low
Time offset to cell1 Note 4	µs	-	33

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.7.4.1.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer[Note 1]	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	Sf160	
shortDRX	disable	disable	
Note 1: UE is continuously scheduled in PCell			

A.7.4.1.2 Test Requirements

The UE shall shall be continuously scheduled in PCell during the entire length of T1. UE shall not be scheduled in PSCell during T1. During the time duration T1 the UE shall transmit at leat 99% of ACK/NACK on PCell.

The UE shall not miss transmitting two consequtive ACK/NACK.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.4.2 E-UTRAN TDD-TDD DC interruption at transitions between active and non-active during DRX in synchronous DC

A.7.4.2.1 Test Purpose and Environment

The purpose of this test is to verify that when PCell is in non-DRX and PSCell is in DRX, PCell interruptions due to transitions from active to non-active and from non-active to active during PSCell DRX the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for TDD PCell in dual connectivity requirements in clause 7.12.2.

The test parameters are given in Table A.7.4.2.1-1, A.7.4.2.1-2 and A.7.4.2.1-3 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. PCell is continuously scheduled in DL while PSCell is not scheduled and has DRX configured. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Cell1 shall be configured as PCell and Cell2 shall be configured as PSCell. Prior to start of T1 the DRX inactivity timer for the PSCell have already expired. During T1 the UE shall be continuously scheduled on PCell while not scheduled on PSCell.

Table A.7.4.2.1-1: General test parameters for E-UTRAN TDD-TDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test.
Active PCell		Cell1	PCell on RF channel number 1.
Configured PSCell		Cell2	PSCell on RF channel number 2.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1
Uplink-downlink configuration		1	As specified in table 4.2-1 in TS 36.211. Applicable to Cell1
CP length		Normal	As specified in table 4.2-2 in TS 36.211. Applicable to Cell1
DRX		ON	DRX related parameters are defined in Table A.8.23.4.1-3
Measurement gap pattern Id		OFF	
T1	s	10	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: A UE capable of both synchronous and asynchronous DC operations is only required to pass this test case in accordance with the principle defined in section A.3.11.			

Table A.7.4.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Parameter	Unit	Cell1	Cell2
		T1	T1
E-UTRA RF Channel Number		1	2
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.4 FDD	5MHz: R.TBD TDD 10MHz: R.TBD TDD 20MHz: R.TBD TDD
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
OCNG Patterns		5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_PB	dB		
PDCCH_RA	dB		
PDCCH_PB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 KHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	19	19
$\hat{E}_s/I_{ot}$	dB	19	19
RSRP Note 2	dBm/15 KHz	-82	-82
SCH_RP Note 2	dBm/15 KHz	-82	-82
Io Note 3	dBm/Ch BW	-54.16 +10log ($N_{RB,c}$ /50)	-54.16 +10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN	AWGN
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low
Time offset to cell1 Note 3	µs	-	33

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.7.4.2.1-3: DRX-Configuration for E-UTRAN TDD-TDD DC interruption at transitions between active and non-active during DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer[Note 1]	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	Sf160	
shortDRX	disable	disable	
Note 1: UE is continuously scheduled in PCell			

A.7.4.2.2 Test Requirements

The UE shall shall be continuously scheduled in PCell during the entire length of T1. UE shall not be scheduled in PSCell during T1. During the time duration T1 the UE shall transmit at leat 99% of ACK/NACK on PCell.

The UE shall not miss transmitting two consequtive ACK/NACK.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.4.3 E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

A.7.4.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE fulfils the requirement on interruptions on PCell at transitions between active and non-active during DRX in TS36.133 section 7.12.2.

The test parameters are given in Table A.7.4.3.1-1, Table A.7.4.3.1-2and Table A.7.4.3.1-3 below. In the test there are two cells: Cell 1 and Cell 2. Cell 1 is PCell on the FDD primary component (RF channel 1). Cell 2 is PSCell on the FDD secondary component (RF channel 2). The test consists of 1 time period, with time duration of T1. PDCCH indicating a new transmission on PCell shall be sent continuously during the whole time duration to ensure UE would not enter DRX state on PCell. PSCell is in DRX state with 320ms DRX cycle.

Table A.7.4.3.1-1: General test parameters for E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active Cell		Cell 1, Cell 2	Cell 1 is PCell on E-UTRA RF channel number 1, and cell 2 is PSCell on E-UTRA RF channel number 2
CP length		Normal	
DRX on Cell1		OFF	
DRX on Cell2	ms	320	
Filter coefficient		0	L3 filtering is not used
T1	s	5	
Note 1: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.			

Table A.7.4.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

Parameter	Unit	Cell 1	Cell 2
		T1	T1
E-UTRA RF Channel Number		1	2
$BW_{channel}$	MHz	5: $N_{RB,c}$ = 25 10: $N_{RB,c}$ = 50 20: $N_{RB,c}$ = 100	5: $N_{RB,c}$ = 25 10: $N_{RB,c}$ = 50 20: $N_{RB,c}$ = 100
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low
PDSCH parameters		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD	-
PCFICH/PDCCH/PHICH parameters		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_PB	dB		
PDCCH_RA	dB		
PDCCH_PB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 3	dBm/15 KHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	19	19
$\hat{E}_s/I_{ot}$	dB	19	19
RSRP Note 4	dBm/15 KHz	-82	-82
SCH_RP Note 4	dBm/15 KHz	-82	-82
Io Note 3	dBm/Ch BW	-54.16+10log ($N_{RB,c}$ /50)	-54.16+10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN	AWGN
Antenna Configuration		1x2	1x2
Receive timing offset to Cell1 Note 5	µs	-	500

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission on PCell are assigned to the UE prior to the start of time period T1 to the end of T2. The resources for uplink transmission on PSCell are assigned to the UE prior to the start of time period T3 to the end of T4.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.7.4.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

Field	PSCell	Comment
	Value	
onDurationTimer	psf1	
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf320	
shortDRX	disable	
Note: For further information see clause 6.3.2 in TS 36.331.		

Table A.7.4.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD Interruption at transitions between active and non-active during DRX in asynchronous dual connectivity

Field	PSCell	Comment
	Value	
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.7.4.3.2 Test Requirements

The UE shall be scheduled on PCell continuously during the whole time duration T1. During time durations T1, at least 99% of all expected ACK/NACKs shall be transmitted on PCell by the UE.

Each interruption shall not exceed 1 subframe.

The rate of correct events observed during repeated tests shall be at least 90%.

A.7.5 Proximity-based Services

A.7.5.1 E-UTRAN FDD – UE ProSe Direct Discovery Transmission Timing Accuracy Test

A.7.5.1.1 Test Purpose and Environment

The purpose of this test is to verify the timing requirements for ProSe Direct Discovery transmissions when PCell downlink timing is used as a reference with $N_{\mathrm{TA,SL}} = 0$. This test will verify the requirements in clause 7.16.2.1.1.1 ProSe Direct Discovery transmissions. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to announce ProSe Direct Discovery.

The test parameters are given in Table A.7.5.1.1-1 below. There is one active cell (PCell) in this test. The transmit timing is verified using the transmission timing of PSDCH.

Table A.7.5.1.1-1: Test parameters for ProSe Transmission Timing Accuracy test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth ($BW_{channel}$)	MHz	5	
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal	
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
ProSe Direct Discovery resource pool configuration		As specified in Table A.3.12.4-1 (Configuration #1)	IE values unless specified otherwise in this test.
PDCCH/PCFICH/PHICH Reference measurement channel Note1		R.11 FDD	
OCNG Pattern Note2		OP.16 FDD	
PBCH_RA	dB	0	
PBCH_RB			
PSS_RA			
SSS_RA			
PCFICH_RB			
PHICH_RA			
PHICH_RB			
PDCCH_RA			
PDCCH_RB			
OCNG_RA Note3			
OCNG_RB Note3			
N_{oc}	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
RSRP Note4	dBm/15 kHz	-95	
SCH_RP Note 4	dBm/15 kHz	-95	
Propagation condition		AWGN	

Note 1: For the reference measurement channels, see clause A.3.1.
Note 2: For the OCNG pattern, see clause A.3.2.
Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.7.5.1.2 Test Requirements

For parameters specified in Tables A.7.5.1.1-1, the timing accuracy for ProSe Direct Discvoery transmissions shall be within the limits defined in clause 7.16.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 5MHz channel bandwidth, the test sequence shall be carried out in RRC_CONNECTED DRX with a cycle length of 320ms:

a) After a connection is set up with the cell, the test system shall verify that the ProSe UE transmit timing offset is within ± $12 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+32 \times T_S$ (approximately +1μs) compared to that in (a). The test system shall wait for at least one discovery period (320ms) before verifying the requirement again in (c).

c) The test system shall verify that the UE transmit timing offset stays within ± $12 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

A.7.5.2 E-UTRAN TDD – UE ProSe Direct Discovery Transmission Timing Accuracy Test

A.7.5.2.1 Test Purpose and Environment

The purpose of this test is to verify the timing requirements for ProSe Direct Discovery transmissions when PCell downlink timing is used as a reference with $N_{\mathrm{TA,SL}} = 0$. This test will verify the requirements in clause 7.16.2.1.1.1 for ProSe Direct Discovery transmissions. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to announce ProSe Direct Discovery.

The test parameters are given in Table A.7.5.2.1-1 below. There is one active cell (PCell) in this test. The transmit timing is verified using the transmission timing of PSDCH.

Table A.7.5.2.1-1: Test parameters for ProSe Transmission Timing Accuracy test for E-UTRAN TDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth ($BW_{channel}$)	MHz	5	
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
Uplink/Downlink Configuration		Config 0	
Special Subframe Configuration		6	
CP length of Cell 1		Normal	
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
ProSe Direct Discovery resource pool configuration		As specified in Table A.3.12.4-3 (Configuration #3)	IE values unless specified otherwise in this test.
PDCCH/PCFICH/PHICH Reference measurement channel Note1		R.11 TDD	
OCNG Pattern Note2		OP.10 TDD	
PBCH_RA	dB	0	
PBCH_RB			
PSS_RA			
SSS_RA			
PCFICH_RB			
PHICH_RA			
PHICH_RB			
PDCCH_RA			
PDCCH_RB			
OCNG_RA Note3			
OCNG_RB Note3			
N_{oc}	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
RSRP Note4	dBm/15 kHz	-95	
SCH_RP Note 4	dBm/15 kHz	-95	
Propagation condition		AWGN	
Note 1: For the reference measurement channels, see clause A.3.1. Note 2: For the OCNG pattern, see clause A.3.2. Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

A.7.5.1.2 Test Requirements

For parameters specified in Tables A.7.5.2.1-1, the timing accuracy for ProSe Direct Discvoery transmissions shall be within the limits defined in clause 7.16.2.

The following sequence of events shall be used to verify that the requirements are met.

For the 5MHz channel bandwidth, the test sequence shall be carried out in RRC_CONNECTED DRX with a cycle length of 320ms:

a) After a connection is set up with the cell, the test system shall verify that the ProSe UE transmit timing offset is within $624 \times T_S \pm 12 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+32 \times T_S$ (approximately +1μs) compared to that in (a). The test system shall wait for at least one discovery period (320ms) before verifying the requirement again in (c).

c) The test system shall verify that the UE transmit timing offset stays within $624 \times T_S \pm 12 \times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

A.7.5.3 E-UTRAN FDD - Interruptions due to ProSe Direct Discovery

A.7.5.3.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to the allowed PCell interruptions due to ProSe Direct Discovery defined in clause 7.16.3.1 and clause 7.16.3.3. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to monitor ProSe Direct Discovery.

The test parameters are given in Table A.7.5.3.1-1 and Table A.7.5.3.1-2 below. There is one active cell (PCell) in this test and 24 active Sidelink transmissions in this test (with 12 active Sidelink UEs per configured discovery subframe). Two tests (Test 1 and Test 2) are defined to verify interruptions due to synchronous (Test 1) and asynchronous (Test 2) ProSe Direct Discovery.

The tests consist of three successive time periods, with time duration of T1, T2 and T3 respectively.

During T1, the UE is in RRC_IDLE and monitoring the ProSe Direct Discovery announcements from other active Sidelink UEs on the ProSe Direct Discvoery resources.

During T2, the test system establishes a RRC connection with the UE. No PDSCH traffic is scheduled for UE during T2, and the UE is expected to transmit *SidelinkUEInformation* indicating *discRxInterest* during T2. On reception of *SidelinkUEInformation*, the test system shall RRC reconfiguration message to the UE and wait for the UE to respond with RRC reconfiguration complete message before transitioning to T3. If the UE does not transmit *SidelinkUEInformation* for up to [2] sec, the test system shall transition to T3.

During T3, the UE is scheduled with PDSCH traffic on PCell downlink. The test system will count the missed ACK/NACKs during T3 to verify the allowed interruptions during ProSe Direct Discovery.

Table A.7.5.3.1-1: Test parameters for interruption due to ProSe Direct Discovery tests

Parameter	Unit	Value		Comment
		Test 1	Test 2	
E-UTRA RF Channel Number		1		
Channel Bandwidth ($BW_{channel}$)	MHz	5		
Active cell		Cell 1		E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal		
T1	s	5.12		
T2	s	Up to receiving RRC reconfiguration setup complete from the UE, or up to [2] sec if UE does not transmit *SidelinkUEInformation* during this period.		
T3	s	10.24		

Table A.7.5.3.1-2: ProSe Direct Discovery configuration for interruption due to ProSe Direct Discovery tests

Parameter	Unit	Value		Comment
		Test 1	Test 2	
E-UTRA RF Channel Number		1		UL carrier frequency
Channel Bandwidth ($BW_{channel}$)	MHz	5		
ProSe Direct Discovery resource pool configuration		As specified in Table A.3.12.4-1 (Configuration #1)	As specified in Table A.3.12.4-2 (Configuration #2)	IE values unless specified otherwise in this test.
Active Sidelink UEs Configuration		PDP.1.FDD As specified in Table A.3.12.8.2-1	PDP.2.FDD As specified in Table A.3.12.8.2-1	Transmitting ProSe Direct Discovery (Test 1 and 2) and SLSS (for Test 2)

Table A.7.5.3.1-3: Cell specific test parameters for interruption due to ProSe Direct Discovery tests

Parameter		Unit	Cell 1		
			T1	T2	T3
E-UTRA RF Channel Number			1		
$BW_{channel}$		MHz	5		
UE RRC state			IDLE	CONNECTED	
Paging configuration	defaultPagingCycle		rf256	N/A	
	nB		T / 32		
DRX			N/A	OFF	
PDSCH Reference measurement channel defined in A.3.1.1.1[Note1]			N/A	None	R.5 FDD
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1[Note1]			R.11 FDD		
OCNG Pattern			OP.16 FDD		
PBCH_RA		dB	0		
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA[Note 1]					
OCNG_RB[Note 1]					
N_{oc} [Note2]		dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$		dB	16		
RSRP[Note3]		dBm/15 kHz	-82		
SCH_RP[Note 3]		dBm/15 kHz	-82		
Propagation Condition			AWGN		
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.7.5.3.2 Test Requirements

The UE shall be scheduled on PCell continuously during T3.

In Test 1, at least 98.75% of all expected ACK/NACKs during T3 shall be transmitted by the ProSe UE. The missed ACK/NACKs can occur only on subframe ‘n’, if either n±1 subframe is a discovery subframe, or if n-3, or n-5 is a discovery subframe.

NOTE: For the test configuration in Table A.7.5.3.1-1 and Table A.7.5.3.1-2, the specific subframes where missed ACK/NACKs are allowed are when (subframe mod 320) = 159, 163, 162, 166, corresponding to allowed interruptions on subframe 159 and 162.

In Test 2, at least 97.5% of all expected ACK/NACKs during T3 shall be transmitted by the ProSe UE. The missed ACK/NACK can occur only on subframe ‘n’, if either n±5 subframe is a discovery or SLSS subframe, or if n+1, or n-9 is a discovery or SLSS subframe.

NOTE: For the test configuration in Table A.7.5.3.1-1 and Table A.7.5.3.1-2, the specific subframes where missed ACK/NACKs are allowed are when (subframe mod 320) = 135, 139, 145, 149, 155, 159, 166, 170, corresponding to allowed interruptions on subframes 135, 145, 155 and 166.

A.7.5.4 E-UTRAN FDD – UE ProSe Direct Communication Transmission Timing Accuracy Test

A.7.5.4.1 Test Purpose and Environment

The purpose of this test is to verify the timing requirements for ProSe Direct Communication transmissions when PCell downlink timing is used as a reference with $N_{\mathrm{TA,SL}} = 0$. This test will verify the requirements in clause 7.16.2.1.1.1 for ProSe Direct Communication transmissions. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A.7.5.4.1-1 below. There is one active cell (PCell) in this test. The test system will configure the ProSe UE to transmit SLSS in each period (40ms) by configuring *networkControlledSyncTx* as ON via dedicated RRC signaling. The transmit timing is verified using the transmission timing of SLSS transmissions.

Table A.7.5.4.1-1: Test parameters for ProSe Transmission Timig Accuracy test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth ($BW_{channel}$)	MHz	5 or 10	Note 5
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal	
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
ProSe Direct Communication configuration		As specified in Table A.3.12.5-1 (Configuration #1)	IE values unless specified otherwise in this test.
networkControlledSyncTx		ON	Configured
PDCCH/PCFICH/PHICH Reference measurement channel[Note1]		5 MHz: R.11 FDD 10 MHz: R.6 FDD	
OCNG Pattern[Note2]		5 MHz: OP.16 FDD 10 MHz: OP.2 FDD	
PBCH_RA	dB	0	
PBCH_RB			
PSS_RA			
SSS_RA			
PCFICH_RB			
PHICH_RA			
PHICH_RB			
PDCCH_RA			
PDCCH_RB			
OCNG_RA[Note3]			
OCNG_RB[Note3]			
N_{oc}	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	3	
RSRP [Note4]	dBm/15 kHz	-95	
SCH_RP [Note 4]	dBm/15 kHz	-95	
Propagation condition		AWGN	
Note 1: For the reference measurement channels, see clause A.3.1. Note 2: For the OCNG pattern, see clause A.3.2. Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 5: This test is according to the principle defined in section A.3.12.3.			

A.7.5.4.2 Test Requirements

For parameters specified in Tables A.7.5.4.1-1, the timing accuracy for ProSe Direct Communication transmissions shall be within the limits defined in clause 7.16.2. The timing accuracy is verified using SLSS transmissions.

The following sequence of events shall be used to verify that the requirements are met.

For 5MHz or 10MHz channel bandwith, the test sequence shall be carried out in RRC_CONNECTED DRX with a cycle length of 320ms:

a) After a connection is set up with the cell, the test system shall verify that the ProSe UE SLSS transmission timing offset is within $\pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

b) The test system adjusts the downlink transmit timing for the cell by $+32\times T_S$ (approximately +1µs) compared to that in (a). The test system shall wait for at least one SLSS period (40ms) before verifying the requirement again in (c).

c) The test system shall verify that the UE SLSS transmissiontiming offset stays within $\pm 12\times T_S$ with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

A.7.5.5 E-UTRAN FDD - Interruptions due to ProSe Direct Communication

A.7.5.5.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to PCell interruptions due to ProSe Direct Communication defined in clause 7.16.3. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to monitor ProSe Direct Communication.

The test parameters are given in Table A.7.5.5.1-1, Table A.7.5.5.1-2 and Table A.7.5.5.1-3 below. There is one active cell (PCell) in this test and 12 (5MHz) or 16 (10 MHz) active Sidelink UEs in this test transmitting ProSe Direct Communication.

The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively.

During T1, the UE is in RRC_IDLE and monitoring the ProSe Direct Communication transmission from other active Sidelink UEs on the ProSe Direct Communication resoruces.

During T2, the test system establishes a RRC connection with the UE. No PDSCH traffic is scheduled for UE during T2, and the UE is expected to transmit *SidelinkUEInformation* indicating *commRxInterestedFreq* during T2. On reception of *SidelinkUEInformation*, the test system shall RRC reconfiguration message to the UE and wait for the UE to repond with RRC reconfiguration complete message before transitioning to T3. If the UE does not transmit *SidelinkUEInformation* for up to [2] sec, the test system shall transition to T3.

During T3, the UE is scheduled with PDSCH traffic on PCell downlink. The test system will count the missed ACK/NACKs during T3 to verify the allowed interruptions during ProSe Direct Communication (no missed ACK/NACKs are allowed).

Table A.7.5.5.1-1: Test parameters for interruption due to ProSe Direct Communication tests

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth ($BW_{channel}$)	MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal	
T1	s	5.12	
T2	s	Up to receiving RRC reconfiguration setup complete from the UE, or up to [2] sec if UE does not transmit *SidelinkUEInformation* during this period.	
T3	s	10.24	
Note 1: This test is according to the principle defined in section A.3.12.3.			

Table A.7.5.5.1-2: ProSe Direct Communication specific configuration for interruption due to ProSe Direct Communication tests

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	UL carrier frequency
Channel Bandwidth ($BW_{channel}$)	MHz	5 or 10	According to principle defined in clause A.3.12.3
ProSe Direct Communication configuration		As specified in Table A.3.12.5-1 (Configuration #1)	IE values unless specified otherwise in this test.
Active Sidelink UEs Configuration[Note 1]		PCP.1.FDD As specified in Table A.3.12.8.1-1	Transmitting ProSe Direct Communication (PSCCH + PSSCH)
Note 1: This test is according to the principle defined in section A.3.12.3.			

Table A.7.5.5.1-2: Cell specific test parameters for interruption due to ProSe Direct Communication tests

Parameter		Unit	Cell 1		
			T1	T2	T3
E-UTRA RF Channel Number			1		
$BW_{channel}$ Note 4		MHz	5 or 10		
UE RRC state			IDLE	CONNECTED	
Paging configuration	defaultPagingCycle		rf256	N/A	
	nB		T / 32		
DRX			N/A	OFF	
PDSCH Reference measurement channel defined in A.3.1.1.1 Note1, Note 4			N/A	None	R.7 FDD (5MHz) or R.3 FDD (10MHz) (Note 5 applies)
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1 Note1, Note 4			5 MHz: R.11 FDD 10 MHz: R.6 FDD		
OCNG Pattern Note 4			5 MHz: OP.16 10 MHz: OP.2 FDD		
PBCH_RA		dB	0		
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA Note 1					
OCNG_RB Note 1					
N_{oc} Note2		dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$		dB	16		
RSRP Note3		dBm/15 kHz	-82		
SCH_RP Note 3		dBm/15 kHz	-82		
Propagation Condition			AWGN		

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: This test is according to the principle defined in section A.3.12.3.
Note 5: The PDSCH scheduled subframes for R.7 FDD (5MHz) / R.3 FDD (10MHz) is changed as per the following bitmap that repeats every 40ms.
PDSCH scheduled subframe bitmap: {01110111 11110111 11110111 11110111 11110110}.

A.7.5.5.2 Test Requirements

The UE shall be scheduled on PCell continuously during T3. During T3, 100% of all expected ACK/NACKs shall be transmitted by the ProSe UE.

A.8 UE Measurements Procedures

The reference channels in this clause assume transmission of PDSCH with a maximum number of 5 HARQ transmissions unless otherwise specified.

A.8.1 E-UTRAN FDD Intra-frequency Measurements

A.8.1.1 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

A.8.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.1.2.2.1.1.

The test parameters are given in Table A.8.1.1.1-1 and A.8.1.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.1.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.1.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.2 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

A.8.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.1.2.2.1.1

The test parameters are given in Table A.8.1.2.1-1 and A.8.1.2.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions shall be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.2.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 μs	Synchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.2.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.1.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.3 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

A.8.1.3.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.1.2.2.1.2.

The test parameters are given in Tables A.8.1.3.1-1, A.8.1.3.1-2, A.8.1.3.1-3 and A.8.1.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.3.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.0 FDD		As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1
Active cell		Cell 1		
Neighbour cell		Cell 2		Cell to be identified.
E-UTRA RF Channel Number		1		One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Hysteresis	dB	0		
Time To Trigger	s	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.1.3.1-3
Time offset between cells		3 μs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.1.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.1.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.1.3.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.1.4 Void

A.8.1.5 E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

A.8.1.5.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.2.3.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.5.1-1 and A.8.1.5.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.1.5.1-1: General test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.1.5.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.10 (OP.10 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.10 FDD	OP.10 FDD	OP.10 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 1]	dB						
OCNG_RB[Note 1]	dB						

$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.8.1.5.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI, intra}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 80 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 80 ACK/NACK number is caused by two parts. Firstly, at least 60 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.1.2.2.3.1. Secondly, given that continuous DL data allocation, additional 20 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

A.8.1.6 E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

A.8.1.6.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.2.3. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.6.1-1, A.8.1.6.1-2, A.8.1.6.1-3 and A.8.1.6.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.1.6.1-1: General test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.1.6.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	s	5	
T2	s	≤30	UE shall report cell within 25.6s (20 DRX cycles)
T3	s	5	

Table A.8.1.6.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA [Note 1]	dB						
OCNG_RB [Note 1]	dB						

$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

Table A.8.1.6.1-3: DRX configuration for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.1.6.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.1.6.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI,\,intra}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.1.7 E-UTRAN FDD-FDD Intra-Frequency Event-Triggered Reporting under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

A.8.1.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects and reports Event A3 (Neighbour becomes offset better than PCell) defined in TS 36.331 [2] within the requirements specified in Clause 8.1.2.8.1.1 under a time domain measurement resource restriction and non-MBSFN ABS configured in the aggressor cell.

The test parameters are given in Tables A.8.1.7.1-1 and A.8.1.7.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A3 is used. In the test there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. Cell 1 is the PCell, and it is also the aggressor cell to Cell 2. Cell 2 is the cell to be identified. The test consists of two successive time periods with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information on Cell 2.

Non-MBSFN ABS pattern is configured for Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells. The UE is also configured with a time domain measurement resource restriction pattern for the PCell measurements. The information for both measurement patterns shall be provided to the UE via higher layers during T1.

Table A.8.1.7.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
PCell		Cell 1	Also the aggressor cell. Active in T1 and T2
Neighbour cell		Cell 2	Cell to be identified. Active only in T2.
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One FDD carrier frequency is used
Channel Bandwidth ($BW_{channel}$)	MHz	10	For all cells in the test
A3-Offset	dB	-11	
Event A3 measurement quantity		RSRP	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 µs	Synchronous cells
T1	s	5	
T2	s	5	
Physical cell ID PCI		$(PCI_{cell1} - PCI_{cell2})$mod6 !=0	Cell PCIs are selected so that the condition is met
ABS pattern		'1000000010000000100000001000000010000000'	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1 during T1. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'1000000010000000100000001000000010000000'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331, clause 6.3.5. Configured during T1 for Cell 2 measurements.
Time domain measurement resource restriction pattern for PCell measurements		'0100000001000000010000000100000001000000'	Configured during T1 for Cell 1 measurements

Table A.8.1.7.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and in A.3.2.1.6 (OP.6 FDD)		OP.5 FDD		OP.6 FDD	
PBCH_RA	dB	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
$(\hat{E}_s / N_{oc})_{meas}$ Note 5	dB	1	1	-Infinity	-4
$(\hat{E}_s / N_{oc})_{ABS}$	dB	1	1	N/A	N/A
RSRP Note 4,5	dBm/15 kHz	-97	-97	-Infinity	-102
SCH_RP Note 4	dBm/15 kHz	-97	-97	-Infinity	-102
CRS $\hat{E}_s / I_{ot}$	dB	1	-0.5	-Infinity	-4
SCH $\hat{E}_s / I_{ot}$	dB	1	-0.5	-Infinity	-7.5
Propagation Condition		ETU30			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 5: RSPP is estimated for Cell 2 during the restricted measurement subframes for neighbour cells. RSPP is estimated for Cell 1 during the PCell restricted subframes.					

A.8.1.7.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 2, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event-triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for the tested Event A3.

NOTE: The actual overall delays measured in the tests may be up to $2 \times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.8 E-UTRAN FDD-FDD Intra-Frequency Event-Triggered Reporting under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.8.1.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects and reports Event A3 (neighbour becomes offset better than PCell) defined in TS 36.331 [2] within the requirements specified in Clause 8.1.2.8.3, when the UE is provided with a time-domain measurement resource restriction pattern and CRS assistance information, and when non-MBSFN ABS configured in the interfering cells.

The test parameters are given in Tables A.8.1.8.1-1 and A.8.1.8.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A3 is used. In the test, there are three synchronous cells, Cell 1, Cell 2, and Cell 3, on the same RF channel. Cell 1 is the PCell. Cell 3 is the cell to be identified. A non-MBSFN ABS pattern is configured in each of the Cell 1 and Cell 2 during the entire test.The test consists of two successive time periods with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information on Cell 3.

The UE is configured by higher layers with a time domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells, nsamely Cell 3 measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement patterns and the CRS assistance information shall be provided via RRC to the UE during T1.

Table A.8.1.8.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
PCell			Cell 1	Also a first interfering cell to Cell 3. Active in T1 and T2.
Neighbour cells			Cell 2 and Cell 3	Cell 2 is a second interfering cell; Cell 2 is active in T1 and T2. Cell 3 is the cell to be identified; Cell 3 is active only in T2.
ABS transmission configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number			1	One FDD carrier frequency is used
Channel Bandwidth ($BW_{channel}$)		MHz	10	For all cells in the test
A3-Offset		dB	-14	
Event A3 measurement quantity			RSRP	
CP length			Normal	
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
Time offset between cells		μs	Cell 2 offset with respect to Cell 1: 0 Cell 3 offset with respect to Cell 1: -2.5	Three synchronous cells
T1		S	5	
T2		S	5	
Physical cell IDs			$(PCI_{cell1} - PCI_{cell3})$mod6 = 0 $(PCI_{cell2} - PCI_{cell3})$mod6 != 0 PCI_{cell1} not equal to PCI_{cell3}	Cell PCIs are selected so that all conditions are met
ABS pattern			'1000000010000000100000001000000010000000'	FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes. Configured in Cell 1 and Cell 2 during T1.
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1			'1000000010000000100000001000000010000000'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Configured during T1 for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Time domain measurement resource restriction pattern for PCell measurements			'0100000001000000010000000100000001000000'	Configured during T1 for Cell 1 measurements
CRS assistance information	physCellId		see PCI conditions above	The CRS assistance information is provided for Cell 2 only in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation *one Frame*='000000'.
	antennaPortsCount		1	
	mbsfn-SubframeConfigList		*oneFrame* = '000000'	

Table A.8.1.8.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		1		1	
$BW_{channel}$	MHz	10		10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and in A.3.2.1.6 (OP.6 FDD)		OP.5 FDD		OP.6 FDD		N/A	OP.6 FDD
PBCH_RA	dB	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.		Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.		N/A	0
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
$(\hat{E}_s / N_{oc})$	dB	4	4	2	2	-Infinity	-4
RSRP Note 4	dBm/15 kHz	-94	-94	-96	-96	-Infinity	-102
SCH_RP Note 4	dBm/15 kHz	-94	-94	-96	-96	-Infinity	-102
CRS $\hat{E}_s/I_{ot}$ Note 5	dB	4	2.54	2	0.54	-Infinity	-9.46
SCH $\hat{E}_s/I_{ot}$	dB	-0.12	-0.75	-3.45	-3.92	-Infinity	-11.07
Propagation Condition		ETU30		ETU30		ETU30	

NOTE 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
NOTE 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
NOTE 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
NOTE 4: RSRP, SCH_RP, and $\hat{E}_s/I_{ot}$ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
NOTE 5: Applies during the restricted measurement subframes configured for neighbour cell (Cell 3) measurements.

A.8.1.8.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event-triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for the tested Event A3.

NOTE: The actual overall delays measured in the tests may be up to $2\times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.9 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for 5MHz bandwidth

A.8.1.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.1.1.1.

The parameters of this test are the same as defined in Subclause A.8.1.1.1 except that the values of the parameters in the Table A.8.1.9.1-1 will replace the values of the corresponding parameters in A.8.1.1.1-1, and the values of the parameters in the Table A.8.1.9.1-2 will replace the values of the corresponding parameters in A.8.1.1.1-2.

Table A.8.1.9.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1
Note 1: See Table A.8.1.1.1-1 for the other parameters. Note 2: This test is according to the principle defined in section A.3.7.2.			

Table A.8.1.9.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for 5MHz

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
$BW_{channel}$	MHz	5		5	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)		OP.15 FDD		OP.16 FDD	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: See Table A.8.1.1.1-2 for the other parameters.					

A.8.1.9.2 Test Requirements

The test requirements defined in section A.8.1.1.2 shall apply to this test case.

A.8.1.10 E-UTRAN FDD-FDD Intra-Frequency Event Triggered Reporting under Fading Propagation Conditions in Synchronous Cells with DRX for 5 MHz Bandwidth

A.8.1.10.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.1.2.2.1.2.

The parameters of this test are the same as defined in Section A.8.1.3.1 except that the values of the parameters in the Table A.8.1.10.1-1 will replace the values of the corresponding parameters in A.8.1.3.1-1, and the values of the parameters in the Table A.8.1.10.1-2 will replace the values of the corresponding parameters in A.8.1.3.1-2.

Table A.8.1.10.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.5 FDD		As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD		As specified in clause A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	5		
NOTE 1: See Table A.8.1.3.1-1 for the other parameters. NOTE 2: This test is according to the principle defined in Section A.3.7.2.				

Table A.8.1.10.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
$BW_{channel}$	MHz	5		5	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.15 FDD		OP.16 FDD	
NOTE 1: See Table A.8.1.3.1-2 for the other parameters.					

A.8.1.10.2 Test Requirements

The test requirements defined in Section A.8.1.3 shall apply to this test case.

A.8.1.11 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for UE category 0

A.8.1.11.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.5.2.1.1.

The test parameters are given in Table A.8.1.11.1-1 and A.8.1.11.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.11.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.13 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.11.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		2x1		2x1	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.1.11.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.12 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

A.8.1.12.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.5.2.1.1

The test parameters are given in Table A.8.1.12.1-1 and A.8.1.12.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.12.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.13 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 µs	Synchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.12.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		2x1		2x1	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.1.12.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.13 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX for UE category 0

A.8.1.13.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.5.2.1.1.2.

The test parameters are given in Tables A.8.1.13.1-1, A.8.1.13.1-2, A.8.1.13.1-3 and A.8.1.13.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.13.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.13 FDD		As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1
Active cell		Cell 1		
Neighbour cell		Cell 2		Cell to be identified.
E-UTRA RF Channel Number		1		One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Hysteresis	dB	0		
Time To Trigger	s	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.1.13.1-3
Time offset between cells		3 μs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.1.13.11-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		2x1		2x1	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.13.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.1.13.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.1.13.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.1.14 E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for UE category 0

A.8.1.14.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.5.2.1.2.1.

The test parameters are given in Table A.8.1.14.1-1 and A.8.1.14.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.14.1-1: General test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.1 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.14.1-2: Cell specific test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		2x1		2x1	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.1.14.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.15 E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells for UE category 0

A.8.1.15.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.5.2.1.2.1

The test parameters are given in Table A.8.1.15.1-1 and A.8.1.15.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.15.1-1: General test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.1 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 µs	Synchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.15.1-2: Cell specific test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		2x1		2x1	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.1.15.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.16 E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX for UE category 0

A.8.1.16.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.5.2.1.2.2.

The test parameters are given in Tables A.8.1.16.1-1, A.8.1.16.1-2, A.8.1.16.1-3 and A.8.1.16.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.16.1-1: General test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.1 HD-FDD		As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.3 HD-FDD		As specified in clause A.3.1.2.3
Active cell		Cell 1		
Neighbour cell		Cell 2		Cell to be identified.
E-UTRA RF Channel Number		1		One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Hysteresis	dB	0		
Time To Trigger	s	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.1.16.1-3
Time offset between cells		3 μs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.1.16.1-2: Cell specific test parameters for E-UTRAN HD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		2x1		2x1	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.16.1-3: DRX-Configuration for E-UTRAN HD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.1.16.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN HD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.1.16.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.1.17 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

A.8.1.17.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in clause 8.5.2.1.3.1.

The test parameters are given in Table A.8.1.17.1-1 and A.8.1.17.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.1.17.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.12 TDD	As specified in clause A.3.1.1.5
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 μs	Synchronous cells
T1	s	5	
T2	s	5	

Table A.8.1.17.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		2x1		2x1	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
Propagation Condition		ETU70			
Note 1 OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.1.17.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.1.18 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

A.8.1.18.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in clause 8.5.2.1.3.2.

The test parameters are given in Tables A.8.1.18.1-1, A.8.1.18.1-2, A.8.1.18.1-3 and A.8.1.18.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.1.18.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.12 TDD		As specified in clause A.3.1.1.5
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in clause A.3.1.2.2
Active cell		Cell 1		
Neighbour cell		Cell 2		Cell to be identified.
E-UTRA RF Channel Number		1		One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1		As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0		
Time To Trigger	s	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.1.18.1-3
Time offset between cells		3 µs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.1.18.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		2x1		2x1	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.1.18.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.1.18.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and clause 10.1 in TS 36.213.

A.8.1.18.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.1.19 E-UTRAN FD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

A.8.1.19.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.4.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.19.1-1 and A.8.1.19.1-2. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.1.19.1-1: General test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.15 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.1.19.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x1			2x1		
OCNG Patterns defined in A.3.2.1.10 (OP.10 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.10 FDD	OP.10 FDD	OP.10 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA	dB	-3			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB	0			0		
PHICH_RA	dB	-3			-3		
PHICH_PB	dB						
PDCCH_RA	dB	0			0		
PDCCH_PB	dB						
PDSCH_RA	dB	-3			-3		
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Timing offset to Cell 1	ms	-			3		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.1.19.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 210 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI\_LC\text{-}UE,\ intra}$ + reporting delay

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 210 ms at least 112 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 112 ACK/NACK number is caused by two parts. Firstly, at least 92 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.5.2.1.4. Secondly, given that continuous DL data allocation, additional 20 ACK/NACK shall be sent from the start of T3 until 210 ms excludes 190 ms for identifying the cell global identifier of cell 2.

A.8.1.20 E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

A.8.1.20.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.4. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.20.1-1, A.8.1.20.1-2, A.8.1.20.1-3 and A.8.1.20.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.1.20.1-1: General test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.14 FDD	As specified in clause A.3.1.1.3
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.1.6.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	s	5	
T2	s	≤30	UE should report cell within 25.6s (20 DRX cycles)
T3	s	5	

Table A.8.1.20.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x1			2x1		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA	dB	-3			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB	0			0		
PHICH_RA	dB	-3			-3		
PHICH_PB	dB						
PDCCH_RA	dB	0			0		
PDCCH_PB	dB						
PDSCH_RA	dB	-3			-3		
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s / I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s / N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Timing offset to Cell 1	ms	-			3		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

Table A.8.1.20.1-3: DRX configuration for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.1.20.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.1.20.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 210 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{\text{identify\_CGI\_LC-UE, intra}}$ + reporting delay

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.1.21 E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

A.8.1.21.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.5.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.21.1-1 and A.8.1.21.1-2. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.1.21.1-1: General test parameters for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.2 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.1.21.1-2: Cell specific test parameters for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps for UE category 0

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x1			2x1		
OCNG Patterns defined in A.3.2.1.10 (OP.10 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.10 FDD	OP.10 FDD	OP.10 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA	dB	-3			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB	0			0		
PHICH_RA	dB	-3			-3		
PHICH_PB	dB						
PDCCH_RA	dB	0			0		
PDCCH_PB	dB						
PDSCH_RA	dB	-3			-3		
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Timing offset to Cell 1	ms	-			3		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.8.1.21.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 210 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI\_LC-UE,\ intra}$ + reporting delay

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 210 ms at least 112 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 112 ACK/NACK number is caused by two parts. Firstly, at least 92 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.5.2.1.5. Secondly, given that continuous DL data allocation, additional 20 ACK/NACK shall be sent from the start of T3 until 210 ms excludes 190 ms for identifying the cell global identifier of cell 2.

A.8.1.22 E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

A.8.1.22.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.5. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA FDD carrier and two cells as given in tables A.8.1.22.1-1, A.8.1.22.1-2, A.8.1.22.1-3 and A.8.1.22.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.1.22.1-1: General test parameters for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.2 HD-FDD	As specified in clause A.3.1.1.4
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.3 HD-FDD	As specified in clause A.3.1.2.3
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.1.6.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	s	5	
T2	s	≤30	UE should report cell within 25.6s (20 DRX cycles)
T3	s	5	

Table A.8.1.22.1-2: Cell specific test parameters for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x1			2x1		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA	dB	-3			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB	0			0		
PHICH_RA	dB	-3			-3		
PHICH_PB	dB						
PDCCH_RA	dB	0			0		
PDCCH_PB	dB						
PDSCH_RA	dB	-3			-3		
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Timing offset to Cell 1	ms	-			3		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.1.22.1-3: DRX configuration for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.1.22.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN HD - FDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX for UE category 0

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.1.22.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 210 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI\_LC\text{-}UE,\ intra}$ + reporting delay

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.2 E-UTRAN TDD Intra-frequency Measurements

A.8.2.1 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

A.8.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in clause 8.1.2.2.2.1.

The test parameters are given in Table A.8.2.1.1-1 and A.8.2.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions or retransmissions shall be sent continuously to ensure that the UE would not enter the DRX state. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.2.1.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-6	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in clause A.3.3
Time offset between cells		3 µs	Synchronous cells
T1	s	5	
T2	s	5	

Table A.8.2.1.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
Propagation Condition		ETU70			
Note 1 OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.2.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.2.2 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

A.8.2.2.1 Test Purpose and Environment

The purpose of the two tests is to verify that the UE makes correct reporting of an event in DRX. The tests will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in clause 8.1.2.2.1.2.

The test parameters are given in Tables A.8.1.3.1-1, A.8.1.3.1-2, A.8.1.3.1-3 and A.8.1.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.2.2.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PDSCH parameters		DL Reference Measurement Channel R.0 TDD		As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in clause A.3.1.2.2
Active cell		Cell 1		
Neighbour cell		Cell 2		Cell to be identified.
E-UTRA RF Channel Number		1		One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
A3-Offset	dB	-6		
CP length		Normal		
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1		As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0		
Time To Trigger	s	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table A.8.2.2.1-3
Time offset between cells		3 µs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.2.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.2.2.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.2.2.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and clause 10.1 in TS 36.213.

A.8.2.2.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

In Test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25600 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.2.3 E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

A.8.2.3.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.2.4.

The test scenario comprises of one E-UTRA TDD carrier and two cells as given in tables A.8.2.3.1-1 and A.8.2.3.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.2.3.1-1: General test parameters for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth (BWchannel)	MHz	10	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	μs	3	Synchronous cells
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.2.3.1-2: Cell specific test parameters for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.2.3.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI,intra}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 47 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 47 ACK/NACK number is caused by two parts. Firstly, at least 35 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement for UL/DL configuration #1 in Table 8.1.2.2.4.1-1 of Clause 8.1.2.2.4.1. Secondly, given that continuous DL data allocation, additional 12 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

A.8.2.4 E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

A.8.2.4.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.2.4. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA TDD carrier and two cells as given in tables A.8.2.4.1-1, A.8.2.4.1-2, A.8.2.4.1-3 and A.8.2.4.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.2.4.1-1: General test parameters for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth (BWchannel)	MHz	10	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.2.4.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	μs	3	Synchronous cells
T1	s	5	
T2	s	≤30	UE shall report cell within 25.6s (20 DRX cycles)
T3	s	5	

Table A.8.2.4.1-2: Cell specific test parameters for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.2.4.1-3: DRX configuration for E-UTRAN TDD - TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.2.4.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD - TDD Intra frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.2.4.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{\text{identify\_CGI, intra}}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.2.5 E-UTRAN TDD-TDD Intra-Frequency Event-Triggered Reporting under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

A.8.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects and reports Event A3 (Neighbour becomes offset better than PCell) defined in TS 36.331 [2] within the requirements specified in Clause 8.1.2.8.2.1 under a time domain measurement resource restriction and non-MBSFN ABS configured in the aggressor cell.

The test parameters are given in Tables A.8.2.5.1-1 and A.8.2.5.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A3 is used. In the test there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. Cell 1 is the PCell, and it is also the aggressor cell to Cell 2. Cell 2 is the cell to be identified. The test consists of two successive time periods with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information on Cell 2.

Non-MBSFN ABS pattern is configured for Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells. The UE is also configured with a time domain measurement resource restriction pattern for the PCell measurements. The information for both measurement patterns shall be provided to the UE via higher layers during T1.

Table A.8.2.5.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
PCell		Cell 1	Also the aggressor cell. Active in T1 and T2
Neighbour cell		Cell 2	Cell to be identified. Active only in T2.
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
A3-Offset	dB	-11	
Event A3 measurement quantity		RSRP	
CP length		Normal	
Special subframe configuration		6	As specified in Table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in Table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
T1	s	5	
T2	s	5	
Physical cell ID PCI		(PCI_{cell1} - PCI_{cell2})mod6 != 0	Cell PCIs are selected so that the condition is met
ABS pattern		'00000000010000000001'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1 during T1. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes.
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'00000000010000000001'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331, clause 6.3.5. Configured during T1 for Cell 2 measurements.
Time domain measurement resource restriction pattern for PCell measurements		'10000000001000000000'	Configured during T1 for Cell 1 measurements

Table A.8.2.5.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
$(\hat{E}_s / N_{oc})_{meas}$ Note 5	dB	1	1	-Infinity	-4
$(\hat{E}_s / N_{oc})_{ABS}$	dB	1	1	N/A	N/A
RSRP Note 4,5	dBm/15 kHz	-97	-97	-Infinity	-102
SCH_RP Note 4	dBm/15 kHz	-97	-97	-Infinity	-102
CRS $\hat{E}_s / I_{ot}$	dB	1	-0.5	-Infinity	-4
SCH $\hat{E}_s / I_{ot}$	dB	1	-0.5	-Infinity	-7.5
Propagation Condition		ETU30			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 5: RSPP is estimated for Cell 2 during the restricted measurement subframes for neighbour cells. RSPP is estimated for Cell 1 during the PCell restricted subframes.					

A.8.2.5.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 2, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event-triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for the tested Event A3.

NOTE: The actual overall delays measured in the tests may be up to $2 \times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.2.6 E-UTRAN TDD-TDD Intra-Frequency Event-Triggered Reporting under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.8.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects and reports Event A3 (neighbour becomes offset better than PCell) defined in TS 36.331 [2] within the requirements specified in Clause 8.1.2.8.4, when the UE is provided with a time-domain measurement resource restriction pattern and CRS assistance information, and when non-MBSFN ABS configured in the interfering cells.

The test parameters are given in Tables A.8.2.6.1-1 and A.8.2.6.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A3 is used. In the test, there are three synchronous cells, Cell 1, Cell 2, and Cell 3, on the same RF channel. Cell 1 is the PCell. Cell 3 is the cell to be identified. A non-MBSFN ABS pattern is configured in each of the Cell 1 and Cell 2 during the entire test.The test consists of two successive time periods with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information on Cell 3.

The UE is configured by higher layers with a time domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells, nsamely Cell 3 measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement patterns and the CRS assistance information shall be provided via RRC to the UE during T1.

Table A.8.2.6.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
PCell			Cell 1	Also a first interfering cell to Cell 3. Active in T1 and T2.
Neighbour cells			Cell 2 and Cell 3	Cell 2 is a second interfering cell; Cell 2 is active in T1 and T2. Cell 3 is the cell to be identified; Cell 3 is active only in T2.
ABS transmission configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number			1	One TDD carrier frequency is used
Channel Bandwidth ($BW_{channel}$)		MHz	10	For all cells in the test
A3-Offset		dB	-14	
Event A3 measurement quantity			RSRP	
CP length			Normal	
Special subframe configuration			6	As specified in Table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration			1	As specified in Table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis		dB	0	
Time To Trigger		s	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
Time offset between cells		μs	Cell 2 offset with respect to Cell 1: 0 Cell 3 offset with respect to Cell 1: -2.5	Three synchronous cells
T1		s	5	
T2		s	5	
Physical cell IDs			$(PCI_{cell1} - PCI_{cell3})$mod6 = 0 $(PCI_{cell2} - PCI_{cell3})$mod6 != 0 PCI_{cell1} not equal to PCI_{cell3}	Cell PCIs are selected so that all conditions are met
ABS pattern			'00000000010000000001'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes. Provided fto the UE for Cell 1 and Cell 2 during T1.
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1			'00000000010000000001'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Provided to the UE during T1 for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Time domain measurement resource restriction pattern for PCell measurements			'10000000001000000000'	Configured during T1 for Cell 1 measurements
CRS assistance information	physCellId		see PCI conditions above	The CRS assistance information is provided for Cell 2 only in CRS-AssistanceInfo. It includes a single
	antennaPortsCount		1	

	mbsfn-SubframeConfigList		*oneFrame* = '000000'	MBSFN-SubframeConfig element with subframe allocation *one Frame*='000000'.

Table A.8.2.6.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		1		1	
$BW_{channel}$	MHz	10		10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD		N/A	OP.2 TDD
PBCH_RA	dB	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.		Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.		N/A	0
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
$(\hat{E}_s / N_{oc})$	dB	4	4	2	2	-Infinity	-4
RSRP Note 4	dBm/15 kHz	-94	-94	-96	-96	-Infinity	-102
SCH_RP Note 4	dBm/15 kHz	-94	-94	-96	-96	-Infinity	-102
CRS $\hat{E}_s/I_{ot}$ Note 5	dB	4	2.54	2	0.54	-Infinity	-9.46
SCH $\hat{E}_s/I_{ot}$	dB	-0.12	-0.75	-3.45	-3.92	-Infinity	-11.07
Propagation Condition		ETU30		ETU30		ETU30	

NOTE 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
NOTE 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
NOTE 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
NOTE 4: RSRP, SCH_RP, and $\hat{E}_s/I_{ot}$ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
NOTE 5: Applies during the restricted measurement subframes configured for neighbour cell (Cell 3) measurements.

A.8.2.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3, with a measurement reporting delay less than 1000 ms from the beginning of time period T2.

The UE shall not send event-triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for the tested Event A3.

NOTE: The actual overall delays measured in the tests may be up to $2 \times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.2.7 E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

A.8.2.7.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.6.

The test scenario comprises of one E-UTRA TDD carrier and two cells as given in tables A.8.2.7.1-1 and A.8.2.7.1-2. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.2.7.1-1: General test parameters for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.13 TDD	As specified in clause A.3.1.1.5
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth (BWchannel)	MHz	10	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.2.7.1-2: Cell specific test parameters for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x1			2x1		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	-3			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB	0			0		
PHICH_RA	dB	-3			-3		
PHICH_RB	dB						
PDCCH_RA	dB	0			0		
PDCCH_RB	dB						
PDSCH_RA	dB	-3			-3		
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Timing offset to Cell 1	µs	-			3		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.8.2.7.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 190 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI\_LC\text{-}UE,\ intra}$ + reporting delay

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 190 ms at least 66 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 66 ACK/NACK number is caused by two parts. Firstly, at least 54 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement for UL/DL configuration #1 in Table 8.1.2.2.4.1-1 of Clause 8.1.2.2.4.1. Secondly, given that continuous DL data allocation, additional 12 ACK/NACK shall be sent from the start of T3 until 210 ms excludes 190 ms for identifying the cell global identifier of cell 2.

A.8.2.8 E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

A.8.2.8.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.5.2.1.6. The requirement is verified in a DRX configuration.

The test scenario comprises of one E-UTRA TDD carrier and two cells as given in tables A.8.2.8.1-1, A.8.2.8.1-2, A.8.2.8.1-3 and A.8.2.8.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.2.8.1-1: General test parameters for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.13 TDD	As specified in clause A.3.1.1.5
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth (BWchannel)	MHz	10	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-3	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.2.4.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
T1	s	5	
T2	s	≤30	UE should report cell within 25.6s (20 DRX cycles)
T3	s	5	

Table A.8.2.8.1-2: Cell specific test parameters for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Correlation Matrix and Antenna Configuration		2x1			2x1		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	-3			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB	0			0		
PHICH_RA	dB	-3			-3		
PHICH_RB	dB						
PDCCH_RA	dB	0			0		
PDCCH_RB	dB						
PDSCH_RA	dB	-3			-3		
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	8	-3.3	-3.3	-Infinity	2.36	2.36
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	8	8	8	-Infinity	11	11
RSRP Note 3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
SCH_RP Note3	dBm/15 KHz	-90	-90	-90	-Infinity	-87	-87
Propagation Condition		AWGN					
Timing offset to Cell 1	μs	-			3		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.2.8.1-3: DRX configuration for E-UTRAN TDD Intra-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.2.8.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD Intra frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.2.8.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{\text{identify\_CGI\_LC-UE, intra}}$ + reporting delay

= 15 + 190 + 2ms from the start of T3

= 207 ms, allow 210 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.3 E-UTRAN FDD - FDD Inter-frequency Measurements

A.8.3.1 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

A.8.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.3.1.1-1 and A.8.3.1.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.3.1.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	5	

Table A.8.3.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.3.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.3.2 E-UTRAN FDD-FDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

A.8.3.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These test will partly verify the FDD-FDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The common test parameters are given in Tables A.8.3.2.1-1 and A.8.3.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.3.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.3.2.1-4. In this tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.3.2.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters		DL Reference Measurement Channel R.0 FDD		As specified in clause A.3.1.1.1 Note that UE may only be allocated at *On Duration*
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1.
E-UTRA RF Channel Number		1, 2		Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
Active cell		Cell 1		Cell 1 is on RF channel number 1
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6		
Hysteresis	dB	0		
CP length		Normal		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.3.2.1-3
Time offset between cells		3 ms		Asynchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.3.2.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.					
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.					
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.3.2.1-3: drx-Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

Table A.8.3.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213..

A.8.3.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

A.8.3.3 E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

A.8.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX when L3 filtering is used. This test will partly verify the FDD-FDD inter-frequency cell search in DRX requirements in clause 8.1.2.3.1.2 and the UE behaviour with the *filterCoefficent* defined in TS 36.331 [2].

The test parameters are given in Tables A.8.3.3.1-1, A.8.3.3.1-2, A.8.3.3.1-3 and A.8.3.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and the filter coefficient is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 1 as defined in Table 8.1.2.1-1 is provided.

The uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.3.3.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Neighbour A3-Offset Ofn	dB	-14	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		9	L3 filtering is used
DRX		ON	DRX related parameters are defined in Table A.8.3.3.1-3
Time offset between cells		3 ms	Asynchronous cells
T1	S	30	
T2	S	9	

Table A.8.3.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	4	24
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	4	24
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-74
SCH_RP Note 3	dBm/15 KHz	-94	-94	-94	-74
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.3.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.3.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.3.4 E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

A.8.3.4.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.5.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.8.3.4.1-1 and A.8.3.4.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

Table A.8.3.4.1-1: General test parameters for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF channel number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.3.4.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.10 (OP.10 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.10 FDD	OP.10 FDD	OP.10 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 1]	dB						
OCNG_RB[Note 1]	dB						

$\hat{E}_s/I_{ot}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.8.3.4.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI,inter}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 80 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 80 ACK/NACK number is caused by two parts. Firstly, at least 60 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.1.2.3.5.1. Secondly, given that continuous DL data allocation, and the measurement gaps have been deconfigured before the start of T3, additional 20 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

A.8.3.5 E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.5. The requirement is verified in a DRX configuration.

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables A.8.3.5.1-1, A.8.3.5.1-2, A.8.3.5.1-3 and A.8.3.5.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.3.5.1-1: General test parameters for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF channel number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.3.5.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	s	5	
T2	s	≤30	UE shall report cell within 25.6s (20 DRX cycles)
T3	s	5	

Table A.8.3.5.1-2: Cell specific test parameters for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 1]	dB						
OCNG_RB[Note 1]	dB						

$\hat{E}_s/I_{ot}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

Table A.8.3.5.1-3: DRX configuration for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.3.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.3.5.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI,inter}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.3.6 E-UTRAN FDD-FDD Inter-frequency event triggered reporting without measurement gaps under AWGN propagation conditions in asynchronous cells

A.8.3.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event without measurement gaps. This test will partly verify the FDD-FDD inter-frequency cell search requirements in section 8.1.2.3.

The test parameters are given in Tables A.8.3.6.1-1 and A.8.3.6.1-2. In this test, there are two cells on different carrier frequencies and no gaps are configured in this test. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. PDCCH on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

Table A.8.3.6.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting without measurement gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active PCell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	5	

Table A.8.3.6.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting without measurement gaps

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.1.10 (OP.10 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.10 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		AWGN			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.3.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall send continuous ACK/NACK throughout the test, and from the start of T2 until Event A3 is reported, at least 85% ACK/NACK shall be detected.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.3.7 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells for Increased Carrier Monitoring without Reduced Performance Group

A.8.3.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.3.1.1-1 and A.8.3.1.1-2. In this test, there are four cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cells 2, 3 or 4.

Table A.8.3.7.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1, 2,3,4,5,6,7,8,9	Serving cell and eight FDD carrier frequencies are used in the UE neighbour cell list.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cells		Cell 2, Cell 3, Cell 4	Cells 2, 3, 4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7,8,9
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
Reduced Performance Group Scaling factor	-	8	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
T1	s	5	
T2	s	40	

Table A.8.3.7.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells (Cell # 1 and Cell # 2)

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		Randomly selected from 2,3,4,5,6,7,8 such that cell 2 is in the normal performance group	
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50		5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50	
Measurement bandwidth	n_{PRB}	5MHz: 10-15 10MHz: 22-27		5MHz: 10-15 10MHz: 22-27	
PDSCH Reference measurement channel defined in A.3.1.1.		5MHz: R.5 FDD 10MHz: R.0 FDD		-	
PDSCH allocation	n_{PRB}	5MHz: 7-17 10MHz: 13-36		-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.		5MHz: R.11 FDD 10MHz: R.6 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD	
OCNG Patterns defined in A.3.2.		5MHz: OP.15 FDD 10MHz: OP.1 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98		-98	
$\hat{E}_s / N_{oc}$	dB	4	4	-Infinity	7
$\hat{E}_s / I_{ot}$	dB	4	4	-Infinity	7
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
Io Note 4	dBm/ $BW_{channel}$	-64.76+10log($N_{RB,c}$/50)	-64.76+10log($N_{RB,c}$/50)	-70.22+10log($N_{RB,c}$/50)	-62.43+10log($N_{RB,c}$/50)
Propagation Condition		ETU70		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Timing offset to cell 1	ms	-		3	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled. Note 4: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.3.7.1-3: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells (Cell # 3 and Cell # 4)

Parameter	Unit	Cell 3		Cell 4	
		T1	T2	T1	T2
E-UTRA RF Channel Number		Randomly selected from 2,3,4,5,6,7,8 such that cell 3 is in the normal performance group		Randomly selected from 2,3,4,5,6,7,8 such that cell 4 is in the normal performance group	
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50		5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50	
Measurement bandwidth	n_{PRB}	5MHz: 10-15 10MHz: 22-27		5MHz: 10-15 10MHz: 22-27	
PDSCH Reference measurement channel defined in A.3.1.1.		-		-	
PDSCH allocation	n_{PRB}	-		-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.		5MHz: R.11 FDD 10MHz: R.6 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD	
OCNG Patterns defined in A.3.2.		5MHz: OP.16 FDD 10MHz: OP.2 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98		-98	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	-Infinity	7
$\hat{E}_s/I_{ot}$	dB	-Infinity	7	-Infinity	7
RSRP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91
Io Note 4	dBm/ $BW_{channel}$	-70.22+10log($N_{RB,c}$/50)	-62.43+10log($N_{RB,c}$/50)	-70.22+10log($N_{RB,c}$/50)	-62.43+10log($N_{RB,c}$/50)
Propagation Condition		ETU70		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Timing offset to cell 1	ms	3		3	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
Note 4: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.3.7.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 30.72s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.3.8 FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX

A.8.3.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell measurement requirements for increased UE carrier monitoring in clause 8.1.2.3.

The test parameters are given in Tables A.8.3.8.1-1, A.8.3.8.1-2 and A.8.3.8.1-3. In this test, there are 4 cells on different carrier frequencies and gap pattern configuration #0 as defined in table A.8.3.8.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Events A3 is used. The test consists of two successive time periods for every reptitaion, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of neighoubour cells. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.3.8.1-1: General test parameters for FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1,2,3,4,5,6,7,8,9	Serving cell and 8 FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance
Test equipment configuration		Cell 1 uses E-UTRA RF cannel number 1 Cell 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7,8,9	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Scaling factor configurations		8	As specified in TS 36.133 clause 8.1.2.1.1a
T1	s	5	
T2	s	155	

Table A.8.3.8.1-2: Cell specific test parameters for FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX (cell #1, cell #2)

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		Randomly selected from 2,3,4 such that cell 2 is in the normal performance group	
$BW_{channel}$		5MHz: N_{RB} = 25 10MHz: N_{RB} = 50		5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50	
PDSCH parameters: DL Reference Measurement Channel As specified in clause A.3.1.1.1		5MHz: R.5 FDD 10MHz:R.0 FDD		5MHz: R.5 FDD 10MHz:R.0 FDD	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel As specified in clause A.3.1.2.1		5MHz: R.11 FDD 10MHz:R.6 FDD		5MHz: R.11 FDD 10MHz:R.6 FDD	
OCNG Patterns defined in A.3.2.1.1, A.3.2.1.2 ,A.3.2.1.15 and A.3.2.1.16		5MHz: OP.15 FDD 10MHz:OP.1 FDD		5MHz: OP.16.FDD 10MHz:OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
$\hat{E}_s/I_{ot}$ Note 4	dB	4	4	-Infinity	7
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
Io Note 4	dBm/Ch BW	-64.76 +10log ($N_{RB,c}$ /50)	-64.76 +10log ($N_{RB,c}$ /50)	-70.22 +10log ($N_{RB,c}$ /50)	-62.43 +10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN		AWGN	
Antenna Configuration		1x2		1x2	
Timing offset to Cell 1		-		3ms	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.8.1-3: Cell specific test parameters for FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX (cell #3, cell #4)

Parameter	Unit	Cell 3		Cell 4	
		T1	T2	T1	T2
E-UTRA RF Channel Number		**Randomly selected from 5,6,7,8,9 such that cell 3 is in the reduced performance group**		**Randomly selected from 5,6,7,8,9 such that cell 4 is in the reduced performance group. Cell 4 RF channel is different from Cell 3 RF channel.**	
$BW_{channel}$		5MHz: N_{RB} = 25 10MHz: N_{RB} = 50		5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50	
PDSCH parameters: DL Reference Measurement Channel As specified in clause A.3.1.1.1		5MHz: R.5 FDD 10MHz:R.0 FDD		5MHz: R.5 FDD 10MHz:R.0 FDD	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel As specified in clause A.3.1.2.1		5MHz: R.11 FDD 10MHz:R.6 FDD		5MHz: R.11 FDD 10MHz:R.6 FDD	
OCNG Patterns defined in A.3.2.1.2 and A.3.2.1.16		5MHz: OP.16.FDD 10MHz:OP.2 FDD		5MHz: OP.16.FDD 10MHz:OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	**-98**		**-98**	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	-Infinity	7
$\hat{E}_s/I_{ot}$ Note 4	dB	-Infinity	7	-Infinity	7
RSRP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91
Io Note 4	dBm/Ch BW	-70.22 +10log ($N_{RB,c}$ /50)	-62.43 +10log ($N_{RB,c}$ /50)	-70.22 +10log ($N_{RB,c}$ /50)	-62.43 +10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN		AWGN	
Antenna Configuration		1x2		1x2	
Timing offset to Cell 1		3ms		3ms	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.3.8.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 13.17s (cell 2) and 153.6s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

A.8.3.9 FDD-FDD Inter-frequency correct reporting of measurement events with reduced performance group configured, DRX

A.8.3.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX. This test will partly verify the FDD-FDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The test parameters are given in Tables A.8.3.9.1-1, A.8.3.9.1-2, A.8.3.9.1-3 and A.8.3.9.1-4. In this test, there are four cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle..

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2, 3 or 4. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells on different frequencies which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.3.9.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting for IncMon

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1, 2,3,4,5,6,7,8,9	Serving cell and eight FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance
Test equipment configuration		Cell 1,2,3,4	Cell 1 uses E-UTRA RF channel number 1 Cells 2 are randomly selected to use different frequencies selected from E-UTRA frequencies 2, 3, 4. Cells 3, 4 are randomly selected to use different frequencies selected from E-UTRA frequencies 5, 6, 7, 8, 9.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cells		Cell 2,3,4	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-5	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.3.9.1-3
Scaling factor for reduced performance group		8	
T1	s	5	
T2	s	155	

Table A.8.3.9.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting for IncMon

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		Randomly selected from 2,3,4 such that cell 2 is in the normal performance group		Randomly selected from 5, 6, 7, 8, 9 such that cell 3 is in the reduced performance group		Randomly selected from 5, 6, 7, 8, 9 such that cell 4 is in the reduced performance group	
Channel Bandwidth ($BW_{channel}$)	MHz	5MHz: NRB = 25 10MHz: NRB = 50		5MHz: NRB,= 25 10MHz: NRB,= 50		5MHz: NRB = 25 10MHz: NRB = 50		5MHz: NRB,= 25 10MHz: NRB,= 50	
PDSCH parameters as specified in clause A.3.1.1.1		5MHz: R.5 FDD 10MHz: R.0 FDD		5MHz: R.5 FDD 10MHz: R.0 FDD		5MHz: R.5 FDD 10MHz: R.0 FDD		5MHz: R.5 FDD 10MHz: R.0 FDD	
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz: R.11 FDD 10MHz: R.6 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD	
OCNG Patterns defined in A.3.2.1		5MHz: OP.15 FDD 10MHz: OP.1 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD	
PBCH_RA	dB	0		0		0		0	
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB								
PHICH_RA	dB								
PHICH_RB	dB								
PDCCH_RA	dB								
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA Note 1	dB								
OCNG_RB Note 1	dB								
N_{oc} Note 3	dBm/15 kHz	-98		-98		-98		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	-Infinity	4	-Infinity	4
$\hat{E}_s/I_{ot}$ Note 4	dB	4	4	-Infinity	4	-Infinity	4	-Infinity	4
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	-Infinity	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	-Infinity	-94	-Infinity	-94
Io Note 4	dBm/Ch BW	-64.76+10log ($N_{RB,c}$ /50)	-64.76+10log ($N_{RB,c}$ /50)	-70.22+10log ($N_{RB,c}$ /50)	-64.76+10log ($N_{RB,c}$ /50)	-70.22+10log ($N_{RB,c}$ /50)	-64.76+10log ($N_{RB,c}$ /50)	-70.22+10log ($N_{RB,c}$ /50)	-64.76+10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN		AWGN		AWGN		AWGN	
Antenna Configuration		1x2		1x2		1x2		1x2	
Time offset to cell1	ms	-		3		3		3	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	E_s/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.3.9.1-3: *drx-Configuration* to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used for IncMon

Field	Value	Comment
onDurationTimer	psf1	
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf160	
shortDRX	disable	
Note: For further information see clause 6.3.2 in TS 36.331.		

Table A.8.3.9.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used for IncMon

Field	Value	Comment
TimeAlignmentTimer	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213..

A.8.3.9.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 13.2s (cell 2) and 153.6s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2\text{x}TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

Where:

When DRX cycle is 160ms, the delay requirement of cell identification and measurement period are specified in section 8.1.2.3.1.2 and Non DRX Requirements in clause 8.1.2.3.1.1 are applicable.

The requirement of inter frequency cell identification delay are specified as

$$\mathrm{T}_{\text{Identify\_Inter}} = \mathrm{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathrm{T}_{\text{Inter1}}} \cdot N_{freq,n} \cdot K_n \quad ms \text{ (normal performance) and}$$

$$\mathrm{T}_{\text{Identify\_Inter}} = \mathrm{T}_{\text{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathrm{T}_{\text{Inter1}}} \cdot N_{freq,r} \cdot K_r \quad ms \text{ (reduced performance)}$$

$T_{Basic\_Identify\_inter}$ 480ms, See section 8.1.2.3.1.1

T_{Inter1} 60ms, See section 8.1.2.1

$N_{freq,n}$ and $N_{freq,r}$ 3 and 5 set in this test case.

K_n and K_r 8/7 and 8, See section 8.1.2.1.1a.

This gives 13165.7ms for cells 2 on normal carrier, and 153600ms for cell 3 and cell 4 on reduced carriers for Event A3 triggered measurement reporting delay. The test requirements allow 13.2s and 153.6s.

A.8.4 E-UTRAN TDD - TDD Inter-frequency Measurements

A.8.4.1 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

A.8.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.4.1.1-1 and A.8.4.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.4.1.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 µs	Synchronous cells
T1	s	5	
T2	s	10	

Table A.8.4.1.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.4.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.4.2 E-UTRAN TDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in synchronous cells

A.8.4.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These test will partly verify the TDD-TDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The common test parameters are given in Tables A.8.4.2.1-1 and A.8.4.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.4.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.4.2.1-4. In these tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time aligmend. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.4.2.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters		DL Reference Measurement Channel R.0 TDD		As specified in clause A.3.1.1.2. Note that UE may only be allocated at *On Duration*
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in clause A.3.1.2.2.
E-UTRA RF Channel Number		1, 2		Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
Active cell		Cell 1		Cell 1 is on RF channel number 1
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration		1		As specified in TS 36.211 clause 4.2 Table 4.2-2
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-6		
Hysteresis	dB	0		
CP length		Normal		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-3 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.4.2.1-3
Time offset between cells		3 µs		Synchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.4.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.4.2.1-3: drx-Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.4.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and 10.1 in TS 36.213.

A.8.4.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.4.3 E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions in synchronous cells with DRX when L3 filtering is used

A.8.4.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX when L3 filtering is used. This test will partly verify the TDD-TDD inter-frequency cell search in DRX requirements in clause 8.1.2.3.2.2 and the UE behaviour with the filterCoefficent defined in TS 36.331 [2].

The test parameters are given in Tables A.8.4.3.1-1, A.8.4.3.1-2, A.8.4.3.1-3 and A.8.4.3.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and the filter coefficient is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 1 as defined in Table 8.1.2.1-1 is provided.

The uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

Table A.8.4.3.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Time offset between cells	μs	3	synchronous cells
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration of cells		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cells		6	As specified in table 4.2.1 in TS 36.211
Neighbour A3-Offset Ofn	dB	-14	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		9	L3 filtering is used
DRX		ON	DRX related parameters are defined in Table A.8.4.3.1-3
T1	s	30	
T2	s	9	

Table A.8.4.3.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	4	24
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	4	24
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-74
SCH_RP Note 3	dBm/15 KHz	-94	-94	-94	-74
Propagation Condition		AWGN			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.4.3.1-3: DRX-Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions with DRX when L3 filtering is used

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.4.3.1-4: TimeAlignmentTimer -Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under AWGN propagation conditions with DRX when L3 filtering is used

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.4.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.4.4 E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

A.8.4.4.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.7.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables A.8.4.4.1-1 and A.8.4.4.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

Table A.8.4.4.1-1: General test parameters for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF channel number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	μs	3	Synchronous cells
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.4.4.1-2: Cell specific test parameters for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.8.4.4.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI,inter}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 42 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 42 ACK/NACK number is caused by two parts. Firstly, at least 30 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requiremenet in Clause 8.1.2.3.7.1. Secondly, given that continuous DL data allocation, and the measurement gaps have been deconfigured before the start of T3, additional 12 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

A.8.4.5 E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

A.8.4.5.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.7. The requirement is verified in a DRX configuration.

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables A.8.4.5.1-1, A.8.4.5.1-2, A.8.4.5.1-3 and A.8.4.5.1-4. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

In the test UE needs to be provided at least once every 1280ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE sends scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

Table A.8.4.5.1-1: General test parameters for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF channel number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.4.5.1-3
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	μs	3	Synchronous cells
T1	s	5	
T2	s	≤30	UE shall report cell within 25.6s (20 DRX cycles)
T3	s	5	

Table A.8.4.5.1-2: Cell specific test parameters for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Cell 1</th><th colspan="3">Cell 2</th></tr>
<tr><th>T1</th><th>T2</th><th>T3</th><th>T1</th><th>T2</th><th>T3</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td colspan="3">1</td><td colspan="3">2</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="3">10</td><td colspan="3">10</td></tr>
<tr><td>OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)</td><td></td><td>OP.1 TDD</td><td>OP.1 TDD</td><td>OP.1 TDD</td><td>OP.2 TDD</td><td>OP.2 TDD</td><td>OP.2 TDD</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td colspan="3" rowspan="13">0</td><td colspan="3" rowspan="13">0</td></tr>
<tr><td>PBCH_RB</td><td>dB</td></tr>
<tr><td>PSS_RA</td><td>dB</td></tr>
<tr><td>SSS_RA</td><td>dB</td></tr>
<tr><td>PCFICH_RB</td><td>dB</td></tr>
<tr><td>PHICH_RA</td><td>dB</td></tr>
<tr><td>PHICH_RB</td><td>dB</td></tr>
<tr><td>PDCCH_RA</td><td>dB</td></tr>
<tr><td>PDCCH_RB</td><td>dB</td></tr>
<tr><td>PDSCH_RA</td><td>dB</td></tr>
<tr><td>PDSCH_RB</td><td>dB</td></tr>
<tr><td>OCNG_RA Note 1</td><td>dB</td></tr>
<tr><td>OCNG_RB Note 1</td><td>dB</td></tr>
<tr><td>$\hat{E}_s/I_{ot}$</td><td>dB</td><td>4</td><td>4</td><td>4</td><td>-Infinity</td><td>7</td><td>7</td></tr>
<tr><td>N_{oc} Note 2</td><td>dBm/15 KHz</td><td colspan="6">-98</td></tr>
<tr><td>$\hat{E}_s/N_{oc}$</td><td>dB</td><td>4</td><td>4</td><td>4</td><td>-Infinity</td><td>7</td><td>7</td></tr>
<tr><td>RSRP Note 3</td><td>dBm/15 KHz</td><td>-94</td><td>-94</td><td>-94</td><td>-Infinity</td><td>-91</td><td>-91</td></tr>
<tr><td>SCH_RP Note3</td><td>dBm/15 KHz</td><td>-94</td><td>-94</td><td>-94</td><td>-Infinity</td><td>-91</td><td>-91</td></tr>
<tr><td>Propagation Condition</td><td></td><td colspan="6">AWGN</td></tr>
<tr><td colspan="8">Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</td></tr>
</table>

Table A.8.4.5.1-3: DRX configuration for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf1280	
shortDRX	disable	

Table A.8.4.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps with DRX

Field	Value	Comment
TimeAlignmentTimer	Infinity	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	2	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.4.5.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{\text{identify\_CGI, inter}}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.4.6 E-UTRAN TDD-TDD Inter-frequency event triggered reporting for TDD UL/DL configuration 0

A.8.4.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.4.6.1-1 and A.8.4.6.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.4.1.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for TDD UL/DL configuration 0

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		0	As specified in TS 36.211 clause 4.2 Table 4.2-2
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 µs	Synchronous cells
T1	s	5	
T2	s	10	

Table A.8.4.6.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for TDD UL/DL configuration 0

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.2 (TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.4.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [7920] ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.4.7 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for Increased Carrier Monitoring without Reduced Performance Group

A.8.4.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.4.1.1-1 and A.8.4.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cells 2, 3 or 4.

Table A.8.4.7.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1, 2,3,4,5,6,7,8,9	Serving cell and eight TDD carrier frequencies are used in the UE neighbour cell list.
Test equipment configuration		Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7,8,9	
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
T1	s	5	
T2	s	80	

Table A.8.4.7.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells (Cell # 1 and Cell # 2)

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		Randomly selected from 2,3,4,5,6,7,8 such that cell 2 is in the normal performance group	
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50		5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50	
Measurement bandwidth	n_{PRB}	5MHz: 10-15 10MHz: 22-27		5MHz: 10-15 10MHz: 22-27	
PDSCH Reference measurement channel defined in A.3.1.1.		5MHz: R.5 TDD 10MHz: R.0 TDD		-	
PDSCH allocation	n_{PRB}	5MHz: 7-17 10MHz: 13-36		-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.		5MHz: R.11 TDD 10MHz: R.6 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD	
OCNG Patterns defined in A.3.2.		5MHz: OP.15 TDD 10MHz: OP.1 TDD		5MHz: OP.16 TDD 10MHz: OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91
Io Note 4	dBm/ $BW_{channel}$	-64.76+10log($N_{RB,c}$/50)	-64.76+10log($N_{RB,c}$/50)	-70.22+10log($N_{RB,c}$/50)	-62.43+10log($N_{RB,c}$/50)
Propagation Condition		ETU70		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Timing offset to cell 1	ms	-		3	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.4.7.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells (Cell # 3 and Cell # 4)

Parameter	Unit	Cell 3		Cell 4	
		T1	T2	T1	T2
E-UTRA RF Channel Number		Randomly selected from 2,3,4,5,6,7,8 such that cell 3 is in the normal performance group		Randomly selected from 2,3,4,5,6,7,8 such that cell 4 is in the normal performance group	
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50		5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Measurement bandwidth	n_{PRB}	5MHz: 10-15 10MHz: 22-27		5MHz: 10-15 10MHz: 22-27	
PDSCH Reference measurement channel defined in A.3.1.1.		-		-	
PDSCH allocation	n_{PRB}	-		-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.		5MHz: R.11 TDD 10MHz: R.6 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD	
OCNG Patterns defined in A.3.2.		5MHz: OP.16 TDD 10MHz: OP.2 TDD		5MHz: OP.16 TDD 10MHz: OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98		-98	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	-Infinity	7
$\hat{E}_s/I_{ot}$	dB	-Infinity	7	-Infinity	7
RSRP Note 4	dBm/15 kHz	-Infinity	-91	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-infinity	-91	-infinity	-91
Io Note 4	dBm/ $BW_{channel}$	$-70.22+10\log(N_{RB,c}/50)$	$-62.43+10\log(N_{RB,c}/50)$	$-70.22+10\log(N_{RB,c}/50)$	$-62.43+10\log(N_{RB,c}/50)$
Propagation Condition		ETU70		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Timing offset to cell 1	ms	3		3	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.4.7.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 61.44s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.4.8 TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX

A.8.4.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell measurement requirements for increased UE carrier monitoring in clause 8.1.2.3.

The test parameters are given in Tables A.8.4.8.1-1, A.8.4.8.1-2 and A.8.4.8.1-3. In this test, there are 4 cells on different carrier frequencies and gap pattern configuration #0 as defined in table A.8.4.8.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Events A3 is used. The test consists of two successive time periods for every reptitaion, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of neighoubour cells. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.4.8.1-1: General test parameters for TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1,2,3,4,5,6,7,8,9	Serving cell and 8 TDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance
Test equipment configuration		Cell 1 uses E-UTRA RF cannel number 1 Cell 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7,8,9	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Scaling factor configurations		8	As specified in TS 36.133 clause 8.1.2.1.1a
T1	s	5	
T2	s	155	

Table A.8.4.8.1-2: Cell specific test parameters for TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX (Cell #1 and Cell #2)

Parameter	Unit	Cell 1		Cell 2, Cell 3, Cell 4	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		Randomly selected from 2,3,4 such that cell 2 is in the normal performance group	
$BW_{channel}$		5MHz: N_{RB} = 25 10MHz: N_{RB} = 50		5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50	
Special subframe configuration Note1		6			
Uplink-downlink configuration Note1		1			
PDSCH parameters: DL Reference Measurement Channel As specified in clause A.3.1.1.2		5MHz: R.4 TDD 10MHz:R.0 TDD		5MHz: R.4 TDD 10MHz:R.0 TDD	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel As specified in clause A.3.1.2.2		5MHz: R.11 TDD 10MHz:R.6 TDD		5MHz: R.11 TDD 10MHz:R.6 TDD	
OCNG Patterns defined in A.3.2.2.1, A.3.2.2.2 ,A.3.2.2.9 and A.3.2.2.10		5MHz: OP.9 TDD 10MHz:OP.1 TDD		5MHz: OP.10.TDD 10MHz:OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 2	dB				
OCNG_RB Note 2	dB				
N_{oc} Note 4	dBm/15 kHz	-98		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
$\hat{E}_s/I_{ot}$ Note 5	dB	4	4	-Infinity	7
RSRP Note 5	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 5	dBm/15 kHz	-94	-94	-Infinity	-91
Io Note 4	dBm/Ch BW	-64.76 +10log ($N_{RB,c}$ /50)	-64.76 +10log ($N_{RB,c}$ /50)	-70.22 +10log ($N_{RB,c}$ /50)	-62.43 +10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN		AWGN	
Antenna Configuration		1x2		1x2	
Timing offset to Cell 1		-		3 μs	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.
Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 5: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.4.8.1-3: Cell specific test parameters for TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured, non DRX (Cell #3, Cell #4)

Parameter	Unit	Cell 3		Cell 4	
		T1	T2	T1	T2
E-UTRA RF Channel Number		Randomly selected from 5,6,7,8,9 such that cell 3 is in the reduced performance group		Randomly selected from 5,6,7,8,9 such that cell 4 is in the reduced performance group. Cell 4 RF channel is different from Cell 3 RF channel.	
$BW_{channel}$		5MHz: N_{RB} = 25 10MHz: N_{RB} = 50		5MHz: $N_{RB,}$= 25 10MHz: $N_{RB,}$= 50	
Special subframe configuration Note1		6			
Uplink-downlink configuration Note1		1			
PDSCH parameters: DL Reference Measurement Channel As specified in clause A.3.1.1.2		5MHz: R.4 TDD 10MHz:R.0 TDD		5MHz: R.4 TDD 10MHz:R.0 TDD	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel As specified in clause A.3.1.2.2		5MHz: R.11 TDD 10MHz:R.6 TDD		5MHz: R.11 TDD 10MHz:R.6 TDD	
OCNG Patterns defined in A.3.2.2.2 and A.3.2.2.10		5MHz: OP.10.TDD 10MHz:OP.2 TDD		5MHz: OP.10.TDD 10MHz:OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 2	dB				
OCNG_RB Note 2	dB				
N_{oc} Note 4	dBm/15 kHz	-98		-98	
$\hat{E}_s/N_{oc}$	dB	-Infinity	7	-Infinity	7
$\hat{E}_s/I_{ot}$ Note 5	dB	-Infinity	7	-Infinity	7
RSRP Note 5	dBm/15 kHz	-Infinity	-91	-Infinity	-91
SCH_RP Note 5	dBm/15 kHz	-Infinity	-91	-Infinity	-91
Io Note 5	dBm/Ch BW	-70.22 +10log ($N_{RB,c}$ /50)	-62.43 +10log ($N_{RB,c}$ /50)	-70.22 +10log ($N_{RB,c}$ /50)	-62.43 +10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN		AWGN	
Antenna Configuration		1x2		1x2	
Timing offset to Cell 1		3 μs		3 μs	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.
Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 5: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.4.8.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 13.17s (cell 2) and 153.6s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

A.8.4.9 TDD-TDD Inter-frequency correct reporting of measurement events with reduced performance group configured, DRX

A.8.4.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX. This test will partly verify the TDD-TDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The test parameters are given in Tables A.8.4.9.1-1, A.8.4.9.1-2, A.8.4.9.1-3 and A.8.4.9.1-4. In this test, there are four cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle..

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2, 3 or 4. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells on different frequencies which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.4.9.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for IncMon

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1, 2,3,4,5,6,7,8,9	Serving cell and eight TDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 and 9 are indicated to have reduced performance
Test equipment configuration		Cell 1,2,3,4	Cell 1 uses E-UTRA RF channel number 1 Cells 2 are randomly selected to use different frequencies selected from E-UTRA frequencies 2, 3, 4. Cells 3, 4 are randomly selected to use different frequencies selected from E-UTRA frequencies 5, 6, 7, 8, 9.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cells		Cell 2,3,4	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
A3-Offset	dB	-5	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.3.9.1-3
Scaling factor for reduced performance group		8	
T1	s	5	
T2	s	155	

Table A.8.4.9.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for IncMon

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		Randomly selected from 2,3,4 such that cell 2 is in the normal performance group		Randomly selected from 5, 6, 7, 8, 9 such that cell 3 is in the reduced performance group		Randomly selected from 5, 6, 7, 8, 9 such that cell 4 is in the reduced performance group	
Channel Bandwidth ($BW_{channel}$)	MHz	5MHz: NRB = 25 10MHz: NRB = 50		5MHz: NRB,= 25 10MHz: NRB,= 50		5MHz: NRB = 25 10MHz: NRB = 50		5MHz: NRB,= 25 10MHz: NRB,= 50	
PDSCH parameters as specified in clause A.3.1.1.2		5MHz: R.4 TDD 10MHz: R.0 TDD		5MHz: R.4 TDD 10MHz: R.0 TDD		5MHz: R.4 TDD 10MHz: R.0 TDD		5MHz: R.4 TDD 10MHz: R.0 TDD	
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.2		5MHz: R.11 TDD 10MHz: R.6 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD	
OCNG Patterns defined in A.3.2.2		5MHz: OP.9 TDD 10MHz: OP.1 TDD		5MHz: OP.10 TDD 10MHz: OP.2 TDD		5MHz: OP.10 TDD 10MHz: OP.2 TDD		5MHz: OP.10 TDD 10MHz: OP.2 TDD	
PBCH_RA	dB	0		0		0		0	
PBCH_RB	dB								
PSS_RA	dB								
SSS_RA	dB								
PCFICH_RB	dB								
PHICH_RA	dB								
PHICH_RB	dB								
PDCCH_RA	dB								
PDCCH_RB	dB								
PDSCH_RA	dB								
PDSCH_RB	dB								
OCNG_RA Note 1	dB								
OCNG_RB Note 1	dB								
N_{oc} Note 3	dBm/15 kHz	-98		-98		-98		-98	
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4	-Infinity	4	-Infinity	4
$\hat{E}_s/I_{ot}$ Note 4	dB	4	4	-Infinity	4	-Infinity	4	-Infinity	4
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	-Infinity	-94	-Infinity	-94
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-94	-Infinity	-94	-Infinity	-94
Io Note 4	dBm/Ch BW	-64.76+10log ($N_{RB,c}$ /50)	-64.76+10log ($N_{RB,c}$ /50)	-70.22+10log ($N_{RB,c}$ /50)	-64.76+10log ($N_{RB,c}$ /50)	-70.22+10log ($N_{RB,c}$ /50)	-64.76+10log ($N_{RB,c}$ /50)	-70.22+10log ($N_{RB,c}$ /50)	-64.76+10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN		AWGN		AWGN		AWGN	
Antenna Configuration		1x2		1x2		1x2		1x2	
Time offset to cell1	μs	-		3		3		3	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	E_s/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.4.9.1-3: *drx-Configuration* to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used for IncMon

Field	Value	Comment
onDurationTimer	psf1	
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf160	
shortDRX	disable	
Note: For further information see clause 6.3.2 in TS 36.331.		

Table A.8.4.9.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* Configuration to be used in E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used for IncMon

Field	Value	Comment
TimeAlignmentTimer	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213..

A.8.4.9.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 13.2s (cell 2) and 153.6s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

Where:

When DRX cycle is 160ms, the delay requirement of cell identification and measurement period are specified in section 8.1.2.3.1.2 and Non DRX Requirements in clause 8.1.2.3.1.1 are applicable.

The requirement of inter frequency cell identification delay are specified as

$$T_{Identify\_Inter} = T_{Basic\_Identify\_Inter} \cdot \frac{480}{T_{Inter1}} \cdot N_{freq,n} \cdot K_n \quad ms \text{ (normal performance) and}$$

$$T_{Identify\_Inter} = T_{Basic\_Identify\_Inter} \cdot \frac{480}{T_{Inter1}} \cdot N_{freq,r} \cdot K_r \quad ms \text{ (reduced performance)}$$

$T_{Basic\_Identify\_inter}$ 480ms, See section 8.1.2.3.1.1

T_{Inter1} 60ms, See section 8.1.2.1

$N_{freq,n}$ and $N_{freq,r}$ 3 and 5 set in this test case.

K_n and K_r 8/7 and 8, See section 8.1.2.1.1a.

This gives 13165.7ms for cells 2 on normal carrier, and 153600ms for cell 3 and cell 4 on reduced carriers for Event A3 triggered measurement reporting delay. The test requirements allow 13.2s and 153.6s.

A.8.5 E-UTRAN FDD - UTRAN FDD Measurements

A.8.5.1 E-UTRAN FDD - UTRAN FDD event triggered reporting under fading propagation conditions

A.8.5.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.5.1.1-1, A.8.5.1.1-2 and A.8.5.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.1.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5	
T2	s	6	

Table A.8.5.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.5.1.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of TS 25.101.			

A.8.5.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.5.2 E-UTRAN FDD - UTRAN FDD SON ANR cell search reporting under AWGN propagation conditions

A.8.5.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of the strongest UTRAN cell for SON automatic neighbour relations. This test will partly verify the E-UTRAN FDD - UTRAN FDD cell search requirements for identification of a new UTRA FDD cell for SON given in clause 8.1.2.4.7.1.

The test parameters are given in Tables A.8.5.2.1-1, A.8.5.2.1-2 and A.8.5.2.1-3 below. In the measurement control information it is indicated to the UE that periodical reporting with the purpose 'reportStrongestCellsForSON' is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. Prior to the start of time period T1, an interRATperiodic measurement reporting configuration with purpose reportStrongestCellsForSON is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.2.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD cell search reporting for SON ANR in AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		None	No explicit neighbour list is provided to the UE
T1	s	>5	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2	s	6	

Table A.8.5.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for UTRAN FDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.5.2.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for UTRAN FDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-3.35
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-15
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.			

A.8.5.2.2 Test Requirements

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The rate of correct measurement reports observed with this delay during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.5.3 E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

A.8.5.3.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN FDD-UTRAN FDD cell search requirements when DRX is used in clause 8.1.2.4.1.2.

In these tests, there are two cells, one E-UTRAN cell and one UTRAN cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.5.3.1-1. Cell specific test parameters are given in Table A.8.5.3.1-2 for E-UTRAN and in Table A.8.5.3.1-5 for UTRAN. DRX configuration for Test1 and Test2 are given in Table A.8.5.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.5.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.5.3.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD		As specified in clause A.3.1.1.1 Note that UE may only be allocated at *On Duration*
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1.
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2		Cell 2 is on UTRA RF channel number 1.
CP length		Normal		Applicable to cell 1
E-UTRA RF Channel Number		1		One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10		
UTRA RF Channel Number		1		One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io		
b1-Threshold-UTRA	dB	-18		CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.5.3.1-3
Monitored UTRA FDD cell list size		12		UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5		
T2	s	6	30	

Table A.8.5.3.1-2: Cell specific test parameters for E-UTRAN FDD (cell #1) event triggered reporting of UTRAN FDD cell when DRX is used under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.5.3.1-3: drx-Configuration to be used in E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	Disable	Disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

Table A.8.5.3.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-UTRAN FDD event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

Table A.8.5.3.1-5: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell when DRX is used under fading propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of TS 25.101.			

A.8.5.3.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 2400 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE sends the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 20*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report.

A.8.5.4 E-UTRAN FDD - UTRAN FDD enhanced cell identification under AWGN propagation conditions

A.8.5.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct enhanced reporting of UTRAN cells. This test will partly verify the Enhanced UTRA FDD cell identification requirements in clause 8.1.2.4.1.1.1a.

The test parameters are given in Tables A.8.5.4.1-1, A.8.5.4.1-2 and A.8.5.4.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time period T1, gaps are activated and an interRAT measurement reporting configuration is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. Prior to time duration T2, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of the T2

Table A.8.5.4.1-1: General test parameters for E-UTRAN FDD - UTRAN FDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list
T1	s	5	
T2	s	2	

Table A.8.5.4.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD - UTRAN FDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.5.4.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD - UTRAN FDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io Note 3	dB	-∞	-13
Propagation Condition		AWGN	

Note 1: The DPCH level is controlled by the power control loop.
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.
Note 3: This gives an SCH Ec/Io of -15dB

A.8.5.4.2 Test Requirements

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than 960 ms from the beginning of time period T2. The rate of correct measurement reports observed with this delay during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH

A.8.5.5 E- UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

A.8.5.5.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of UTRA cell with autonomous gaps in clause 8.1.2.4.17.

The test parameters are given in Tables A.8.5.5.1-1, A.8.5.5.1-2 and A.8.5.5.1-3 below. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event B1. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.5.5.1-1: General test parameters for E-UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
SIB3_REP	Frames	32	Applicable for cell 2 SIB3 scheduling
SIB3 SEG_COUNT		1	Applicable for cell 2 SIB3 scheduling
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CSG id (of cell 2)		Set to any non-empty value	
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.5.5.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.5.5.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io Note 3	dB	-∞	-13
Propagation Condition		AWGN	

Note 1: The DPCH level is controlled by the power control loop.
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.
Note 3: This gives an SCH Ec/Io of -15dB

A.8.5.5.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within [1965] milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI, UTRAN FDD}$ + reporting delay

= 50 + [630]+40*32 + 2ms from the start of T3

= [1962] ms, allow [1965] ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.5.6 E-UTRAN FDD - UTRAN FDD event triggered reporting without measurement gaps under AWGN propagation conditions

A.8.5.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event without measurement gaps. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.5.6.1-1, A.8.5.6.1-2 and A.8.5.6.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. PDCCH on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

Table A.8.5.6.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting without measurement gaps under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5	
T2	s	6	

Table A.8.5.6.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of UTRAN FDD cell without measurement gaps under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.10 (OP.10 FDD)		OP.10 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.5.6.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell without measurement gaps under AWGN propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}			

A.8.5.6.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall send continuous ACK/NACK throughout the test, and from the start of T2 until Event B1 is reported, at least 85% ACK/NACK shall be detected.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.5.7 E-UTRAN FDD - UTRAN FDD Event Triggered Reporting under Fading Propagation Conditions for 5 MHz Bandwidth

A.8.5.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The parameters of this test are the same as defined in Section A.8.5.1.1 except that the values of the parameters in the Table A.8.5.7.1-1 will replace the values of the corresponding parameters in A.8.5.1.1-1, and the values of the parameters in the Table A.8.5.7.1-2 will replace the values of the corresponding parameters in A.8.5.1.1-2.

Table A.8.5.7.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	5	
NOTE 1: See Table A.8.5.1.1-1 for the other parameters. NOTE 2: This test is according to the principle defined in Section A.3.7.2.			

Table A.8.5.7.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
$BW_{channel}$	MHz	5	
OCNG Pattern defined in A.3.2.1.15		OP.15 FDD	
NOTE: See Table A.8.1.3.1-2 for the other parameters.			

A.8.5.7.2 Test Requirements

The test requirements defined in Section A.8.5.1 shall apply to this test case.

A.8.5.8 E-UTRA FDD InterRAT UTRA FDD correct reporting of measurement events with reduced performance group configured, non DRX

A.8.5.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA FDD-UTRA FDD inter-RAT cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.5.8.1-1 and A.8.5.8.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2, 3 or 4. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.5.8.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1	Serving cell and six UTRA FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6 and 7 are indicated to have reduced performance
UE is configured UTRA RF channel numbers		2, 3, 4, 5, 6, 7	
Test equipment configuration		Cell 1 uses E-UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7	Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Correlation Matrix and Antenna Configuration		1x2 low	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Time offset with respect to cell1		0	
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Scaling factor for reduced performance group		16	
T1	s	5	
T2	s	155	

Table A.8.5.8.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	5MHz: N_{RB} = 25 10MHz: N_{RB} = 50	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.5.8.1-3: Cell specific test parameters for UTRAN FDD (cell # 2, 3 and 4) for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Cell 2		Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Cells 2 is randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7		Cells 3 is randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7		Cells 4 is randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7	
CPICH_Ec/Ior	dB	-10					
PCCPCH_Ec/Ior	dB	-12					
SCH_Ec/Ior	dB	-12					
PICH_Ec/Ior	dB	-15					
DPCH_Ec/Ior	dB	N/A					
OCNS		-0.941					
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-infinity	-1.8	-infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70					
CPICH_Ec/Io	dB	-infinity	-14	-infinity	-14	-infinity	-14
Propagation Conditions		Case 5 (Note 3)					
Notes TBD							

A.8.5.8.2 Test Requirements

The UE shall send Event B1 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 7.68s (cell 2) and 115,2s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

A.8.6 E-UTRAN TDD - UTRAN FDD Measurements

A.8.6.1 E-UTRAN TDD - UTRAN FDD event triggered reporting under fading propagation conditions

A.8.6.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- UTRAN FDD cell search requirements in clause 8.1.2.4.2.

The test parameters are given in Tables A.8.6.1.1-1, A.8.6.1.1-2 and A.8.6.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.6.1.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1.
CP length		Normal	Applicable to cell 1.
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5	
T2	s	6	

Table A.8.6.1.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.6.1.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of TS 25.101.			

A.8.6.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.6.2 E- UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

A.8.6.2.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of UTRA cell with autonomous gaps in clause 8.1.2.4.18.

The test parameters are given in Tables A.8.6.2.1-1, A.8.6.2.1-2 and A.8.6.2.1-3 below. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event B1. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

Table A.8.6.2.1-1: General test parameters for E-UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1.
CP length		Normal	Applicable to cell 1.
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
SIB3_REP	Frames	32	Applicable for cell 2 SIB3 scheduling.
SIB3 SEG_COUNT		1	Applicable for cell 2 SIB3 scheduling.
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CSG id (of cell 2)		Set to any non-empty value	
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.6.2.1-2: Cell specific test parameters for cell #1 E-UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.6.2.1-3: Cell specific test parameters for cell #2 E-UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-∞	0.02
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io Note 3	dB	-∞	-13
Propagation Condition		AWGN	

Note 1: The DPCH level is controlled by the power control loop.
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.
Note 3: This gives an SCH Ec/Io of -15dB

A.8.6.2.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within [1965] milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI,\ UTRAN\ FDD}$ + reporting delay

= 50 + [630]+40*32 + 2ms from the start of T3

= [1962] ms, allow [1965] ms.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.6.3 E-UTRA TDD InterRAT UTRA FDD correct reporting of measurement events with reduced performance group configured, non DRX

A.8.6.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA TDD-UTRA FDD inter-RAT cell search requirements in clause 8.1.2.4.2.

The test parameters are given in Tables A.8.6.3.1-1 and A.8.6.3.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2, 3 or 4. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 8 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.6.3.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1	Serving cell and seven UTRA FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6 and 7 are indicated to have reduced performance
UE is configured UTRA RF channel numbers		2, 3, 4, 5, 6, 7,8	
Test equipment configuration		Cell 1 uses E-UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7,8	Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Correlation Matrix and Antenna Configuration		1x2 low	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1
Active cell		Cell 1	Cell 1 is on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Scaling factor for reduced performance group		16	
T1	s	5	
T2	s	155	

Table A.8.6.3.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.6.3.1-3: Cell specific test parameters for UTRAN FDD (cell # 2, 3 and 4) for correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Cell 2		Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Cells 2 is randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7		Cells 3 is randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7		Cells 4 is randomly selected to use different frequencies selected from UTRA RF channel numbers 2,3,4,5,6,7	
CPICH_Ec/Ior	dB	-10					
PCCPCH_Ec/Ior	dB	-12					
SCH_Ec/Ior	dB	-12					
PICH_Ec/Ior	dB	-15					
DPCH_Ec/Ior	dB	N/A					
OCNS		-0.941					
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-infinity	-1.8	-infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70					
CPICH_Ec/Io	dB	-infinity	-14	-infinity	-14	-infinity	-14
Propagation Conditions		Case 5 (Note 3)					
Notes TBD							

A.8.6.3.2 Test Requirements

The UE shall send Event B1 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 7.68s (cell 2) and 115,2s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI$_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

A.8.7 E-UTRAN TDD – UTRAN TDD Measurements

A.8.7.1 E-UTRAN TDD to UTRAN TDD cell search under fading propagation conditions

A.8.7.1.1 Test Purpose and Environment

A.8.7.1.1.1 Void

A.8.7.1.1.2 1.28 Mcps TDD option

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA TDD to UTRA TDD cell search requirements in clause 8.1.2.4.3 under fading propagation conditions.

This test scenario comprised of 1 E-UTRA TDD PCell, and 1 UTRA TDD cell to be searched. Test parameters are given in Table A.8.7.1.1.2-1, A.8.7.1.1.2-2, and A.8.7.1.1.2-3. Gap pattern configuration #0 as defined in table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.7.1.1.2-1: General test parameters for E-UTRA TDD to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	E-UTRA TDD cell
Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1		normal	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 ms	Asynchronous cells
Ofn	dB	0	
Thresh	dBm	-87	
T1	s	5	
T2	s	10	

Table A.8.7.1.1.2-2: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
$\hat{E}_s/I_{ot}$	dB	9	9
$\hat{E}_s/N_{oc}$	dB	9	9
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-89	-89
SCH_RP	dBm/15kHz	-89	-89
Propagation Condition		ETU70	

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.7.1.1.2-3: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number NOTE1		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior NOTE2	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	-inf	5	-inf	5
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-inf	-78	n.a.	n.a.
Propagation Condition		Case 3 NOTE3			

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.
Note 3: Case 3 propagation conditions are defined in Annex B of TS 25.102

A.8.7.1.1.3 Void

A.8.7.1.2 Test Requirements

A.8.7.1.2.1 Void

A.8.7.1.2.2 1.28 Mcps TDD option

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.7.1.2.3 Void

A.8.7.2 E-UTRAN TDD-UTRAN TDD cell search when DRX is used under fading propagation conditions

A.8.7.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN TDD to UTRAN TDD inter-RAT cell search requirements when DRX is used in clause 8.1.2.4.3.2 under fading propagation conditions.

The common test parameters are given in Tables A.8.7.2.1-1, A.8.7.2.1-2 and A.8.7.2.1-3. DRX configuration for Test1 and Test2 are given in Table A.8.7.2.1-4 and time alignment timer and scheduling request related parameters in Table A.8.7.2.1-5. In these tests, there are two cells, 1 E-UTRAN TDD PCell and 1 UTRAN TDD cell to be searched, Gap pattern configuration # 0 as defined in table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time aligmend. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.7.2.1-1: General test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		

PDSCH parameters		DL Reference Measurement Channel R.0 TDD		As specified in clause A.3.1.1.2. Note that UE may only be allocated at On Duration
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in clause A.3.1.2.2.
Active cell		Cell 1		E-UTRAN TDD cell
Neighbour cell		Cell 2		UTRAN 1.28Mcps TDD cell
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration		1		As specified in TS 36.211 clause 4.2 Table 4.2-2
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
PRACH configuration		4		As specified in table 5.7.1-3 in TS 36.211
CP length of cell 1		Normal		
Ofn	dB	0		
Thresh	dBm	-83		Absolute P-CCPCH RSCP threshold for event B1
Hysteresis	dB	0		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.4.2.1-3
Time offset between cells		3 ms		Asynchronous cells
T1	s	5		
T2	s	8	30	

Table A.8.7.2.1-2: Cell specific test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions(cell 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
BWchannel	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RANote1	dB		
OCNG_RBNote1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc} Note 2	dBm/15kHz	-98	
RSRP Note 3	dBm/15kHz	-94	-94
SCH_RP Note 3	dBm/15kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.7.2.1-3: Cell specific test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions(cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number NOTE1		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior NOTE2	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	-inf	9	-inf	9
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-inf	-74	n.a.	n.a.
Propagation Condition		Case 3 NOTE3			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior. Note 3: Case 3 propagation conditions are defined in Annex B of TS 25.102					

Table A.8.7.2.1-4: drx-Configuration to be used in E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.7.2.1-5: TimeAlignmentTimer and sr-ConfigIndex -Configuration to be used in E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and 10.1 in TS 36.213.

A.8.7.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6400ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 25.6s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

A.8.7.3 E-UTRAN TDD - UTRAN TDD SON ANR cell search reporting in AWGN propagation conditions

A.8.7.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of the strongest UTRAN TDD cell for SON automatic neighbour relations. This test will partly verify the E-UTRAN TDD - UTRAN TDD cell search requirements for identification of a new UTRA TDD cell for SON given in clause 8.1.2.4.13.

In the measurement control information it is indicated to the UE that periodical reporting with the purpose ‘reportStrongestCellsForSON’ is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. Prior to the start of time period T1, an interRATperiodic measurement reporting configuration with purpose reportStrongestCellsForSON is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. During time duration T1, the UE shall not have any timing information of cell 2.

A.8.7.3.2 Test Parameters

The test parameters are given in Tables A.8.7.3.1-1, A.8.7.3.1-2 and A.8.7.3.1-3.

Table A.8.7.3.1-1: General test parameters for E-UTRAN TDD-UTRAN TDD cell search reporting for SON ANR in AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
Inter-RAT (UTRA TDD) measurement quantity		P-CCPCH RSCP	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		None	No explicit neighbour list is provided to the UE
T1	s	>5	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2	s	14	

Table A.8.7.3.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for UTRAN TDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.7.3.1-3: Cell specific test parameters for UTRAN TDD (cell # 2) for UTRAN TDD cell search for SON ANR under AWGN propagation conditions

Parameter	Unit	Cell 2			
		T1		T2	
UTRA RF Channel number Note2		Channel 2			
DL timeslot number		0	DwPTS	0	DwPTS
PCCPCH_Ec/Ior	dB	-3		-3	
DwPCH_Ec/Ior	dB		0		0
OCNS_Ec/Ior	dB	-3		-3	
Îor/Ioc	dB	-Infinity		5	
PCCPCH RSCP Note1	dBm	-Infinity	n.a.	-73	n.a.
Io Note1	dBm/1.28MHz	-Infinity		-70.88	
Ioc	dBm/1.28MHz	-75			
Propagation condition		AWGN			
Note 1: PCCPCH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves. Note 2: In the case of multi-frequency network of 1.28 Mcps TDD, the UTRA RF Channel Number can be set for the primary frequency in this test.					

A.8.7.3.3 Test Requirements

The UE shall send the first measurement report containing the physical cell identity of cell 2, with a measurement reporting delay less than 12800 ms from the beginning of time period T2.

The rate of correct measurement reports observed with this delay during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.7.4 E-UTRAN TDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

A.8.7.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct enhanced reporting of UTRAN TDD cells. This test will partly verify the Enhanced UTRA TDD cell identification requirements in clause 8.1.2.4.3.1.1a under AWGN propagation conditions.

The test parameters are given in Tables A.8.7.4.1-1, A.8.7.4.1-2 and A.8.7.4.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods of T1 and T2 respectively. During time period T1, measurement gaps are activated and an inter-RAT measurement reporting configuration is configured with linkage to a UTRA measurement object corresponding to UARFCN channel number 1. Prior to time duration T2, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of T2.

Table A.8.7.4.1-1: General test parameters for E-UTRAN TDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2.
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
CP length		Normal	Applicable to cell 1
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Inter-RAT (UTRA TDD) measurement quantity		P-CCPCH RSCP	
Thresh	dBm	-83	Absolute P-CCPCH RSCP threshold for event B1
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list
T1	s	5	
T2	s	2	

Table A.8.7.4.1-2: Cell specific test parameters for cell 1 in E-UTRAN TDD - UTRAN TDD enhanced cell identification test under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.7.4.1-3: Cell specific test parameters for cell 2 in E-UTRAN TDD - UTRAN TDD enhanced cell identification test under AWGN propagation conditions

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number Note1		Channel 1			
P-CCPCH_Ec/Ior	dB	-4.77	-4.77		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior Note2	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
I_{oc}	dBm/1.28 MHz	-80			
P-CCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
P-CCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition		AWGN			

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.
Note 3: P-CCPCH RSRP, PCCPCH_Ec/Io and DwPCH_Ec/Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.7.4.2 Test Requirements

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than 1120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct measurement reports observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH

A.8.7.5 E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX

A.8.7.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- UTRAN TDD measurement requirements for increased UE carrier monitoring in clause 8.1.2.4.3.

The test parameters are given in Tables A.8.7.5.1-1, A.8.7.5.1-2 and A.8.7.5.1-3. In this test, there are 4 cells on different carrier frequencies and gap pattern configuration #0 as defined in table A.8.7.5.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Events B1 is used. The test consists of two successive time periods for every reptitaion, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of neighoubour cells. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 7 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.7.5.1-1: General test parameters for E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1	Serving cell
UE is configured UTRA RF channel numbers		2, 3, 4, 5, 6, 7, 8	7 UTRA TDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6, 7,and 8 are indicated to have reduced performance
Test equipment configuration		**Cell 1 uses E-UTRA RF cannel number 1** Cell 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7, 8	
Active cell		Cell 1	E-UTRA TDD cell
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
CP length of cell 1		normal	
Inter-RAT measurement quantity		UTRA TDD PCCPCH RSCP	
B1 Threshold	dBm	-75	UTRA TDD PCCPCH RSCP threshold for event B1
Hysteresis	dB	0	
Ofn	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Scaling factor configurations		8	
T1	s	5	
T2	s	205	

Table A.8.7.5.1-2: Cell specific test parameters for E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX (cell #1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$		5MHz: N_{RB} = 25 10MHz: N_{RB} = 50	
Uplink-downlink configuration of cell 1 as specified in table 4.2.2 in TS 36.211		1	
Special subframe configuration of cell 1 as specified in table 4.2.1 in TS 36.211		6	
PDSCH parameters: DL Reference Measurement Channel as specified in clause A.3.1.1.2		5MHz: R.4 TDD 10MHz: R.0 TDD	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel as specified in clause A.3.1.2.2		5MHz: R.11 TDD 10MHz:R.6 TDD	
OCNG Pattern defined in A.3.2.2.1 and A.3.2.2.9		5MHz: OP.9 TDD 10MHz:OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc}	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
$\hat{E}_s/I_{ot}$ Note 3	dB	4	4
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP Note 3	dBm/15 kHz	-94	-94
Io Note 3	dBm/Ch BW	-64.70 +10log ($N_{RB,c}$ /50)	-64.70 +10log ($N_{RB,c}$ /50)
Propagation Condition		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.7.5.1-3: Cell specific test parameters for E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX (cell #2, cell #3 and cell #4)

Parameter	Unit	Cell 2				Cell 3				Cell 4			
		T1		T2		T1		T2		T1		T2	
Timeslot Number		0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS
UTRA RF Channel Number (NOTE1)		Randomly selected from 2,3,4 such that cell 2 is in the normal performance group				Randomly selected from 5,6,7,8 such that cell 3 is in the reduced performance group				Randomly selected from 5,6,7,8 such that cell 4 is in the reduced performance group. Cell 4 RF channel is different from Cell 3 RF channel.			
PCCPCH_Ec/Ior	dB	-Infinity		-3		-Infinity		-3		-Infinity		-3	
DwPCH_Ec/Ior	dB	-Infinity			0	-Infinity			0	-Infinity			0
OCNS_Ec/Ior		-Infinity		-3		-Infinity		-3		-Infinity		-3	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity		9		-Infinity		9		-Infinity		9	
I_{oc}	dBm/1.28 MHz	-70				-70				-70			
PCCPCH_RSCP Note 3	dB	-Infinity		-64		-Infinity		-64		-Infinity		-64	
Io Note 3	dBm/1.28 MHz	-70.00		-60.49		-70.00		-60.49		-70.00		-60.49	
Propagation Condition		Case 3 (NOTE2)				Case 3 (NOTE2)				Case 3 (NOTE2)			
NOTE1: The DPCH of the cell is located in a timeslot other than 0. NOTE2: Case 3 propagation conditions are specified in TS25.102 Annex B NOTE3: PCCPCH_RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves													

A.8.7.5.2 Test Requirements

The UE shall send Event B1 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 21.95s (cell 2) and 204.8s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

A.8.7A TBD

A.8.7A.1 E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX

A.8.7A.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN TDD measurement requirements for increased UE carrier monitoring in clause 8.1.2.4.4.

The test parameters are given in Tables A.8.7A.1.1-1, A.8.7A.1.1-2 and A.8.7A.1.1-3. In this test, there are 4 cells on different carrier frequencies and gap pattern configuration #0 as defined in table A.8.7A.1.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Events B1 is used. The test consists of two successive time periods for every reptitaion, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of neighoubour cells. At the start of each repetition of T1, the test equipment provides signals for cell 1 (serving cell), and cells 2, 3 and 4 which are selected from the 7 cells which are configured in the UE neighbour cell list. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group.

Table A.8.7A.1.1-1: General test parameters for E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX

Parameter	Unit	Value	Comment
UE configured E-UTRA RF Channel Number		1	Serving cell
UE is configured UTRA RF channel numbers		2, 3, 4, 5, 6, 7, 8	7 UTRA TDD carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6, 7,and 8 are indicated to have reduced performance
Test equipment configuration		Cell 1 uses E-UTRA RF cannel number 1 Cell 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6,7, 8	
Active cell		Cell 1	E-UTRA FDD cell
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
CP length of cell 1		normal	
Inter-RAT measurement quantity		UTRA TDD PCCPCH RSCP	
B1 Threshold	dBm	-75	UTRA TDD PCCPCH RSCP threshold for event B1
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Scaling factor configurations		8	
T1	s	5	
T2	s	205	

Table A.8.7A.1.1-2: Cell specific test parameters for E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX (cell #1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$		5MHz: N_{RB} = 25 10MHz: N_{RB} = 50	
PDSCH parameters: DL Reference Measurement Channel as specified in clause A.3.1.1.1		5MHz: R.5 FDD 10MHz: R.0 FDD	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel as specified in clause A.3.1.2.1		5MHz: R.11 FDD 10MHz:R.6 FDD	
OCNG Pattern defined in A.3.2.1.1 and A.3.2.1.15		5MHz: OP.15 FDD 10MHz:OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc}	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
$\hat{E}_s/I_{ot}$ Note 3	dB	4	4
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP Note 3	dBm/15 kHz	-94	-94
Io Note 3	dBm/Ch BW	-64.76 +10log ($N_{RB,c}$ /50)	-64.76 +10log ($N_{RB,c}$ /50)
Propagation Condition		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.7A.1.1-3: Cell specific test parameters for E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured, non DRX (cell #2, cell #3 and cell #4)

Parameter	Unit	Cell 2				Cell 3				Cell 4			
		T1		T2		T1		T2		T1		T2	
Timeslot Number		0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS	0	DwPTS
UTRA RF Channel Number (NOTE1)		Randomly selected from 2,3,4 such that cell 2 is in the normal performance group				Randomly selected from 5,6,7,8 such that cell 3 is in the reduced performance group				Randomly selected from 5,6,7,8 such that cell 4 is in the reduced performance group. Cell 4 RF channel is different from Cell 3 RF channel.			
PCCPCH_Ec/Ior	dB	-Infinity		-3		-Infinity		-3		-Infinity		-3	
DwPCH_Ec/Ior	dB	-Infinity			0	-Infinity			0	-Infinity			0
OCNS_Ec/Ior		-Infinity		-3		-Infinity		-3		-Infinity		-3	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity		9		-Infinity		9		-Infinity		9	
I_{oc}	dBm/1.28 MHz	-70				-70				-70			
PCCPCH_RSCP Note 3	dB	-Infinity		-64		-Infinity		-64		-Infinity		-64	
Io Note 3	dBm/1.28 MHz	-70.00		-60.49		-70.00		-60.49		-70.00		-60.49	
Propagation Condition		Case 3 (NOTE2)				Case 3 (NOTE2)				Case 3 (NOTE2)			

NOTE1: The DPCH of the cell is located in a timeslot other than 0.
NOTE2: Case 3 propagation conditions are specified in TS25.102 Annex B
NOTE3: PCCPCH_RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves

A.8.7A.1.2 Test Requirements

The UE shall send Event B1 triggered measurement reports for cells 2, 3 and 4, with a measurement reporting delay less than 21.95s (cell 2) and 204.8s (cell 3 and 4) from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report.

A.8.8 E-UTRAN FDD – GSM Measurements

A.8.8.1 E-UTRAN FDD – GSM event triggered reporting in AWGN

A.8.8.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter-RAT (GSM) measurements. This test will partly verify the E-UTRAN FDD - GSM cell search requirements in clause 8.1.2.4.5.

The test parameters are given in Tables A.8.8.1.1-1, A.8.8.1.1-2 and A.8.8.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.8.1.1-1: General test parameters for E-UTRAN FDD-GSM event triggered reporting in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b1-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1	List of GSM cells provided before T2 starts.
T1	s	5	
T2	s	5	

Table A.8.8.1.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA^Note 1	dB		
OCNG_RB^Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.8.1.1-3: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.8.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 3120 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay = $2*T_{\text{Measurement Period, GSM}}$ = 2* 480ms =960ms.

Initial BSIC identification delay = 2160 ms.

A.8.8.2 E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

A.8.8.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN FDD-GSM cell search requirements when DRX is used in clause 8.1.2.4.5.2.

In these tests, there are two cells, one E-UTRAN cell and one GSM cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.8.2.1-1. Cell specific test parameters are given in Table A.8.8.2.1-2 for E-UTRAN and in Table A.8.8.2.1-5 for GSM. DRX configuration for Test1 and Test2 are given in Table A.8.8.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.8.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.8.2.1-1: General test parameters for E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD		As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1.
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2		Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal		Applicable to cell 1
E-UTRA RF Channel Number		1		One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10		
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI		
B1-Threshold-GERAN	dBm	-80		GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.8.2.1-3
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1		List of GSM cells provided before T2 starts.
T1	s	5		
T2	s	5	45	

Table A.8.8.2.1-2: Cell specific test parameters for E-UTRAN FDD (cell #1) event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		

$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.8.2.1-3: drx-Configuration to be used in E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	Disable	Disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

Table A.8.8.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and clause 10.1 in TS 36.213.

Table A.8.8.2.1-5: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.8.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 42.8 seconds from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

A.8.8.3 E-UTRAN FDD – GSM event triggered reporting in AWGN with enhanced BSIC identification

A.8.8.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter-RAT (GSM) measurements with enhanced BSIC identification. This test will partly verify the E-UTRAN FDD - GSM cell search requirements in clause 8.1.2.4.5.1.2a

The test parameters are given in Tables A.8.8.3.1-1, A.8.8.1.1-2 and A.8.8.3.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. Prior time duration T1, the UE shall not have any timing information of cell 2. . During time period T1, gaps are activated and an interRAT measurement reporting configuration is configured, and linked to a GSM measurement object including channel ARFCN 1. Cell 2 is powered up at the beginning of T2.

Table A.8.8.3.1-1: General test parameters for E-UTRAN FDD-GSM event triggered reporting in AWGN with enhanced BSIC identification

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b1-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1	List of GSM cells provided before T2 starts.
T1	s	5	T1 ends at the end of the last TTI where the measurement configuration is given
T2	s	3	

Table A.8.8.3.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for event triggered reporting of GSM cell in AWGN with enhanced BSIC identification

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.8.3.1-3: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell in AWGN with enhanced BSIC identification

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-∞	-75
GSM BSIC		N/A	Valid

A.8.8.3.2 Test Requirements

The UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 2280 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 2280 ms, which is the sum of the event triggered measurement reporting delay and the enhanced initial BSIC identification delay.

The event triggered measurement reporting delay = $2*T_{Measurement\ Period,\ GSM}$ = 2* 480ms =960ms.

Initial BSIC identification delay = 1320 ms.

A.8.9 E-UTRAN FDD - UTRAN TDD measurements

A.8.9.1 E-UTRAN FDD - UTRAN TDD event triggered reporting in fading propagation conditions

A.8.9.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. The test will partly verify the E-UTRAN FDD - UTRAN TDD cell search requirements in clause 8.1.2.4.4 in fading environment.

The test parameters are given in Table A.8.9.1.1-1, A.8.9.1.1-2 and A.8.9.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.9.1.1-1: General test parameters for Event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	E-UTRA FDD Cell 1
Neighbour cell		Cell 2	UTRA TDD Cell 2 is to be identified.
Gap Pattern Id		1	As specified in TS 36.133 section8.1.2.1. Measurement Gap Repetition Period = 80ms
Inter-RAT measurement quantity		UTRA TDD PCCPCH RSCP	
Threshold other system	dBm	-75	UTRA TDD PCCPCH RSCP threshold for event B1.
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
T1	s	5	
T2	s	15	

Table A.8.9.1.1-2: Cell specific test parameters for Event triggered reporting of UTRA TDD neighbours in fading propagation conditions (cell1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc}	dBm/15KHz	-98	
RSRP	dBm	-94	-94
$\hat{E}_s/I_{ot}$	dB	4	4
P-SCH_RP	dBm	-94	
S-SCH_RP	dBm	-94	
Propagation Condition		ETU70	

Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Table A.8.9.1.1-3: Cell specific test parameters for Event triggered reporting of UTRA TDD neighbours in fading propagation conditions (cell2)

Parameter	Unit	Cell 2			
		T1		T2	
Timeslot Number		0	DwPTS	0	DwPTS
UTRA RF Channel Number (NOTE1)		Channel1			
PCCPCH_Ec/Ior	dB	-Infinity		-3	
DwPCH_Ec/Ior	dB	-Infinity			0
OCNS_Ec/Ior		-Infinity		-3	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity		9	
I_{oc}	dBm/1.28 MHz	-70			
PCCPCH_RSCP Note 3	dB	-Infinity		-64	
Io Note 3	dBm/1.28 MHz	-70.00		-60.49	
Propagation Condition		Case 3 (NOTE2)			

NOTE1: The DPCH of the cell is located in a timeslot other than 0.
NOTE2: Case 3 propagation conditions are specified in TS25.102 Annex B
NOTE3: PCCPCH_RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves

A.8.9.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 12800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2 x TTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.9.2 E-UTRAN FDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

A.8.9.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct enhanced reporting of UTRAN cells. This test will partly verify the enhanced UTRA TDD cell identification requirements in clause 8.1.2.4.4 under AWGN propagation conditions.

This test scenario comprised of 1 E-UTRA FDD serving cell, and 1 UTRA TDD cell to be searched. Test parameters are given in Table A.8.9.2.1-1, A.8.9.2.1-2, and A.8.9.2.1-3. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time period T1, gaps are activated and an interRAT measurement reporting configuration is configured, and linked to a UTRA measurement object corresponding to channel UARFCN 1. Prior to time duration T2, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of the T2.

Table A.8.9.2.1-1: General test parameters for E-UTRAN FDD- UTRAN TDD enhanced cell search in AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Inter-RAT (UTRA TDD) measurement quantity		P-CCPCH RSCP	
Thresh	dBm	-83	Absolute P-CCPCH RSCP threshold for event B1
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list
Time offset between cells	ms	3	
T1	s	5	
T2	s	2	

Table A.8.9.2.1-2: Cell specific test parameters for cell #1 E-UTRAN FDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.9.2.1-3: Cell specific test parameters for cell #2 E-UTRAN FDD - UTRAN TDD enhanced cell identification under AWGN propagation conditions

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number Note1		Channel 1			
P-CCPCH_Ec/Ior	dB	-4.77	-4.77		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior Note2	dB	-1.76	-1.76		
$\hat{I}_{or}/I_{oc}$	dB	-inf	8	-inf	8
I_{oc}	dBm/1.28 MHz	-80			
P-CCPCH RSCP Note3	dBm	-inf	-76.77	n.a.	n.a.
P-CCPCH_Ec/Io Note3	dB	-inf	-5.41	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	-0.64
Propagation Condition		AWGN			

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.
Note 3: P-CCPCH RSRP, PCCPCH_Ec/Io and DwPCH_Ec/Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.9.2.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 1120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.10 E-UTRAN TDD – GSM Measurements

A.8.10.1 E-UTRAN TDD – GSM event triggered reporting in AWGN

A.8.10.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter-RAT (GSM) measurements. This test will partly verify the E-UTRAN TDD - GSM cell search requirements in clause 8.1.2.4.6.

The test parameters are given in Tables A.8.10.1.1-1, A.8.8.1.1-2 and A.8.10.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.10.1.1-1: General test parameters for E-UTRAN TDD-GSM event triggered reporting in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b1-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1	List of GSM cells provided before T2 starts.
T1	s	5	
T2	s	5	

Table A.8.10.1.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4	4
RSRP Note 4	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.10.1.1-3: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid
Propagation Condition		AWGN	

A.8.10.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report including the valid BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 3120 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay = $2*T_{Measurement\ Period,\ GSM}$ = 2* 480ms =960ms.

Initial BSIC identification delay = 2160 ms.

A.8.10.2 E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

A.8.10.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the E-UTRAN TDD-GSM cell search requirements when DRX is used in clause 8.1.2.4.6.

In these tests, there are two cells, one E-UTRAN cell and one GSM cell, and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

The common test parameters are given in Table A.8.10.2.1-1. Cell specific test parameters are given in Table A.8.10.2.1-2 for E-UTRAN and in Table A.8.10.2.1-5 for GSM. DRX configuration for Test1 and Test2 are given in Table A.8.10.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.10.2.1-4.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.10.2.1-1: General test parameters for E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD		As specified in clause A.3.1.1.2. Note that UE may only be allocated at *On Duration*
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD		As specified in clause A.3.1.2.2.
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1		Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2		Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211.
Uplink-downlink configuration		1		As specified in TS 36.211 clause 4.2 Table 4.2-2
CP length		Normal		Applicable to cell 1
E-UTRA RF Channel Number		1		One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10		
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI		
B1-Threshold-GERAN	dBm	-80		GSM Carrier RSSI threshold for event B1.
Hysteresis	dB	0		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.10.2.1-3
Monitored GSM cell list size		6 GSM neighbours including ARFCN 1		List of GSM cells provided before T2 starts.
T1	s	5		
T2	s	5	45	

Table A.8.10.2.1-2: Cell specific test parameters for E-UTRAN TDD (cell #1) event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.10.2.1-3: drx-Configuration to be used in E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	Disable	Disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

Table A.8.10.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and clause 10.1 in TS 36.213.

Table A.8.10.2.1-5: Cell specific test parameters for GSM (cell # 2) for event triggered reporting of GSM cell when DRX is used in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		ARFNC 1	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.10.2.2 Test Requirements

In Test1 the UE shall send one Event B1 triggered measurement report including BSIC of cell # 2, with a measurement reporting delay less than 3120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 42.8 seconds from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event B1 measurement report

A.8.11 Monitoring of Multiple Layers

A.8.11.1 Multiple E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions

A.8.11.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of multiple events. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.11.1.1.1-1 and A.8.11.1.1.1-2. In this test, there are three cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 or cell 3.

Table A. 8.11.1.1-1: General test parameters for Inter-frequency E-UTRA FDD – E-UTRA FDD and E-UTRA FDD cell search under fading

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF Channel Number		1, 2, 3	Three FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2 and cell 3	Cell 2 is on RF channel number 2 and cell 3 is on RF channel number 3
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between E-UTRAN FDD cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	10	

Table A.8.11.1.1-2: Cell specific test parameters for Inter-frequency E-UTRA FDD – E-UTRA FDD and E-UTRA FDD cell search under fading

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	10		10		10	
Correlation Matrix and Antenna Configuration		1x2		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD		OP.2 FDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
RSRP Note 4	dBm/15 kHz	-98	-98	-Infinity	-95	-Infinity	-95
$\hat{E}_s/I_{ot}$	dB	0	0	-Infinity	3	-Infinity	3
SCH_RP Note 4	dBm/15 kHz	-98	-98	-Infinity	-95	-Infinity	-95
$\hat{E}_s/N_{oc}$	dB	0	0	-Infinity	3	-Infinity	3
Propagation Condition		AWGN		ETU70		ETU70	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.11.1.2 Test Requirements

The UE shall send Event A3 triggered measurement reports for both cell 2 and cell 3, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.11.2 E-UTRAN TDD – E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions

A.8.11.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of two events. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.11.2.1-1 and A.8.11.2.1-2. In this test, there are three cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.2.1-1: General test parameters for E-UTRAN TDD - E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
E-UTRA RF Channel Number		1, 2, 3	Three TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbor cells		Cell 2 and Cell 3	Cell 2 and 3 are on RF channel numbers 2 and 3 respectively
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 μs	Synchronous cells
T1	s	5	
T2	s	10	

Table A.8.11.2.1-2: Cell specific test parameters for E-UTRAN TDD - E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions cells

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	10		10		10	
Correlation Matrix and		1x2		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD		OP.2 TDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
RSRP Note 4	dBm/15 kHz	-98	-98	-inf	-95	-inf	-95
$\hat{E}_s/I_{ot}$	dB	0	0	-inf	3	-inf	3
SCH_RP Note 4	dBm/15 kHz	-98	-98	-inf	-95	-inf	-95
$\hat{E}_s/N_{oc}$	dB	0	0	-inf	3	-inf	3
Propagation Condition		AWGN		ETU70		ETU70	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.11.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for cell 2 with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event A3 triggered measurement report for cell 3 with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.11.3 E-UTRAN FDD-FDD Inter-frequency and UTRAN FDD event triggered reporting under fading propagation conditions

A.8.11.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency and UTRAN FDD measurements. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3 and the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.11.3.1-1, A.8.11.3.1-2 and A.8.11.3.1-3. In this test, there are two cells on different carrier frequencies and one cell on UTRAN carrier frequency and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.3.1-1: General test parameters for Combined inter-frequency and UTRAN event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cells		Cell 2, 3	Cell 2 is on E-UTRA RF channel number 2. Cell 3 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
E-UTRAN FDD measurement quantity		RSRP	
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/N0	
A3-Offset	dB	-6	
b2-Threshold-E-UTRA	dB	-86	RSRP threshold for event B2.
b2-Threshold-UTRA	dB	-18	CPICH Ec/N0 threshold for event B2.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	8	

Table A.8.11.3.1-2: Cell specific test parameters for Combined inter-frequency and UTRAN event triggered reporting in fading propagation conditions

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		AWGN		ETU70	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.3.1-3: Cell specific test parameters for UTRAN FDD (cell # 3) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 3	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of TS 25.101.			

A.8.11.3.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.11.4 InterRAT E-UTRA TDD to E-UTRA TDD and UTRA TDD cell search test case

A.8.11.4.1 Test Purpose and Environment

This test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements and UTRA TDD measurements. The test will partly verify the requirements in clause 8.1.2.3.2 combined 8.1.2.4.3 under fading propagation conditions.

This test scenario comprised of 2 E-UTRA TDD cells operating on different frequency, and 1 UTRA TDD cell. Test parameters are given in table A.8.11.4.1-1, A.8.11.4.1-2, and A.8.11.4.1-3. Gap pattern configuration #0 as defined in clause 8.1.2.1 is provided.

The test consists of 2 successive time periods, with time duration T1 and T2. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 and B2 shall be used.

Table A.8.11.4.1-1: General test parameters for combined E-UTRA TDD inter-frequency and UTRA TDD cells search under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	E-UTRA TDD cell is on RF channel number 1
Neighbour cell		Cell 2	E-UTRA TDD cell is on RF channel number 2
		Cell 3	1.28Mcps TDD cell
CP length of cell1 and cell2		Normal	
Uplink-downlink configuration of cell1 and cell2		1	As specified in Table 4.2-2 in TS 36.211. The same configuration in both cells
Special subframe configuration of cell1 and cell2		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
E-UTRAN TDD measurement quantity		RSRP	
UTRAN TDD measurement quantity		RSCP	
DRX		OFF	
Ofn	dB	0	Parameter for A3 and B2 event
Ocn	dB	0	Parameter for A3 event
Hysteresis	dB	0	Parameter for A3 and B2 event
Ofs	dB	0	Parameter for A3 event
Ocs	dB	0	Parameter for A3 event
A3-Offset	dB	-6	Parameter for A3 event
Thresh1	dBm	-86	Absolute E-UTRAN RSRP threshold for event B2
Thresh2	dBm	-84	Absolute UTRAN RSCP threshold for event B2
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
Time offset between E-UTRAN TDD cells	µs	3	Synchronous cells
T1	s	>5	During T1, cell 2 and cell 3 shall be powered off. During the off time the physical layer cell identity of cell 2 shall be changed, and the primary scrambling code of cell 3 shall be changed.
T2	s	15	

Table A.8.11.4.1-2: Cell specific test parameters for combined E-UTRAN TDD inter-frequency and UTRA TDD cell search under fading propagation conditions(cell1 and cell2)

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
BWchannel	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RANote 1	dB				
OCNG_RBNote 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
N_{oc}	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP	dBm/15 kHz	-94	-94	-infinity	-91
Propagation Condition		AWGN		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.11.4.1-3: Cell specific test parameters for combined E-UTRA TDD inter-frequency and UTRA TDD cell search under fading propagation conditions(cell3)

Parameter	Unit	Cell 3 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number*		Channel 3			
PCCPCH_Ec/Ior	dB	-3			
DwPCH_Ec/Ior	dB			0	
OCNS_Ec/Ior	dB	-3			
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	9	-Infinity	9
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-Infinity	-74	n.a.	
Propagation Condition		Case 3			
Note1: The DPCH of all cells are located in a timeslot other than 0. Note2: In the case of multi-frequency network, the UTRA RF Channel Number can be set for the primary frequency in this test. Note3: P-CCPCH RSCP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.11.4.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than 12.8s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.11.5 Combined E-UTRAN FDD – E-UTRA FDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

A.8.11.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of multiple events when doing inter frequency and GSM measurements. This test will partly verify the E-UTRAN FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.1 and simultaneously the E-UTRAN FDD- GSM cell search requirements in clause 8.1.2.4.5.

The test parameters are given in Tables A.8.11.5.1-1, A.8.11.5.1-2 and A.8.11.5.1-3. In this test, there are two cells on different carrier frequencies and one GSM cell. Gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.5.1-1: General test parameters for combined E-UTRAN FDD – E-UTRA FDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cells		Cell 2, 3	Cell 2 is on E-UTRA RF channel number 2. Cell 3 is on Absolute RF Channel Number 3 (GSM cell).
CP length		Normal	Applicable to cell 1 and cell 2
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
E-UTRAN FDD measurement quantity		RSRP	
Hysteresis	dB	0	Parameter for A3 and B2 event
A3-Offset	dB	-6	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between E-UTRAN FDD cells	ms	3 ms	Asynchronous cells
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b2-Threshold-E-UTRA	dBm	-83	RSRP threshold for event B2. This is the threshold for E-UTRA in the B2 configuration. E-UTRA PCell RSRP is below this throughout the test to account for measurement accuracy and fading
b2-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B2.
Monitored GSM cell list size		6 GSM neighbours including ARFCN 3	List of GSM cells provided before T2 starts.
T1	s	5	
T2	s	10	

Table A.8.11.5.1-2: Cell specific test parameters for E-UTRAN FDD cells for combined E-UTRAN FDD – E-UTRA FDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70		ETU70	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.5.1-3: Cell specific test parameters for GSM (cell # 3) for combined E-UTRAN FDD – E-UTRA FDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Cell 3	
		T1	T2
Absolute RF Channel Number		ARFCN3	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.11.5.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for cell 2, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report including BSIC of cell 3, with a measurement reporting delay less than 7200 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 7200 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay = $2*T_{Measurement\ Period,\ GSM} = 2* N_{freq}*480ms = 1920ms$.

Initial BSIC identification delay = 5280 ms, when one carrier frequency other than GSM is monitored in the gaps.

A.8.11.6 Combined E-UTRAN TDD – E-UTRA TDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

A.8.11.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of multiple events when doing inter frequency and GSM measurements. This test will partly verify the E-UTRAN TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.2 and simultaneously the E-UTRAN TDD- GSM cell search requirements in clause 8.1.2.4.6.

The test parameters are given in Tables A.8.11.6.1-1, A.8.11.6.1-2 and A.8.11.6.1-3. In this test, there are two cells on different carrier frequencies and one GSM cell. Gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 and B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2 and cell 3.

Table A.8.11.6.1-1: General test parameters for combined E-UTRAN TDD – E-UTRA TDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Special subframe configuration of cell1 and cell2		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration of cell1 and cell2		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cells		Cell 2, 3	Cell 2 is on E-UTRA RF channel number 2. Cell 3 is on Absolute RF Channel Number 3 (GSM cell).
CP length		Normal	Applicable to cell 1 and cell 2
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
E-UTRAN TDD measurement quantity		RSRP	
Hysteresis	dB	0	Parameter for A3 and B2 event
A3-Offset	dB	-6	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between E-UTRAN TDD cells	µs	3	Synchronous cells
Inter-RAT (GSM) measurement quantity		GSM Carrier RSSI	
b2-Threshold-E-UTRA	dBm	-83	RSRP threshold for event B2. This is the threshold for E-UTRA in the B2 configuration. E-UTRA PCell RSRP is below this throughout the test to account for measurement accuracy and fading
b2-Threshold-GERAN	dBm	-80	GSM Carrier RSSI threshold for event B2.
Monitored GSM cell list size		6 GSM neighbours including ARFCN 3	List of GSM cells provided before T2 starts.
T1	s	5	
T2	s	10	

Table A.8.11.6.1-2: Cell specific test parameters for E-UTRAN TDD cells for combined E-UTRAN TDD – E-UTRA TDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70		ETU70	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.11.6.1-3: Cell specific test parameters for GSM (cell # 3) for combined E-UTRAN TDD – E-UTRA TDD and GSM cell search. E-UTRA cells in fading; GSM cell in static propagation conditions

Parameter	Unit	Cell 3	
		T1	T2
Absolute RF Channel Number		ARFCN3	
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

A.8.11.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for cell 2, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall send one Event B2 triggered measurement report including BSIC of cell 3, with a measurement reporting delay less than 7200 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 2: The delay for GSM cell identification with BSIC verified is equal to 7200 ms, which is the sum of the event triggered measurement reporting delay and the initial BSIC identification delay.

The event triggered measurement reporting delay = $2*T_{Measurement\ Period,\ GSM} = 2* N_{freq}*480ms = 1920ms$.

Initial BSIC identification delay = 5280 ms, when one carrier frequency other than GSM is monitored in the gaps.

A.8.12 RSTD Intra-frequency Measurements

A.8.12.1 E-UTRAN FDD intra-frequency RSTD measurement reporting delay test case

A.8.12.1.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the requirements specified in Clause 8.1.2.5.1 in an environment with fading propagation conditions.

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All cells are on the same RF channel.

The test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, whilst Cell 2 and Cell 3 are activated only in the beginning of T2. Cell 2 is active until the end of T3, and Cell 3 is active until the end of T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, while Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T2. Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of T2, where $\Delta T = 150$ ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.12.1.1-1, Table A.8.12.1.1-2, Table A.8.12.1.1-3 and Table A.8.12.1.1-4.

Table A.8.12.1.1-1: General test parameters for E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Value	Comment
Reference cell		Cell 1	Reference cell is the cell in the OTDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 36.214 [4] and TS 36.355 [24]. The reference cell is the PCell in this test case.
Neighbor cells		Cell 2 and Cell 3	Cell 2 and Cell 3 appear at random places in the neighbour cell list in the OTDOA assistance data, but Cell 2 always appears in the first half of the list, whilst Cell 3 appears in the second half of the list.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	10	
PRS Transmission Bandwidth	RB	50	PRS are transmitted over the system bandwidth
PRS configuration index I_{PRS}		171	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\mathrm{PRS}}-160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes N_{PRS}		1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 1 – PCI of Cell 2)mod6=0 and (PCI of Cell 1 – PCI of Cell 3)mod6=0	The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters
CP length		Normal	
DRX		ON	DRX parameters are further specified in Table A.8.12.1.1-3
Radio frame receive time offset between the cells at the UE antenna connector	µs	Cell 2 to Cell 1: 1 Cell 3 to Cell 1: -1	PRS are transmitted from synchronous cells
Expected RSTD	µs	Cell 2: 3 Cell 3: 3 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	µs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Number of cells provided in OTDOA assistance data		16	Including the reference cell
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3	The length of the time interval from the beginning of each test
T2	s	1.28	The length of the time interval that follows immediately after time interval T1
T3	s	1.28	The length of the time interval that follows immediately after time interval T2

Table A.8.12.1.1-2: Cell-specific test parameters for E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions during T1

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number		1	1	1
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low
OCNG patterns defined in A.3.2.1		OP.5 FDD	N/A	N/A
PBCH_RA	dB	0	N/A	N/A
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA Note 1				
OCNG_RB Note 1				
N_{oc} Note 3	dBm/15 kHz	-95		
PRS $\hat{E}_s/N_{oc}$	dB	-Infinity	-Infinity	-Infinity
Io Note 4	dBm/9 MHz	-67.22	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity
Propagation Condition		ETU30		

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.12.1.1-3: Cell-specific test parameters for E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions during T2 and T3

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
E-UTRA RF Channel Number		1		1		1	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG patterns defined in A.3.2.1		OP.5 FDD		OP.6 FDD		OP.6 FDD	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0		0		0	N/A
PRS_RA	dB	-3	N/A	N/A	3	3	N/A
N_{oc} Note 3	dBm/ 15 kHz	-98	-95	-98	-95	-98	-95
PRS $\hat{E}_s/N_{oc}$	dB	-1	-Infinity	-Infinity	-7	-7	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-1.79	-Infinity	-Infinity	-7	-9.54	-Infinity
Io Note 4	dBm/ 9 MHz	-69.55	-67.08	-69.55	-67.08	-69.55	N/A
PRP Note 4	dBm/ 15 kHz	-99	-Infinity	-Infinity	-102	-105	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-93	-105	-105	-108	-Infinity
$\hat{E}_s/N_{oc}$ Note 4	dB	2	2	-7	-10	-10	-Infinity
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: If PRS_RA is not "N/A", $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.12.1.1-4: DRX parameters for the test of E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Field	Value	Comment
onDurationTimer	psf1	As specified in TS 36.331 [2], Clause 6.3.2
Drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf320	
shortDRX	Disable	

A.8.12.1.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.1.2.5.1.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the OTDOA assistance data, Cell 1, within 2560 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD_0000 and RSTD_12711.

NOTE: The RSTD measurement time in the test is derived from the following expression, $T_{PRS}(M-1)+160\left\lceil \frac{n}{M} \right\rceil$, where M =8 and n =16 are the parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1. This gives the total RSTD measurement time of 2560 ms for Cell 2 and Cell 3 with respect to the reference cell Cell 1.

A.8.12.2 E-UTRAN TDD intra-frequency RSTD measurement reporting delay test case

A.8.12.2.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the requirements specified in Clause 8.1.2.5.2 in an environment with fading propagation conditions.

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All cells are on the same RF channel.

The test consists of three consecutive time intervals, with duration of T1 and T2. Cell 1 is active in T1, T2 and T3, whilst Cell 2 and Cell 3 are activated only in the beginning of T2. Cell 2 is active until the end of T3, and Cell 3 is active until the end of T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, while Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T2. Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of T2, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.12.2.1-1, Table A.8.12.2.1-2, Table A.8.12.2.1-3, and Table A.8.12.2.1-4.

Table A.8.12.2.1-1: General test parameters for E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Value	Comment
Reference cell		Cell 1	Reference is the cell in the OTDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 36.214 [4] and TS 36.355 [24]. The reference cell is the PCell in this test case.
Neighbor cells		Cell 2 and Cell 3	Cell 2 and Cell 3 appear at random places in the neighbour cell list in the OTDOA assistance data, but Cell 2 always appears in the first half of the list, whilst Cell 3 appears in the second half of the list.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	10	
PRS Transmission Bandwidth	RB	50	PRS are transmitted over the system bandwidth
PRS configuration index I_{PRS}		174	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\text{PRS}} - 160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes N_{PRS}		1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 1 – PCI of Cell 2)mod6=0 and (PCI of Cell 1 – PCI of Cell 3)mod6=0	The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters
TDD uplink-downlink configuration		1	As specified in TS 36.211 [16], Clause 4.2; corresponds to a configuration with 5 ms switch-point periodicity and two downlink consecutive subframes
TDD special subframe configuration		6	As specified in TS 36.211 [16], Clause 4.2; corresponds to DwPTS of $19760 \cdot T_s$ and UpPTS of $4384 \cdot T_s$
CP length		Normal	The same CP length applies for DL and UL
DRX		ON	DRX parameters are further specified in Table A.8.12.2.1-3
Radio frame receive time offset between the cells at the UE antenna connector	µs	Cell 2 to Cell 1: 1 Cell 3 to Cell 1: -1	PRS are transmitted from synchronous cells
Expected RSTD	µs	Cell 2: 3 Cell 3: 3 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	µs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Number of cells provided in OTDOA assistance data		16	Including the reference cell
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3	The length of the time interval from the beginning of each test
T2	s	1.28	The length of the time interval that follows immediately after time interval T1
T3	s	1.28	The length of the time interval that follows immediately after time interval T2

Table A.8.12.2.1-2: Cell-specific test parameters for E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions during T1

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number		1	1	1
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low
OCNG patterns defined in A.3.2.2		OP.1 TDD	N/A	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0	N/A	N/A
N_{oc} Note 3	dBm/15 kHz	-95		
PRS $\hat{E}_s/N_{oc}$	dB	-Infinity	-Infinity	-Infinity
Io Note 4	dBm/9 MHz	-67.22	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity
Propagation Condition		ETU30		

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.12.2.1-3: Cell-specific test parameters for E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
E-UTRA RF Channel Number		1		1		1	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG patterns defined in A.3.2.2		OP.1 TDD		OP.2 TDD		OP.2 TDD	N/A
PBCH_RA	dB	0		0		0	N/A
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA							
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
OCNG_RA Note 1							
OCNG_RB Note 1							
PRS_RA	dB	-3	N/A	N/A	3	3	N/A
N_{oc} Note 3	dBm/15 kHz	-98	-95	-98	-95	-98	-95
PRS $\hat{E}_s/N_{oc}$	dB	-1	-Infinity	-Infinity	-7	-7	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-1.79	-Infinity	-Infinity	-7	-9.54	-Infinity
Io Note 4	dBm/9 MHz	-69.55	-67.08	-69.55	-67.08	-69.55	N/A
PRP Note 4	dBm/15 kHz	-99	-Infinity	-Infinity	-102	-105	-Infinity
RSRP Note 4	dBm/15 kHz	-96	-93	-105	-105	-108	-Infinity
$\hat{E}_s/N_{oc}$ Note 4	dB	2	2	-7	-10	-10	-Infinity
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test and assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: If PRS_RA is not "N/A", $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.12.2.1-4: DRX parameters for the test of E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions

Field	Value	Comment
onDurationTimer	psf1	As specified in TS 36.331 [2], Clause 6.3.2.
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf320	
shortDRX	disable	

A.8.12.2.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.1.2.5.2.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the OTDOA assistance data, Cell 1, within 2560 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD_0000 and RSTD_12711.

NOTE: The RSTD measurement time in the test is derived from the following expression, $T_{PRS}(M-1)+160\left\lceil \frac{n}{M} \right\rceil$, where M =8 and n =16 are the parameters specified for this test case in Clause 8.1.2.5.2, Table 8.1.2.5.2-1, under Note 1. This gives the total RSTD measurement time of 2560 ms for Cell 2 and Cell 3 with respect to the reference cell Cell 1.

A.8.13 RSTD Inter-frequency Measurements

A.8.13.1 E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay test case with the reference cell on the serving carrier frequency

A.8.13.1.1 Test Purpose and Environment

The purpose of the test is to verify that the FDD-FDD inter-frequency RSTD measurement meets the requirements specified in Clause 8.1.2.6.1, specifically for Note 2 in Table 8.1.2.6.1-1, in an environment with fading propagation conditions.

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. Cell 1 is on FDD RF channel 1. Cell 2 and Cell 3 are on a FDD RF channel 2.

The UE requires measurement gaps to perform inter-frequency measurements. Gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided and configured to not overlap with PRS subframes of Cell 1.

The test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, whilst Cell 2 and Cell 3 are activated only in the beginning of T2. Cell 2 is active until the end of T3, and Cell 3 is active until the end of T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the Cell 3, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 and Cell 3 transmit PRS only in T2. Cell 2 transmits PRS only in T3. Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of T2, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data. The measurement gap configuration is known and configured in the UE at the start of T1. DRX is configured before T2.

The test parameters are as given in Table A.8.13.1.1-1, Table A.8.13.1.1-2, Table A.8.13.1.1-3 and Table A.8.13.1.1-4.

Table A.8.13.1.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Value	Comment
Reference cell		Cell 1	Reference cell is the cell with respect to which the RSTD measurement is defined, as specified in TS 36.214 [4]. The reference cell is the PCell on RF channel 1 in this test case.
Neighbor cells		Cell 2 and Cell 3	Cells on RF channel 2. The cells appear at random places in the neighbour cell list in the OTDOA assistance data, but Cell 2 always appears in the first half of the list, whilst Cell 3 appears in the second half of the list.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	10	
PRS Bandwidth	RB	50	PRS bandwidth is as indicated in prs-Bandwidth in the OTDOA assistance data defined in [24]. Here, PRS are transmitted over the system bandwidth
Gap pattern Id		0	As specified in Table 8.1.2.1-1. Applies for measurements on Cell 2 and Cell 3
Gap offset		9	As specified in TS 36.331 [2], Clause 6.3.5
PRS configuration index I_{PRS}		Cell 1: 181, Cell 2, Cell 3: 171	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\mathrm{PRS}} - 160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes N_{PRS}		1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 1 – PCI of Cell 2)mod6=0 and (PCI of Cell 1 – PCI of Cell 3)mod6=0	The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters
CP length		Normal	
DRX		ON	DRX parameters are further specified in Table A.8.13.1.1-3.
prs-SubframeOffset		310	Number of subframes rounded to the closest integer. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell specified in TS 36.355 [24]
Radio frame receive time offset between the cells at the UE antenna connector	µs	Cell 2 to Cell 1: 1 Cell 3 to Cell 1: -1	PRS are transmitted from synchronous cells
Expected RSTD	µs	Cell 2: -2 Cell 3: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator

Expected RSTD uncertainty for all neighbour cells	µs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Number of cells provided in OTDOA assistance data		16	The list includes the reference cell (received in *OTDOA-ReferenceCellInfo* [24]) on RF channel 1 and 15 other cells on RF channel 2, all received in *OTDOA-ProvideAssistanceData* [24].
PRS muting info		Cell 1: '1111111100000000' Cell 2: '0000000011111111' Cell 3: '1111111100000000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3	The length of the time interval from the beginning of each test
T2	s	2.48	The length of the time interval that follows immediately after time interval T1
T3	s	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.13.1.1-2: Cell-specific test parameters for E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay under fading propagation conditions during T1

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number		1	N/A	N/A
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low
OCNG patterns defined in A.3.2.1		OP.5 FDD	N/A	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0	N/A	N/A
N_{oc} Note 3	dBm/15 kHz	-95	N/A	N/A
PRS $\hat{E}_s/N_{oc}$	dB	-Infinity	-Infinity	-Infinity
Io Note 4	dBm/9 MHz	-67.22	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity
Propagation Condition		ETU30		
Note 1: OCNG shall be used such that the active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.				

Table A.8.13.1.1-3: Cell-specific test parameters for E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay under fading propagation conditions during T2 and T3

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
E-UTRA RF Channel Number		1		2		2	N/A
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG patterns defined in A.3.2.1		OP.5 FDD		OP.6 FDD		OP.6 FDD	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0		0		0	N/A
PRS_RA	dB	-3	N/A	N/A	3	3	N/A
N_{oc} Note 3	dBm/ 15 kHz	-98	-98	-98	-95	-98	N/A
PRS $\hat{E}_s/N_{oc}$	dB	-1	-Infinity	-Infinity	-7	-8	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-1	-Infinity	-Infinity	-7	-8	-Infinity
Io Note 4	dBm/ 9 MHz	-69.68	-70.22	-70.11	-67.08	-70.11	N/A
PRP Note 4	dBm/ 15 kHz	-99	-Infinity	-Infinity	-102	-106	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-105	-109	-Infinity
$\hat{E}_s/N_{oc}$ Note 4	dB	2	2	-7	-10	-11	-Infinity
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: If PRS_RA is not "N/A", $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes

Table A.8.13.1.1-4: DRX parameters for the test of E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Field	Value	Comment
onDurationTimer	psf1	As specified in TS 36.331 [2], Clause 6.3.2
Drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf320	
shortDRX	Disable	

A.8.13.1.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.1.2.6.1.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell Cell 1 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD_0000 and RSTD_12711.

NOTE: The RSTD measurement time in the test is derived from the following expression, $T_{PRS}(M-1)+160\left\lceil \frac{n}{M} \right\rceil$, where M =16 and n =16 are the parameters specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 2. This gives the total RSTD measurement time of 4960 ms for Cell 2 and Cell 3 with respect to the reference cell Cell 1.

A.8.13.2 E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay test case with the reference cell on the serving carrier frequency

A.8.13.2.1 Test Purpose and Environment

The purpose of the test is to verify that the TDD-TDD inter-frequency RSTD measurement meets the requirements specified in Clause 8.1.2.6.3, specifically for Note 2 in Table 8.1.2.6.3-1, in an environment with fading propagation conditions.

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. Cell 1 is on TDD RF channel 1. Cell 2 and Cell 3 are on TDD RF channel 2.

The UE requires measurement gaps to perform inter-frequency measurements. Gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided and configured to not overlap with PRS subframes of Cell 1.

The test consists of three consecutive time intervals, with duration of T1 and T2. Cell 1 is active in T1, T2 and T3, whilst Cell 2 and Cell 3 are activated only in the beginning of T2. Cell 2 is active until the end of T3, and Cell 3 is active until the end of T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the Cell 3, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 and Cell 3 transmit PRS only in T2. Cell 2 transmits PRS only in T3. Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of T2, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data. The measurement gap configuration is known and configured in the UE at the start of T1. DRX is configured before T2.

The test parameters are as given in Table A.8.13.2.1-1, Table A.8.13.2.1-2, Table A.8.13.2.1-3, and Table A.8.13.2.1-4.

Table A.8.13.2.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Value	Comment
Reference cell		Cell 1	Reference cell is the cell with respect to which the RSTD measurement is defined, as specified in TS 36.214 [4]. The reference cell is the PCell on RF channel 1 in this test case.
Neighbor cells		Cell 2 and Cell 3	Cells on RF channel 2. The cells appear at random places in the neighbour cell list in the OTDOA assistance data, but Cell 2 always appears in the first half of the list, whilst Cell 3 appears in the second half of the list.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	10	
PRS Bandwidth	RB	50	PRS bandwidth is as indicated in prs-Bandwidth in the OTDOA assistance data defined in [24]. Here, PRS are transmitted over the system bandwidth
Gap pattern Id		0	As specified in Table 8.1.2.1-1. Applies for measurements on Cell 2 and Cell 3
Gap offset		12	As specified in TS 36.331 [2], Clause 6.3.5
PRS configuration index I_{PRS}		Cell 1: 184, Cell 2, Cell 3: 174	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\text{PRS}} - 160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes N_{PRS}		1	As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 1 – PCI of Cell 2)mod6=0 and (PCI of Cell 1 – PCI of Cell 3)mod6=0	The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters
TDD uplink-downlink configuration		1	As specified in TS 36.211 [16], Clause 4.2; corresponds to a configuration with 5 ms switch-point periodicity and two downlink consecutive subframes
TDD special subframe configuration		6	As specified in TS 36.211 [16], Clause 4.2; corresponds to DwPTS of $19760 \cdot T_s$ and UpPTS of $4384 \cdot T_s$
CP length		Normal	The same CP length for DL and UL
DRX		ON	DRX parameters are further specified in Table A.8.13.2.1-3.
prs-SubframeOffset		310	Number of subframes rounded to the closest integer. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell specified in TS 36.355 [24]
Radio frame receivetime offset between the cells at the UE antenna connecto	µs	Cell 2 to Cell 1: 1 Cell 3 to Cell 1: -1	PRS are transmitted from synchronous cells
Expected RSTD	µs	Cell 2: -2 Cell 3: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	µs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index

Number of cells provided in OTDOA assistance data		16	The list includes the reference cell (received in *OTDOA-ReferenceCellInfo* [24]) on RF channel 1 and 15 other cells on RF channel 2, all received in *OTDOA-ProvideAssistanceData* [24].
PRS muting info		Cell 1: '1111111100000000' Cell 2: '0000000011111111' Cell 3: '1111111100000000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3	The length of the time interval from the beginning of each test
T2	s	2.48	The length of the time interval that follows immediately after time interval T1
T3	s	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.13.2.1-2: Cell-specific test parameters for E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay under fading propagation conditions during T1

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number		1	N/A	N/A
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low
OCNG patterns defined in A.3.2.2		OP.1 TDD	N/A	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0	N/A	N/A
N_{oc} Note 3	dBm/15 kHz	-95	N/A	N/A
PRS $\hat{E}_s/N_{oc}$	dB	-Infinity	-Infinity	-Infinity
Io Note 4	dBm/9 MHz	-67.22	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity
Propagation Condition		ETU30		
Note 1: OCNG shall be used such that the active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.				

Table A.8.13.2.1-3: Cell-specific test parameters for E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
E-UTRA RF Channel Number		1		2		2	N/A
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG patterns defined in A.3.2.2		OP.1 TDD		OP.2 TDD		OP.2 TDD	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0		0		0	N/A
PRS_RA	dB	-3	N/A	N/A	3	3	N/A
N_{oc} Note 3	dBm/ 15 kHz	-98	-98	-98	-95	-98	N/A
PRS $\hat{E}_s/N_{oc}$	dB	-1	-Infinity	-Infinity	-7	-8	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-1	-Infinity	-Infinity	-7	-8	-Infinity
Io Note 4	dBm/ 9 MHz	-69.68	-70.22	-70.11	-67.08	-70.11	N/A
PRP Note 4	dBm/ 15 kHz	-99	-Infinity	-Infinity	-102	-106	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-105	-109	-Infinity
$\hat{E}_s/N_{oc}$ Note 4	dB	2	2	-7	-10	-11	-Infinity
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test and assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: If PRS_RA is not "N/A", $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.13.2.1-4: DRX parameters for the test of E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay under fading propagation conditions

Field	Value	Comment
onDurationTimer	psf1	As specified in TS 36.331 [2], Clause 6.3.2.
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf320	
shortDRX	disable	

A.8.13.2.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.1.2.6.3.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell Cell 1 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD_0000 and RSTD_12711.

NOTE: The RSTD measurement time in the test is derived from the following expression, $T_{PRS}(M-1)+160\left\lceil \frac{n}{M} \right\rceil$, where M =16 and n =16 are the parameters specified in Clause 8.1.2.6.3, Table 8.1.2.6.3-1, under Note 2. This gives the total RSTD measurement time of 4960 ms for Cell 2 and Cell 3 with respect to the reference cell Cell 1.

A.8.14 E-UTRAN TDD - FDD Inter-frequency Measurements

A.8.14.1 E-UTRAN TDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

A.8.14.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.3.

The test parameters are given in Tables A.8.14.1.1-1 and A.8.14.1.1-2. In this test, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.14.1.1-1: General test parameters for E-UTRAN TDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
Cell 1 PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
Cell 1 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Cell1 Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
Cell1 Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2.
Cell 2 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Cell 1 E-UTRA TDD RF Channel Number		1	One TDD carrier frequency is used.
Cell 2 E-UTRA FDD RF Channel Number		2	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	5	

Table A.8.14.1.1-2: Cell specific test parameters for E-UTRAN TDD-FDD inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 TDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.8.14.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.14.2 E-UTRAN TDD-FDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

A.8.14.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These test will partly verify the TDD-FDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.

The common test parameters are given in Tables A.8.14.2.1-1 and A.8.14.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.14.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.14.2.1-4. In these tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time aligmend. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.14.2.1-1: General test parameters for E-UTRAN TDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Parameter	Unit	Test 1	Test 2	Comment
		Value		
Cell1 PDSCH parameters		DL Reference Measurement Channel R.0 TDD		As specified in clause A.3.1.1.2. Note that UE may only be allocated at *On Duration*
Cell1PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in clause A.3.1.2.2.
Cell2 PDSCH parameters		DL Reference Measurement Channel R.0 FDD		As specified in clause A.3.1.1.1. Note that UE may only be allocated at *On Duration*
Cell2PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1.
E-UTRA RF Channel Number		1		one TDD carrier frequencies is used.
E-UTRA RF Channel Number		2		one FDD carrier frequencies is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
Active cell		Cell 1		Cell 1 is on RF channel number 1
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
Cell1 Uplink-downlink configuration		1		As specified in TS 36.211 clause 4.2 Table 4.2-2
Cell1 Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
A3-Offset	dB	-6		
Hysteresis	dB	0		
CP length		Normal		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
PRACH configuration		4		As specified in table 5.7.1-3 in TS 36.211
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.14.2.1-3
Time offset between cells		3 ms		Asynchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.14.2.1-2: Cell specific test parameters for E-UTRAN TDD-FDD inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 TDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.14.2.1-3: drx-Configuration to be used in E-UTRAN TDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table A.8.14.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN TDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	2	2	For further information see clause 6.3.2 in TS 36.331 and 10.1 in TS 36.213.

A.8.14.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

A.8.14.3 E-UTRAN TDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

A.8.14.3.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.6.

The test scenario comprises of one E-UTRA FDD carriers and one cell on each carrier as given in tables A.8.14.3.1-1 and A.8.14.3.1-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

Table A.8.14.3.1-1: General test parameters for E-UTRAN TDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
Cell1PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
Cell1 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Cell2 PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
Cell2 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Cell1 E-UTRA RF channel number		1	One TDD carrier is used
Cell2 E-UTRA RF channel number		2	One FDD carrier is used
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Cell1 special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
Cell1 Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211.
Gap Pattern Id		0	As specified in 3GPP TS 36.133 section 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.14.3.1-2: Cell specific test parameters for E-UTRAN TDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 TDD	OP.1 TDD	OP.1 TDD	OP.2 FDD	**OP.2 FDD**	**OP.2 FDD**
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.14.3.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI,inter}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 42 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 42 ACK/NACK number is caused by two parts. Firstly, at least 30 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requiremenet in Clause 8.1.2.3.7.1. Secondly, given that continuous DL data allocation, and the measurement gaps have been deconfigured before the start of T3, additional 12 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

A.8.15 E-UTRAN FDD - TDD Inter-frequency Measurements

A.8.15.1 E-UTRAN FDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

A.8.15.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.15.1.1-1 and A.8.15.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.15.1.1-1: General test parameters for E-UTRAN FDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
Cell 1 PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
Cell 1 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Cell 2 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Cell2 Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to Cell 2.
Cell2 Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2. Applicable to Cell 2.
CP length		Normal	
Cell 1 E-UTRA FDD RF Channel Number		1	One TDD carrier frequency is used.
Cell 2 E-UTRA TDD RF Channel Number		2	One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 ms	Asynchronous cells
T1	s	5	
T2	s	10	

Table A.8.15.1.1-2: Cell specific test parameters for E-UTRAN FDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 FDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.15.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCC

A.8.15.2 E-UTRAN FDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

A.8.15.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify the FDD-TDD inter-frequency cell search requirements when DRX is used in clause 8.1.2.3.4.

The common test parameters are given in Tables A.8.15.2.1-1 and A.8.15.2.1-2. DRX configuration for Test1 and Test2 are given in Table A.8.15.2.1-3 and time alignment timer and scheduling request related parameters in Table A.8.15.2.1-4. In these tests, there are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In Test 1 UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The tests consist of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.15.2.1-1: General test parameters for E-UTRAN FDD-TDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Parameter	Unit	Test 1	Test 2	Comment
		Value		
Cell 1 PDSCH parameters		DL Reference Measurement Channel R.0 FDD		As specified in clause A.3.1.1.1 Note that UE may only be allocated at *On Duration*
Cell 1 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1.
Cell 2 PDSCH parameters		DL Reference Measurement Channel R.0 TDD		As specified in clause A.3.1.1.2 Note that UE may only be allocated at *On Duration*
Cell 2 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in clause A.3.1.2.2.
Cell 1 E-UTRA FDD RF Channel Number		1		One FDD carrier frequency is used.
Cell 2 E-UTRA TDD RF Channel Number		2		One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	10		
Active cell		Cell 1		Cell 1 is on RF channel number 1
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2
Gap Pattern Id		0		As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6		
Hysteresis	dB	0		
CP length		Normal		
TimeToTrigger	s	0		
Filter coefficient		0		L3 filtering is not used
E-UTRA FDD PRACH configuration		4		As specified in table 5.7.1-2 in TS 36.211
Cell 2 Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211
Cell 2 Uplink-downlink configuration		1		As specified in table 4.2-2 in TS 36.211
E-UTRA TDD Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table A.8.15.2.1-3
Time offset between cells	ms	3		Asynchronous cells
T1	s	5		
T2	s	5	30	

Table A.8.15.2.1-2: Cell specific test parameters for E-UTRAN FDD-TDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 FDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.15.2.1-3: drx-Configuration to be used in E-UTRAN FDD-TDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	
Note: For further information see clause 6.3.2 in TS 36.331.			

Table A.8.15.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-TDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.15.2.2 Test Requirements

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 20*1280ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.15.3 E-UTRAN FDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

A.8.15.3.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in clause 8.1.2.3.8.

The test scenario comprises of one E-UTRA FDD carrier and one E-UTRA TDD carrier and one cell on each carrier as given in tables A.8.15.3-1 and A.8.15.3-2. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-frequency monitoring.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event A3. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *si-RequestForHO* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE. Measurement gaps shall be deconfigured before the start of T3.

Table A.8.15.3-1: General test parameters for E-UTRAN FDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Value	Comment
Cell1 PDSCH parameters		DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1
Cell1 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Cell2 PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF channel number		1, 2	One FDD and one TDD carrier frequency are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1.
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2.
CP length		Normal	
Cell 2 Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211.
Cell 2 Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211.
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
si-RequestForHO		TRUE	As specified in clause 5.5.3.1 in TS 36.331.
Time offset between cells	ms	3	Asynchronous cells
T1	s	5	
T2	s	≤10	
T3	s	5	

Table A.8.15.3-2: Cell specific test parameters for E-UTRAN FDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.10 (OP.10 FDD) and in A.3.2.2.1 (OP.2 TDD)		OP.10 FDD	OP.10 FDD	OP.10 FDD	OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	4	4	-Infinity	7	7
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4	4	4	-Infinity	7	7
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
SCH_RP Note3	dBm/15 KHz	-94	-94	-94	-Infinity	-91	-91
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

A.8.15.3.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 170 milliseconds from the start of T3.

Test requirement = RRC Procedure delay + $T_{identify\_CGI,inter}$ + reporting delay

= 15 + 150 + 2ms from the start of T3

= 167 ms, allow 170 ms.

The UE shall be scheduled continuously throughout the test, and from the start of T3 until 170 ms at least 60 ACK/NACK shall be detected as being transmitted by the UE.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The overall 80 ACK/NACK number is caused by two parts. Firstly, at least 60 ACK/NACK shall be sent during identifying the cell global identifier of cell 2 according to the requirement in Clause 8.1.2.3.5.1. Secondly, given that continuous DL data allocation, and the measurement gaps have been deconfigured before the start of T3, additional 20 ACK/NACK shall be sent from the start of T3 until 170 ms excludes 150 ms for identifying the cell global identifier of cell 2.

A.8.16 E-UTRAN Carrier Aggregation Measurements

A.8.16.1 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX

A.8.16.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.1.1-1 and A.8.16.1.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.16.1.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
Channel Bandwidth ($BW_{channel}$)		MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
Cell2 timing offset to cell1		µs	0	
Time alignment error between cell2 and cell1		µs	≤ Time alignment error as specified in TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3 timing offset to cell1		µs	3	Synchronous cells
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤12	UE shall report Event A6 within 6.4s (20×scellMeasCycle)
T3		s	5	UE shall report Event A2 within 200 ms and 1.6s for cells 1 and 2, respectively.
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.16.1.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			2		
$BW_{channel}$	MHz	10			10			10		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low			1x2 Low		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD			OP.2 FDD			OP.2 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-101			-101					
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
$\hat{E}_s/I_{ot}$	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
Propagation Condition		ETU70								

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

A.8.16.1.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2\times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.2 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX

A.8.16.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.2.1-1 and A.8.16.2.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.16.2.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
Channel Bandwidth ($BW_{channel}$)		MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration			1	
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
Cell2 timing offset to cell1		μs	0	
Time alignment error between cell2 and cell1		μs	≤ Time alignment error as specified in TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3 timing offset to cell1		μs	3	Synchronous cells
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤12	UE shall report Event A6 within 6.4s (20×scellMeasCycle)
T3		s	5	UE shall report Event A2 within 200 ms and 1.6s for cells 1 and 2, respectively.
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.16.2.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			2		
$BW_{channel}$	MHz	10			10			10		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low			1x2 Low		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD			OP.2 TDD			OP.2 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-101			-101					
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
$\hat{E}_s/I_{ot}$	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
Propagation Condition		ETU70								

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

A.8.16.2.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 6.4s (20× measCycleSCell) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2 \times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.3 E-UTRAN FDD-FDD Event triggered reporting on deactivated SCell with PCell interruption in non-DRX

A.8.16.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.3.1-1 and A.8.16.3.1-2 below. In the test there are three synchronous cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is deactivated SCell, and Cell3 is the neighbour cell. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. During T1 the UE shall not have any information of cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. PDCCH indicating a new transmission on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

Table A.8.16.3.1-1: General test parameters for E-UTRAN FDD-FDD Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.3 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
Channel Bandwidth ($BW_{channel}$)		MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle		ms	1280	
Cell2 timing offset to cell1		µs	0	
Time alignment error between cell2 and cell1		µs	≤ Time alignment error as specified in TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3 timing offset to cell1		µs	3	Synchronous cells
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤30	UE shall report Event A6 within 25.6s (20×scellMeasCycle)
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.16.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		2	
$BW_{channel}$	MHz	10		10		10	
OCNG Pattern defined in A.3.2.1.10 (OP.10 FDD) and in A.3.2.1.2 (OP.2)		OP.10 FDD		OP.2 FDD		OP.2 FDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
RSRP Note 4	dBm/15 kHz	-82	-82	-82	-82	-Infinity	-82
$\hat{E}_s/I_{ot}$	dB	16	16	16	-0.11	-Infinity	-0.11
SCH_RP Note 4	dBm/15 kHz	-82	-82	-82	-82	-Infinity	-82
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-Infinity	16
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.16.3.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.4 E-UTRAN TDD-TDD Event triggered reporting on deactivated SCell with PCell interruption in non-DRX

A.8.16.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.4.1-1 and A.8.16.4.1-2 below. In the test there are three synchronous cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is deactivated SCell, and Cell3 is the neighbour cell. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. During T1 the UE shall not have any information of cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. PDCCH indicating a new transmission on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

Table A.8.16.4.1-1: General test parameters for E-UTRAN TDD-TDD Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
Channel Bandwidth ($BW_{channel}$)		MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration			1	
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle		ms	1280	
Cell2 timing offset to cell1		µs	0	
Time alignment error between cell2 and cell1		µs	≤ Time alignment error as specified in TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3 timing offset to cell1		µs	3	Synchronous cells
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤30	UE shall report Event A6 within 25.6s (20×scellMeasCycle)
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.16.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		2	
$BW_{channel}$	MHz	10		10		10	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD		OP.2 TDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
RSRP Note 4	dBm/15 kHz	-82	-82	-82	-82	-Infinity	-82
$\hat{E}_s/I_{ot}$	dB	16	16	16	-0.11	-Infinity	-0.11
SCH_RP Note 4	dBm/15 kHz	-82	-82	-82	-82	-Infinity	-82
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-Infinity	16
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.16.4.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.5 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX for 20 MHz bandwidth

A.8.16.5.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.5.1-1 and A.8.16.5.1-2 will replace the values of corresponding parameters in Tables A.8.16.1.1-1 and A.8.16.1.1-2.

Table A.8.16.5.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 20 MHz

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.4 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.10 FDD	As specified in section A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)		MHz	20	Channel bandwidth for cells on primary and secondary component carriers
A2	Threshold RSRP	dBm	-96	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
Note 1: See Table A.8.16.1.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.16.5.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 20 MHz

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			20			20		
OCNG Patterns defined in A.3.2.1.11 (OP.11 FDD) and in A.3.2.1.12 (OP.12 FDD)		OP.11 FDD			OP.12 FDD			OP.12 FDD		
N_{oc} Note 2	dBm/15 kHz	-104			-104					
RSRP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
$\hat{E}_s/I_{ot}$	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
SCH_RP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
Note: See Table A.8.16.1.1-2 for other cell-specific test parameters.										

A.8.16.5.2 Test Requirements

The test requirements defined in section A.8.16.1.2 shall apply to this test case.

A.8.16.6 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20 MHz bandwidth

A.8.16.6.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.6.1-1 and A.8.16.6.1-2 will replace the values of corresponding parameters in Tables A.8.16.2.1-1 and A.8.16.2.1-2.

Table A.8.16.6.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 20 MHz

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)		MHz	20	Channel bandwidth for cells on primary and secondary component carriers
A2	Threshold RSRP	dBm	-96	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
Note 1: See Table A.8.16.2.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.16.6.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 20 MHz

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			20			20		
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and in A.3.2.2.8 (OP.8 TDD)		OP.7 TDD			OP.8 TDD			OP.8 TDD		
N_{oc} Note 2	dBm/15 kHz	-104			-104					
RSRP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
$\hat{E}_s/I_{ot}$	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
SCH_RP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
Note: See Table A.8.16.2.1-2 for other cell-specific test parameters.										

A.8.16.6.2 Test Requirements

The test requirements defined in section A.8.16.2.2 shall apply to this test case.

A.8.16.7 E-UTRA FDD event triggered reporting on deactivated SCell with PCell interruption in non-DRX for 20 MHz bandwidth

A.8.16.7.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.3. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.7.1-1 and A.8.16.7.1-2 will replace the values of corresponding parameters in Tables A.8.16.3.1-1 and A.8.16.3.1-2.

Table A.8.16.7.1-1: General test parameters for E-UTRAN FDD event-triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 20 MHz

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 FDD	As specified in section A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	20	Channel bandwidth for cells on primary and secondary component carriers
Note 1: See Table A.8.16.3.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.7.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 20 MHz

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	20		20		20	
OCNG Patterns defined in A.3.2.1.17 (OP.17 FDD) and in A.3.2.1.12 (OP.12 FDD)		OP.17 FDD		OP.12 FDD		OP.12 FDD	
N_{oc} Note 3	dBm/15 kHz	-101		-101			
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-Infinity	-85
$\hat{E}_s/I_{ot}$	dB	16	16	16	-0.11	-Infinity	-0.11
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-Infinity	-85
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-Infinity	16
Note: See Table A.8.16.3.1-2 for other cell-specific test parameters.							

A.8.16.7.2 Test Requirements

The test requirements defined in section A.8.16.3.2 shall apply to this test case.

A.8.16.8 E-UTRA TDD event triggered reporting on deactivated SCell with PCell interruption in non-DRX for 20 MHz bandwidth

A.8.16.8.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.8.1-1 and A.8.16.8.1-2 will replace the values of corresponding parameters in Tables A.8.16.4.1-1 and A.8.16.4.1-2.

Table A.8.16.8.1-1: General test parameters for E-UTRAN TDD event-triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 20 MHz

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	20	Channel bandwidth for cells on primary and secondary component carriers
Note 1: See Table A.8.16.4.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.8.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 20 MHz

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	20		20		20	
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and in A.3.2.2.8 (OP.8 TDD)		OP.7 TDD		OP.8 TDD		OP.8 TDD	
N_{oc} Note 3	dBm/15 kHz	-101		-101			
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-Infinity	-85
$\hat{E}_s/I_{ot}$	dB	16	16	16	-0.11	-Infinity	-0.11
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-Infinity	-85
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-Infinity	16
Note: See Table A.8.16.4.1-2 for other cell-specific test parameters.							

A.8.16.8.2 Test Requirements

The test requirements defined in section A.8.16.4.2 shall apply to this test case.

A.8.16.9 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX for 10MHz+5MHz

A.8.16.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.1.1.

The test parameters are the same as defined in Subclause A.8.16.1.1 except those described in the following section. The listed parameter values in Tables A.8.16.9.1-1 and A.8.16.9.1-2 will replace the values of corresponding parameters in Tables A.8.16.1.1-1 and A.8.16.1.1-2.

Table A.8.16.9.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for 10MHz+5MHz bandwidth

Parameter	Unit	Value	Comment
Channel bandwidth for cells on primary carriers ($BW_{channel}$)	MHz	10	Channel bandwidth for cells on primary carriers
Channel bandwidth for cells on secondary carriers ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on secondary carriers
Note 1: See Table A.8.16.1.1-1 for the other general parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.9.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for 10MHz+5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	10			5			5		
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD			N/A			N/A		
PDSCH allocation	n_{PRB}	13—36			N/A			N/A		
PCFICH/PDCCH/PHICH parameters defined in A.3.1.2.1		R.6 FDD			R.11 FDD			R.11 FDD		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.1 FDD			OP.16 FDD			OP.16 FDD		
Note 1: See Table A.8.16.1.1-2 for the other specific parameters.										

A.8.16.9.2 Test Requirements

The test requirements defined in section A.8.16.1.2 shall apply to this test case.

A.8.16.10 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 10MHz+5MHz

A.8.16.10.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.2.1.

The test parameters are the same as defined in Subclause A.8.16.2.1 except those described in the following section. The listed parameter values in Tables A.8.16.10.1-1 and A.8.16.10.1-2 will replace the values of corresponding parameters in Tables A.8.16.2.1-1 and A.8.16.2.1-2.

Table A.8.16.10.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for 10MHz+5MHz bandwidth

Parameter	Unit	Value	Comment
Channel bandwidth for cells on primary carriers ($BW_{channel}$)	MHz	10	Channel bandwidth for cells on primary carriers
Channel bandwidth for cells on secondary carriers ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on secondary carriers
Note 1: See Table A.8.16.2.1-1 for the other general parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.10.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for 10MHz+5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	10			5			5		
PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD			N/A			N/A		
PDSCH allocation	n_{PRB}	13—36			N/A			N/A		
PCFICH/PDCCH/PHICH parameters defined in A.3.1.2.2		R.6 TDD			R.12 TDD			R.12 TDD		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.10 (OP.10 TDD)		OP.1 TDD			OP.10 TDD			OP.10 TDD		
Note 1: See Table A.8.16.2.1-2 for the other specific parameters.										

A.8.16.10.2 Test Requirements

The test requirements defined in section A.8.16.2.2 shall apply to this test case.

A.8.16.11 E-UTRAN FDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

A.8.16.11.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.3. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.11.1-1 and A.8.16.11.1-2 will replace the values of corresponding parameters in Tables A.8.16.3.1-1 and A.8.16.3.1-2.

Table A.8.16.11.1-1: General test parameters for E-UTRAN FDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

Parameter	Unit	Value	Comment
Channel bandwidth for cells on primary carrier ($BW_{channel}$)	MHz	10	Channel bandwidth for cells on primary component carrier
PDSCH parameters for cells on primary carriers		DL Reference Measurement Channel R.3 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters for cells on primary carriers		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
Channel bandwidth for cells on secondary carriers ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on secondary component carrier
PCFICH/PDCCH/PHICH parameters for cells on secondary carrier		DL Reference Measurement Channel R.11 FDD	As specified in section A.3.1.2.1
Note 1: See Table A.8.16.3.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.11.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	10		5		5	
OCNG Patterns defined in A.3.2.1		OP.10 FDD		OP.16 FDD		OP.16 FDD	
Note: See Table A.8.16.3.1-2 for other cell-specific test parameters.							

A.8.16.11.2 Test Requirements

The test requirements defined in section A.8.16.3.2 shall apply to this test case.

A.8.16.12 E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

A.8.16.12.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.12.1-1 and A.8.16.12.1-2 will replace the values of corresponding parameters in Tables A.8.16.4.1-1 and A.8.16.4.1-2.

Table A.8.16.12.1-1: General test parameters for E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

Parameter	Unit	Value	Comment
Channel bandwidth for cells on primary carrier ($BW_{channel}$)	MHz	10	Channel bandwidth for cells on primary component carrier
PDSCH parameters for cells on primary carriers		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on primary carriers		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Channel bandwidth for cells on secondary carriers ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on secondary component carrier
PDSCH parameters for cells on secondary carrier		DL Reference Measurement Channel R.4 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on secondary carrier		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2
Note 1: See Table A.8.16.4.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.12.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 10MHz+5MHz

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	10		5		5	
OCNG Patterns defined in A.3.2.2		OP.1 TDD		OP.10 TDD		OP.10 TDD	
Note: See Table A.8.16.4.1-2 for other cell-specific test parameters.							

A.8.16.12.2 Test Requirements

The test requirements defined in section A.8.16.4.2 shall apply to this test case.

A.8.16.13 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX for 5MHz +5 MHz bandwidth

A.8.16.13.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.13.1-1 and A.8.16.13.1-2 will replace the values of corresponding parameters in Tables A.8.16.1.1-1 and A.8.16.1.1-2.

Table A.8.16.13.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 5MHz +5 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in section A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on primary component carrier
Channel Bandwidth ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on secondary component carrier
Note 1: See Table A.8.16.1.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.13.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 5MHz +5 MHz bandwidth

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	10			3			3		
OCNG Patterns defined in A.3.2.1.15 (OP.15.FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.15 FDD			OP.16 FDD			OP.16 FDD		
Note: See Table A.8.16.1.1-2 for other cell-specific test parameters.										

A.8.16.13.2 Test Requirements

The test requirements defined in section A.8.16.1.2 shall apply to this test case.

A.8.16.14 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 5 MHz +5 MHz bandwidth

A.8.16.14.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.14.1-1 and A.8.16.14.1-2 will replace the values of corresponding parameters in Tables A.8.16.2.1-1 and A.8.16.2.1-2.

Table A.8.16.14.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 10 MHz +5 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.4.TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on primary component carrier
Channel Bandwidth ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on secondary component carrier
Note 1: See Table A.8.16.2.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.14.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions, 10 MHz +5 MHz bandwidth

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	10			3			3		
OCNG Patterns defined in A.3.2.2.9 (OP.9 TDD) and in A.3.2.2.10 (OP.10 TDD)		OP.9 TDD			OP.10 TDD			OP10 TDD		
Note: See Table A.8.16.2.1-2 for other cell-specific test parameters.										

A.8.16.14.2 Test Requirements

The test requirements defined in section A.8.16.2.2 shall apply to this test case.

A.8.16.15 E-UTRA FDD event triggered reporting on deactivated SCell with PCell interruption in non-DRX for 5 +5 MHz bandwidth

A.8.16.15.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.3. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.15.1-1 and A.8.16.14.1-2 will replace the values of corresponding parameters in Tables A.8.16.3.1-1 and A.8.16.3.1-2.

Table A.8.16.15.1-1: General test parameters for E-UTRAN FDD event-triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 5 + 5 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.7 FDD (Cell 1)	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in section A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on primary and secondary component carriers
Note 1: See Table A.8.16.3.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.15.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 5+5 MHz bandwidth

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	5		5		5	
OCNG Patterns defined in A.3.2.1.20 (OP.20 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.20 FDD		OP.16 FDD		OP.16 FDD	
Note: See Table A.8.16.3.1-2 for other cell-specific test parameters.							

A.8.16.7.2 Test Requirements

The test requirements defined in section A.8.16.3.2 shall apply to this test case.

A.8.16.16 E-UTRA TDD event triggered reporting on deactivated SCell with PCell interruption in non-DRX for 5+5 MHz bandwidth

A.8.16.16.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.16.1-1 and A.8.16.16.1-2 will replace the values of corresponding parameters in Tables A.8.16.4.1-1 and A.8.16.4.1-2.

Table A.8.16.16.1-1: General test parameters for E-UTRAN TDD event-triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 5+5 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.4 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	5	Channel bandwidth for cells on primary and secondary component carriers
Note 1: See Table A.8.16.4.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.16.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX, 5+5 MHz bandwidth

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	5		5		5	
OCNG Patterns defined in A.3.2.2.9 (OP.9 TDD) and in A.3.2.2.10 (OP.10 TDD)		OP.9 TDD		OP.10 TDD		OP.10 TDD	
Note: See Table A.8.16.4.1-2 for other cell-specific test parameters.							

A.8.16.16.2 Test Requirements

The test requirements defined in section A.8.16.4.2 shall apply to this test case.

A.8.16.17 E-UTRAN FDD activation and deactivation of known SCell in non-DRX

A.8.16.17.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is known by the UE at the time of activation.

The test parameters are given in Tables A.8.16.17.1-1 and cell-specific parameters in A.8.16.17.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Both cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2 (SCC). The UE now starts monitoring also the SCC. The test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m which is an even number, defines the start of time period T2. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+24). The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+9).

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell in a subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell deactivation command is sent until CQI reporting for SCell is discontinued.

Table A.8.16.17.1-1: General test parameters for known SCell activation case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD (Cell 1)	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell		Cell 2	Configured deactivated secondary cell on RF channel number 2.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	320	
Cell2 timing offset to cell1	µs	0	
Time alignment error between cell2 and cell1	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	s	7	During this time the PCell shall be known and the SCell configured and detected.
T2	s	1	During this time the UE shall activate the SCell.
T3	s	1	During this time the UE shall deactivate the SCell.
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.17.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.10 FDD			OP.2 FDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 kHz	-104			-104		
RSRP Note 3	dBm/15 kHz	-87			-87		
$\hat{E}_s/I_{ot}$	dB	17			17		
SCH_RP Note 3	dBm/15 kHz	-87			-87		
$\hat{E}_s/N_{oc}$	dB	17			17		
Propagation Condition		AWGN					
Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.							

A.8.16.17.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in a subframe (m+8), or in a subframe (m+10) if the suframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+24).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+9).

During T3 interruption of PCell during SCell deactivation shall not happen outside the subframes (n+5) to (n+9).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+24) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.17A E-UTRAN FDD activation and deactivation of known SCell in non-DRX for 20MHz

A.8.16.17A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.17. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.17A.1-1 and A.8.16.17A.1-2 will replace the values of corresponding parameters in Tables A.8.16.17.1-1 and A.8.16.17.1-2.

Table A.8.16.17A.1-1: General test parameters for known SCell activation case, 20MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 FDD	As specified in section A.3.1.2.1

Table A.8.16.17A.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation, 20MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			20		
OCNG Patterns defined in A.3.2.1.17 (OP.17 FDD) and in A.3.2.1.12 (OP.12 FDD)		OP.17 FDD			OP.12.FDD		

A.8.16.17A.2 Test Requirements

The test requirements defined in section A.8.16.17.2 shall apply to this test case.

A.8.16.17B E-UTRAN FDD activation and deactivation of known SCell in non-DRX for 10MHz + 5MHz

A.8.16.17B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.17. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.17B.1-1 and A.8.16.17B.1-2 will replace the values of corresponding parameters in Tables A.8.16.17.1-1 and A.8.16.17.1-2.

Table A.8.16.17B.1-1: General test parameters for known SCell activation case, 10+5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD (Cell 1)	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD (Cell 1) DL Reference Measurement Channel R.11 FDD (Cell 2)	As specified in section A.3.1.2.1

Table A.8.16.17B.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation, 10+5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	10			5		
OCNG Patterns defined in A.3.2.1.11 (OP.11 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.10 FDD			OP.16.FDD		

A.8.16.17B.2 Test Requirements

The test requirements defined in section A.8.16.17.2 shall apply to this test case.

A.8.16.17C E-UTRAN FDD activation and deactivation of known SCell in non-DRX for 5MHz + 5MHz

A.8.16.17C.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.17. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.17C.1-1 and A.8.16.17C.1-2 will replace the values of corresponding parameters in Tables A.8.16.17.1-1 and A.8.16.17.1-2.

Table A.8.16.17C.1-1: General test parameters for known SCell activation case, 5+5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.7 FDD (Cell 1)	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in section A.3.1.2.1

Table A.8.16.17C.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation, 5+5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	5			5		
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.20 FDD			OP.16.FDD		

A.8.16.17C.2 Test Requirements

The test requirements defined in section A.8.16.17.2 shall apply to this test case.

A.8.16.18 E-UTRAN TDD activation and deactivation of known SCell in non-DRX

A.8.16.18.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is known by the UE at the time of activation.

The test parameters are given in Tables A.8.16.18.1-1 and cell-specific parameters in A.8.16.18.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Both cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2 (SCC). The UE now starts monitoring also the SCC. The test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m, where m is 4 or 9, defines the start of time period T2. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+24). The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+11).

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a subframe # denoted n where n is 4 or 9, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+11).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell deactivation command is sent until CQI reporting for SCell is discontinued.

Table A.8.16.18.1-1: General test parameters for known SCell activation case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell		Cell 2	Configured deactivated secondary cell on RF channel number 2.
Channel Bandwidth ($BW_{channel}$)	MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every UL subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	320	
Cell2 timing offset to cell1	µs	0	
Time alignment error between cell2 and cell1	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3 timing offset to cell1	µs	3	Synchronous cells
T1	s	7	During this time the PCell shall be known and the SCell configuredand detected.
T2	s	1	During this time the UE shall activate the SCell.
T3	s	1	During this time the UE shall deactivate the SCell.
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.18.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD			OP.2 TDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 kHz	-104			-104		
RSRP Note 3	dBm/15 kHz	-87			-87		
$\hat{E}_s/I_{ot}$	dB	17			17		
SCH_RP Note 3	dBm/15 kHz	-87			-87		
$\hat{E}_s/N_{oc}$	dB	17			17		
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

A.8.16.18.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption, or in a subframe (m+13) if the subframes (m+8) and (m+9) were subject to interruption when an intra-band SCell is activated. Whether CSI report in subframe (m+8) and/or (m+9) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8) and/or (m+9).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+24).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (m+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+11).

During T3 interruption of PCell during SCell deactivation shall not happen outside the subframes (n+5) to (n+11).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+24) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.18A E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 20MHz

A.8.16.18A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.18. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.18A.1-1 and A.8.16.18A.1-2 will replace the values of corresponding parameters in Tables A.8.16.18.1-1 and A.8.16.18.1-2.

Table A.8.16.18A.1-1: General test parameters for known SCell activation case, 20MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2

Table A.8.16.18A.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation, 20MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			20		
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.7 TDD			OP.2.TDD		

A.8.16.18A.2 Test Requirements

The test requirements defined in section A.8.16.18.2 shall apply to this test case.

A.8.16.18B E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 10MHz + 5MHz

A.8.16.18B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.18. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.18B.1-1 and A.8.16.18B.1-2 will replace the values of corresponding parameters in Tables A.8.16.18.1-1 and A.8.16.18.1-2.

Table A.8.16.18B.1-1: General test parameters for known SCell activation case, 10 + 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD (cell 1) DL Reference Measurement Channel R.12 TDD (cell 2)	As specified in section A.3.1.2.2

Table A.8.16.18B.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation, 10 + 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	10			5		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.10 (OP.10 TDD)		OP.1 TDD			OP.10.TDD		

A.8.16.18B.2 Test Requirements

The test requirements defined in section A.8.16.18.2 shall apply to this test case.

A.8.16.18C E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 5MHz + 5MHz

A.8.16.18C.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.18. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.18C.1-1 and A.8.16.18C.1-2 will replace the values of corresponding parameters in Tables A.8.16.18.1-1 and A.8.16.18.1-2.

Table A.8.16.18C.1-1: General test parameters for known SCell activation case, 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.4 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2

Table A.8.16.18C.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation, 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	5			5		
OCNG Patterns defined in A.3.2.2.9 (OP.9 TDD) and in A.3.2.2.10 (OP.10 TDD)		OP.9 TDD			OP.10.TDD		

A.8.16.18C.2 Test Requirements

The test requirements defined in section A.8.16.18.2 shall apply to this test case.

A.8.16.18D E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 20MHz + 10MHz

A.8.16.18D.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.18. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.18D.1-1 and A.8.16.18D.1-2 will replace the values of corresponding parameters in Tables A.8.16.18.1-1 and A.8.16.18.1-2.

Table A.8.16.18D.1-1: General test parameters for known SCell activation case, 20 + 10MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD (cell 1) DL Reference Measurement Channel R.6 TDD (cell 2)	As specified in section A.3.1.2.2

Table A.8.16.18D.1-2: Cell specific test parameters for E-UTRAN TDD known SCell activation, 10 + 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			10		
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.7 TDD			OP.2.TDD		

A.8.16.18D.2 Test Requirements

The test requirements defined in section A.8.16.18.2 shall apply to this test case.

A.8.16.19 E-UTRAN FDD activation and deactivation of unknown SCell in non-DRX

A.8.16.19.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.19.1-1 and cell-specific parameters in A.8.16.19.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Cell 1 has constant signal level throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (cell2) becomes configured on radio channel 2 (SCC). During T1 the SCell is powered off and UE is not aware of SCell.

A MAC message for activation of SCell is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m which is an even number. The point in time at which the MAC message for activation of SCell is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of cell 2 is increased to same level as for cell 1. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+34) provided the SCell can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+9).

Time period T3 starts when a MAC message for deactivation of the SCell, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell at latest in subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.19.1-1: General test parameters for unknown SCell activation case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell		Cell 2	Configured deactivated secondary cell on RF channel number 2.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
SCell measurement cycle (measCycleSCell)	ms	320	
Cell2 timing offset to cell1	µs	0	
Time alignment error between cell2 and cell1	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	ms	100	During this time the PCell shall be known and the SCell configured, but not dectected.
T2	s	1	During this time the UE shall activate the SCell.
T3	s	1	During this time the UE shall deactivate the SCell.
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.19.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD			OP.2 FDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						

N_{oc} Note 2	dBm/15 kHz	-104	-104	
RSRP Note 3	dBm/15 kHz	-87	-infinity	-87
$\hat{E}_s/I_{ot}$	dB	17	-infinity	17
SCH_RP Note 3	dBm/15 kHz	-87	-infinity	-87
$\hat{E}_s/N_{oc}$	dB	17	-infinity	17
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.				

A.8.16.19.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+34).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 Interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+9).

During T3 Interruption of PCell during SCell1 deactivation shall not happen outside the subframes (n+5) to (n+9).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay to be counted as correct. The rate of correct observed SCell activation and deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+34) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.19A E-UTRAN FDD activation and deactivation of unknown SCell in non-DRX for 20MHz

A.8.16.19A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.19. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.19A.1-1 and A.8.16.19A.1-2 will replace the values of corresponding parameters in Tables A.8.16.19.1-1 and A.8.16.19.1-2.

Table A.8.16.19A.1-1: General test parameters for unknown SCell activation case, 20MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 FDD	As specified in section A.3.1.2.1

Table A.8.16.19A.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation, 20MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			20		
OCNG Patterns defined in A.3.2.1.17 (OP.17 FDD) and in A.3.2.1.12 (OP.12 FDD)		OP.17 FDD			OP.12.FDD		

A.8.16.19A.2 Test Requirements

The test requirements defined in section A.8.16.19.2 shall apply to this test case.

A.8.16.19B E-UTRAN FDD activation and deactivation of unknown SCell in non-DRX for 10MHz + 5MHz

A.8.16.19B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.19. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.19B.1-1 and A.8.16.19B.1-2 will replace the values of corresponding parameters in Tables A.8.16.19.1-1 and A.8.16.19.1-2.

Table A.8.16.19B.1-1: General test parameters for unknown SCell activation case, 10+5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 FDD (Cell 1)	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD (Cell 1) DL Reference Measurement Channel R.11 FDD (Cell 2)	As specified in section A.3.1.2.1

Table A.8.16.19B.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation, 10+5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	10			5		
OCNG Patterns defined in A.3.2.1.11 (OP.11 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.10 FDD			OP.16.FDD		

A.8.16.19B.2 Test Requirements

The test requirements defined in section A.8.16.19.2 shall apply to this test case.

A.8.16.19C E-UTRAN FDD activation and deactivation of unknown SCell in non-DRX for 5MHz + 5MHz

A.8.16.19C.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.19. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.19C.1-1 and A.8.16.19C.1-2 will replace the values of corresponding parameters in Tables A.8.16.19.1-1 and A.8.16.19.1-2.

Table A.8.16.19C.1-1: General test parameters for unknown SCell activation case, 5+5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.7 FDD (Cell 1)	As specified in section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in section A.3.1.2.1

Table A.8.16.19C.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation, 5+5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	5			5		
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and in A.3.2.1.16 (OP.16 FDD)		OP.20 FDD			OP.16.FDD		

A.8.16.19C.2 Test Requirements

The test requirements defined in section A.8.16.19.2 shall apply to this test case.

A.8.16.20 E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX

A.8.16.20.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.20.1-1 and cell-specific parameters in A.8.16.20.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Cell 1 has constant signal level throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (cell2) becomes configured on radio channel 2 (SCC). During T1 the signal level of SCell is powered off and UE is not aware of SCell.

A MAC message for activation of SCell is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m, where m is 4 or 9. The point in time at which the MAC message for activation of SCell is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of cell 2 is increased to same level as for cell 1. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+34) provided the SCell can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+11).

Time period T3 starts when a MAC message for deactivation of the SCell, sent from the test equipment to the UE in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell at latest in subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+11).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.20.1-1: General test parameters for unknown SCell activation case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell		Cell 2	Configured deactivated secondary cell on RF channel number 2.
Channel Bandwidth ($BW_{channel}$)	MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every UL subframe
SCell measurement cycle (measCycleSCell)	ms	320	
Cell2 timing offset to cell1	µs	0	
Time alignment error between cell2 and cell1	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Cell3 timing offset to cell1	µs	3	Synchronous cells
T1	ms	100	During this time the PCell shall be known and the SCell configured, but not dectected.
T2	s	1	During this time the UE shall activate the SCell.
T3	s	1	During this time the UE shall deactivate the SCell.
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.20.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD			OP.2 TDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 kHz	-104			-104		
RSRP Note 3	dBm/15 kHz	-87			-infinity	-87	
$\hat{E}_s/I_{ot}$	dB	17			-infinity	17	
SCH_RP Note 3	dBm/15 kHz	-87			-infinity	-87	
$\hat{E}_s/N_{oc}$	dB	17			-infinity	17	
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.

A.8.16.20.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell at in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption, or in a subframe (m+13) if the subframes (m+8) and (m+9) were subject to interruption when an intra-band SCell is activated. Whether first CSI report was interrupted or not is checked by monitoring ACK/NACK sent in PCell at the same time as the first CSI report.

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+34).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 Interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+11).

During T3 Interruption of PCell during SCell1 deactivation shall not happen outside the subframes (n+5) to (n+11).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay to be counted as correct. The rate of correct observed SCell activation and deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+34) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.20A E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX for 20MHz

A.8.16.20A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.20. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.20A.1-1 and A.8.16.20A.1-2 will replace the values of corresponding parameters in Tables A.8.16.20.1-1 and A.8.16.20.1-2.

Table A.8.16.20A.1-1: General test parameters for unknown SCell activation case, 20MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2

Table A.8.16.20A.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation, 20MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			20		
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.7 TDD			OP.2.TDD		

A.8.16.20A.2 Test Requirements

The test requirements defined in section A.8.16.20.2 shall apply to this test case.

A.8.16.20B E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX for 10MHz + 5MHz

A.8.16.20B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.20. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.20B.1-1 and A.8.16.20B.1-2 will replace the values of corresponding parameters in Tables A.8.16.20.1-1 and A.8.16.20.1-2.

Table A.8.16.20B.1-1: General test parameters for unknown SCell activation case, 10 + 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD (cell 1) DL Reference Measurement Channel R.12 TDD (cell 2)	As specified in section A.3.1.2.2

Table A.8.16.20B.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation, 10 + 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	10			5		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.10 (OP.10 TDD)		OP.1 TDD			OP.10.TDD		

A.8.16.20B.2 Test Requirements

The test requirements defined in section A.8.16.20.2 shall apply to this test case.

A.8.16.20C E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX for 5MHz + 5MHz

A.8.16.20C.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.20. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.20C.1-1 and A.8.16.20C.1-2 will replace the values of corresponding parameters in Tables A.8.16.20.1-1 and A.8.16.20.1-2.

Table A.8.16.20C.1-1: General test parameters for unknown SCell activation case, 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.4 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD	As specified in section A.3.1.2.2

Table A.8.16.20C.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation, 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	5			5		
OCNG Patterns defined in A.3.2.2.9 (OP.9 TDD) and in A.3.2.2.10 (OP.10 TDD)		OP.9 TDD			OP.10.TDD		

A.8.16.20C.2 Test Requirements

The test requirements defined in section A.8.16.20.2 shall apply to this test case.

A.8.16.20D E-UTRAN TDD activation and deactivation of unknown SCell in non-DRX for 20MHz + 10MHz

A.8.16.20D.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.20. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.20D.1-1 and A.8.16.20D.1-2 will replace the values of corresponding parameters in Tables A.8.16.20.1-1 and A.8.16.20.1-2.

Table A.8.16.20D.1-1: General test parameters for unknown SCell activation case, 20 + 10MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD (cell 1) DL Reference Measurement Channel R.6 TDD (cell 2)	As specified in section A.3.1.2.2

Table A.8.16.20D.1-2: Cell specific test parameters for E-UTRAN TDD unknown SCell activation, 10 + 5MHz bandwidth

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			10		
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.7 TDD			OP.2.TDD		

A.8.16.20D.2 Test Requirements

The test requirements defined in section A.8.16.20.2 shall apply to this test case.

A.8.16.21 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20MHz+10MHz

A.8.16.21.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.21.1-1 and A.8.16.21.1-2 will replace the values of corresponding parameters in Tables A.8.16.2.1-1 and A.8.16.2.1-2.

Table A.8.16.21.1-1: E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20MHz+10MHz

Parameter		Unit	Value	Comment
Channel bandwidth for cells on primary carrier ($BW_{channel}$)		MHz	20	Channel bandwidth for cells on primary component carrier
PDSCH parameters for cells on primary carriers			DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on primary carriers			DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
Channel bandwidth for cells on secondary carriers ($BW_{channel}$)		MHz	10	Channel bandwidth for cells on secondary component carrier
PDSCH parameters for cells on secondary carrier			DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on secondary carrier			DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-96	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
Note 1: See Table A.8.16.2.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.16.21.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20MHz+10MHz

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
$BW_{channel}$	MHz	20			10			10		
OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.7 TDD			OP.2 TDD			OP.2 TDD		
N_{oc} Note 2	dBm/15 kHz	-104			-104					
RSRP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
$\hat{E}_s/I_{ot}$	dB	19	19	-3	19.00	-0.05	-4.76	-infinity	-0.05	-4.76
SCH_RP Note 3	dBm/15 kHz	-85	-85	-107	-85	-85	-107	-infinity	-85	-107
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
Note: See Table A.8.16.2.1-2 for other cell-specific test parameters.										

A.8.16.21.2 Test Requirements

The test requirements defined in section A.8.16.2.2 shall apply to this test case.

A.8.16.22 E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 20MHz+10MHz

A.8.16.22.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.16.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.16.22.1-1 and A.8.16.22.1-2 will replace the values of corresponding parameters in Tables A.8.16.4.1-1 and A.8.16.4.1-2.

Table A.8.16.22.1-1: General test parameters for E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 20MHz+10MHz

Parameter	Unit	Value	Comment
Channel bandwidth for cells on primary carrier ($BW_{channel}$)	MHz	20	Channel bandwidth for cells on primary component carrier
PDSCH parameters for cells on primary carriers		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on primary carriers		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Channel bandwidth for cells on secondary carriers ($BW_{channel}$)	MHz	10	Channel bandwidth for cells on secondary component carrier
PDSCH parameters for cells on secondary carrier		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for cells on secondary carrier		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Note 1: See Table A.8.16.4.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.22.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 20MHz+10MHz

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	20		10		10	
OCNG Patterns defined in A.3.2.2		OP.7 TDD		OP.2 TDD		OP.2 TDD	
Note: See Table A.8.16.4.1-2 for other cell-specific test parameters.							

A.8.16.22.2 Test Requirements

The test requirements defined in section A.8.16.4.2 shall apply to this test case.

A.8.16.23 E-UTRAN TDD-FDD CA Event Triggered Reporting Under Deactivated SCell in Non-DRX with PCell in FDD

A.8.16.23.1 Test Purpose and Environment

The purpose of this test is to verify that in TDD-FDD CA with PCell in FDD the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements for SCell stated in clause 8.3.3.2.1 and the requirements for PCell stated in clause 8.3.2.

In this test case there are 3 cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the PCell on the FDD primary component carrier, Cell 2 is the configured and deactivated SCell on the TDD secondary component carrier, and Cell 3 is the neighbor cell on the TDD secondary component carrier. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At the beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

The test parameters are given in Table A.8.16.23.1-1 and A.8.16.23.1-2 below.

Table A.8.16.23.1-1: General test parameters for E-UTRAN TDD-FDD CA event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions with PCell in FDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration in TDD cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration in TDD cells
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤12	UE shall report Event A6 within 6.4s (20×scellMeasCycle)
T3		s	5	UE shall report Event A2 within 200 ms and 1.6s for cells 1 and 2, respectively.

Table A.8.16.23.1-2: Cell specific test parameters for E-UTRAN TDD-FDD CA event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions with PCell in FDD

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2					
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD			-			-		
PCFICH/PDCCH/ PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns defined		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104					
$\hat{E}_s/N_{oc}$	dB	17	17	-3	17	17	-3	-infinity	17	-3
$\hat{E}_s/I_{ot}$	dB	17	17	-3	17	-0.09	-4.76	-infinity	-0.09	-4.76
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-87	-87	-107	-infinity	-87	-107
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-87	-87	-107	-infinity	-87	-107
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)	-74.45 +10log ($N_{RB,c}$ /50)	-59.17 +10log ($N_{RB,c}$ /50)	-56.13 +10log ($N_{RB,c}$ /50)	-73.20 +10log ($N_{RB,c}$ /50)	Specified in columns for Cell 2		
Propagation Condition		AWGN			ETU70			ETU70		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low			1x2 Low		
Timing offset to Cell 1	µs	-			0			3		
Time alignment error relative to cell 1 Note 5	µs	-			≤ TAE			N/A		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.23.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 3 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to 2×TTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.24 E-UTRAN TDD-FDD CA Event Triggered Reporting Under Deactivated SCell in Non-DRX with PCell in TDD

A.8.16.24.1 Test Purpose and Environment

The purpose of this test is to verify that in TDD-FDD CA with PCell in TDD the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements for SCell stated in clause 8.3.3.2.1 and the requirements for PCell stated in clause 8.3.2.

In this test case there are 3 cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the PCell on the TDD primary component carrier, Cell 2 is the configured and deactivated SCell on the FDD secondary component carrier, and Cell 3 is the neighbor cell on the FDD secondary component carrier. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At the beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

The test parameters are given in Table A.8.16.24.1-1 and Table A.8.16.24.1-2.

Table A.8.16.24.1-1: General test parameters for E-UTRAN TDD-FDD CA event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions with PCell in TDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211.
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211.
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤12	UE shall report Event A6 within 6.4s (20×scellMeasCycle)
T3		s	5	UE shall report Event A2 within 200 ms and 1.6s for cells 1 and 2, respectively.

Table A.8.16.24.1-2: Cell specific test parameters for E-UTRAN TDD-FDD CA event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions with PCell in TDD

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2					
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns defined		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104					
$\hat{E}_s/N_{oc}$	dB	17	17	-3	17	17	-3	-infinity	17	-3
$\hat{E}_s/I_{ot}$	dB	17	17	-3	17	-0.09	-4.76	-infinity	-0.09	-4.76
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-87	-87	-107	-infinity	-87	-107
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-87	-87	-107	-infinity	-87	-107
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$/50)	-59.13 +10log ($N_{RB,c}$/50)	-74.45 +10log ($N_{RB,c}$/50)	-59.17 +10log ($N_{RB,c}$/50)	-56.13 +10log ($N_{RB,c}$/50)	-73.20 +10log ($N_{RB,c}$/50)	Specified in columns for Cell 2		
Propagation Condition		AWGN			ETU70			ETU70		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low			1x2 Low		
Timing offset to Cell 1	µs	-			0			3		
Time alignment error relative to cell 1 Note 5	µs	-			≤ TAE			N/A		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.24.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell3 with a measurement reporting delay of less than 6.4s (20× measCycleSCell) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to 2×TTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.25 E-UTRAN TDD-FDD CA Event triggered reporting on deactivated SCell with PCell interruption in non-DRX with PCell in FDD

A.8.16.25.1 Test Purpose and Environment

The purpose of this test is to verify that in TDD-FDD CA with PCell in FDD the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 and the requirements for PCell stated in clause 8.3.2 while at the same time fulfilling the requirement on interruption rate.

In this test case there are three cells: Cell1, Cell2 and Cell3. Cell 1 is the PCell on the FDD primary component carrier, Cell 2 is the configured and deactivated SCell on the TDD secondary component carrier, and Cell 3 is the neighbor cell on the TDD secondary component carrier. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. During T1 the UE shall not have any information of cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. PDCCH indicating a new transmission on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

The test parameters are given in Table A.8.16.25.1-1 and Table A.8.16.25.1-2 below.

Table A.8.16.25.1-1: General test parameters for E-UTRAN TDD-FDD CA Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX with PCell in FDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration in TDD cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration in TDD cells
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	1280	
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤30	UE shall report Event A6 within 25.6s (20×scellMeasCycle)

Table A.8.16.25.1-2: Cell specific test parameters for E-UTRAN TDD-FDD CA Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX with PCell in FDD

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2			
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		-		-	
PCFICH/PDCCH/ PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	
OCNG Patterns defined		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD		5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						

PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 kHz	-101		-101			
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-infinity	16
$\hat{E}_s/I_{ot}$	dB	16	16	16	-0.11	-infinity	-0.11
RSRP Note 3	dBm/15 kHz	-85	-85	-85	-85	-infinity	-85
SCH_RP Note 3	dBm/15 kHz	-85	-85	-85	-85	-infinity	-85
Io Note 3	dBm/Ch BW	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)	Specified in columns for Cell 2	
Propagation Condition		AWGN		AWGN		AWGN	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
Timing offset to Cell 1	µs	-		0		3	
Time alignment error relative to cell 1 Note 5	µs	-		≤ TAE		N/A	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.25.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 3, with a measurement reporting delay less than 25.6s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.26 E-UTRAN TDD-FDD CA Event triggered reporting on deactivated SCell with PCell interruption in non-DRX with PCell in TDD

A.8.16.26.1 Test Purpose and Environment

The purpose of this test is to verify that in TDD-FDD CA with PCell in TDD the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 and the requirements for PCell stated in clause 8.3.2 while at the same time fulfilling the requirement on interruption rate.

In this test case there are three cells: Cell1, Cell2 and Cell3. Cell 1 is the PCell on the TDD primary component carrier, Cell 2 is the configured and deactivated SCell on the FDD secondary component carrier, and Cell 3 is the neighbor cell on the FDD secondary component carrier. It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. During T1 the UE shall not have any information of cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. PDCCH indicating a new transmission on the PCell shall be sent continuously to ensure that the UE sends ACK/NACKs throughout the test.

The test parameters are given in Table A.8.16.26.1-1 and Table A.8.16.26.1-1 below.

Table A.8.16.26.1-1: General test parameters for E-UTRAN TDD-FDD CA Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX with PCell in TDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration in TDD cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration in TDD cells
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	1280	
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤30	UE shall report Event A6 within 25.6s (20×scellMeasCycle)

Table A.8.16.26.1-2: Cell specific test parameters for E-UTRAN TDD-FDD CA Event triggered reporting on configured but deactivated SCell with PCell interruption in non-DRX with PCell in TDD

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2			
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD		-		-	
PCFICH/PDCCH/ PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	
OCNG Patterns defined		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						

PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 kHz	-101		-101			
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	-infinity	16
$\hat{E}_s/I_{ot}$	dB	16	16	16	-0.11	-infinity	-0.11
RSRP Note 3	dBm/15 kHz	-85	-85	-85	-85	-infinity	-85
SCH_RP Note 3	dBm/15 kHz	-85	-85	-85	-85	-infinity	-85
Io Note 3	dBm/Ch BW	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)	Specified in columns for Cell 2	
Propagation Condition		AWGN		AWGN		AWGN	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
Timing offset to Cell 1	µs	-		0		3	
Time alignment error relative to cell 1 Note 5	µs	-		≤ TAE		N/A	
Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.							

A.8.16.26.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 3, with a measurement reporting delay less than 25.6s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.A.8.16.27 3 DL PCell in FDD CA Event Triggered Reporting with 2 Deactivated SCells in Non-DRX

A.8.16.27.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A1 (Serving cell becomes better than threshold), A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.27.1-1 and A.8.16.27.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A1 (for only SCell1 i.e. cell2), A2 (PCell and SCells) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 4. At the beginning of T2 the transmission power of cell 4 is increased to the same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6. Also, at the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, which shall result in reporting of Event A1. At the beginning of T3 the transmission powers of cells 1, 2, 3 and 4 are reduced below a threshold value and this shall result in reporting of Event A2 for Cell 1, for Cell 2 and for Cell 3.

Table A.8.16.27.1-1: General test parameters for E-UTRAN TDD-FDD 3 DL CA event triggered reporting under fading propagation conditions with 2 configured but deactivated SCells in non-DRX with PCell in FDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell			Cell 3	Configured deactivated secondary cell on RF channel number 3.
Neighbour cell			Cell 4	Neighbour cell to be identified on RF channel number 3.
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration applies to all TDD cells (cell2, cell3 and cell4).
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration applies to all TDD cells (cell2, cell3 and cell4).
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A1. Needs to take absolute accuracy tolerance in section 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in section 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in section 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
T1		s	5	During this time the cell1 and cell3 shall be known to the UE; but cell2 and cell 4 shall be unknown to the UE.
T2		s	≤12	UE should report Event A1 for cell2 and event A6 for cell4 within 6.4s (20×scellMeasCycle)
T3		s	5	UE should report Event A2 within 200 ms. 1.6s, and 1.6s for cells 1, 2 and 3, respectively.

Table A.8.16.27.1-2: Cell specific test parameters for E-UTRAN TDD-FDD 3 DL CA event triggered reporting under fading propagation conditions with 2 configured but deactivated SCells in non-DRX with PCell in FDD

Parameter	Unit	Cell 1			Cell 2			Cell 3			Cell 4		
		T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3					
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD			-			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
PBCH_RA	dB	0			0			0			0		
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB												
PCFICH_RB	dB												
PHICH_RA	dB												
PHICH_RB	dB												
PDCCH_RA	dB												
PDCCH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA Note 1	dB												
OCNG_RB Note 1	dB												
N_{oc} Note 2	dBm/15 KHz	-104			-104			-104					
$\hat{E}_s/N_{oc}$	dB	17	17	-3	-infinity	17	-3	17	17	-3	-infinity	17	-3
$\hat{E}_s/I_{ot}$ Note 3	dB	17	17	-3	-infinity	17	-3	17	-0.09	-4.76	-infinity	-0.09	-4.76
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)	-74.45 +10log ($N_{RB,c}$ /50)	-76.22 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)	-74.45 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)	-56.17 +10log ($N_{RB,c}$ /50)	-73.20 +10log ($N_{RB,c}$ /50)	Specified in columns for Cell 3		
Propagation Condition		AWGN			ETU70			ETU70			ETU70		
Correlation Matrix and Antenna Configuration		1x2			1x2 Low			1x2 Low			1x2 Low		

Timing offset to Cell 1	μs	-	0	0	3
Time alignment error relative to cell 1 Note 5	μs	-	≤ TAE	≤ TAE	N/A
Time alignment error relative to cell 2 Note 5	μs	-	-	≤ TAE	N/A
Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.					

A.8.16.27.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 4 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A1 triggered measurement report for Cell 2 with a measurement reporting delay of less than 6.4s (20×measCycleSCell from beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 3 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2\times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.28 3 DL PCell in TDD CA Event Triggered Reporting with 2 Deactivated SCells in Non-DRX

A.8.16.28.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A1 (Serving cell becomes better than threshold), A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.28.1-1 and A.8.16.28.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A1 (for only SCell1 i.e. cell2), A2 (PCell and SCells) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 4. At the beginning of T2 the transmission power of cell 4 is increased to the same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6. Also, at the beginning of T2 the transmission power of cell 2 is increased to the same level as for cell 1, which shall result in reporting of Event A1. At the beginning of T3 the transmission powers of cells 1, 2, 3 and 4 are reduced below a threshold value and this shall result in reporting of Event A2 for Cell 1, for Cell 2 and for Cell 3.

Table A.8.16.28.1-1: General test parameters for E-UTRAN TDD-FDD 3 DL CA event triggered reporting under fading propagation conditions with 2 configured but deactivated SCells in non-DRX with PCell in TDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell			Cell 3	Configured deactivated secondary cell on RF channel number 3.
Neighbour cell			Cell 4	Neighbour cell to be identified on RF channel number 3.
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration applies to TDD cell (cell1).
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration applies to TDD cell (cell1).
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A1. Needs to take absolute accuracy tolerance in section 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of events A1 A2.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for events A2. Needs to take absolute accuracy tolerance in section 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in section 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
T1		s	5	During this time the cell1 and cell3 shall be known to the UE; but cell2 and cell 4 shall be unknown to the UE.
T2		s	≤12	UE should report Event A1 for cell2 and event A6 for cell4 within 6.4s (20×scellMeasCycle)
T3		s	5	UE should report Event A2 within 200 ms. 1.6s, and 1.6s for cells 1, 2 and 3, respectively.

Table A.8.16.28.1-2: Cell specific test parameters for E-UTRAN TDD-FDD 3 DL CA event triggered reporting under fading propagation conditions with 2 configured but deactivated SCells in non-DRX with PCell in TDD

Parameter	Unit	Cell 1			Cell 2			Cell 3			Cell 4		
		T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3					
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD			-			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
PBCH_RA	dB	0			0			0			0		
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB												
PCFICH_RB	dB												
PHICH_RA	dB												
PHICH_RB	dB												
PDCCH_RA	dB												
PDCCH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA Note 1	dB												
OCNG_RB Note 1	dB												
N_{oc} Note 2	dBm/15 KHz	-104			-104			-104					
$\hat{E}_s/N_{oc}$	dB	17	17	-3	-infinity	17	-3	17	17	-3	-infinity	17	-3
$\hat{E}_s/I_{ot}$ Note 3	dB	17	17	-3	-infinity	17	-3	17	-0.09	-4.76	-infinity	-0.09	-4.76
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$/50)	-59.13 +10log ($N_{RB,c}$/50)	-74.45 +10log ($N_{RB,c}$/50)	-76.22 +10log ($N_{RB,c}$/50)	-59.13 +10log ($N_{RB,c}$/50)	-74.45 +10log ($N_{RB,c}$/50)	-59.13 +10log ($N_{RB,c}$/50)	-56.17 +10log ($N_{RB,c}$/50)	-73.20 +10log ($N_{RB,c}$/50)	Specified in columns for Cell 3		
Propagation Condition		AWGN			ETU70			ETU70			ETU70		
Correlation Matrix and Antenna Configuration		1x2			1x2 Low			1x2 Low			1x2 Low		

Timing offset to Cell 1	µs	-	0	0	3
Time alignment error relative to cell 1 Note 5	µs	-	≤ TAE	≤ TAE	N/A
Time alignment error relative to cell 2 Note 5	µs	-	-	≤ TAE	N/A
Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.					

A.8.16.28.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 4 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A1 triggered measurement report for Cell 2 with a measurement reporting delay of less than 6.4s (20×measCycleSCell from beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 3 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2\times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.29 3 DL FDD CA Event Triggered Reporting under Deactivated SCells in Non-DRX

A.8.16.29.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects Events A1 (Serving cell becomes better than threshold), A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.29.1-1 and A.8.16.29.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A1 (SCell 1), Events A2 (PCell and SCell 1/2) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 4. Immediately at beginning of T2 the transmission power of cell 2 is increased above a threshold value such that this shall result in reporting of Event A1 for SCell 1, and cell 4 is increased to the same level as for Cell 3. Due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2, 3 and 4 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell 1/2, respectively.

Table A.8.16.29.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2 (SCell 1)	Configured deactivated secondary cell 1 on RF channel number 2.
			Cell 3 (SCell 2)	Configured deactivated secondary cell 2 on RF channel number 3.
Neighbour cell			Cell 4	Neighbor cell to be identified on RF channel number 3.
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A1. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin. No event A1 reporting is configured for cell 1 and 3.
	Time To Trigger	s	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier 1.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on secondary component carrier 2.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell) for SCell 1 and 2		ms	320	
T1		s	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.
T2		s	≤12	UE should report Event A1 within 1.6s (5×scellMeasCycle) UE should report Event A6 within 6.4s (20×scellMeasCycle)
T3		s	5	UE should report Event A2 within 200 ms and 1.6s for cells 1, 2 and 3, respectively.

Table A.8.16.29.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter	Unit	Cell 1			Cell 2			Cell 3			Cell 4		
		T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3					
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD			-			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
PBCH_RA	dB	0			0			0			0		
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB												
PCFICH_RB	dB												
PHICH_RA	dB												
PHICH_RB	dB												
PDCCH_RA	dB												
PDCCH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA Note 1	dB												
OCNG_RB Note 1	dB												
N_{oc} Note 2		-104			-104			-104					
$\hat{E}_s/N_{oc}$	dB	17	17	-3	-infinity	17	-3	17	17	-3	-infinity	17	-3
$\hat{E}_s/I_{ot}$ Note 3	dB	17	17	-3	-infinity	17	-3	17	-0.09	-4.76	-infinity	-0.05	-4.76
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)	-74.45 +10log ($N_{RB,c}$ /50)	-76.22 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)	-74.45 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)	-56.17 +10log ($N_{RB,c}$ /50)	-73.20 +10log ($N_{RB,c}$ /50)	Specified in columns for Cell 3		

Propagation Condition		AWGN	ETU70	ETU70	ETU70
Correlation Matrix and Antenna Configuration		1x2	1x2 Low	1x2 Low	1x2 Low
Timing offset to Cell 1	μs	-	0	0	3
Time alignment error relative to cell 1 Note 5	μs	-	≤ TAE	≤ TAE	N/A
Time alignment error relative to cell 2 Note 5	μs	-	-	≤ TAE	N/A
Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.					

A.8.16.29.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 4 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A1 triggered measurement report for Cell 2 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 3 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2\times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.30 3 DL TDD CA Event Triggered Reporting under Deactivated SCells in Non-DRX

A.8.16.30.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects Events A1 (Serving cell becomes better than threshold), A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1.

The test parameters are given in Tables A.8.16.30.1-1 and A.8.16.30.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A1 (SCell 1), Events A2 (PCell and SCell 1/2) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 4. Immediately at beginning of T2 the transmission power of cell 2 is increased above a threshold value such that this shall result in reporting of Event A1 for SCell 1, and cell 4 is increased to the same level as for Cell 3. Due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2, 3 and 4 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell 1/2, respectively.

Table A.8.16.30.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2 (SCell 1)	Configured deactivated secondary cell 1 on RF channel number 2.
			Cell 3 (SCell 2)	Configured deactivated secondary cell 2 on RF channel number 3.
Neighbour cell			Cell 4	Neighbor cell to be identified on RF channel number 3.
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A1. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin. No event A1 reporting is configured for cell 1 and 3.
	Time To Trigger	s	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-98	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier 1.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on secondary component carrier 2.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell) for SCell 1 and 2		ms	320	
T1		s	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.
T2		s	≤12	UE should report Event A1 within 1.6s (5×scellMeasCycle) UE should report Event A6 within 6.4s (20×scellMeasCycle)
T3		s	5	UE should report Event A2 within 200 ms and 1.6s for cells 1, 2 and 3, respectively.

Table A.8.16.30.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions

Parameter	Unit	Cell 1			Cell 2			Cell 3			Cell 4		
		T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3					
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 TDD 10MHz: R.0 TDD 20MHz: R.4 TDD			-			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.15 TDD 10MHz: OP.1 TDD 20MHz: OP.11 TDD			5MHz: OP.16 TDD 10MHz: OP.2 TDD 20MHz: OP.12 TDD			5MHz: OP.16 TDD 10MHz: OP.2 TDD 20MHz: OP.12 TDD			5MHz: OP.16 TDD 10MHz: OP.2 TDD 20MHz: OP.12 TDD		
PBCH_RA	dB	0			0			0			0		
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB												
PCFICH_RB	dB												
PHICH_RA	dB												
PHICH_RB	dB												
PDCCH_RA	dB												
PDCCH_RB	dB												
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA Note 1	dB												
OCNG_RB Note 1	dB												
N_{oc} Note 2		-104			-104			-104					
$\hat{E}_s/N_{oc}$	dB	17	17	-3	-infinity	17	-3	17	17	-3	-infinity	17	-3
$\hat{E}_s/I_{ot}$ Note 3	dB	17	17	-3	-infinity	17	-3	17	-0.09	-4.76	-infinity	-0.05	-4.76
RSRP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
SCH_RP Note 3	dBm/15 kHz	-87	-87	-107	-infinity	-87	-107	-87	-87	-107	-infinity	-87	-107
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$/50)	-59.13 +10log ($N_{RB,c}$/50)	-74.45 +10log ($N_{RB,c}$/50)	-76.22 +10log ($N_{RB,c}$/50)	-59.13 +10log ($N_{RB,c}$/50)	-74.45 +10log ($N_{RB,c}$/50)	-59.13 +10log ($N_{RB,c}$/50)	-56.17 +10log ($N_{RB,c}$/50)	-73.20 +10log ($N_{RB,c}$/50)	Specified in columns for Cell 3		

Propagation Condition		AWGN	ETU70	ETU70	ETU70
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low	1x2 Low
Timing offset to Cell 1	µs	-	0	0	3
Time alignment error relative to cell 1 Note 5	µs	-	≤ TAE	≤ TAE	N/A
Time alignment error relative to cell 2 Note 5	µs	-	-	≤ TAE	N/A

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.30.2 Test Requirements

The UE shall send one Event A6 triggered measurement report for cell 4 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from the beginning of time T2.

The UE shall send one Event A1 triggered measurement report for Cell 2 with a measurement reporting delay of less than 6.4s (20×measCycleSCell) from beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 200 ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 3 with a measurement reporting delay of less than 1.6s (5× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2\times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in PDCCH.

A.8.16.31 E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in FDD

A.8.16.31.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.31.1-1 and A.8.16.31.1-2 below. In the test there are four cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the FDD primary component (RF Channel 1), Cell 2 is SCell on the TDD secondary component (RF Channel 2), and Cell 3 is SCell on the TDD secondary component (RF Channel 3) and Cell 4 is the neighbour cell on the TDD secondary component (RF Channel 3). It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. During T1 and T2, both Cell2 and Cell3 are deactivated. During T1 the UE shall not have any information of cell 4. Immediately at beginning of T2 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6.

At the beginning of T3, the transmission power of Cell 4 is turned off and the test equipment sends a MAC message for activation of Cell 2 to UE but Cell3 remains deactivated. Immediately at beginning of T4 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6. The UE shall be continuously scheduled in the PCell throughout the whole test and continuously scheduled in Cell 2 during T4.

Table A.8.16.31.1-1: General test parameters for E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in FDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	three radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell			Cell 3	Configured deactivated secondary cell on RF channel number 3.
Neighbour cell			Cell 4	Neighbor cell to be identified on RF channel number 3.
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration in TDD cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration in TDD cells
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle		ms	1280	
T1		s	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.
T2		s	≤30	UE should report Event A6 within 25.6s (20×scellMeasCycle)
T3		s	1	During this time the UE shall activate cell 2
T4		s	≤10	UE should report Event A6 within 6.4s (5×scellMeasCycle)

Table A.8.16.31.1-2: Cell specific test parameters for E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in FDD

Parameter	Unit	Cell 1				Cell 2				Cell 3				Cell 4			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
E-UTRA RF Channel Number		1				2				3				3			
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD				N/A	N/A	N/A	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	N/A				N/A			
PCFICH/PDCCH/ PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD				5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD				5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			
OCNG Pattern defined in A.3.2.1 and A.3.2.2		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD				5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD				5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			
PBCH_RA	dB	0				0				0				0			
PBCH_RB	dB																
PSS_RA	dB																
SSS_RA	dB																
PCFICH_RB	dB																
PHICH_RA	dB																
PHICH_RB	dB																
PDCCH_RA	dB																
PDCCH_RB	dB																
PDSCH_RA	dB																
PDSCH_RB	dB																

OCNG_RA Note 1	dB																
OCNG_RB Note 1	dB																
N_{oc} Note 3	dBm/15 kHz	-101				-101				-101							
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	16	16	16	16	16	16	16	16	-Infinity	16	-Infinity	16
$\hat{E}_s/I_{ot}$	dB	16	16	16	16	16	16	16	16	16	-0.11	16	-0.11	-Infinity	-0.11	-Infinity	-0.11
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
Io Note 3	dBm/Ch BW	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-54.15 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-54.15 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-54.15 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-54.15 +10log ($N_{RB,c}$/50)
Propagation Condition		AWGN				AWGN				AWGN				AWGN			
Antenna Configuration		1x2				1x2				1x2				1x2			
Timing offset to Cell 1	µs	-				0				0				3			
Time alignment error relative to cell 1 Note 5	µs	-				≤ TAE				≤ TAE				N/A			
Time alignment error relative to cell 2 Note 5	µs	-				-				≤ TAE				N/A			

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE on cell1 prior to the start of time period T2 and on cell2 prior to the start of time period T4.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.31.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s (20×scellMeasCycle) from the beginning of time period T2.

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 6.4s (5×scellMeasCycle) from the beginning of time period T4.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

The UE shall be scheduled on Cell2 continuously from the start of T4 to the end. From the start of T4 until the measurement report is received during T4, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.32 E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in TDD

A.8.16.32.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.32.1-1 and A.8.16.32.1-2 below. In the test there are four cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the TDD primary component (RF Channel 1), Cell 2 is SCell on the FDD secondary component (RF Channel 2), and Cell 3 is SCell on the FDD secondary component (RF Channel 3) and Cell 4 is the neighbour cell on the FDD secondary component (RF Channel 3). It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. During T1 and T2, both Cell2 and Cell3 are deactivated. During T1 the UE shall not have any information of cell 4. Immediately at beginning of T2 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6.

At the beginning of T3, the transmission power of Cell 4 is turned off and the test equipment sends a MAC message for activation of Cell 2 to UE but Cell3 remains deactivated. Immediately at beginning of T4 the transmission power of Cell 4 is increased to same level as for Cell 3, and due to usage of an offset this shall result in reporting of Event A6. The UE shall be continuously scheduled in the PCell throughout the whole test and continuously scheduled in Cell2 during T4.

Table A.8.16.32.1-1: General test parameters for E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in TDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured SCell			Cell 2	Configured secondary cell on RF channel number 2.
Configured SCell			Cell 3	Configured secondary cell on RF channel number 3.
Neighbour cell			Cell 4	Neighbor cell to be identified on RF channel number 3.
CP length			Normal	
Special subframe configuration on PCell			6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration on PCell			1	
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle		ms	1280	
T1		s	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.
T2		s	≤30	UE should report Event A6 within 25.6s (20×scellMeasCycle)
T3		s	1	During this time the UE shall activate cell 2
T4		s	≤10	UE should report Event A6 within 6.4s (5×scellMeasCycle)
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.16.32.1-2: Cell specific test parameters for E-UTRAN TDD-FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX and with PCell in TDD

Parameter	Unit	Cell 1				Cell 2				Cell 3				Cell 4			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
E-UTRA RF Channel Number		1				2				3				3			
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD				N/A	N/A	N/A	5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD	N/A				N/A			
PCFICH/PDCCH/PHICH parameters		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD				5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			
OCNG Pattern defined in A.3.2.1		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP. 7 TDD				5MHz: OP.19 FDD; 10MHz:OP.6 FDD; 20MHz: OP.14 FDD	5MHz: OP.19 FDD; 10MHz:OP.6 FDD; 20MHz: OP.14 FDD	5MHz: OP.19 FDD; 10MHz:OP.6 FDD; 20MHz: OP.14 FDD	5MHz: OP.20 FDD; 10MHz:OP.10 FDD; 20MHz: OP.17 FDD	5MHz: OP.16FDD; 10MHz:OP.2 FDD; 20MHz: OP.12FDD				5MHz: OP.16FDD; 10MHz:OP.2 FDD; 20MHz: OP.12FDD			
PBCH_RA	dB	0				0				0				0			
PBCH_RB	dB																
PSS_RA	dB																
SSS_RA	dB																
PCFICH_RB	dB																
PHICH_RA	dB																
PHICH_RB	dB																
PDCCH_RA	dB																
PDCCH_RB	dB																
PDSCH_RA	dB																
PDSCH_RB	dB																
OCNG_RA[Note 1]	dB																
OCNG_RB[Note 1]	dB																

N_{oc} Note 3	dBm/15 kHz	-101				-101				-101							
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	16	16	16	16	16	16	16	16	-Infinity	16	-Infinity	16
$\hat{E}_s/I_{ot}$	dB	16	16	16	16	16	16	16	16	16	-0.11	16	-0.11	-Infinity	-0.11	-Infinity	-0.11
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
Io Note 3	dBm/Ch BW	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-54.15 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-54.15 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-54.15 +10log ($N_{RB,c}$/50)	-57.11 +10log ($N_{RB,c}$/50)	-54.15 +10log ($N_{RB,c}$/50)
Propagation Condition		AWGN				AWGN				AWGN				AWGN			
Antenna Configuration		1x2				1x2				1x2				1x2			
Timing offset to Cell 1	µs	-				0				0				3			
Time alignment error relative to cell 1 Note5	µs	-				≤ TAE				≤ TAE				N/A			
Time alignment error relative to cell 2 Note5	µs	-				-				≤ TAE				N/A			

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE on cell1 prior to the start of time period T2 and on cell2 prior to the start of time period T4.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.32.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s (20×scellMeasCycle) from the beginning of time period T2.

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 6.4s (5×scellMeasCycle) from the beginning of time period T4.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

The UE shall be scheduled on Cell2 continuously from the beginning of T4 to the end. From the start of T4 until the measurement report is received during T4, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.33 E-UTRAN FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX

A.8.16.33.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.33.1-1 and A.8.16.33.1-2 below. In the test there are four cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the FDD primary component (RF Channel 1), Cell 2 is SCell on the FDD secondary component (RF Channel 2), and Cell 3 is SCell on the FDD secondary component (RF Channel 3) and Cell 4 is the neighbour cell on the FDD secondary component (RF Channel 3). It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. During T1 and T2, both Cell2 and Cell3 are deactivated. During T1 the UE shall not have any information of cell 4. Immediately at beginning of T2 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6.

At the beginning of T3, the transmission power of Cell 4 is turned off and the test equipment sends a MAC message for activation of Cell 2 to UE but Cell3 remains deactivated. Immediately at beginning of T4 the transmission power of Cell 4 is increased to same level as for Cell 3, and due to usage of an offset this shall result in reporting of Event A6. The UE shall be continuously scheduled in the PCell throughout the whole test and continuously scheduled in Cell2 during T4.

Table A.8.16.33.1-1: General test parameters for E-UTRAN FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell interruptions in Non-DRX

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell			Cell 3	Configured deactivated secondary cell on RF channel number 3.
Neighbour cell			Cell 4	Neighbor cell to be identified on RF channel number 3.
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle		ms	1280	
T1		s	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.
T2		s	≤30	UE should report Event A6 within 25.6s (20×scellMeasCycle)
T3		s	1	During this time the UE shall activate cell 2
T4		s	≤10	UE should report Event A6 within 6.4s (5×scellMeasCycle)

Table A.8.16.33.1-2: Cell specific test parameters for E-UTRAN FDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell interruptions in Non-DRX (Cell #1 and Cell #2)

Parameter	Unit	Cell 1				Cell 2				Cell 3				Cell 4			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
E-UTRA RF Channel Number		1				2				3				3			
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD				N/A	N/A	N/A	5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD	N/A				N/A			
PCFICH/PDCCH/PHICH parameters		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			
OCNG Pattern defined in A.3.2.1		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD				5MHz: OP.19 FDD 10MHz: OP.6 FDD 20MHz: OP.14 FDD	5MHz: OP.19 FDD 10MHz: OP.6FDD 20MHz: OP.14 FDD	5MHz: OP.19 FDD 10MHz: OP.6 FDD 20MHz: OP.14 FDD	5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD				5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			
PBCH_RA	dB	0				0				0				0			
PBCH_RB	dB																
PSS_RA	dB																
SSS_RA	dB																
PCFICH_RB	dB																
PHICH_RA	dB																
PHICH_RB	dB																
PDCCH_RA	dB																
PDCCH_RB	dB																
PDSCH_RA	dB																
PDSCH_RB	dB																
OCNG_RA[Note 1]	dB																
OCNG_RB[Note 1]	dB																

N_{oc} Note 3	dBm/15 kHz	-101				-101				-101							
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	16	16	16	16	16	16	16	16	-Infinity	16	-Infinity	16
$\hat{E}_s/I_{ot}$	dB	16	16	16	16	16	16	16	16	16	-0.11	16	-0.11	-Infinity	-0.11	-Infinity	-0.11
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
Io Note 3	dBm/Ch BW	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN				AWGN				AWGN				AWGN			
Antenna Configuration		1x2				1x2				1x2				1x2			
Timing offset to Cell 1	µs	-				0				0				3			
Time alignment error relative to cell 1 Note 5	µs	-				≤ TAE				≤ TAE				N/A			
Time alignment error relative to cell 2 Note 5	µs	-				-				≤ TAE				N/A			

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE on cell1 from the start of time period T2 and on cell2 from the start of time period T4.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.33.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s (20×scellMeasCycle) from the beginning of time period T2.

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 6.4s (5×scellMeasCycle) from the beginning of time period T4.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

The UE shall be scheduled on Cell2 continuously from the beginning of T4 to the end. From the start of T4 until the measurement report is received during T4, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.34 E-UTRAN TDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell Interruptions in Non-DRX

A.8.16.34.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects event A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.3.3.2.1 while at the same time fulfilling the requirement on interruption rate.

The test parameters are given in Table A.8.16.34.1-1 and A.8.16.34.1-2 below. In the test there are four cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the TDD primary component (RF Channel 1), Cell 2 is SCell on the TDD secondary component (RF Channel 2), and Cell 3 is SCell on the TDD secondary component (RF Channel 3) and Cell 4 is the neighbour cell on the TDD secondary component (RF Channel 3). It is indicated to the UE in the measurement control information that event-triggered reporting with Event A6 is used. The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. During T1 and T2, both Cell2 and Cell3 are deactivated. During T1 the UE shall not have any information of cell 4. Immediately at beginning of T2 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6.

At the beginning of T3, the transmission power of Cell 4 is turned off and the test equipment sends a MAC message for activation of Cell 2 to UE but Cell3 remains deactivated. Immediately at beginning of T4 the transmission power of cell 4 is increased to same level as for cell 3, and due to usage of an offset this shall result in reporting of Event A6. The UE shall be continuously scheduled in the PCell throughout the whole test and continuously scheduled in Cell 2 during T4.

Table A.8.16.34.1-1: General test parameters for E-UTRAN TDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell interruptions in Non-DRX

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	three radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell			Cell 3	Configured deactivated secondary cell on RF channel number 3.
Neighbour cell			Cell 4	Neighbor cell to be identified on RF channel number 3.
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
DRX			OFF	Continuous monitoring of primary cell
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-3	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle		ms	1280	
T1		s	5	During this time the UE shall be aware of cells 1, 2 and 3 but not cell 4.
T2		s	≤30	UE should report Event A6 within 25.6s (20×scellMeasCycle)
T3		s	1	During this time the UE shall activate cell 2
T4		s	≤10	UE should report Event A6 within 6.4s (5×scellMeasCycle)

Table A.8.16.34.1-2: Cell specific test parameters for E-UTRAN TDD 3 DL CA Event Triggered Reporting on Deactivated SCell with PCell and SCell interruptions in Non-DRX

Parameter	Unit	Cell 1				Cell 2				Cell 3				Cell 4			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
E-UTRA RF Channel Number		1				2				3				3			
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD				N/A	N/A	N/A	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	N/A				N/A			
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD				5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD				5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD				5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			
OCNG Pattern defined in A.3.2.2		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD				5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD				5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			
PBCH_RA	dB	0				0				0				0			
PBCH_RB	dB																
PSS_RA	dB																
SSS_RA	dB																
PCFICH_RB	dB																
PHICH_RA	dB																
PHICH_RB	dB																
PDCCH_RA	dB																
PDCCH_RB	dB																
PDSCH_RA	dB																
PDSCH_RB	dB																
OCNG_RA[Note 1]	dB																

OCNG_RB Note 1	dB																
N_{oc} Note 3	dBm/15 kHz	-101				-101				-101							
$\hat{E}_s/N_{oc}$	dB	16	16	16	16	16	16	16	16	16	16	16	16	-Infinity	16	-Infinity	16
$\hat{E}_s/I_{ot}$	dB	16	16	16	16	16	16	16	16	16	-0.11	16	-0.11	-Infinity	-0.11	-Infinity	-0.11
RSRP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
SCH_RP Note 4	dBm/15 kHz	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-Infinity	-85	-Infinity	-85
Io Note 3	dBm/Ch BW	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)	-57.11 +10log ($N_{RB,c}$ /50)	-54.15 +10log ($N_{RB,c}$ /50)
Propagation Condition		AWGN				AWGN				AWGN				AWGN			
Antenna Configuration		1x2				1x2				1x2				1x2			
Timing offset to Cell 1	µs	-				0				0				3			
Time alignment error relative to cell 1 Note 5	µs	-				≤ TAE				≤ TAE				N/A			
Time alignment error relative to cell 2 Note 5	µs	-				-				≤ TAE				N/A			

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE on cell1 prior to the start of time period T2 and on cell2 prior to the start of time period T4.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.34.2 Test Requirements

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 25.6s (20×scellMeasCycle) from the beginning of time period T2.

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 6.4s (5×scellMeasCycle) from the beginning of time period T4.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

The UE shall be scheduled on Cell2 continuously from the start of T4 to the end. From the start of T4 until the measurement report is received during T4, at least 99.5% of all expected ACK/NACKs shall be transmitted by the UE.

For a test to be considered successful requirements on both event detection and percentage of transmitted ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.16.35 3 DL PCell in FDD CA Activation and Deactivation of Known SCell in Non-DRX

A.8.16.35.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7 for UE configured with two downlink SCells, when the SCell is known by the UE at the time of activation and PCell is in FDD.

The test parameters are given in Tables A.8.16.35.1-1 and cell-specific parameters in A.8.16.35.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and deactivated Cell 3 (SCell2) on radio channel 3 (SCC2) but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell1 (Cell 2) becomes configured on radio channel 2 (SCC1). The UE now starts monitoring also the SCC1. The test equipment sends a MAC message for activation of the SCell1.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m which is an even number, defines the start of time period T2. At the beginning of T2 the test equipment sends a MAC message for activation of the SCell1. The UE receives the SCell2 activation command in a subframe (m+10) during activation of the SCell1. The UE shall be able to report valid CSI for the activated SCell1 at latest in subframe (m+29). The UE shall start reporting CSI for SCell1 in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+9) and (m+15) to (m+19).

Time period T3 starts when a MAC message for deactivation of SCell1, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the SCell2 in subframe (n+10). The UE shall carry out deactivation of the SCell1 at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+9) and (n+15) to (n+19).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell1, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell1 activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.35.1-1: General test parameters for known SCell1 activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated SCell1		Cell 2	Deconfigured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	s	7	During this time the PCell and SCell2 shall be known and the SCell1 configured and detected.
T2	s	1	During this time the UE shall activate the SCell1.
T3	s	1	During this time the UE shall deactivate the SCell1.

Table A.8.16.35.1-2: Cell specific test parameters for E-UTRAN TDD known SCell1 activation with PCell in FDD

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			17			17		
$\hat{E}_s/I_{ot}$	dB	17			17			17		
RSRP Note 3	dBm/15 kHz	-87			-87			-87		
SCH_RP Note 3	dBm/15 kHz	-87			-87			-87		
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)			-59.13 +10log ($N_{RB,c}$ /50)			-59.13 +10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	µs	-			0			0		
Time alignment error relative to cell 1 Note 5	µs	-			≤ TAE			≤ TAE		
Time alignment error relative to cell 2 Note 5	µs	-			-			≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.35.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+29).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+9) and outside the subframes (m+15) to (m+19).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+9) and outside the subframes (n+15) to (n+19).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+29) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.36 3 DL PCell in TDD CA Activation and Deactivation of Known SCell in Non-DRX

A.8.16.36.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7 for UE configured with two downlink SCells, when the SCell is known by the UE at the time of activation and PCell is in TDD.

The test parameters are given in Tables A.8.16.36.1-1 and cell-specific parameters in A.8.16.36.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and deactivated Cell 3 (SCell2) on radio channel 3 (SCC2) but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell1 (Cell 2) becomes configured on radio channel 2 (SCC1). The UE now starts monitoring also the SCC1. The test equipment sends a MAC message for activation of the SCell1.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m, where m is 4 or 9, defines the start of time period T2. At the beginning of T2 the test equipment sends a MAC message for activation of the SCell1. The UE receives the SCell2 activation command in a subframe (m+15) during activation of the SCell1. The UE shall be able to report valid CSI for the activated SCell1 at latest in a subframe (m+29). The UE shall start reporting CSI for SCell1 in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+11) and (m+20) to (m+26).

Time period T3 starts when a MAC message for deactivation of SCell1, sent from the test equipment to the UE in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the SCell2 in subframe (n+15). The UE shall carry out deactivation of the SCell1 at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+11) and (n+20) to (n+26).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell1, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell1 activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.36.1-1: General test parameters for known SCell1 activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated SCell		Cell 2	Deconfigured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every UL subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC1.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	s	7	During this time the PCell and SCell2 shall be known and the SCell1 configured and detected.
T2	s	1	During this time the UE shall activate the SCell1.
T3	s	1	During this time the UE shall deactivate the SCell1.

Table A.8.16.36.1-2: Cell specific test parameters for E-UTRAN FDD known SCell1 activation with PCell in TDD

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			17			17		
$\hat{E}_s/I_{ot}$	dB	17			17			17		
RSRP Note 3	dBm/15 kHz	-87			-87			-87		
SCH_RP Note 3	dBm/15 kHz	-87			-87			-87		
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)			-59.13 +10log ($N_{RB,c}$ /50)			-59.13 +10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	μs	-			0			0		
Time alignment error relative to cell 1 Note 5	μs	-			≤ TAE			≤ TAE		
Time alignment error relative to cell 2 Note 5	μs	-			-			≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.36.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8,) or in a subframe (m+9) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+29).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+11) and outside the subframes (m+20) to (m+26).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+11) and outside the subframes (n+20) to (n+26).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+29) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.37 3 DL FDD CA activation and deactivation of known SCell in non-DRX

A.8.16.37.1 Test Purpose and Environment

The purpose of this test is to verify that SCell activation and deactivation times are within the requirements stated in clause 7.7 for 3DL FDD carrier aggregation, when the SCells are known by the UE at the time of activation.

The test parameters are given in Tables A.8.16.37-1 and cell-specific parameters in A.8.16.37-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2), but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell1 (Cell 2) becomes configured on radio channel 2 (SCC1). The UE now starts monitoring also the SCC1. The test equipment sends a MAC message for activation of the SCell1.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m which is an even number,defines the start of time period T2. At the beginning of T2 the test equipment sends a MAC message for activation of the SCell1. The UE receives the SCell2 activation command in a subframe (m+10) during activation of the SCell1. The UE shall be able to report valid CSIs for the activated SCell1 at latest in asubframe (m+29). The UE shall start reporting CSI for SCell1 in subframe in (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+9ms) and (m+15) to (m+19).

Time period T3 starts when a MAC message for deactivation of SCell1, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the SCell2 in subframe (n+10). The UE shall carry out deactivation of the SCell1 at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+9) and (n+15) to (n+19).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCells, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell1 activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.37-1: General test parameters for E-UTRAN FDD 3 DL CA activation and deactivation of known SCell in non-DRX

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured SCell		Cell 2	Deconfigured secondary cell on RF channel number 2.
Configured deactivated SCell		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCells every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.
Filter coefficient		0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)	ms	320	
T1	s	7	During this time the PCell and SCell2 shall be known and the SCell1 configured and detected.
T2	s	1	During this time the UE shall activate the SCell1 and SCell2.
T3	s	1	During this time the UE shall deactivate the SCell1 and SCell2.

Table A.8.16.37-2: Cell specific test parameters for E-UTRAN FDD 3 DL CA activation and deactivation of known SCell in non-DRX

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3		
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			17			17		
$\hat{E}_s/I_{ot}$ Note 3	dB	17			17			17		
RSRP Note 3	dBm/15 kHz	-87			-87			-87		
SCH_RP Note 3	dBm/15 kHz	-87			-87			-87		
Io Note 3	dBm/Ch BW	-59.13+10log ($N_{RB,c}$ /50)			-59.13+10log ($N_{RB,c}$ /50)			-59.13+10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	µs	-			0			0		
Time alignment error relative to cell 1 Note 5	µs	-			≤ TAE			≤ TAE		
Time alignment error relative to cell 2 Note 5	µs	-			-			≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: E_s/I_{ot}, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.37.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+29).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+9) and outside the subframes (m+15) to (m+19).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+9) and outside the subframes (n+15) to (n+19).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+29) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.38 3 DL TDD CA activation and deactivation of known SCell in non-DRX

A.8.16.38.1 Test Purpose and Environment

The purpose of this test is to verify that SCell activation and deactivation times are within the requirements stated in clause 7.7 for 3DL TDD carrier aggregation, when the SCells are known by the UE at the time of activation.

The test parameters are given in Tables A.8.16.38-1 and cell-specific parameters in A.8.16.38-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2), but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell1 (Cell 2) becomes configured on radio channel 2 (SCC1). The UE now starts monitoring also the SCC1. The test equipment sends a MAC message for activation of the SCell1.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m, where m is 4 or 9, defines the start of time period T2. At the beginning of T2 the test equipment sends a MAC message for activation of the SCell1. The UE receives the SCell2 activation command in a subframe (m+15) during activation of the SCell1. The UE shall be able to report valid CSIs for the activated SCell1 at latest in a subframe (m+29). The UE shall start reporting CSI for SCell1 for SCell1 in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+11) and (m+20) to (m+26).

Time period T3 starts when a MAC message for deactivation of SCell1, sent from the test equipment to the UE, in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the SCell2 in subframe (n+15). The UE shall carry out deactivation of the SCell1 at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+11) and (n+20) to (n+26).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCells, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell1 activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell1 deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.38-1: General test parameters for E-UTRAN TDD 3 DL CA activation and deactivation of known SCell in non-DRX

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured SCell		Cell 2	Deconfigured secondary cell on RF channel number 2.
Configured deactivated SCell		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration applies to all cells
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCells every UL subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.
Filter coefficient		0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)	ms	320	
T1	s	7	During this time the PCell and SCell2 shall be known and the SCell1 configured and detected.
T2	s	1	During this time the UE shall activate the SCell1 and SCell2.
T3	s	1	During this time the UE shall deactivate the SCell1 and SCell2

Table A.8.16.38-2: Cell specific test parameters for E-UTRAN TDD 3 DL CA activation and deactivation of known SCell in non-DRX

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3		
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			17			17		
$\hat{E}_s/I_{ot}$ Note 3	dB	17			17			17		
RSRP Note 3	dBm/15 kHz	-87			-87			-87		
SCH_RP Note 3	dBm/15 kHz	-87			-87			-87		
Io Note 3	dBm/Ch BW	-59.13+10log ($N_{RB,c}$ /50)			-59.13+10log ($N_{RB,c}$ /50)			-59.13+10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	µs	-			0			0		
Time alignment error relative to cell 1 Note 5	µs	-			≤ TAE			≤ TAE		
Time alignment error relative to cell 2 Note 5	µs	-			-			≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: E_s/I_{ot}, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.38.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption, or in a subframe (m+13) if the subframe (m+8) and (m+9) were subject to interruption when an intra-band SCell is actitvated. Whether CSI report in subframe (m+8) and/or (m+9) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8) and/or (m+9).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+29).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+11) and outside the subframes (m+20) to (m+26).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframest (n+5) to (n+11) and outside the subframes (n+20) to (n+26).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+29) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.39 E-UTRA TDD-FDD 3DL CA Activation and Deactivation of Unknown SCell in Non-DRX with PCell in FDD

A.8.16.39.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7 for UE configured with two downlink SCells, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.39.1-1 and cell-specific parameters in A.8.16.39.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 is FDD cell, and Cell 2 and Cell 3 are TDD cells. Cell 1 and Cell 3 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2) but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 (SCell1) becomes configured on radio channel 2 (SCC1). During T1 Cell 2 (SCell1) is powered off and UE is not aware of Cell 2 (SCell1).

A MAC message for activation of SCell1 is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m which is an even number. The point in time at which the MAC message for activation of Cell 2 (SCell1) is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of Cell 2 (SCell1) is increased to same level as for Cell 1 (PCell). The test equipment sends a MAC message for activation of the Cell 3 (SCell2) in subframe (m+10). Since UE received SCell2 activation command during activation of SCell1, the UE shall be able to report valid CSI for the activated SCell1 at latest in subframe (m+39) provided the SCell1 can be successfully detected on the first attempt. The UE shall start reporting CSI for SCell1 in subframe (m+8), and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+9) and (m+15) to (m+19).

Time period T3 starts when a MAC message for deactivation of Cell 2 (SCell1), sent from the test equipment to the UE, in a subframe # denoted n which is an even number, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the Cell 3 (SCell2) in subframe (n+10). The UE shall carry out deactivation of the Cell 2 (SCell1) at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in subframes (n+5) to (n+9) and (n+10) to (n+19).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell1, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the Cell 2 (SCell1) activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the Cell 2 (SCell1) deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.39.1-1: General test parameters for unknown SCell1 activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated SCell1		Cell 2	Deconfigured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	ms	100	During this time the PCell and SCell2 shall be known and the SCell1 configured.
T2	s	1	During this time the UE shall activate the SCell1 and SCell2.
T3	s	1	During this time the UE shall deactivate the SCell1 and SCell2.
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.39.1-2: Cell specific test parameters for E-UTRAN TDD known SCell1 activation with PCell in FDD

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3		
TDD special subframe configuration		-			6			6		
TDD uplink-downlink configuration		-			1			1		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			-infinity	17		17		
$\hat{E}_s/I_{ot}$	dB	17			-infinity	17		17		
RSRP Note 3	dBm/15 kHz	-87			-infinity	-87		-87		
SCH_RP Note 3	dBm/15 kHz	-87			-infinity	-87		-87		
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)			-76.22 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)		-59.13 +10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	µs	-			0			0		
Time alignment error relative to cell 1 Note 5	µs	-			≤ TAE			≤ TAE		
Time alignment error relative to cell 2 Note 5	µs	-			-			≤ TAE		

Note 1:	OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3:	Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5:	Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 6:	TDD special subframe configuration and uplink-downlink configuration are as specified in Table 4.2-1 and 4.2-2 in TS36.211 [16]. The same configuration applies to all TDD cells.

A.8.16.39.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 at latest in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption . Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+39).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2interruption of PCell during SCells activation shall not happen outside subframes (m+5) to (m+9) and outside the subframes (m+15) to (m+19).

During T3iInterruption of PCell during SCells deactivation shall not happen outside subframes (n+5) to (n+9) and outside subframes (n+15) to (n+19).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+39) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.40 E-UTRA TDD-FDD 3DL CA Activation and Deactivation of Unknown SCell in Non-DRX with PCell in TDD

A.8.16.40.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7 for UE configured with two downlink SCells, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.40.1-1 and cell-specific parameters in A.8.16.40.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 is TDD cell, and Cell 2 and Cell 3 are FDD cells. Cell 1 and Cell 3 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2) but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 (SCell1) becomes configured on radio channel 2 (SCC1). During T1 Cell 2 (SCell1) is powered off and UE is not aware of Cell 2 (SCell1).

A MAC message for activation of SCell1 is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m, where m is 4 or 9. The point in time at which the MAC message for activation of Cell 2 (SCell1) is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of Cell 2 (SCell1) is increased to same level as for Cell 1 (PCell). The test equipment sends a MAC message for activation of the Cell 3 (SCell2) in subframe (m+15). Since UE received SCell2 activation command during activation of SCell1, the UE shall be able to report valid CSI for the activated SCell1 at latest in subframe (m+39) provided the SCell1 can be successfully detected on the first attempt. The UE shall start reporting CSI for SCell1 in subframe (m+8), and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in subframes (m+5) to (m+9) and (m+20) to (m+24).

Time period T3 starts when a MAC message for deactivation of Cell 2 (SCell1), sent from the test equipment to the UE in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the Cell 3 (SCell2) in subframe (n+15). The UE shall carry out deactivation of the Cell 2 (SCell1) at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in subframes (n+5) to (n+9) and (n+20) to (n+24).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell1, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the Cell 2 (SCell1) activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the Cell 2 (SCell1) deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.40.1-1: General test parameters for unknown SCell1 activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated SCell1		Cell 2	Deconfigured deactivated secondary cell on RF channel number 2.
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	ms	100	During this time the PCell and SCell2 shall be known and the SCell1 configured.
T2	s	1	During this time the UE shall activate the SCell1 and SCell2.
T3	s	1	During this time the UE shall deactivate the SCell1 and SCell2.
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.40.1-2: Cell specific test parameters for E-UTRAN FDD known SCell1 activation with PCell in TDD

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3		
TDD special subframe configuration		6			-			-		
TDD uplink-downlink configuration		1			-			-		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			-infinity	17		17		
$\hat{E}_s/I_{ot}$	dB	17			-infinity	17		17		
RSRP Note 3	dBm/15 kHz	-87			-infinity	-87		-87		
SCH_RP Note 3	dBm/15 kHz	-87			-infinity	-87		-87		
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)			-76.22 +10log ($N_{RB,c}$ /50)	-59.13 +10log ($N_{RB,c}$ /50)		-59.13 +10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	μs	-			0			0		
Time alignment error relative to cell 1 Note 5	μs	-			≤ TAE			≤ TAE		
Time alignment error relative to cell 2 Note 5	μs	-			-			≤ TAE		

Note 1:	OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3:	Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5:	Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 6:	TDD special subframe configuration and uplink-downlink configuration are as specified in Table 4.2-1 and 4.2-2 in TS36.211 [16]. The same configuration applies to all TDD cells.

A.8.16.40.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell12in a subframe (m+8), or in a subframe (m+9) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+39).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside subframes (m+5) and (m+9) and outside the subframes (m+20) to (m+24).

During T3 interruption of PCell during SCells deactivation shall not happen outside subframes (n+5) to (n+9) and outside subframes (n+20) to (n+24).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in subframe (m+39) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.41 3 DL FDD CA activation and deactivation of unknown SCell in non-DRX

A.8.16.41.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in clause 7.7 for 3DL FDD carrier aggregation, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.41-1 and cell-specific parameters in A.8.16.41-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 and Cell 3 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on radio channel 3 (SCC2), but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 (SCell1) becomes configured on radio channel 2 (SCC1). During T1 the signal level of Cell 2 (SCell1) is powered off and UE is not aware of Cell 2 (SCell1).

A MAC message for activation of the SCell1 is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m which is an even number. The point in time at which the MAC message for activation of Cell 2 (SCell1) is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of Cell 2 (SCell1) is increased to same level as for Cell 1 (PCell). The test equipment sends a MAC message for activation of Cell 3 (SCell2) in subframe (m+10). Since UE received SCell2 activation command during activation of SCell1, the UE shall be able to report valid CSIs for the activated SCell1 at latest in subframe (m+39) provided the SCell1 can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframe (m+5) to (m+9) and (m+15) to (m+19).

Time period T3 starts when a MAC message for deactivation of Cell 2 (SCell1), sent from the test equipment to the UE in a subframe # denoted n, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the Cell 3 (SCell2) in subframe (n+10). The UE shall carry out deactivation of Cell 2 (SCell1) at latest in subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9) and (n+15) to (n+19).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCells, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the Cell 2 (SCell1) activation command is sent until a CSI reports with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the Cell 2 (SCell1) deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.41-1: General test parameters for E-UTRAN FDD 3 DL CA activation and deactivation of unknown SCell in non-DRX

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured SCell1		Cell 2	Deconfigured secondary cell on RF channel number 2.
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCells every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	ms	100	During this time the PCell and SCell2 shall be known and the SCell1 configured.
T2	s	1	During this time the UE shall activate the SCell1 and SCell2.
T3	s	1	During this time the UE shall deactivate the SCell1 and SCell2.
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.41-2: Cell specific test parameters for E-UTRAN FDD 3 DL CA activation and deactivation of unknown SCell in non-DRX

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3		
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD			5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			-infinity	17		17		
$\hat{E}_s/I_{ot}$ Note 3	dB	17			-infinity	17		17		
RSRP Note 3	dBm/15 kHz	-87			-infinity	-87		-87		
SCH_RP Note 3	dBm/15 kHz	-87			-infinity	-87		-87		
Io Note 3	dBm/Ch BW	-59.13+10log ($N_{RB,c}$ /50)			-76.22 +10log ($N_{RB,c}$ /50)	-59.13+10log ($N_{RB,c}$ /50)		-59.13+10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	μs	-			0			0		
Time alignment error relative to cell 1 Note 5	μs	-			≤ TAE			≤ TAE		
Time alignment error relative to Cell 2 Note 5	μs	-			-			≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: E_s/I_{ot}, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5: The time alignment error (TAE) between two cells specified in TS36.104 [30] clause 6.5.3.1 (value depends upon the type of carrier aggregation).

A.8.16.41.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+39).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+9) and outside the subframes (m+15) to (m+19).

During T2 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+9) and outside the subframes (n+15) to (n+19).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+39) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.42 3 DL TDD CA activation and deactivation of unknown SCell in non-DRX

A.8.16.42.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in clause 7.7 for 3DL TDD carrier aggregation, when the SCell is unknown by the UE at the time of activation.

The test parameters are given in Tables A.8.16.42-1 and cell-specific parameters in A.8.16.42-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 and cell 3 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 3 (deactivated SCell2) on redio channel 3 (SCC2), but is not aware of Cell 2 (SCell1) on radio channel 2 (SCC1). The UE is only monitoring the PCC and SCC2. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 (SCell 1) becomes configured on radio channel 2 (SCC1). During T1 the signal level of Cell 2 (SCell 1) is powered off and UE is not aware of Cell 2 (SCell1).

A MAC message for activation of the SCell1 is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m, where m is 4 or 9. The point in time at which the MAC message for activation of Cell 2 (SCell1) is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of Cell 2 (SCell1) is increased to same level as for Cell 1 (PCell). The test equipment sends a MAC message for activation of Cell 3 (SCell2) in subframe (m+15). Since UE received SCell2 activation command during activation of SCell1, the UE shall be able to report valid CSIs for the activated SCell1 at latest in subframe (m+39) provided the SCell1 can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCells shall occur in the subframes (m+5) to (m+11) and (m+20) to (m+26).

Time period T3 starts when a MAC message for deactivation of Cell 2 (SCell1), sent from the test equipment to the UE in a subframe # denoted n, where n is 4 or 9, is received at the UE antenna connector. The test equipment sends a MAC message for deactivation of the Cell 3 (SCell2) in subframe (n+15). The UE shall carry out deactivation of Cell 2 (SCell1) at latest in subframe (n+8), and any PCell interruption due to the deactivation of SCells shall occur in the subframes (n+5) to (n+11) and (n+20) to (n+26).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCells, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the Cell 2 (SCell1) activation command is sent until a CSI reports with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the Cell 2 (SCell1) deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.42-1: General test parameters for E-UTRAN TDD 3 DL CA activation and deactivation of unknown SCell in non-DRX

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2, 3	Three radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured SCell1		Cell 2	Deconfigured secondary cell on RF channel number 2.
Configured deactivated SCell2		Cell 3	Configured deactivated secondary cell on RF channel number 3.
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211 [16]. The same configuration applies to all cells.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211 [16]. The same configuration applies to all cells
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCells every UL subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on PCC.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on SCC1.
Cell-individual offset for cells on RF channel number 3	dB	0	Individual offset for cells on SCC2.
Filter coefficient		0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)	ms	320	
T1	ms	100	During this time the PCell and SCell2 shall be known and the SCell1 configured,
T2	s	1	During this time the UE shall activate the SCell1 and SCell2.
T3	s	1	During this time the UE shall deactivate the SCell1 and SCell2
Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.16.42-2: Cell specific test parameters for E-UTRAN TDD 3 DL CA activation and deactivation of unknown SCell in non-DRX

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			3		
$BW_{channel}$		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-104			-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			-infinit	17		17		
$\hat{E}_s/I_{ot}$ Note 3	dB	17			-infinit	17		17		
RSRP Note 3	dBm/15 kHz	-87			-infinit	-87		-87		
SCH_RP Note 3	dBm/15 kHz	-87			-infinit	-87		-87		
Io Note 3	dBm/Ch BW	-59.13+10log ($N_{RB,c}$ /50)			-76.22 +10log ($N_{RB,c}$ /50)	-59.13+10log ($N_{RB,c}$ /50)		-59.13+10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN			AWGN		
Antenna Configuration		1x2			1x2			1x2		
Timing offset to Cell 1	μs	-			0			0		
Time alignment error relative to cell 1 Note 5	μs	-			≤ TAE			≤ TAE		
Time alignment error relative to cell 2 Note 5	μs	-			-			≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: E_s/I_{ot}, RSRP, SCH_RP and Io have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5: The time alignment error (TAE) between two cells specified in TS 36.104 [30] clause 6.5.3.1 (value depends upon the type of carrier aggregation).

A.8.16.42.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell1 in a subframe (m+8)), or in a subframe (m+9) if the subframe (m+8) was subject to interruption, or in a subframe (m+13) if the subframes (m+8) and (m+9) were subject to interruption when an intra-band SCell is activated. Whether CSI report in subframe (m+8) and/or (m+9) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8) and/or (m+9).

During T2 the UE shall start sending CSI reports for SCell1 with non-zero CQI index at latest in a subframe (m+39).

During T3 the UE shall stop sending CSI reports for SCell1 at latest in a subframe (n+8).

During T2 interruption of PCell during SCells activation shall not happen outside the subframes (m+5) to (m+11) and outside the subframes (m+20) to (m+26).

During T3 interruption of PCell during SCells deactivation shall not happen outside the subframes (n+5) to (n+11) and outside the subframes (n+20) to (n+26).

The interruption of PCell shall not be more than the values specified for intra-band CA and inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell1 activation delay and SCell1 deactivation delay to be counted as correct. The rate of correct observed SCell1 activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+39) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.43 E-UTRAN TDD-FDD CA activation and deactivation of known SCell in non-DRX with PCell in FDD

A.8.16.43.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is known by the UE at the time of activation and PCell is in FDD.

The test parameters are given in Tables A.8.16.43.1-1 and cell-specific parameters in A.8.16.43.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Both cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2 (SCC). The UE now starts monitoring also the SCC. The test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a subframe # denoted m which is an even number, defines the start of time period T2. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+24). The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+9).

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a subframe # denoted n which is an even number, received at the UE antenna connector. The UE shall carry out deactivation of the SCell in a subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell deactivation command is sent until CQI reporting for SCell is discontinued.

Table A.8.16.43.1-1: General test parameters for known SCell activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated SCell		Cell 2	Deconfigured deactivated secondary cell on RF channel number 2.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	s	7	During this time the PCell shall be known and the SCell configured and detected.
T2	s	1	During this time the UE shall activate the SCell.
T3	s	1	During this time the UE shall deactivate the SCell.

Table A.8.16.43.1-2: Cell specific test parameters for E-UTRAN FDD known SCell activation with PCell in FDD

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 kHz	-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			17		
$\hat{E}_s/I_{ot}$	dB	17			17		
RSRP Note 3	dBm/15 kHz	-87			-87		
SCH_RP Note 3	dBm/15 kHz	-87			-87		
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)			-59.13 +10log ($N_{RB,c}$ /50)		
Propagation Condition		AWGN			AWGN		
Antenna Configuration		1x2			1x2		
Timing offset to Cell 1	µs	-			0		
Time alignment error relative to cell 1 Note 5	µs	-			≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.43.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in a subframe (m+8), or in a subframe (m+10) if the suframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+24).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+9).

During T3 interruption of PCell during SCell deactivation shall not happen outside the subframes (n+5) to (n+9).

The interruption of PCell shall not be more than the values specified for inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+24) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.16.44 E-UTRAN TDD-FDD CA activation and deactivation of unknown SCell in non-DRX with PCell in FDD

A.8.16.44.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in section 7.7, when the SCell is unknown by the UE at the time of activation and PCell is in FDD.

The test parameters are given in Tables A.8.16.44.1-1 and cell-specific parameters in A.8.16.44.1-2 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell. Cell 1 has constant signal level throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2 (SCC). During T1 the SCell is powered off and UE is not aware of SCell.

A MAC message for activation of SCell is sent by the test equipment 100ms after the RRC message, in a subframe # denoted m which is an even number. The point in time at which the MAC message for activation of SCell is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of cell 2 is increased to same level as for cell 1. The UE shall be able to report valid CSI for the activated SCell at latest in subframe (m+34) provided the SCell can be successfully detected on the first attempt. The UE shall start reporting CSI in subframe (m+8) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the subframes (m+5) to (m+9).

Time period T3 starts when a MAC message for deactivation of the SCell, sent from the test equipment to the UE in a subframe # denoted n which is an even number, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell at latest in subframe (n+8), and any PCell interruption due to the deactivation shall occur in the subframes (n+5) to (n+9).

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the subframes from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the subframes from the time when the SCell deactivation command is sent until CQI reporting for SCell1 is discontinued.

Table A.8.16.44.1-1: General test parameters for unknown SCell activation case

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two radio channels are used for this test
Active PCell		Cell 1	Primary cell on RF channel number 1.
Deconfigured deactivated SCell		Cell 2	Deconfigured deactivated secondary cell on RF channel number 2.
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on RF channel number 1	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	320	
T1	ms	100	During this time the PCell shall be known and the SCell configured, but not detected.
T2	s	1	During this time the UE shall activate the SCell.
T3	s	1	During this time the UE shall deactivate the SCell.

Table A.8.16.44.1-2: Cell specific test parameters for E-UTRAN FDD unknown SCell activation

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD			5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 kHz	-104			-104		
$\hat{E}_s/N_{oc}$	dB	17			-Infinity	17	
$\hat{E}_s/I_{ot}$	dB	17			-Infinity	17	
RSRP Note 3	dBm/15 kHz	-87			-Infinity	-87	
SCH_RP Note 3	dBm/15 kHz	-87			-Infinity	-87	
Io Note 3	dBm/Ch BW	-59.13 +10log ($N_{RB,c}$ /50)			-76.22 +10log ($N_{RB,c}$ /50)	−59.13 +10log ($N_{RB,c}$ /50)	
Propagation Condition		AWGN			AWGN		
Antenna Configuration		1x2			1x2		
Timing offset to Cell 1	μs	-			0		
Time alignment error relative to cell 1 Note 5	μs	-			≤ TAE		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.16.44.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell (m+8), or in a subframe (m+10) if the subframe (m+8) was subject to interruption. Whether CSI report in subframe (m+8) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in subframe (m+8).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a subframe (m+34).

During T3 the UE shall stop sending CSI reports for SCell at latest in a subframe (n+8).

During T2 interruption of PCell during SCell activation shall not happen outside the subframes (m+5) to (m+9).

During T3 interruption of PCell during SCell deactivation shall not happen outside the subframes (n+5) to (n+9).

The interruption of PCell shall not be more than the values specified for inter-band CA in Section 7.8.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation and deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a subframe (m+34) then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

A.8.17 RSTD Measurements for E-UTRAN Carrier Aggregation

A.8.17.1 E-UTRAN FDD RSTD measurement reporting delay test case

A.8.17.1.1 Test Purpose and Environment

The purpose of the test case is to verify that the RSTD measurements meet the requirements specified in Clause 8.4 in a synchronized network environment with fading propagation conditions. This test case will verify the measurement period requirements specified in Clause 8.4.3 for RSTD measurements performed on the secondary component carrier and also the measurement period requirements for RSTD measurements performed on both the primary and secondary component carriers specified in Clause 8.4.4.

In the tests, there are two configured component carriers: PCC and SCC, and three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is PCell on the PCC, Cell 2 is an active SCell on the SCC, and Cell 3 is a neighbour cell on the SCC. In all tests, Cell 2 is the OTDOA assistance data reference cell.

The test case includes two tests. Test 1 is designed for the scenario where the UE receives OTDOA assistance data with cells on SCC, and the UE is expected to report RSTD measurements performed on SCC only. Test 2 is designed for the scenario where the UE receives OTDOA assistance data with cells on PCC and SCC, and the UE is expected to report RSTD measurements performed on PCC and on SCC.

Each test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, whilst Cell 2 is active only in T2 and T3, and Cell 3 is active only during T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the OTDOA assistance data reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, while Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of T2, where $\Delta T = 150$ ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.17.1.1-1, Table A.8.17.1.1-2, Table A.8.17.1.1-3 and Table A.8.17.1.1-4.

Table A.8.17.1.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCell		Cell 1		PCell is on RF channel 1 (PCC).
SCell		Cell 2		SCell on RF channel 2 (SCC). Cell 2 is the assistance data reference cell.
Other neighbor cell		Cell 3		Neighbor cell on RF channel 2 (SCC).
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	10		
PRS Transmission Bandwidth	RB	50		PRS are transmitted over the system bandwidth
PRS configuration index I_{PRS}		171 for all cells on PCC 181 for all cells on SCC		This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\text{PRS}} - 160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes N_{PRS}		1		As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 2 – PCI of Cell 3)mod6=0		The PCI of Cell 1 is selected randomly. PCIs of Cell 2 and Cell 3 are selected randomly such that the relative subcarrier shifts of PRS patterns among these cells are as given by the condition
CP length		Normal		
DRX		ON		DRX parameters are further specified in Table A.8.17.1.1-3
Radio frame receive time offset between the cells at the UE antenna connector	µs	Cell 1 to Cell 2: 1 Cell 3 to Cell 2: -1		PRS are transmitted from synchronous cells
Time alignment error between cell2 and cell1	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.		The value of time alignment error depends upon the type of carrier aggregation.
Expected RSTD	µs	Cell 3: 2 Other neighbour cells: randomly between -3 and 3	Cell 1: -2 Cell 3: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	µs	5		The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Cells in OTDOA assistance data		16 cells in total		The list includes the reference cell (received in *OTDOA-ReferenceCellInfo* [24]) and 15 other cells, all received in *OTDOA-ProvideAssistanceData* [24]. Cell 1 (when included) appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 3 always appears at random places in the second half of the list.
		OTDOA neighbor cells include Cell 3 and other 14 cells on SCC	OTDOA neighbor cells include Cell 1 and other 7 cells on PCC, and Cell 3 and other 6 cells on SCC	

prs-SubframeOffset		Cells on PCC: 310 Cells on SCC, except reference cell: 0		Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC, except reference cell: 0		The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000'	Cell 1: '1111111100000000' Cell 2: '0000000011111111' Cell 3: '1111111100000000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3		The length of the time interval from the beginning of each test
T2	s	1.28	2.48	The length of the time interval that follows immediately after time interval T1
T3	s	1.28	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.17.1.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number		1	N/A	N/A
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low
OCNG patterns defined in A.3.2.1		OP.5 FDD	N/A	N/A
PBCH_RA	dB	0	N/A	N/A
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA Note 1				
OCNG_RB Note 1				
N_{oc} Note 3	dBm/15 kHz	-95	N/A	N/A
PRS $\hat{E}_s/N_{oc}$	dB	-Infinity	-Infinity	-Infinity
Io Note 4	dBm/9 MHz	-67.22	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity
Propagation Condition		ETU30		

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.17.1.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
E-UTRA RF Channel Number		1		2		2	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG patterns defined in A.3.2.1		OP.5 FDD		OP.6 FDD		OP.6 FDD	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0		0		0	N/A
PRS_RA	dB	-6	N/A	N/A	3	3	N/A
N_{oc} Note 3	dBm/ 15 kHz	-98	-98	-98	-95	-98	-95
PRS $\hat{E}_s/N_{oc}$	dB	-4	-Infinity	-Infinity	-1	-8	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-4	-Infinity	-Infinity	-1	-8	-Infinity
Io Note 4	dBm/ 9 MHz	-69.94	N/A	N/A	-66.68	-70.11	N/A
PRP Note 4	dBm/ 15 kHz	-102	-Infinity	-Infinity	-96	-106	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-99	-109	-Infinity
$\hat{E}_s/N_{oc}$ Note 4	dB	2	2	-7	-4	-11	-Infinity
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: If PRS_RA is not "N/A", $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.17.1.1-4: DRX parameters for the test of E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Field	Value	Comment
onDurationTimer	psf1	As specified in TS 36.331 [2], Clause 6.3.2
Drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf320	
shortDRX	Disable	

A.8.17.1.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.4.

In Test 1, the UE shall perform and report the RSTD measurements from Cell 2 and Cell 3 within 2560 ms starting from the beginning of time interval T2.

In Test 2, the UE shall perform and report the RSTD measurements from Cell 1 and Cell 2, and RSTD measurements from Cell 2 and Cell 3 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD_0000 and RSTD_12711.

NOTE: The RSTD measurement times in the tests are derived from the following expression,

$$T_{PRS}(M-1)+160\left\lceil \frac{n}{M} \right\rceil,$$

where M =8 and n =16 for Test 1, and M =16 and n =16 for Test 2. For Test 1, the M and n parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1, which gives the total RSTD measurement time of 2560 ms for Cell 3 with respect to the reference cell Cell 2. For Test 2, the M and n parameters are specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 1, which gives the total RSTD measurement time of 4960 ms for reporting the RSTD measurements of Cell 1 and Cell 3 with respect to the reference cell Cell 2.

A.8.17.2 E-UTRAN TDD RSTD measurement reporting delay test case

A.8.17.2.1 Test Purpose and Environment

The purpose of the test case is to verify that the RSTD measurements meet the requirements specified in Clause 8.4 in a synchronized network environment with fading propagation conditions. This test case will verify the measurement period requirements specified in Clause 8.4.3 for RSTD measurements performed on the secondary component carrier and also the measurement period requirements for RSTD measurements performed on both the primary and secondary component carriers specified in Clause 8.4.4.

In the tests, there are two configured component carriers: PCC and SCC, and three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is PCell on the PCC, Cell 2 is an active SCell on the SCC, and Cell 3 is a neighbour cell on the SCC. In all tests, Cell 2 is the OTDOA assistance data reference cell.

The test case includes two tests. Test 1 is designed for the scenario where the UE receives OTDOA assistance data with cells on SCC, and the UE is expected to report RSTD measurements performed on SCC only. Test 2 is designed for the scenario where the UE receives OTDOA assistance data with cells on PCC and SCC, and the UE is expected to report RSTD measurements performed on PCC and on SCC.

Each test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, whilst Cell 2 is active only in T2 and T3, and Cell 3 is active only during T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the OTDOA assistance data reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, while Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of T2, where $\Delta T = 150$ ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.17.2.1-1, Table A.8.17.2.1-2, Table A.8.17.2.1-3 and Table A.8.17.2.1-4.

Table A.8.17.2.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value Test 1	Value Test 2	Comment
PCell		Cell 1		PCell is on RF channel 1 (PCC).
SCell		Cell 2		SCell on RF channel 2 (SCC). Cell 2 is the assistance data reference cell.
Other neighbor cell		Cell 3		Neighbor cell on RF channel 2 (SCC).
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in clause A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	10		
PRS Transmission Bandwidth	RB	50		PRS are transmitted over the system bandwidth
PRS configuration index I_{PRS}		174 for all cells on PCC 184 for all cells on SCC		This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{PRS}-160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Number of consecutive downlink positioning subframes N_{PRS}		1		As defined in TS 36.211 [16]. The number of subframes in a positioning occasion
Physical cell ID PCI		(PCI of Cell 2 – PCI of Cell 3)mod6=0		The PCI of Cell 1 is selected randomly. PCIs of Cell 2 and Cell 3 are selected randomly such that the relative subcarrier shifts of PRS patterns among these cells are as given by the condition
TDD uplink-downlink configuration		1		As specified in TS 36.211 [16], Clause 4.2; corresponds to a configuration with 5 ms switch-point periodicity and two downlink consecutive subframes
TDD special subframe configuration		6		As specified in TS 36.211 [16], Clause 4.2; corresponds to DwPTS of $19760 \cdot T_s$ and UpPTS of $4384 \cdot T_s$
CP length		Normal		
DRX		ON		DRX parameters are further specified in Table A.8.17.2.1-3
Radio frame receive time offset between the cells at the UE antenna connector	µs	Cell 1 to Cell 2: 1 Cell 3 to Cell 2: -1		PRS are transmitted from synchronous cells
Time alignment error between cell2 and cell1	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.		The value of time alignment error depends upon the type of carrier aggregation.
Expected RSTD	µs	Cell 3: 2 Other neighbour cells: randomly between -3 and 3	Cell 1: -2 Cell 3: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	µs	5		The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Cells in OTDOA		16 cells in total		The list includes the reference

assistance data		OTDOA neighbor cells include Cell 3 and other 14 cells on SCC	OTDOA neighbor cells include Cell 1 and other 7 cells on PCC, and Cell 3 and other 6 cells on SCC	cell (received in *OTDOA-ReferenceCellInfo* [24]) and 15 other cells, all received in *OTDOA-ProvideAssistanceData* [24]. Cell 1 (when included) appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 3 always appears at random places in the second half of the list.
prs-SubframeOffset		Cells on PCC: 310 Cells on SCC, except reference cell: 0		Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC, except reference cell: 0		The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000'	Cell 1: '1111111100000000' Cell 2: '0000000011111111' Cell 3: '1111111100000000'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3		The length of the time interval from the beginning of each test
T2	s	1.28	2.48	The length of the time interval that follows immediately after time interval T1
T3	s	1.28	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.17.2.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number		1	N/A	N/A
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low
OCNG patterns defined in A.3.2.2		OP.1 TDD	N/A	N/A
PBCH_RA	dB	0	N/A	N/A
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA Note 1				
OCNG_RB Note 1				
N_{oc} Note 3	dBm/ 15 kHz	-95	N/A	N/A
PRS $\hat{E}_s/N_{oc}$	dB	-Infinity	-Infinity	-Infinity
Io Note 4	dBm/ 9 MHz	-67.22	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity
Propagation Condition		ETU30		
Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.				

Table A.8.17.2.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
E-UTRA RF Channel Number		1		2		2	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG patterns defined in A.3.2.2		OP.1 TDD		OP.2 TDD		OP.2 TDD	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0		0		0	N/A
PRS_RA	dB	-6	N/A	N/A	3	3	N/A
N_{oc} Note 3	dBm/15 kHz	-98	-98	-98	-95	-98	-95
PRS $\hat{E}_s/N_{oc}$	dB	-4	-Infinity	-Infinity	-1	-8	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-4	-Infinity	-Infinity	-1	-8	-Infinity
Io Note 4	dBm/9 MHz	-69.94	N/A	N/A	-66.68	-70.11	N/A
PRP Note 4	dBm/15 kHz	-102	-Infinity	-Infinity	-96	-106	-Infinity
RSRP	dBm/15 kHz	-96	-96	-105	-99	-109	-Infinity
$\hat{E}_s/N_{oc}$ Note 4	dB	2	2	-7	-4	-11	-Infinity
Propagation Condition		ETU30					

Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: If PRS_RA is not "N/A", $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.

Table A.8.17.2.1-4: DRX parameters for the test of E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Field	Value	Comment
onDurationTimer	psf1	As specified in TS 36.331 [2], Clause 6.3.2
Drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf320	
shortDRX	Disable	

A.8.17.2.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.4.

In Test 1, the UE shall perform and report the RSTD measurements from Cell 2 and Cell 3 within 2560 ms starting from the beginning of time interval T2.

In Test 2, the UE shall perform and report the RSTD measurements from Cell 1 and Cell 2, and RSTD measurements from Cell 2 and Cell 3 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD_0000 and RSTD_12711.

NOTE: The RSTD measurement times in the tests are derived from the following expression,

$$T_{PRS}(M-1)+160\left\lceil \frac{n}{M} \right\rceil,$$

where M =8 and n =16 for Test 1, and M =16 and n =16 for Test 2. For Test 1, the M and n parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1, which gives the total RSTD measurement time of 2560 ms for Cell 3 with respect to the reference cell Cell 2. For Test 2, the M and n parameters are specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 1, which gives the total RSTD measurement time of 4960 ms for reporting the RSTD measurements of Cell 1 and Cell 3 with respect to the reference cell Cell 2.

A.8.17.3 E-UTRAN FDD RSTD Measurement Reporting Test Case for 20 MHz

A.8.17.3.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.1.1.

The parameters of this test are the same as defined in Subclause A.8.17.1.1 except that the values of the parameters in Table A.8.17.3.1-1, Table A.8.17.3.1-2 and Table A.8.17.3.1-1 will replace the values of the corresponding parameters in Table A.8.17.1.1-1, Table A.8.17.1.1-2 and Table A.8.17.1.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.3.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 FDD		As specified in section A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	20		
PRS Transmission Bandwidth	RB	100		PRS are transmitted over the system bandwidth
Note 1: See Table A.8.17.1.1-1 for the other parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.17.3.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
OCNG patterns defined in A.3.2.1		OP.13 FDD	N/A	N/A
Io Note 1	dBm/ 18 MHz	-64.21	N/A	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-2 for the other parameters.				

Table A.8.17.3.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.1		OP.13 FDD		OP.14 FDD		OP.14 FDD	N/A
Io Note 1	dBm/ 18 MHz	-66.93	N/A	N/A	-63.67	-67.09	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-3 for the other parameters.							

A.8.17.3.2 Test Requirements

The test requirements defined in section A.8.17.1.2 shall apply in this test case.

A.8.17.4 E-UTRAN TDD RSTD Measurement Reporting Test Case for 20 MHz

A.8.17.4.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.2.1.

The parameters of this test are the same as defined in Subclause A.8.17.2.1 except that the values of the parameters in Table A.8.17.4.1-1, Table A.8.17.4.1-2 and Table A.8.17.4.1-1 will replace the values of the corresponding parameters in Table A.8.17.2.1-1, Table A.8.17.2.1-2 and Table A.8.17.2.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.4.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD		As specified in section A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	20		
PRS Transmission Bandwidth	RB	100		PRS are transmitted over the system bandwidth
Note 1: See Table A.8.17.2.1-1 for the other parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.17.4.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
OCNG patterns defined in A.3.2.2		OP.7 TDD	N/A	N/A
Io Note 1	dBm/ 18 MHz	-64.21	N/A	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.2.1-2 for the other parameters.				

Table A.8.17.4.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.2		OP.7 TDD		OP.8 TDD		OP.8 TDD	N/A
Io Note 1	dBm/ 18 MHz	-66.93	N/A	N/A	-63.67	-67.09	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.2.1-3 for the other parameters.							

A.8.17.4.2 Test Requirements

The test requirements defined in section A.8.17.2.2 shall apply in this test case.

A.8.17.5 E-UTRAN FDD RSTD Measurement Reporting Test Case for 10MHz+5MHz

A.8.17.5.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.1.1.

The parameters of this test are the same as defined in Subclause A.8.17.1.1 except that the values of the parameters in Table A.8.17.5.1-1, Table A.8.17.5.1-2 and Table A.8.17.5.1-1 will replace the values of the corresponding parameters in Table A.8.17.1.1-1, Table A.8.17.1.1-2 and Table A.8.17.1.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.5.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		Cell 1: R.6 FDD Cell 2: R.11 FDD Cell 3: R.11 FDD	Cell 1: R.6 FDD Cell 2: R.11 FDD Cell 3: R.11 FDD	As specified in section A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	Cell 1: 10 Cell 2: 5 Cell 3: 5	Cell 1: 10 Cell 2: 5 Cell 3: 5	
PRS Transmission Bandwidth	RB	Cell 1: 50 Cell 2: 25 Cell 3: 25	Cell 1: 50 Cell 2: 25 Cell 3: 25	PRS are transmitted over the system bandwidth
Note 1: See Table A.8.17.1.1-1 for the other parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.17.5.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
Io Note 1	dBm/ 9 MHz	-67.22	N/A	N/A
	dBm/ 4.5MHz	N/A	N/A	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-2 for the other parameters.				

Table A.8.17.5.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.1		OP.5 FDD		OP.19 FDD		OP.19 FDD	N/A
Io Note 1	dBm/ 9 MHz	-69.94	N/A	N/A	N/A	N/A	N/A
	dBm/ 4.5MHz	N/A	N/A	N/A	-69.69	-73.12	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-3 for the other parameters.							

A.8.17.5.2 Test Requirements

The test requirements defined in section A.8.17.1.2 shall apply in this test case.

A.8.17.6 E-UTRAN TDD RSTD Measurement Reporting Test Case for 10MHz+5MHz

A.8.17.6.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.2.1.

The parameters of this test are the same as defined in Subclause A.8.17.2.1 except that the values of the parameters in Table A.8.17.6.1-1, Table A.8.17.6.1-2 and Table A.8.17.6.1-1 will replace the values of the corresponding parameters in Table A.8.17.2.1-1, Table A.8.17.2.1-2 and Table A.8.17.2.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.6.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		Cell 1: R.6 TDD Cell 2: R.11 TDD Cell 3: R.11 TDD	Cell 1: R.6 TDD Cell 2: R.11 TDD Cell 3: R.11 TDD	As specified in section A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	Cell 1: 10 Cell 2: 5 Cell 3: 5	Cell 1: 10 Cell 2: 5 Cell 3: 5	
PRS Transmission Bandwidth	RB	Cell 1: 50 Cell 2: 25 Cell 3: 25	Cell 1: 50 Cell 2: 25 Cell 3: 25	PRS are transmitted over the system bandwidth
Note 1: See Table A.8.17.2.1-1 for the other parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.17.6.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
Io Note 1	dBm/ 9 MHz	-67.22	N/A	N/A
	dBm/ 4.5MHz	N/A	N/A	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-2 for the other parameters.				

Table A.8.17.6.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.1		OP.1 TDD		OP.10 TDD		OP.10 TDD	N/A
Io Note 1	dBm/ 9 MHz	-69.94	N/A	N/A	N/A	N/A	N/A
	dBm/ 4.5MHz	N/A	N/A	N/A	-69.69	-73.12	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-3 for the other parameters.							

A.8.17.6.2 Test Requirements

The test requirements defined in section A.8.17.2.2 shall apply in this test case.

A.8.17.7 E-UTRAN FDD RSTD Measurement Reporting Test Case for 5 + 5 MHz Bandwidth

A.8.17.7.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.1.1.

The parameters of this test are the same as defined in Subclause A.8.17.1.1 except that the values of the parameters in Table A.8.17.7.1-1, Table A.8.17.7.1-2 and Table A.8.17.7.1-1 will replace the values of the corresponding parameters in Table A.8.17.1.1-1, Table A.8.17.1.1-2 and Table A.8.17.1.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.7.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD		As specified in section A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	5		
PRS Transmission Bandwidth	RB	25		PRS are transmitted over the system bandwidth
Note 1: See Table A.8.17.1.1-1 for the other parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.17.7.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
OCNG patterns defined in A.3.2.1		OP.18 FDD	N/A	N/A
Io Note 1	dBm/ 4.5 MHz	-70.23	N/A	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-2 for the other parameters.				

Table A.8.17.7.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.1		OP.18 FDD		OP.19 FDD		OP.19 FDD	N/A
Io Note 1	dBm/ 4.5 MHz	-72.95	N/A	N/A	-69.69	-73.12	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-3 for the other parameters.							

A.8.17.7.2 Test Requirements

The test requirements defined in section A.8.17.1.2 shall apply in this test case.

A.8.17.8 E-UTRAN TDD RSTD Measurement Reporting Test Case for 5+5 MHz bandwidth

A.8.17.8.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.2.1.

The parameters of this test are the same as defined in Subclause A.8.17.2.1 except that the values of the parameters in Table A.8.17.8.1-1, Table A.8.17.8.1-2 and Table A.8.17.8.1-1 will replace the values of the corresponding parameters in Table A.8.17.2.1-1, Table A.8.17.2.1-2 and Table A.8.17.2.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.8.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 TDD		As specified in section A.3.1.2.1
Channel Bandwidth ($BW_{channel}$)	MHz	5		
PRS Transmission Bandwidth	RB	25		PRS are transmitted over the system bandwidth
Note 1: See Table A.8.17.2.1-1 for the other parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.17.8.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
OCNG patterns defined in A.3.2.1		OP.9 TDD	N/A	N/A
Io Note 1	dBm/ 4.5 MHz	-70.23	N/A	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.2.1-2 for the other parameters.				

Table A.8.17.8.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.1		OP.9 TDD		OP.10 TDD		OP.10 TDD	N/A
Io Note 1	dBm/ 4.5 MHz	-72.95	N/A	N/A	-69.69	-73.12	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.2.1-3 for the other parameters.							

A.8.17.8.2 Test Requirements

The test requirements defined in section A.8.17.2.2 shall apply in this test case.

A.8.17.9 E-UTRAN TDD RSTD Measurement Reporting Test Case for 20MHz+10MHz

A.8.17.9.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.8.17.2.1.

The parameters of this test are the same as defined in Subclause A.8.17.2.1 except that the values of the parameters in Table A.8.17.9.1-1, Table A.8.17.9.1-2 and Table A.8.17.9.1-1 will replace the values of the corresponding parameters in Table A.8.17.2.1-1, Table A.8.17.2.1-2 and Table A.8.17.2.1-3, respectively.

Note: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.

Table A.8.17.9.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters		Cell 1: R.10 TDD Cell 2: R.6 TDD Cell 3: R.6 TDD	Cell 1: R.10 TDD Cell 2: R.6 TDD Cell 3: R.6 TDD	As specified in section A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	Cell 1: 20 Cell 2: 10 Cell 3: 10	Cell 1: 20 Cell 2: 10 Cell 3: 10	
PRS Transmission Bandwidth	RB	Cell 1: 100 Cell 2: 50 Cell 3: 50	Cell 1: 100 Cell 2: 50 Cell 3: 50	PRS are transmitted over the system bandwidth
Note 1: See Table A.8.17.2.1-1 for the other parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.17.9.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3
Io Note 1	dBm/ 18 MHz	-64.21	N/A	N/A
	dBm/ 9 MHz	N/A	N/A	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-2 for the other parameters.				

Table A.8.17.9.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T2	T3	T2	T3	T2	T3
OCNG patterns defined in A.3.2.1		OP.7 TDD		OP.2 TDD		OP.2 TDD	N/A
Io Note 1	dBm/ 18 MHz	-66.93	N/A	N/A	N/A	N/A	N/A
	dBm/ 9MHz	N/A	N/A	N/A	-66.68	-70.11	N/A
Note 1: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: See Table A.8.17.1.1-3 for the other parameters.							

A.8.17.9.2 Test Requirements

The test requirements defined in section A.8.17.2.2 shall apply in this test case.

A.8.17.10 E-UTRAN 3 DL FDD CA RSTD Measurement Reporting Delay Test Case

A.8.17.10.1 Test Purpose and Environment

The purpose of the test case is to verify that the RSTD measurements meet the requirements specified in Clause 8.4 in a synchronized network environment with fading propagation conditions. This test case will verify the measurement period requirements specified in Clause 8.4.3 for RSTD measurements performed on the same secondary component carrier, the measurement period requirements for RSTD measurements performed on both the primary and secondary component carriers specified in Clause 8.4.4, and also the measurement period requirements for RSTD measurements performed on different secondary component carriers specified in Clause 8.4.5.

In the tests, there are three configured component carriers: PCC, SCC1 and SCC2, and four synchronous cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the PCC, Cell 2 is SCell on the SCC1, Cell 3 is SCell on the SCC2 and Cell 4 is a neighbour cell on the SCC2. In all tests, Cell 3 is the OTDOA assistance data reference cell.

The test case includes two tests. Test 1 is designed for the scenario where the UE receives OTDOA assistance data with cells only on SCC2, and the UE is expected to report RSTD measurements performed on SCC2 only. Test 2 is designed for the scenario where the UE receives OTDOA assistance data with cells on PCC, SCC1 and SCC2, and the UE is expected to report RSTD measurements performed on PCC, SCC1 and SCC2.

Each test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, Cell 2 is active only in T2 and T3, Cell 3 is active only during T2 and T3, and Cell 4 is active only during T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the OTDOA assistance data reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T3, and Cell 4 transmits PRS only in T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of T2, where $\Delta T = 150$ ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.17.10.1-1, Table A.8.17.10.1-2, Table A.8.17.10.1-3 and Table A.8.17.10.1-4.

Table A.8.17.10.1-1: General test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	
PCell		Cell 1		PCell is on RF channel 1 (PCC).
SCell 1		Cell 2		SCell 1 on RF channel 2 (SCC1).
SCell 2		Cell 3		SCell 2 on RF channel 3 (SCC2). Cell 3 is the assistance data reference cell.
Other neighbor cell		Cell 4		Neighbor cell on RF channel 3 (SCC2).
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in clause A.3.1.2.1
PRS configuration index I_{PRS}		171 for all cells on PCC 181 for all cells on SCC1 191 for all cells on SCC2		This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\text{PRS}} - 160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
Physical cell ID PCI		(PCI of Cell 3 – PCI of Cell 4)mod6=0		The PCIs of Cell 1 and Cell 2 are selected randomly. PCIs of Cell 3 and Cell 4 are selected randomly such that the relative subcarrier shifts of PRS patterns among these cells are as given by the condition
CP length		Normal		
DRX		ON		DRX parameters are further specified in Table A.8.17.10.1-3
Radio frame receive time offset between the cells at the UE antenna connector	µs	Cell 1 to Cell 2: 1 Cell 3 to Cell 2: -1 Cell 4 to Cell 2: 3		PRS are transmitted from synchronous cells
Time alignment errors between cell1, cell2 and cell3	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.		The value of time alignment error depends upon the type of carrier aggregation.
Expected RSTD	µs	Cell 4: 2 Other neighbour cells: randomly between -3 and 3	Cell 1: -2 Cell 2: 0 Cell 4: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
Expected RSTD uncertainty for all neighbour cells	µs	5		The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
Cells in OTDOA assistance data		16 cells in total		The list includes the reference cell (received in *OTDOA-ReferenceCellInfo* [24]) and 15 other cells, all received in *OTDOA-ProvideAssistanceData* [24]. Cell 1 and Cell 2 (when included) appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 4 always appears at random places in the second half of the list.
		OTDOA neighbor cells include Cell 4 and other 14 cells on SCC2	OTDOA neighbor cells include Cell 1 and other 3 cells on PCC, Cell 2 and other 3 cells on SCC1 and Cell 4 and other 6 cells on SCC2	

‘prs-SubframeOffset		Cells on PCC: 310 Cells on SCC1: 320 Cells on SCC2, except reference cell: 0		Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC1: 0 Cells on SCC2, except reference cell: 0		The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
PRS muting info		Cell 1: ‘11110000’ Cell 2: ‘00001111’ Cell 3: ‘11110000’ Cell 4: ‘00001111’	Cell 1: ‘1111111100000000’ Cell 2: ‘0000000011111111’ Cell 3: ‘1111111100000000’ Cell 4: 0000000011111111’	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3		The length of the time interval from the beginning of each test
T2	s	1.28	2.48	The length of the time interval that follows immediately after time interval T1
T3	s	1.28	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.17.10.1-2: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3	Cell 4
E-UTRA RF Channel Number		1	N/A	N/A	N/A
Channel Bandwidth ($BW_{channel}$)	MHz	5,10,20	N/A	N/A	N/A
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low	1x2 Low
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	N/A	N/A	N/A
OCNG patterns defined in A.3.2.1		5MHz: OP.18 FDD 10MHz: OP.5 FDD 20MHz: OP.13 FDD	N/A	N/A	N/A
PBCH_RA	dB	0	N/A	N/A	N/A
PBCH_RB	dB	0	N/A	N/A	N/A
PSS_RA	dB	0	N/A	N/A	N/A
SSS_RA	dB	0	N/A	N/A	N/A
PCFICH_RB	dB	0	N/A	N/A	N/A
PHICH_RA	dB	0	N/A	N/A	N/A
PHICH_RB	dB	0	N/A	N/A	N/A
PDCCH_RA	dB	0	N/A	N/A	N/A
PDCCH_RB	dB	0	N/A	N/A	N/A
OCNG_RA Note 1	dB	0	N/A	N/A	N/A
OCNG_RB Note 1	dB	0	N/A	N/A	N/A
N_{oc} Note 3	dBm/15 kHz	-95	N/A	N/A	N/A
PRS $\hat{E}_s/N_{oc}$	dB	-Infinity	-Infinity	-Infinity	-Infinity
Io Note 4	dBm/9 MHz	-67.22 +10log ($N_{RB,c}$ /50)	N/A	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity	-Infinity
Propagation Condition		ETU30			

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.17.10.1-3: Cell-specific test parameters for E-UTRAN FDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4	
		T2	T3	T2	T3	T2	T3	T2	T3
E-UTRA RF Channel Number		1		2		3		3	
Channel Bandwidth ($BW_{channel}$)	MHz	5,10,20		5,10,20		5,10,20		5,10,20	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low		1x2 Low	
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	N/A
OCNG patterns defined in A.3.2.1 (There is no PDSCH allocated in the subframe transmitting PRS)		5MHz: OP.18 FDD 10MHz: OP.5 FDD 20MHz: OP.13 FDD		5MHz: OP.19 FDD 10MHz: OP.6 FDD 20MHz: OP.14 FDD		5MHz: OP.19 FDD 10MHz: OP.6 FDD 20MHz: OP.14 FDD		5MHz: OP.19 FDD 10MHz: OP.6 FDD 20MHz: OP.14 FDD	N/A
PRS Transmission Bandwidth (PRS transmission bandwidth depends on selected channel bandwidth. PRS are transmitted over the system bandwidth)	RB	5MHz: 25 10MHz: 50 20MHz:100		5MHz: 25 10MHz: 50 20MHz:100		5MHz: 25 10MHz: 50 20MHz:100		5MHz: 25 10MHz: 50 20MHz:100	N/A
Number of consecutive downlink positioning subframes N_{PRS}. N_{PRS} also depends on selected channel bandwidth. As defined in TS 36.211 [16]. The number of subframes in a positioning occasion		5MHz: 2 10MHz: 1 20MHz:1		5MHz: 2 10MHz: 1 20MHz:1		5MHz: 2 10MHz: 1 20MHz:1		5MHz: 2 10MHz: 1 20MHz:1	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0		0		0		0	N/A
PRS_RA	dB	-6	N/A	N/A	3	N/A	3	3	N/A
N_{oc} Note 3	dBm/15 kHz	-98	-98	-98	-95	-98	-95	-98	-95
PRS $\hat{E}_s/N_{oc}$	dB	-4	-Infinity	-Infinity	-1	-Infinity	-1	-8	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-4	-Infinity	-Infinity	-1	-Infinity	-1	-8	-Infinity

Io Note 4	dBm/ 9 MHz	-69.94 +10log ($N_{RB,c}$ /50)	N/A	N/A	-66.68 +10log ($N_{RB,c}$ /50)	N/A	-66.68 +10log ($N_{RB,c}$ /50)	-70.11 +10log ($N_{RB,c}$ /50)	N/A
PRP Note 4	dBm/ 15 kHz	-102	-Infinity	-Infinity	-96	-Infinity	-96	-106	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-99	-105	-99	-109	-Infinity
$\hat{E}_s/N_{oc}$ Note 4	dB	2	2	-7	-4	-7	-4	-11	-Infinity
Propagation Condition		ETU30							
Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: If PRS_RA is not "N/A", $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.									

Table A.8.17.10.1-4: DRX parameters for the test of E-UTRAN FDD intra-frequency RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Field	Value	Comment
onDurationTimer	psf1	As specified in TS 36.331 [2], Clause 6.3.2
Drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf320	
shortDRX	Disable	

A.8.17.10.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.4.

In Test 1, the UE shall perform and report the RSTD measurements from Cell 4 and Cell 3 within 2560 ms starting from the beginning of time interval T2.

In Test 2, the UE shall perform and report the RSTD measurements from Cell 1 and Cell 3, RSTD measurements from Cell 2 and Cell 3, and RSTD measurements from Cell 4 and Cell 3 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD_0000 and RSTD_12711.

NOTE: The RSTD measurement times in the tests are derived from the following expression,

$$T_{PRS}(M-1)+160\left\lceil \frac{n}{M} \right\rceil,$$

where M =8 and n =16 for Test 1, and M =16 and n =16 for Test 2. For Test 1, the M and n parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1, which gives the total RSTD measurement time of 2560 ms for Cell 4 with respect to the reference cell Cell 3. For Test 2, the M and n parameters are specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 1, which gives the total RSTD measurement time of 4960 ms for reporting the RSTD measurements of Cell 1, Cell 2 and Cell 4 with respect to the reference cell Cell 3.

A.8.17.11 E-UTRAN 3 DL TDD CA RSTD Measurement Reporting Delay Test Case

A.8.17.11.1 Test Purpose and Environment

The purpose of the test case is to verify that the RSTD measurements meet the requirements specified in Clause 8.4 in a synchronized network environment with fading propagation conditions. This test case will verify the measurement period requirements specified in Clause 8.4.3 for RSTD measurements performed on the same secondary component carrier, the measurement period requirements for RSTD measurements performed on both the primary and secondary component carriers specified in Clause 8.4.4, and also the measurement period requirements for RSTD measurements performed on different secondary component carriers specified in Clause 8.4.5.

In the tests, there are three configured component carriers: PCC, SCC1 and SCC2, and four synchronous cells: Cell 1, Cell 2, Cell 3 and Cell 4. Cell 1 is PCell on the PCC, Cell 2 is SCell on the SCC1, Cell 3 is SCell on the SCC2 and Cell 4 is a neighbour cell on the SCC2. In all tests, Cell 3 is the OTDOA assistance data reference cell.

The test case includes two tests. Test 1 is designed for the scenario where the UE receives OTDOA assistance data with cells only on SCC2, and the UE is expected to report RSTD measurements performed on SCC2 only. Test 2 is designed for the scenario where the UE receives OTDOA assistance data with cells on PCC, SCC1 and SCC2, and the UE is expected to report RSTD measurements performed on PCC, SCC1 and SCC2.

Each test consists of three consecutive time intervals, with duration of T1, T2 and T3. Cell 1 is active in T1, T2 and T3, Cell 2 is active only in T2 and T3, Cell 3 is active only during T2 and T3, and Cell 4 is active only during T2. The beginning of the time interval T2 shall be aligned with the first PRS positioning subframe of a positioning occasion in the OTDOA assistance data reference cell, where the PRS positioning occasion is as defined in Clause 8.1.2.5.1. Cell 1 transmits PRS in T2, Cell 2 transmits PRS only in T3, and Cell 3 transmits PRS only in T3, and Cell 4 transmits PRS only in T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE during T1. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of T2, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data.

The test parameters are as given in Table A.8.17.11.1-1, Table A.8.17.11.1-2, Table A.8.17.11.1-3 and Table A.8.17.11.1-4.

Table A.8.17.11.1-1: General test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Parameter	Unit	Value		Comment
		Test 1	Test 2	

<table>
<tr><td>PCell</td><td></td><td colspan="2">Cell 1</td><td>PCell is on RF channel 1 (PCC).</td></tr>
<tr><td>SCell 1</td><td></td><td colspan="2">Cell 2</td><td>SCell 1 on RF channel 2 (SCC1).</td></tr>
<tr><td>SCell 2</td><td></td><td colspan="2">Cell 3</td><td>SCell 2 on RF channel 3 (SCC2). Cell 3 is the assistance data reference cell.</td></tr>
<tr><td>Other neighbor cell</td><td></td><td colspan="2">Cell 4</td><td>Neighbor cell on RF channel 3 (SCC2).</td></tr>
<tr><td>PCFICH/PDCCH/PHICH parameters</td><td></td><td colspan="2">DL Reference Measurement Channel R.6 TDD</td><td>As specified in clause A.3.1.2.2</td></tr>
<tr><td>Channel Bandwidth ($BW_{channel}$)</td><td>MHz</td><td colspan="2">5MHz or 10MHz or 20MHz</td><td>All channels in a test have the same bandwidth.</td></tr>
<tr><td>PRS configuration index I_{PRS}</td><td></td><td colspan="2">174 for all cells on PCC
184 for all cells on SCC1
194 for all cells on SCC2</td><td>This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{PRS} - 160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1</td></tr>
<tr><td>Physical cell ID PCI</td><td></td><td colspan="2">(PCI of Cell 3 – PCI of Cell 4)mod6=0</td><td>The PCIs of Cell 1 and Cell 2 are selected randomly. PCIs of Cell 3 and Cell 4 are selected randomly such that the relative subcarrier shifts of PRS patterns among these cells are as given by the condition</td></tr>
<tr><td>TDD uplink-downlink configuration</td><td></td><td colspan="2">1</td><td>As specified in TS 36.211 [16], Clause 4.2; corresponds to a configuration with 5 ms switch-point periodicity and two downlink consecutive subframes</td></tr>
<tr><td>TDD special subframe configuration</td><td></td><td colspan="2">6</td><td>As specified in TS 36.211 [16], Clause 4.2; corresponds to DwPTS of $19760 \cdot T_s$ and UpPTS of $4384 \cdot T_s$</td></tr>
<tr><td>CP length</td><td></td><td colspan="2">Normal</td><td></td></tr>
<tr><td>DRX</td><td></td><td colspan="2">ON</td><td>DRX parameters are further specified in Table A.8.17.11.1-3</td></tr>
<tr><td>Radio frame receive time offset between the cells at the UE antenna connector</td><td>µs</td><td colspan="2">Cell 1 to Cell 2: 1
Cell 3 to Cell 2: -1
Cell 4 to Cell 2: 3</td><td>PRS are transmitted from synchronous cells</td></tr>
<tr><td>Time alignment errors among cell1, cell2 and cell3</td><td>µs</td><td colspan="2">≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.</td><td>The value of time alignment error depends upon the type of carrier aggregation.</td></tr>
<tr><td>Expected RSTD</td><td>µs</td><td>Cell 4: 2
Other neighbour cells: randomly between -3 and 3</td><td>Cell 1: -2
Cell 2: 0
Cell 4: 2
Other neighbour cells: randomly between -3 and 3</td><td>The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator</td></tr>
<tr><td>Expected RSTD uncertainty for all neighbour cells</td><td>µs</td><td colspan="2">5</td><td>The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index</td></tr>
<tr><td>Cells in OTDOA assistance data</td><td></td><td colspan="2">16 cells in total</td><td>The list includes the reference cell (received in OTDOA-</td></tr>
</table>

		OTDOA neighbor cells include Cell 4 and other 14 cells on SCC2	OTDOA neighbor cells include Cell 1 and other 3 cells on PCC, Cell 2 and other 3 cells on SCC1 and Cell 4 and other 6 cells on SCC2	*ReferenceCellInfo* [24]) and 15 other cells, all received in *OTDOA-ProvideAssistanceData* [24]. Cell 1 and Cell 2 (when included) appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 4 always appears at random places in the second half of the list.
prs-SubframeOffset		Cells on PCC: 310 Cells on SCC1: 320 Cells on SCC2, except reference cell: 0		Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC1: 0 Cells on SCC2, except reference cell: 0		The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
PRS muting info		Cell 1: '11110000' Cell 2: '00001111' Cell 3: '11110000' Cell 4: '00001111'	Cell 1: '1111111100000000' Cell 2: '0000000011111111' Cell 3: '1111111100000000' Cell 4: 0000000011111111'	Correponds to prs-MutingInfo defined in TS 36.355 [24]
T1	s	3		The length of the time interval from the beginning of each test
T2	s	1.28	2.48	The length of the time interval that follows immediately after time interval T1
T3	s	1.28	2.48	The length of the time interval that follows immediately after time interval T2

Table A.8.17.11.1-2: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T1 for carrier aggregation

Parameter	Unit	Cell 1	Cell 2	Cell 3	Cell 4
E-UTRA RF Channel Number		1	N/A	N/A	N/A
Channel Bandwidth ($BW_{channel}$)	MHz	5,10,20	N/A	N/A	N/A
Correlation Matrix and Antenna Configuration		1x2 Low	1x2 Low	1x2 Low	1x2 Low
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD	N/A	N/A	N/A
OCNG patterns defined in A.3.2.2		5MHz: OP.10 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	N/A	N/A	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0	N/A	N/A	N/A
N_{oc} Note 3	dBm/15 kHz	-95	N/A	N/A	N/A
PRS $\hat{E}_s/N_{oc}$	dB	-Infinity	-Infinity	-Infinity	-Infinity
Io Note 4	dBm/9 MHz	-67.22 +10log ($N_{RB,c}$ /50)	N/A	N/A	N/A
$\hat{E}_s/N_{oc}$	dB	0	-Infinity	-Infinity	-Infinity
Propagation Condition		ETU30			

Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters.

Table A.8.17.11.1-3: Cell-specific test parameters for E-UTRAN TDD RSTD measurement reporting delay under fading propagation conditions during T2 and T3 for carrier aggregation

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4	
		T2	T3	T2	T3	T2	T3	T2	T3

E-UTRA RF Channel Number		1		2		3		3	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low		1x2 Low	
Channel Bandwidth ($BW_{channel}$)	MHz	5,10,20		5,10,20		5,10,20		5,10,20	
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD		5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD		5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD		5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD	N/A
OCNG patterns defined in A.3.2.1		5MHz: OP.10 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		5MHz: OP.10 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		5MHz: OP.10 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		5MHz: OP.10 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	N/A
PRS Transmission Bandwidth (PRS transmission bandwidth depends on selected channel bandwidth. PRS are transmitted over the system bandwidth)	RB	5MHz: 25 10MHz: 50 20MHz:100		5MHz: 25 10MHz: 50 20MHz:100		5MHz: 25 10MHz: 50 20MHz:100		5MHz: 25 10MHz: 50 20MHz:100	N/A
Number of consecutive downlink positioning subframes N_{PRS}. N_{PRS} also depends on selected channel bandwidth. As defined in TS 36.211 [16]. The number of subframes in a positioning occasion		5MHz: 2 10MHz: 1 20MHz:1		5MHz: 2 10MHz: 1 20MHz:1		5MHz: 2 10MHz: 1 20MHz:1		5MHz: 2 10MHz: 1 20MHz:1	N/A
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0		0		0		0	N/A
PRS_RA	dB	-6	N/A	N/A	3	N/A	3	3	N/A
N_{oc} Note 3	dBm/15 kHz	-98	-98	-98	-95	-98	-95	-98	-95
PRS $\hat{E}_s/N_{oc}$	dB	-4	-Infinity	-Infinity	-1	-Infinity	-1	-8	-Infinity
PRS $\hat{E}_s/I_{ot}$ Note 4	dB	-4	-Infinity	-Infinity	-1	-Infinity	-1	-8	-Infinity

Io Note 4	dBm/ 9 MHz	-69.94 +10log ($N_{RB,c}$ /50)	N/A	N/A	-66.68 +10log ($N_{RB,c}$ /50)	N/A	-66.68 +10log ($N_{RB,c}$ /50)	-70.11 +10log ($N_{RB,c}$ /50)	N/A
PRP Note 4	dBm/ 15 kHz	-102	-Infinity	-Infinity	-96	-Infinity	-96	-106	-Infinity
RSRP Note 4	dBm/ 15 kHz	-96	-96	-105	-99	-105	-99	-109	-Infinity
$\hat{E}_s/N_{oc}$ Note 4	dB	2	2	-7	-4	-7	-4	-11	-Infinity
Propagation Condition		ETU30							
Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: If PRS_RA is not "N/A", $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters and are given for information purpose. If PRS_RA is "N/A", Io and RSRP levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. Interference conditions shall be applied to all PRS symbols of DL positioning subframes.									

Table A.8.17.11.1-4: DRX parameters for the test of E-UTRAN TDD intra-frequency RSTD measurement reporting delay under fading propagation conditions for carrier aggregation

Field	Value	Comment
onDurationTimer	psf1	As specified in TS 36.331 [2], Clause 6.3.2
Drx-InactivityTimer	psf1	
drx-RetransmissionTimer	sf1	
longDRX-CycleStartOffset	sf320	
shortDRX	Disable	

A.8.17.11.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 8.4.

In Test 1, the UE shall perform and report the RSTD measurements from Cell 4 and Cell 3 within 2560 ms starting from the beginning of time interval T2.

In Test 2, the UE shall perform and report the RSTD measurements from Cell 1 and Cell 3, RSTD measurements from Cell 2 and Cell 3, and RSTD measurements from Cell 4 and Cell 3 within 4960 ms starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 9.1.10.3, i.e., between RSTD_0000 and RSTD_12711.

NOTE: The RSTD measurement times in the tests are derived from the following expression,

$$T_{PRS}(M-1)+160\left\lceil \frac{n}{M} \right\rceil,$$

where M =8 and n =16 for Test 1, and M =16 and n =16 for Test 2. For Test 1, the M and n parameters specified in Clause 8.1.2.5.1, Table 8.1.2.5.1-1, under Note 1, which gives the total RSTD measurement time of 2560 ms for Cell 4 with respect to the reference cell Cell 3. For Test 2, the M and n parameters are specified in Clause 8.1.2.6.1, Table 8.1.2.6.1-1, under Note 1, which gives the total RSTD measurement time of 4960 ms for reporting the RSTD measurements of Cell 1, Cell 2 and Cell 4 with respect to the reference cell Cell 3.

A.8.18 E-UTRAN TDD – HRPD Measurements

A.8.18.1 E-UTRAN TDD-HRPD event triggered reporting under fading propagation conditions

A.8.18.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- HRPD cell search requirements in clause 8.1.2.4.12.

The test parameters are given in Tables A.8.18.1.1-1, A.8.18.1.1-2 and A.8.18.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.18.1.1-1: General test parameters for E-UTRAN TDD to HRPD event triggered reporting under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	E-UTRAN TDD cell
Neighbouring cell		Cell 2	HRPD cell
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
E-UTRAN TDD measurement quantity		RSRP	
Inter-RAT (HRPD) measurement quantity		CDMA2000 HRPD Pilot Strength	
b1-ThresholdCDMA2000	dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B1
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	Non-DRX test
Access Barring Information	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
HRPD RF Channel Number		1	One HRPD carrier frequency is used.
HRPD neighbour cell list size		8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize		8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1	s	5	
T2	s	3	

Table A.8.18.1.1-2: Cell specific test parameters for E-UTRAN TDD cell#1 for event triggered reporting under fading propagation conditions

Parameter	Unit	Cell 1 (E-UTRA)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Patterns defined in TS36.133 A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 KHz	-98	-98
$\hat{E}_s/N_{oc}$	dB	0	0
$\hat{E}_s/I_{ot}$	dB	0	0
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table A.8.18.1.1-3: Cell specific test parameters for HRPD (cell # 2) for event triggered reporting under fading propagation conditions

Parameter	Unit	Cell 2 (HRPD)	
		T1	T2
$\frac{\text{Control } E_b}{N_t}$ (38.4 kbps)	dB	21	
$\frac{\text{Control } E_b}{N_t}$ (76.8 kbps)	dB	18	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3
Propagation Condition		ETU70	

A.8.18.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 2134 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.19 E-UTRAN TDD – CDMA2000 1X Measurements

A.8.19.1 E-UTRAN TDD – CDMA2000 1X event triggered reporting under fading propagation conditions

A.8.19.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN TDD- CDMA2000 1X cell search requirements in clause 8.1.2.4.10.

The test parameters are given in Tables A.8.19.1.1-1, A.8.19.1.1-2 and A.8.19.1.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.19.1.1-1: General test parameters for E-UTRAN TDD-CDMA2000 1X event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on CDMA2000 1X RF channel number 1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. Applicable to cell 1.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. Applicable to cell 1.
CP length		Normal	Applicable to cell 1.
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
CDMA2000 1X Channel Number		1	One CDMA2000 1X carrier frequency is used.
Inter-RAT (CDMA2000 1X) measurement quantity		CDMA2000 1xRTT Pilot Strength	
B1-Threshold-CDMA2000	dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B1
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
cdma2000 1X neighbour cell list size		8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize		8 (60 PN chips)	Search window size as defined in clause 6.3.5 in TS 36.331
T1	s	5	
T2	s	3	

Table A.8.19.1.1-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for event triggered reporting of CDMA2000 1X cell under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
Correlation Matrix and Antenna Configuration		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA[Note 1]	dB		
OCNG_RB[Note 1]	dB		
$\hat{E}_s/I_{ot}$	dB	4	4
$\hat{E}_s/N_{oc}$	dB	4	4
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.19.1.1-3: Cell specific test parameters for CDMA2000 1X (cell # 2) for event triggered reporting of CDMA2000 1X cell under fading propagation conditions

Parameter	Unit	Cell 2 (cdma2000 1X)	
		T1	T2
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7	
$\frac{\text{Sync } E_c}{I_{or}}$	dB	-16	
$\frac{\text{Paging } E_c}{I_{or}}$ (4.8 kbps)	dB	-12	
$\hat{I}_{or}/I_{oc}$	dB	-infinity	0
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10
Propagation Condition		ETU70	

A.8.19.1.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 2134 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.20 Inter-frequency/RAT Measurements in CA mode

A.8.20.1 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

It is not necessary for CA UEs to be tested in A.8.3.1 if this case is done.

A.8.20.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD-FDD inter-frequency cell search requirements in clause 8.1.2.3.

The test parameters are given in Tables A.8.20.1.1-1 and A.8.20.1.1-2. In this test, there are three cells on different carrier frequencies and gap pattern configuration # 0 as defined in Table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.20.1.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
E-UTRA RF Channel Number for Scell		3	One FDD carrier frequencies is used
Channel Bandwidth (BWchannel)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Configured active Scell		Cell 3	Cell 3 is on RF channel number 3
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Cell2 timing offset to cell1	ms	3	Asynchronous cells
Cell3 timing offset to cell1	µs	0	Synchronous cells
Time alignment error between cell3 and cell1	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	s	5	
T2	s	5	

Table A.8.20.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	10		10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD		OP.1 FDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 3	dBm/15 kHz	-98					
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	-94	-94
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7	4	4
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	4	4
Propagation Condition		ETU70					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.20.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3840 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.20.2 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

It is not necessary for CA UEs to be tested in A.8.4.1 if this case is done.

A.8.20.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD-TDD inter-frequency cell search requirements in clause 8.1.2.3.4.

The test parameters are given in Table A.8.20.2.1-1 and A.8.20.2.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.20.2.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
CP length		Normal	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
E-UTRA RF Channel Number for Scell		3	One TDD carrier frequencies is used
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Configured active Scell		Cell 3	Cell 3 is on RF channel number 3
A3-Offset	dB	-6	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Cell2 timing offset to cell1	μs	3	Synchronous cells
Cell3 timing offset to cell1	μs	0	Synchronous cells
Time alignment error between cell3 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	s	5	
T2	s	10	

Table A.8.20.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	10		10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2)		OP.1 TDD		OP.2 TDD		OP.1 TDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7	4	4
N_{oc} Note 3	dBm/15 kHz	-98					
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-91	-94	-94
SCH_RP Note 4	dBm/15 kHz	-94	-94	-infinity	-91	-94	-94
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7	4	4
Propagation Condition		ETU70					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.20.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7680 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.20.2A E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +20 MHz bandwidth.

A.8.20.2A.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.20.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.20.2A.1-1 and A.8.20.2A.1-2 will replace the values of corresponding parameters in Tables A.8.20.2.1-1 and A.8.20.2.1-2.

Table A.8.20.2A.1-1: General test parameters for E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +20 MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD	As specified in clause A.3.1.2.2
Channel Bandwidth ($BW_{channel}$)	MHz	20	
Note 1: See Table A.8.20.2.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.20.2A.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +20 MHz bandwidth

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	20		20		20	
OCNG Pattern defined in A.3.2.2		OP.7 TDD		OP.8 TDD		OP.7 TDD	
Note 1: See Table A.8.20.2.1-1 for other general test parameters.							

A.8.20.2A.2 Test Requirements

The test requirements defined in section A.8.20.2.2 shall apply to this test case.

A.8.20.2B E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +10 MHz bandwidth.

A.8.20.2B.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.8.20.2. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8.20.2B.1-1 and A.8.20.2B.1-2 will replace the values of corresponding parameters in Tables A.8.20.2.1-1 and A.8.20.2.1-2.

Table A.8.20.2B.1-1: General test parameters for E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +10 MHz bandwidth

Parameter	Unit	Value	Comment
Channel bandwidth for Cell 1 ($BW_{channel}$)	MHz	20	
PDSCH parameters for Cell 1		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for Cell 1		DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
Channel bandwidth for Cells 2, 3 ($BW_{channel}$)	MHz	10	
PDSCH parameters for Cells 2, 3		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for Cells 2, 3		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Note 1: See Table A.8.20.2.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.20.2B.1-2: Cell specific test parameters for E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +10 MHz bandwidth

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
$BW_{channel}$	MHz	20		10		10	
OCNG Pattern defined in A.3.2.2		OP.7 TDD		OP.2 TDD		OP.1 TDD	
Note 1: See Table A.8.20.2.1-1 for other general test parameters.							

A.8.20.2B.2 Test Requirements

The test requirements defined in section A.8.20.2.2 shall apply to this test case.

A.8.20.3 E-UTRAN FDD - UTRAN FDD event triggered reporting under fading propagation conditions

It is not necessary for CA UEs to be tested in A.8.5.1 if this case is done.

A.8.20.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRAN FDD- UTRAN FDD cell search requirements in clause 8.1.2.4.1.

The test parameters are given in Tables A.8.20.3.1-1, A.8.20.3.1-2 and A.8.20.3.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.20.3.1-1: General test parameters for E-UTRAN FDD-UTRAN FDD event triggered reporting in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Configured active Scell		Cell 3	Cell 3 is on E-UTRA RF channel number 2.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA RF Channel Number for Scell		2	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth ($BW_{channel}$)	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
b1-Threshold-UTRA	dB	-18	CPICH Ec/Io threshold for event B1.
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
T1	s	5	
T2	s	6	

Table A.8.20.3.1-2: Cell specific test parameters for E-UTRAN FDD (cell # 1, cell # 3) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 1		Cell 3	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD		OP.1 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
$\hat{E}_s/I_{ot}$	dB	4	4	4	
$\hat{E}_s/N_{oc}$	dB	4	4	4	
N_{oc}	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94	-94	-94	
SCH_RP	dBm/15 kHz	-94	-94	-94	
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.					

Table A.8.20.3.1-3: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or} Note3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

A.8.20.3.2 Test Requirements

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 4800 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.20.4 E-UTRAN TDD to UTRAN TDD cell search under fading propagation conditions

It is not necessary for CA UEs to be tested in A.8.7.1 if this case is done.

A.8.20.4.1 Test Purpose and Environment

A.8.20.4.1.1 1.28 Mcps TDD option

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the E-UTRA TDD to UTRA TDD cell search requirements in clause 8.1.2.4.3 under fading propagation conditions.

This test scenario comprised of 1 E-UTRA TDD PCell, 1 E-UTRA TDD SCell and 1 UTRA TDD cell to be searched. Test parameters are given in Table A.8.20.4.1.2-1, A.8.20.4.1.2-2, and A.8.20.4.1.2-3. Gap pattern configuration #0 as defined in table 8.1.2.1-1 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B1 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.20.4.1.1-1: General test parameters for E-UTRA TDD to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA RF Channel Number for Scell		2	One E-UTRA TDD carrier frequency is used.
Active cell		Cell 1	E-UTRA TDD cell
Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Configured active SCell		Cell 3	E-UTRA TDD cell
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1		normal	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells		3 ms	Asynchronous cells
Ofn	dB	0	
Thresh	dBm	-87	
T1	s	5	
T2	s	10	

Table A.8.20.4.1.1-2: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 1, cell3)

Parameter	Unit	Cell 1		Cell 3	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Pattern defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD		OP.1 TDD	
PBCH_RA	dB	0	0	0	0
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note1	dB				
OCNG_RB Note1	dB				
$\hat{E}_s/I_{ot}$	dB	9	9	9	9
$\hat{E}_s/N_{oc}$	dB	9	9	9	9
N_{oc}	dBm/15kHz	-98			
RSRP	dBm/15kHz	-89	-89	-89	-89
SCH_RP	dBm/15kHz	-89	-89	-89	-89
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.					

Table A.8.20.4.1.1-3: Cell specific test parameters for cell search E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number NOTE1		Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/Ior NOTE2	dB	-3	-3		
$\hat{I}_{or}/I_{oc}$	dB	-inf	5	-inf	5
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-inf	-78	n.a.	n.a.
Propagation Condition		Case 3 NOTE3			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 3 propagation conditions are defined in Annex B of TS 25.102					

A.8.20.4.2 Test Requirements

A.8.20.4.2.1 1.28 Mcps TDD option

The UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.20.4A E-UTRAN TDD with 20 MHz +20 MHz bandwidth to UTRAN TDD cell search under fading propagation conditions

A.8.20.4A.1 Test Purpose and Environment

A.8.20.4A.1.1 1.28 Mcps TDD option

The purpose of this test case is the same as for the test defined in subclause A.8.20.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8. 20.4A.1.1-1 and A.8. 20.4A.1.1-2 will replace the values of corresponding parameters in Tables A.8. 20.4.1.1-1 and A.8. 20.4.1.1-2.

Table A.8.20.4A.1.1-1: General test parameters for E-UTRA TDD with 20MHz +20MHz bandwidth to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
Note 1: See Table A.8.20.4.1.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.20.4A.1.1-2: Cell specific test parameters for cell search E-UTRA TDD with 20MHz +20MHz bandwidth to UTRA TDD test case (cell 1, cell3)

Parameter	Unit	Cell 1		Cell 3	
		T1	T2	T1	T2
$BW_{channel}$	MHz	20		20	
OCNG Pattern defined in A.3.2.2		OP.7 TDD		OP.7 TDD	
Propagation Condition		ETU70			
Note 1: See Table A.8.20.4.1.1-2 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.					

A.8.20.4A.2 Test Requirements

A.8.20.4A.2.1 1.28 Mcps TDD option

The test requirements defined in section A.8.20.4.2.1 shall apply to this test case.

A.8.20.4B E-UTRAN TDD with 20 MHz +10 MHz bandwidth to UTRAN TDD cell search under fading propagation conditions

A.8.20.4B.1 Test Purpose and Environment

A.8.20.4B.1.1 1.28 Mcps TDD option

The purpose of this test case is the same as for the test defined in subclause A.8.20.4. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.8. 20.4B.1.1-1 and A.8. 20.4B.1.1-2 will replace the values of corresponding parameters in Tables A.8. 20.4.1.1-1 and A.8. 20.4.1.1-2.

Table A.8.20.4B.1.1-1: General test parameters for E-UTRA TDD with 20MHz +10MHz bandwidth to UTRA(1.28 Mcps TDD OPTION) cell search in fading propagation conditions

Parameter	Unit	Value	Comment
Channel bandwidth for Cell 1 ($BW_{channel}$)	MHz	20	
PDSCH parameters for Cell 1		DL Reference Measurement Channel R.3 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for Cell 1		DL Reference Measurement Channel R.10 TDD	As specified in section A.3.1.2.2
Channel bandwidth for Cell 3 ($BW_{channel}$)	MHz	10	
PDSCH parameters for Cell 3		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHICH parameters for Cell 3		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
Note 1: See Table A.8.20.4.1.1-1 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.			

Table A.8.20.4B.1.1-2: Cell specific test parameters for cell search E-UTRA TDD with 20MHz +10MHz bandwidth to UTRA TDD test case (cell 1, cell3)

Parameter	Unit	Cell 1		Cell 3	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	20		10	
OCNG Pattern defined in A.3.2.2		OP.7 TDD		OP.1 TDD	
Note 1: See Table A.8.20.4.1.1-2 for other general test parameters. Note 2: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.					

A.8.20.4B.2 Test Requirements

A.8.20.4B.2.1 1.28 Mcps TDD option

The test requirements defined in section A.8.20.4.2.1 shall apply to this test case.

A.8.21 CSG Proximity Indication Testing Case for E-UTRAN FDD – FDD Inter frequency

Note : The test case in this section forms the basis for a signalling test for CSG proximity detection.

A.8.21.1 Test Purpose and Environment

The purpose of this test is to verify the UE has implemented properly the feature for indicating that the UE is entering or leaving the proximity of one or more CSG member cells based on proximity detection with an autonomous search function, as defined by the requirements in Section 6.4.

The test case consists of three successive segments: Test Preparation, Negative Test, and Positive Test. The test scenario comprises of three E-UTRAN FDD cells on different carriers. Cell 1 represents the serving cell in the proximity of the CSG cell, Cell 2 the CSG cell, and Cell 3 the serving cell not in the proximity of the CSG cell.The description of the test procedure is shown in Table A.8.21-1. The general test parameters and cell specific test parameters are presented in Table A.8.21-2 and Table A.8.21-3 respectively.

Table A.8.21-1: Description of the test procedures

Parameter	Cell Status	Comment
Test Preparation		
Initial Condition	Cell 1 is active	Clean up the UE memory to be free from previously stored cell information for proximity detection. Turn on the UE and allow sufficient time for the UE to select to Cell 1.
Time duration T1	Cell 1 and Cell 2 are active	Turn on Cell 2 at the start of T1. Perform manual CSG selection towards Cell 2. The UE is expected to store necessary information for later proximity detection.
End condition		Turn off the UE. Turn off Cell 1 and Cell 2.
Negative Test		
Initial Condition	Cell 3 is active	Turn on Cell 3. Turn on the UE and set up the UE in connected mode with Cell 3..
Time duration T2	Cell 3 is active	Configure the UE with proximity indication control by sending the Reconfiguration message with ReportProximityConfig at the start of T2. The UE is not expected to report “entering” proximity in the negative test.
End condition		Turn off the UE. Turn off Cell 3.
Positive Test		
Initial Condition	Cell 1 is active	Turn on Cell 1. Turn on the UE and set up the UE in connected mode with Cell 1.
Time duration T3	Cell 1 and Cell 2 are active	Turn on Cell 2 at the start of T3. Configure the UE with proximity indication control by sending the Reconfiguration message with reportProximityConfig at the start of T3. The UE is expected to report “entering” proximity before end of T3.
End condition		Turn off the UE. Turn off Cell 1 and Cell 2.

Table A.8.21-2: General test parameters for E-UTRAN FDD-FDD inter frequency cell proximity detection test case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.3.1.1.1
PDSCH allocation	n_{PRB}	2—3	13—36
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.3.1.2.1
A3-Offset	dB	-4	
Hysteresis	dB	0	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		off	As specified in section A.3.3
PRACH configuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211
Access Barring Information	-	Not sent	No additional delays in random access procedure
Time offset between cells		3 ms	Asynchronous cells
Gap pattern configuration Id		0	As specified in Table 8.1.2.1-1 started before T1 starts
Time duration T1	s	[10]	Defined to give enough time for the UE to complete the manual reselection to Cell 2.
Time duration T2	s	[360]	Defined to be longer enough to see whether the UE will report enter “proximity” indication.
Time duration T3 [Note 1]	s	[<=360]	The time duration for a UE to report enters “proximity” when the UE is near a CSG cell.
Note 1: The maximum allowed time duration for the UE to decide either entering or leaving “proximity” is 360s. To reduce test time, T3 may end once UE reports entering “proximity”. Note 2: The test case assumes an environment where CSG proximity detection results not being impact by non-3GPP signals, such as GPS and WiFi. When the test case is being executed, the UE may ignore any radio signals which are not provided by the test setup which it would otherwise use in proximity estimation.			

Table A.8.21-3: Cell specific test parameters for E-UTRAN FDD-FDD inter frequency cell proximity detection test case

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UARFCN		Channel 1			Channel 2		
CSG indicator		False			True	N/A	True
Physical cell global identity		1	1	1	2	N/A	2
CSG identity		Not sent			Sent	N/A	Sent
$BW_{channel}$	MHz	10			10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	N/A	OP.2 FDD	OP.2 FDD	N/A	OP.2 FDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	0	-inf	4	7	-inf	7
N_{oc} Note 2	dBm/15 kHz	-98			-98		
$\hat{E}_s/N_{oc}$	dB	0	-inf	4	7	-inf	7
RSRP Note 3	dBm/15 KHz	-98	-inf	-94	-91	-inf	-91
Propagation Condition		AWGN			AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.21-4: Cell specific test parameters for E-UTRAN FDD-FDD inter frequency cell proximity detection test case (Cell 3)

Parameter	Unit	Cell 3		
		T1	T2	T3
E-UARFCN		Channel 1		
CSG indicator		False		
Physical cell global identity		3		
CSG identity		Not sent		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		N/A		
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
$\hat{E}_s/I_{ot}$	dB	-inf		
N_{oc} Note 2	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$	dB	-inf		
RSRP Note 3	dBm/15 KHz	-inf		
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves				

A.8.21.2 Test Requirements

The UE shall not send an "entering" proximity indication in T2 during Negative Test.

The UE shall send an "entering" proximity indication in T3 during Positive Test.

A.8.22 E-UTRAN Discovery Signal Measurements

A.8.22.1 E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

A.8.22.1.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event when discovery signal is configured in DRX. The test will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.6.2.1.1.

The test parameters are given in Tables A.8.22.1.1-1, A.8.22.1.1-2, A.8.22.1.1-3 and A.8.22.1.1-4. In the measurement control information, it is indicated to the UE performing CRS based discovery signals measurement and event-triggered reporting with Event A3 is configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.1.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Parameter	Unit	Value	Comment
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
DMTC period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset	ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration	ms	1	As specified in IE MeasDS-Config in TS 36.331
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.22.1.1-3
T1	s	5	
T2	s	10	

Table A.8.22.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Measurement bandwidth	n_{PRB}	13-37		13-37	
PDSCH parameters: DL Reference Measurement Channel		R.0 FDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
Io Note 3	dBm/9MHz	-64.76	-62.42	Specified in columns for Cell 1	
Propagation Condition		ETU30		ETU30	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Timing offset to Cell 1	μs	-		2.3 (CP/2)	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: Es/Iot, RSRP and SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.1.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf256	
shortDRX	disable	

Table A.8.22.1.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.22.1.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 4864ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.22.2 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

A.8.22.2.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event when discovery signal is configured in DRX. The test will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in clause 8.6.2.1.1.

The test parameters are given in Tables A.8.22.2.1-1, A.8.22.2.1-2, A.8.22.2.1-3 and A.8.22.2.1-4. In the measurement control information, it is indicated to the UE performing CRS based discovery signals measurement and event-triggered reporting with Event A3 is configured. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.2.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Parameter	Unit	Value	Comment
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
DMTC period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset	ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration	ms	2	As specified in IE MeasDS-Config in TS 36.331
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.22.2.1-3
T1	s	5	
T2	s	10	

Table A.8.22.2.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Measurement bandwidth	n_{PRB}	13-37		13-37	
PDSCH parameters: DL Reference Measurement Channel		R.0 TDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
$\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
SCH_RP Note 3	dBm/15 KHz	-94	-94	-Infinity	-94
Io Note 3	dBm/9MHz	-64.76	-62.42	Specified in columns for Cell 1	
Propagation Condition		ETU30		ETU30	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Timing offset to Cell 1	µs	-		2.3 (CP/2)	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP and SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.2.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf256	
shortDRX	disable	

Table A.8.22.2.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells in DRX based on CRS based discovery signal

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.22.2.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 4864ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.22.3 E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

A.8.22.3.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event when discovery signal is configured in DRX. The test will partly verify the FDD-FDD inter-frequency measurement requirements in clause 8.6.2.2.1.

The test parameters are given in Tables A.8.22.3.1-1, A.8.22.3.1-2, A.8.22.3.1-3 and A.8.22.3.1-4. In the measurement control information, it is indicated to the UE performing CRS based discovery signals measurement and event-triggered reporting with Event A3 is configured. Entire discovery signal occasion should be contained in the measurement gap. The subframe contained discovery signal for the measurement is not overlapped with the first 0.5ms period and the last 0.5ms period in every gap.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.22.3.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two FDD carrier frequencies are used.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 1 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Gap Offset		9	As specified in TS 36.331 clause 6.3.5
DMTC period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset	ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration	ms	1	As specified in IE MeasDS-Config in TS 36.331
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent	No additional delays in random access procedure.
DRX		ON	DRX related parameters are defined in Table A.8.22.3.1-3
T1	s	5	
T2	s	10	

Table A.8.22.3.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Measurement bandwidth	n_{PRB}	13-37		13-37	
PDSCH parameters: DL Reference Measurement Channel		R.0 FDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
Io Note 3	dBm/9MHz	-64.76	-64.76	-70.22	-62.43
Propagation Condition		ETU30		ETU30	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Timing offset to Cell 1	µs	-		3	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRP and SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.22.3.1-3: DRX-Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf256	
shortDRX	disable	

Table A.8.22.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.22.3.2 Test Requirements

UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.22.4 E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

A.8.22.4.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event when discovery signal is configured in DRX. The test will partly verify the FDD-FDD inter-frequency measurement requirements in clause 8.6.2.2.1.

The test parameters are given in Tables A.8.22.4.1-1, A.8.22.4.1-2, A.8.22.4.1-3 and A.8.22.4.1-4. In the measurement control information, it is indicated to the UE performing CRS based discovery signals measurement and event-triggered reporting with Event A3 is configured. Entire discovery signal occasion should be contained in the measurement gap. The subframe contained discovery signal for the measurement is not overlapped with the first 0.5ms period and the last 0.5ms period in every gap.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

Table A.8.22.4.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Gap Offset		9	As specified in TS 36.331 clause 6.3.5
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
DMTC period	ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset	ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration	ms	2	As specified in IE MeasDS-Config in TS 36.331
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information	-	Not Sent	No additional delays in random access procedure.
DRX		ON	DRX related parameters are defined in Table A.8.22.4.1-3
T1	s	5	
T2	s	10	

Table A.8.22.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Measurement bandwidth	n_{PRB}	13-37		13-37	
PDSCH parameters: DL Reference Measurement Channel		R.0 TDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
N_{oc} Note 2	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	7
$\hat{E}_s/I_{ot}$	dB	4	4	-Infinity	7
RSRP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
SCH_RP Note 3	dBm/15 kHz	-94	-94	-Infinity	-91
Io Note 3	dBm/9MHz	-64.76	-64.76	-70.22	-62.43
Propagation Condition		ETU30		ETU30	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
Timing offset to Cell 1	μs	-		3 (Synchronous cells)	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRP and SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.22.4.1-3: DRX-Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf256	
shortDRX	disable	

Table A.8.22.4.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.22.4.2 Test Requirements

UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5120 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to send preambles on the PRACH for scheduling request (SR) to obtain allocation to send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.22.5 E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX based on CSI-RS based discovery signal

A.8.22.5.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event in DRX. The test will partly verify the FDD-FDD intra-frequency cell search in DRX requirements in clause 8.6.3.1.1.2.

The test parameters are given in Tables A.8.22.5.1-1, A.8.22.5.1-2, A.8.22.5.1-3 and A.8.22.5.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.5.1-1: General test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Value	Comment
		Test 1	
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One FDD carrier frequency is used.
DMTC period [2]	ms	160	
DMTC period offset [2]	ms	10	
Discovery signal occasion duration	ms	1	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.22.5.1-3
Time offset between cells		2.3 µs	CP/2 or Synchronous cells
T1	s	5	
T2	s	10	

Table A.8.22.5.1-2: Cell specific test parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Measurement bandwidth	n_{PRB}	13-37		13-37	
PDSCH parameters		DL Reference Measurement Channel R.0 FDD as in A.3.1.1.1		DL Reference Measurement Channel R.0 FDD as in A.3.1.1.1	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD as in A.3.1.2.1		DL Reference Measurement Channel R.6 FDD as in A.3.1.2.1	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
p-C-r10 [2]	dB	6	6	6	6
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
CRS $\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
CSI-RS $\hat{E}_s/I_{ot}$	dB	10	4.54	-Infinity	4.54
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
CSI-RSRP Note 4	dBm/15 KHz	-88	-88	-Infinity	-88
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Io	dBm/9 MHz	-60	-60	Specied in columns for cell1	
CSI reference signal configurations [16]		2		4	
CSI-RS subframe offset		0		0	
CSI-RS individual offset [2]	dB	0		0	
CSI-RS muting		Enable		Enable	
Propagation Condition		ETU30		ETU30	
Timing offset to cell 1	us	-		2.3 (CP/2)	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.5.1-3: DRX-Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	Sf256	
shortDRX	disable	

Table A.8.22.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.22.5.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5632ms ($T_{identify\_intra\_SCE\_DRX}$ + $T_{Measurement\_Period\ \_intra\_FDD\_CSI-RS\_DRX}$ = 16* max { $T_{DMTC\_periodicity}$, DRX cycle length} + 3**Max*{$T_{DMTC\_periodicity}$, DRX cycle length} + 3**Max*{$T_{DMTC\_periodicity}$, DRX cycle length} = 22* *Max*{$T_{DMTC\_periodicity}$, DRX cycle length}) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.22.6 E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX based on CSI-RS based discovery signal

A.8.22.6.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event in DRX. The test will partly verify the TDD-TDD intra-frequency cell search in DRX requirements in clause 8.6.3.1.2.2.

The test parameters are given in Tables A.8.22.6.1-1, A.8.22.6.1-2, A.8.22.6.1-3 and A.8.22.6.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.6.1-1: General test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Value	Comment
		Test 1	
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1	One TDD carrier frequency is used.
DMTC period [2]	ms	160	
DMTC period offset [2]	ms	10	
Discovery signal occasion duratuion	ms	2	
A3-Offset	dB	-6	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.22.6.1-3
T1	s	5	
T2	s	10	

Table A.8.22.6.1-2: Cell specific test parameters for E-UTRAN TDD-TDD intra-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Measurement bandwidth	n_{PRB}	13-37		13-37	
PDSCH parameters		DL Reference Measurement Channel R.0 TDD as in A.3.1.1.2		DL Reference Measurement Channel R.0 TDD as in A.3.1.1.2	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD as in A.3.1.2.2		DL Reference Measurement Channel R.6 TDD as in A.3.1.2.2	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
p-C-r10 [2]	dB	6	6	6	6
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
CRS $\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
CSI-RS $\hat{E}_s/I_{ot}$	dB	10	4.54	-Infinity	4.54
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
CSI-RSRP Note 4	dBm/15 KHz	-88	-88	-Infinity	-88
Io	dBm/9 MHz	-60	-57	Specied in columns for cell1	
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Propagation Condition		ETU30			
CSI reference signal configurations [16]		2		4	
CSI-RS subframe offset		0		0	
CSI-RS individual offset [2]	dB	0		0	
CSI-RS muting		Enable		Enable	
Timing offset to cell 1	us	0		2.3 (CP/2)	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.6.1-3: DRX-Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	Sf256	
shortDRX	disable	

Table A.8.22.6.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.22.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5632 ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.22.7 E-UTRAN FDD-FDD Inter-frequency event triggered reporting in DRX based on CSI-RS based discovery signal

A.8.22.7.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event in DRX. The test will partly verify the FDD-FDD inter-frequency cell search in DRX requirements in clause 8.6.3.2.1.2.

The test parameters are given in Tables A.8.22.7.1-1, A.8.22.7.1-2, A.8.22.7.1-3 and A.8.22.7.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.7.1-1: General test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Value	Comment
		Test 1	
Active cell		Cell 1	
Neighbour cell		Cell 2	Cell to be identified.
E-UTRA RF Channel Number		1,2	Two FDD carrier frequency is used.
DMTC period [2]	ms	160	
DMTC period offset [2]	ms	10	
Discovery signal occasion duration	ms	1	
A3-Offset	dB	-6	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		ON	DRX related parameters are defined in Table A.8.22.7.1-3
T1	s	5	
T2	s	10	

Table A.8.22.7.1-2: Cell specific test parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Measurement bandwidth	n_{PRB}	13-37		13-37	
PDSCH parameters		DL Reference Measurement Channel R.0 FDD as in A.3.1.1.1		DL Reference Measurement Channel R.0 FDD as in A.3.1.1.1	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD as in A.3.1.2.1		DL Reference Measurement Channel R.6 FDD as in A.3.1.2.1	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.2 FDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
p-C-r10 [2]	dB	6	6	6	6
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
CRS $\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
CSI-RS $\hat{E}_s/I_{ot}$	dB	10	4.54	-Infinity	4.54
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
CSI-RSRP Note 4	dBm/15 KHz	-88	-88	-Infinity	-88
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Io	dBm/9 MHz	-60	-60	As specified for cell 1	
Propagation Condition		ETU30			
CSI reference signal configurations [16]		2		4	
CSI-RS subframe offset		0		0	
CSI-RS individual offset [2]	dB	0		0	
CSI-RS muting		Enable		Enable	
Timing offset to cell 1	us	-		3us	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.8.22.7.1-3: DRX-Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
onDurationTimer	psf1	
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	Sf256	
shortDRX	disable	

Table A.8.22.7.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD inter-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
TimeAlignmentTimer	sf500	For further information see clause 6.3.2 in TS 36.331.
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213..

A.8.22.7.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5888ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report

A.8.22.8 E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation condition in DRX based on CSI-RS based discovery signal

A.8.22.8.1 Test Purpose and Environment

The purpose of the test is to verify that the UE makes correct reporting of an event in DRX. The test will partly verify the TDD-TDD inter-frequency cell search in DRX requirements in clause 8.6.3.2.2.2.

The test parameters are given in Tables A.8.22.8.1-1, A.8.22.8.1-2, A.8.22.8.1-3 and A.8.22.8.1-4. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

The UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.22.8.1-1: General test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Test 1	Comment
		Value	
E-UTRA RF Channel Number		1, 2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration		1	As specified in TS 36.211 clause 4.2 Table 4.2-2
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
DMTC period [2]	ms	160	
DMTC period offset [2]	ms	10	
Discovery signal occasion duration	ms	2	
A3-Offset	dB	-6	
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	s	0	
Filter coefficient		0	L3 filtering is not used
PRACH configuration		4	As specified in table 5.7.1-3 in TS 36.211
Access Barring Information	-	Not Sent	No additional delays in random access procedure.
DRX		ON	DRX related parameters are defined in Table A.8.22.8.1-3
T1	s	5	
T2	s	10	

Table A.8.22.8.1-2: Cell specific test parameters for E-UTRAN TDD-TDD inter-frequency event triggered reporting for DRS measurement based on CSI-RS with DRX

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
E-UTRA RF Channel Number		1		2	
$BW_{channel}$	MHz	10		10	
Measurement bandwidth	n_{PRB}	13-37		13-37	
PDSCH parameters		DL Reference Measurement Channel R.0 TDD as in A.3.1.1.2		DL Reference Measurement Channel R.0 TDD as in A.3.1.1.2	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD as in A.3.1.2.2.		DL Reference Measurement Channel R.6 TDD as in A.3.1.2.2.	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low	
OCNG Patterns defined in A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD		OP.2 TDD	
PBCH_RA	dB	0		0	
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_PB	dB				
PDCCH_RA	dB				
PDCCH_PB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA Note 1	dB				
OCNG_RB Note 1	dB				
p-C-r10 [2]	dB	6	6	6	6
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4	4	-Infinity	4
CRS $\hat{E}_s/I_{ot}$	dB	4	-1.46	-Infinity	-1.46
CSI-RS $\hat{E}_s/I_{ot}$	dB	10	4.54	-Infinity	4.54
RSRP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
CSI-RSRP Note 4	dBm/15 KHz	-88	-88	-Infinity	-88
SCH_RP Note 4	dBm/15 KHz	-94	-94	-Infinity	-94
Io	dBm/9 MHz	-60	-60	As specificed for cell1	
Propagation Condition		ETU30			
CSI reference signal configurations [16]		2		4	
CSI-RS subframe offset		0		0	
CSI-RS individual offset [2]	dB	0		0	
CSI-RS muting		Enable		Enable	
Timing offset to cell 1	us	-		3	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table A.8.22.8.1-3: DRX-Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
onDurationTimer	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	Sf256	
shortDRX	disable	

Table A.8.22.8.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD inter-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Value	Comment
TimeAlignmentTimer	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.22.8.2 Test Requirements

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 5888ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE send the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

A.8.22.9 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

A.8.22.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] when CRS based discovery signal is configured within the requirements stated in clause 8.7.2.4.1.

The test parameters are given in Tables A.8.22.9.1-1 and A.8.22.9.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.22.9.1-1: General test parameters for E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
DMTC period		ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset for cells 2 and 3		ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration		ms	1	As specified in IE MeasDS-Config in TS 36.331
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.14.2 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.14.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
T1		s	10	
T2		s	10	
T3		s	5	
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.22.9.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			2		
$BW_{channel}$	MHz	10			10			10		
Measurement bandwidth	n_{PRB}	13-37			13-37			13-37		
PDSCH parameters: DL Reference Measurement Channel		R.0 FDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		R.6 FDD			R.6 FDD			R.6 FDD		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD			OP.2 FDD			OP.2 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-101			-101					
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
$\hat{E}_s/I_{ot}$	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
Io Note 3	dBm/9MHz	-54.16	-54.16	-71.45	-54.16	-51.18	-70.20	Specified in columns for Cell 2		
Propagation Condition		ETU30			ETU30			ETU30		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low			1x2 Low		
Timing offset to Cell 1	μs	-			0			-		
Time alignment error relative to cell 1 Note 5	μs	-			≤ TAE			N/A		
Timing offset to Cell 2	μs	-			-			2.3 (CP/2)		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP and SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.22.9.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 5.12s (13×*measCycleSCell*+ $T_{measure\_scc\_CRS}$) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 480 (3×$T_{DMTC\_periodicity}$) ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 960ms (3× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2\times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.22.10 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

A.8.22.10.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] when CRS based discovery signal is configured within the requirements stated in clause 8.7.2.4.1.

The test parameters are given in Tables A.8.22.10.1-1 and A.8.22.10.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.22.10.1-1: General test parameters for E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration			1	
DRX			OFF	Continuous monitoring of primary cell
DMTC period		ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset for cells 2 and 3		ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration		ms	2	As specified in IE MeasDS-Config in TS 36.331
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.14.2 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.14.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
T1		s	10	
T2		s	10	
T3		s	5	
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.22.10.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			2		
$BW_{channel}$	MHz	10			10			10		
Measurement bandwidth	n_{PRB}	13-37			13-37			13-37		
PDSCH parameters: DL Reference Measurement Channel		R.0 TDD			-			-		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		R.6 TDD			R.6 TDD			R.6 TDD		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.1 TDD			OP.2 TDD			OP.2 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-101			-101					
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
$\hat{E}_s/I_{ot}$	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
Io Note 3	dBm/9MHz	-54.16	-54.16	-71.45	-54.16	-51.18	-70.20	Specified in columns for Cell 2		
Propagation Condition		ETU30			ETU30			ETU30		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low			1x2 Low		
Timing offset to Cell 1	µs	-			0			-		
Time alignment error relative to cell 1 Note 5	µs	-			≤ TAE			N/A		
Timing offset to Cell 2	µs	-			-			2.3 (CP/2)		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP and SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.22.10.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 5.12s (13×*measCycleSCell*+ $T_{measure\_scc\_CRS}$) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 480 (3×$T_{DMTC\_periodicity}$) ms from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 960ms (3× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2\times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.22.11 E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CSI-RS based discovery signal

A.8.22.11.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.7.3.4.1.

The test parameters are given in Tables A.8.22.11.1-1 and A.8.22.11.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.22.11.1-1: General test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for CSI-RS based measurements under discovery signal

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
DMTC period		ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset for cells 2 and 3		ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration		ms	1	As specified in IE MeasDS-Config in TS 36.331
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
T1		s	10	
T2		s	10	
T3		s	5	
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.22.11.1-2: Cell specific test parameters for E-UTRAN FDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for CSI-RS based measurements under discovery signal

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			2		
$BW_{channel}$	MHz	10			10			10		
Measurement bandwidth	n_{PRB}	13-37			13-37			13-37		
PDSCH parameters		DL Reference Measurement Channel R.0 FDD as in A.3.1.1.1			DL Reference Measurement Channel R.0 FDD as in A.3.1.1.1			DL Reference Measurement Channel R.0 FDD as in A.3.1.1.1		
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD as in A.3.1.2.1			DL Reference Measurement Channel R.6 FDD as in A.3.1.2.1			DL Reference Measurement Channel R.6 FDD as in A.3.1.2.1		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low			1x2 Low		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.1 FDD			OP.2 FDD			OP.2 FDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-101			-101					
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
CSI-RSRP Note 3	dBm/15 kHz	-76	-76	-98	-76	-76	-98	-infinity	-76	-98
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
CRS $\hat{E}_s/I_{ot}$	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
CSI-RS $\hat{E}_s/I_{ot}$	dB	25	25	3	25	5.95	1.24	-infinity	5.95	1.24
CSI-RS resource configurations [16]		2			4			6		
p-C-r10 [2]	dB	6			6			6		
CSI-RS subframe offset		0			0			0		
CSI-RS individual offset [2]	[dB]	0			0			0		
CSI-RS muting		Enable			Enable			Enable		
Propagation Condition		ETU30			ETU30			ETU30		
Time offset to cell 1	us	0			0			2.3 (CP/2)		
Time alignment error relative to cell1 Note 5	us	-			≤ TAE			N/A		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.22.11.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 6.08s ($T_{identify\_scc\_SCE}$ + $T_{measure\_scc\_CSI-RS}$ = 13**measCycleSCell*+$T_{measure\_scc\_CRS}$+$T_{measure\_scc\_CSI-RS}$ = 13**measCycleSCell*+3* *measCycleSCell* +3* *measCycleSCell*) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 480 ms (3* $T_{DMTC\_periodicity}$) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 960ms (3× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to $2 \times TTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.22.12 E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CSI-RS based discovery signal

A.8.22.12.1 Test Purpose and Environment

The purpose of this test is to verify that the UE correctly detects events A2 (Serving cell becomes worse than threshold) and A6 (Neighbour becomes better than SCell) defined in TS 36.331 [2] within the requirements stated in clause 8.7.3.4.1.

The test parameters are given in Tables A.8.22.12.1-1 and A.8.22.12.1-2 below. It is indicated to the UE in the measurement control information that event-triggered reporting with Events A2 (PCell and SCell) and A6 is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. During T1 the UE shall not have any information on cell 3. Immediately at beginning of T2 the transmission power of cell 3 is increased to same level as for cell 2, and due to usage of an offset this shall result in reporting of Event A6. At beginning of T3 the transmission powers of cells 1, 2 and 3 are reduced below a threshold value and this shall result in reporting of Event A2 for PCell and SCell, respectively.

Table A.8.22.12.1-1: General test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for CSI-RS based measurements under discovery signal

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Active PCell			Cell 1	Primary cell on RF channel number 1.
Configured deactivated SCell			Cell 2	Configured deactivated secondary cell on RF channel number 2.
Neighbour cell			Cell 3	Neighbor cell to be identified on RF channel number 2.
DMTC period		ms	160	As specified in IE MeasDS-Config in TS 36.331
dmtc-PeriodOffset for cells 2 and 3		ms	10	As specified in IE MeasDS-Config in TS 36.331
Discovery signal occasion duration		ms	1	As specified in IE MeasDS-Config in TS 36.331
Channel Bandwidth ($BW_{channel}$)		MHz	10	Channel bandwidth for cells on primary and secondary component carriers
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2.1 in TS 36.211. The same configuration applies to all cells.
Uplink-downlink configuration			1	
DRX			OFF	Continuous monitoring of primary cell
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
A6	Hysteresis	dB	0	Hysteresis for evaluation of event A6.
	Offset	dB	-6	Offset parameter for evaluation of event A6. Needs to take relative accuracy tolerance in clause 9.1.11.2 into account plus margin.
	Report on leave		False	
	Time To Trigger	s	0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on secondary component carrier.
Filter coefficient			0	L3 filtering is not used
SCell measurement cycle (measCycleSCell)		ms	320	
T1		s	5	During this time the UE shall be aware of cells 1 and 2 but not cell 3.
T2		s	≤12	UE should report Event A6 within 6.08s (19×scellMeasCycle)
T3		s	5	UE should report Event A2 within 200 ms and 960s for cells 1 and 2, respectively.
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.22.12.1-2: Cell specific test parameters for E-UTRAN TDD event triggered reporting on configured but deactivated SCell in non-DRX under fading propagation conditions for CSI-RS based measurements under discovery signal

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2			2		
$BW_{channel}$	MHz	10			10			10		
Measurement bandwidth	n_{PRB}	13-37			13-37			13-37		
PDSCH parameters		DL Reference Measurement Channel R.0 TDD As in A.3.1.1.2			DL Reference Measurement Channel R.0 TDD As in A.3.1.1.2			DL Reference Measurement Channel R.0 TDD As in A.3.1.1.2		
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD as in A.3.1.2.2			DL Reference Measurement Channel R.6 TDD as in A.3.1.2.2			DL Reference Measurement Channel R.6 TDD as in A.3.1.2.2		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low			1x2 Low		
OCNG Patterns defined in A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD			OP.2 TDD			OP.2 TDD		
PBCH_RA	dB	0			0			0		
PBCH_RB	dB									
PSS_RA	dB									
SSS_RA	dB									
PCFICH_RB	dB									
PHICH_RA	dB									
PHICH_RB	dB									
PDCCH_RA	dB									
PDCCH_RB	dB									
PDSCH_RA	dB									
PDSCH_RB	dB									
OCNG_RA Note 1	dB									
OCNG_RB Note 1	dB									
N_{oc} Note 2	dBm/15 kHz	-101			-101					
RSRP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
SCH_RP Note 3	dBm/15 kHz	-82	-82	-104	-82	-82	-104	-infinity	-82	-104
$\hat{E}_s/N_{oc}$	dB	19	19	-3	19	19	-3	-infinity	19	-3
CRS $\hat{E}_s/I_{ot}$	dB	19	19	-3	19	-0.05	-4.76	-infinity	-0.05	-4.76
CSI-RS $\hat{E}_s/I_{ot}$	dB	25	25	3	25	5.95	1.24	-infinity	5.95	1.24
Propagation Condition		ETU70								
CSI-RS resource configurations [16]		0			2			4		
CSI-RS subframe offset		0			0			0		
CSI-RS individual offset [2]	[dB]	0			0			0		
CSI-RS muting		Enable			Enable			Enable		
p-C-r10 [2]	dB	6			6			6		
Time offset to cell 1	us	0			0			2.3 (CP/2)		
Time alignment error relative to cell1 Note 5	us	-			≤ TAE			N/A		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 5: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.8.22.12.2 Test Requirements

The UE shall send one Event A6 triggered measurement report with a measurement reporting delay of less than 6.08s ($T_{identify\_scc\_SCE}$ + $T_{measure\_scc\_CSI-RS}$ = 13**measCycleSCell*+$T_{measure\_scc\_CRS}$+$T_{measure\_scc\_CSI-RS}$ = 13**measCycleSCell*+3* *measCycleSCell* +3* *measCycleSCell*) from the beginning of time T2.

The UE shall send one Event A2 triggered measurement report for Cell 1 with a measurement reporting delay of less than 480 ms (3* $T_{DMTC\_periodicity}$) from beginning of time T3.

The UE shall send one Event A2 triggered measurement report for Cell 2 with a measurement reporting delay of less than 960ms (3× measCycleSCell) from beginning of time T3.

The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events.

NOTE: The actual overall delays measured in the tests may be up to 2×TTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

A.8.23 E-UTRAN Dual Connectivity Measurements

A.8.23.1 E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

A.8.23.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of intra frequency measurement. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.8.2 and 8.8.3.

The test parameters are given in Table A.8.23.1.1-1, A.8.23.1.1-2, A.8.23.1.1-3 and A.8.23.1.1-4 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A1 (PCell and PSCell) and A2 (PCell and PSCell) is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired. Immediately at beginning of T2 the transmission powers of Cell1 and Cell2 are reduced below a threshold value of event A2 and this shall result in reporting of Event A2 for PCell and PSCell, respectively. Immediately after receiving the reporting of event A2 for both PCell and PSCell, PDCCH indicating a new transmission on Cell1 shall be sent continuously to ensure that the UE would not enter the DRX state on MCG throughout T3. At beginning of T3 the transmission powers of Cell1 and Cell2 are increased above a threshold value of event A1 and this shall result in reporting of Event A1 for PCell and PSCell, respectively.

When MCG DRX is used, the uplink time aligment of Cell1 is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting in Cell1. When SCG DRX is used, the UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell2. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.1.1-1: General test parameters for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test.
Active PCell			Cell1	**PCell on RF channel number 1.**
Configured PSCell			**Cell2**	**PSCell on RF channel number 2.**
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-95	Actual RSRP threshold for event A1. Needs to take absolute accuracy tolerance in clause 9.1.11.1 and 9.1.11.2 into account plus margin.
	Time To Trigger	s	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-99	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 and 9.1.11.2 into account plus margin.
	Time To Trigger	s	0	
CP length			Normal	
DRX			ON	DRX related parameters are defined in Table A.8.23.1.1-3
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of Cell2.
Filter coefficient			0	L3 filtering is not used
T1		s	2	
T2		s	10	
T3		s	1	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: A UE capable of both synchronous and asynchronous DC operations is not required to pass this test case in accordance with the principle defined in section A.3.6.11.				

Table A.8.23.1.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD			5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD			5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 KHz	-104			-104		
$\hat{E}_s/N_{oc}$	dB	16	-2.5	20	16	-2.5	20
$\hat{E}_s/I_{ot}$	dB	16	-2.5	20	16	-2.5	20
RSRP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84
SCH_RP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84
Io Note 3	dBm/Ch BW	-60.11 +10log ($N_{RB,c}$ /50)	-74.28 +10log ($N_{RB,c}$ /50)	-56.18 +10log ($N_{RB,c}$ /50)	-60.11 +10log ($N_{RB,c}$ /50)	-74.28 +10log ($N_{RB,c}$ /50)	-56.18 +10log ($N_{RB,c}$ /50)
Propagation Condition		ETU70			ETU70		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low		
Receive Time offset to cell1 Note 5	µs	-			33		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
Note 3: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission in Cell1 are assigned to the UE prior to the start of time period T3.
Note 5: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.1.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf1280	sf80	
shortDRX	disable	disable	

Table A.8.23.1.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.23.1.2 Test Requirements

The UE shall send one Event A2 triggered report for PCell on PCell with a measurement reporting delay less than 6.4s (5*MCG_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A2 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5*SCG_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PCell on PCell with a measurement reporting delay less than 200ms from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5*SCG_DRX cycle) from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.23.2 E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

A.8.23.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of intra frequency measurement. This test will partly verify the FDD intra-frequency cell search requirements in clause 8.8.2 and 8.8.3.

The test parameters are given in Table A.8.23.2.1-1, A.8.23.2.1-2, A.8.23.2.1-3 and A.8.23.2.1-4 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A1 (PCell and PSCell) and A2 (PCell and PSCell) is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

Immediately at beginning of T2 the transmission powers of Cell1 and Cell2 are reduced below a threshold value of event A2 and this shall result in reporting of Event A2 for PCell and PSCell, respectively. Immediately after receiving the reporting of event A2 for both PCell and PSCell, PDCCH indicating a new transmission on Cell1 shall be sent continuously to ensure UE would not enter DRX state on MCG throughout T3. At beginning of T3 the transmission powers of Cell1 and Cell2 are increased above a threshold value of event A1 and this shall result in reporting of Event A1 for PCell and PSCell, respectively.

When MCG DRX is used, the uplink time aligment of Cell1 is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting in Cell1. When SCG DRX is used, the UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell2. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.2.1-1: General test parameters for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test.
Active PCell			Cell1	**PCell on RF channel number 1.**
Configured PSCell			**Cell2**	**PSCell on RF channel number 2.**
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-95	Actual RSRP threshold for event A1. Needs to take absolute accuracy tolerance in clause 9.1.11.1 and 9.1.11.2 into account plus margin.
	Time To Trigger	s	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-99	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 and 9.1.11.2 into account plus margin.
	Time To Trigger	s	0	
CP length			Normal	
DRX			ON	DRX related parameters are defined in Table A.8.23.2.1-3
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of Cell2.
Filter coefficient			0	L3 filtering is not used
T1		s	2	
T2		s	10	
T3		s	1	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.				

Table A.8.23.2.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD			5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD			5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 KHz	-104			-104		
$\hat{E}_s/N_{oc}$	dB	16	-2.5	20	16	-2.5	20
$\hat{E}_s/I_{ot}$	dB	16	-2.5	20	16	-2.5	20
RSRP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84
SCH_RP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84
Io Note 3	dBm/Ch BW	-60.11 +10log ($N_{RB,c}$ /50)	-74.28 +10log ($N_{RB,c}$ /50)	-56.18 +10log ($N_{RB,c}$ /50)	-60.11 +10log ($N_{RB,c}$ /50)	-74.28 +10log ($N_{RB,c}$ /50)	-56.18 +10log ($N_{RB,c}$ /50)
Propagation Condition		ETU70			ETU70		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low		
Receive Time offset to cell1 Note 5	µs	-			500		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission in Cell1 are assigned to the UE prior to the start of time period T3.
Note 5: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.2.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf1280	sf80	
shortDRX	disable	disable	

Table A.8.23.2.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD DC intra-frequency event triggered reporting with DRX in asynchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.23.2.2 Test Requirements

The UE shall send one Event A2 triggered report for PCell on PCell with a measurement reporting delay less than 6.4s (5*MCG_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A2 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5*SCG_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PCell on PCell with a measurement reporting delay less than 200ms from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5*SCG_DRX cycle) from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.23.3 E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

A.8.23.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of intra frequency measurement. This test will partly verify the TDD intra-frequency cell search requirements in clause 8.8.2 and 8.8.3.

The test parameters are given in Table A.8.23.3.1-1, A.8.23.3.1-2, A.8.23.3.1-3 and A.8.23.3.1-4 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is PSCell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A1 (PCell and PSCell) and A2 (PCell and PSCell) is used. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

Immediately at beginning of T2 the transmission powers of Cell1 and Cell2 are reduced below a threshold value of event A2 and this shall result in reporting of Event A2 for PCell and PSCell, respectively. Immediately after receiving the reporting of event A2 for both PCell and PSCell, PDCCH indicating a new transmission on Cell1 shall be sent continuously to ensure UE would not enter DRX state on MCG throughout T3. At beginning of T3 the transmission powers of Cell1 and Cell2 are increased above a threshold value of event A1 and this shall result in reporting of Event A1 for PCell and PSCell, respectively.

When MCG DRX is used, the uplink time aligment of Cell1 is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting in Cell1. When SCG DRX is used, the UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment in Cell2. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.3.1-1: General test parameters for E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test.
Active PCell			Cell1	PCell on RF channel number 1.
Configured PSCell			Cell2	PSCell on RF channel number 2.
A1	Hysteresis	dB	0	Hysteresis for evaluation of event A1.
	Threshold RSRP	dBm	-95	Actual RSRP threshold for event A1. Needs to take absolute accuracy tolerance in clause 9.1.11.1 and 9.1.11.2 into account plus margin.
	Time To Trigger	s	0	
A2	Hysteresis	dB	0	Hysteresis for evaluation of event A2.
	Threshold RSRP	dBm	-99	Actual RSRP threshold for event A2. Needs to take absolute accuracy tolerance in clause 9.1.11.1 and 9.1.11.2 into account plus margin.
	Time To Trigger	s	0	
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
DRX			ON	DRX related parameters are defined in Table A.8.23.3.1-3
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of Cell2.
Filter coefficient			0	L3 filtering is not used
T1		s	5	
T2		s	10	
T3		s	1	
NOTE: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.23.3.1-2: Cell specific test parameters for E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			2		
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD			5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD			5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 KHz	-104			-104		
$\hat{E}_s/N_{oc}$	dB	16	-2.5	20	16	-2.5	20
$\hat{E}_s/I_{ot}$	dB	16	-2.5	20	16	-2.5	20
RSRP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84
SCH_RP Note 3	dBm/15 KHz	-88	-106.5	-84	-88	-106.5	-84
Io Note 3	dBm/Ch BW	-60.11 +10log ($N_{RB,c}$ /50)	-74.28 +10log ($N_{RB,c}$ /50)	-56.18 +10log ($N_{RB,c}$ /50)	-60.11 +10log ($N_{RB,c}$ /50)	-74.28 +10log ($N_{RB,c}$ /50)	-56.18 +10log ($N_{RB,c}$ /50)
Propagation Condition		ETU70			ETU70		
Correlation Matrix and Antenna Configuration		1x2 Low			1x2 Low		
Receive Time offset to cell1 Note 5	µs	-			33		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: The resources for uplink transmission in Cell1 are assigned to the UE prior to the start of time period T3.
Note 5: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.3.1-3: DRX-Configuration for E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf1280	sf80	
shortDRX	disable	disable	

Table A.8.23.3.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD DC intra-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.23.3.2 Test Requirements

The UE shall send one Event A2 triggered report for PCell on PCell with a measurement reporting delay less than 6.4s (5*MCG_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A2 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5*SCG_DRX cycle) from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE starts to send preambles on the PRACH to obtain allocation to send the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PCell on PCell with a measurement reporting delay less than 200ms from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall send one Event A1 triggered report for PSCell on PCell with a measurement reporting delay less than 400ms (5*SCG_DRX cycle) from the beginning of time period T3. The measurement reporting delay is defined as the time from the beginning of time period T3 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.23.4 E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

A.8.23.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of inter frequency measurement. This test will partly verify the FDD inter-frequency cell search requirements in clause 8.8.4.

The test parameters are given in Table A.8.23.4.1-1, A.8.23.4.1-2, A.8.23.4.1-3 and A.8.23.4.1-4 below. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is PSCell and Cell3 is a neighbour cell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A3 (PCell) is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. During T1 the UE shall not have any information on Cell3.

Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

In this test, UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment in Cell1. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.4.1-1: General test parameters for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test.
Active PCell			Cell1	**PCell on RF channel number 1.**
Configured PSCell			**Cell2**	**PSCell on RF channel number 2.**
Neighbour cell			Cell3	Neighbour cell on RF channel number 3.
A3	Hysteresis	dB	0	Hysteresis for evaluation of event A3.
	A3-offset	dB	-6	
	Time To Trigger	s	0	
CP length			Normal	
DRX			ON	DRX related parameters are defined in Table A.8.23.4.1-3
Measurement gap pattern Id			0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of Cell2.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on carrier frequency of Cell3.
Filter coefficient			0	L3 filtering is not used
T1		s	5	
T2		s	5	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: A UE capable of both synchronous and asynchronous DC operations is not required to pass this test case in accordance with the principle defined in section A.3.6.11.				

Table A.8.23.4.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Parameter	Unit	Cell1		Cell2		Cell3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 KHz	-101		-101		N/A	-101
$\hat{E}_s/N_{oc}$	dB	4	4	4	4	-infinity	7
$\hat{E}_s/I_{ot}$	dB	4	4	4	4	-infinity	7
RSRP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94
SCH_RP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94
Io Note 3	dBm/Ch BW	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	N/A	-65.43 +10log ($N_{RB,c}$ /50)
Propagation Condition		ETU70		ETU70		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
Receive Time offset to cell1 Note 4	µs	-		33		-	
Time offset to cell1	µs	-		-		3	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.4.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf1280	
shortDRX	disable	disable	

Table A.8.23.4.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.23.4.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3 on PCell, with a measurement reporting delay less than 3.84s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.23.5 E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

A.8.23.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of inter frequency measurement. This test will partly verify the FDD inter-frequency cell search requirements in clause 8.8.4.

The test parameters are given in Table A.8.23.5.1-1, A.8.23.5.1-2, A.8.23.5.1-3 and A.8.23.5.1-4 below. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is PSCell and Cell3 is a neighbour cell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A3 (PCell) is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. During T1 the UE shall not have any information on Cell3. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

In this test, UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment in Cell1. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.5.1-1: General test parameters for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test.
Active PCell			Cell1	PCell on RF channel number 1.
Configured PSCell			Cell2	PSCell on RF channel number 2.
Neighbour cell			Cell3	Neighbour cell on RF channel number 3.
A3	Hysteresis	dB	0	Hysteresis for evaluation of event A3.
	A3-offset	dB	-6	
	Time To Trigger	s	0	
CP length			Normal	
DRX			ON	DRX related parameters are defined in Table A.8.23.4.1-3
Measurement gap pattern Id			0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of Cell2.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on carrier frequency of Cell3.
Filter coefficient			0	L3 filtering is not used
T1		s	5	
T2		s	5	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.				

Table A.8.23.5.1-2: Cell specific test parameters for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

Parameter	Unit	Cell1		Cell2		Cell3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD		5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 KHz	-101		-101		N/A	-101
$\hat{E}_s/N_{oc}$	dB	4	4	4	4	-infinity	7
$\hat{E}_s/I_{ot}$	dB	4	4	4	4	-infinity	7
RSRP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94
SCH_RP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94
Io Note 3	dBm/Ch BW	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	N/A	-65.43 +10log ($N_{RB,c}$ /50)
Propagation Condition		ETU70		ETU70		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
Receive time offset to cell1 Note 4	µs	-		500		-	
Time offset to cell1	µs	-		-		400	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.5.1-3: DRX-Configuration for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf1280	
shortDRX	disable	disable	

Table A.8.23.5.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD-FDD DC inter-frequency event triggered reporting with DRX in asynchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.23.5.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3 on PCell, with a measurement reporting delay less than 3.84s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.23.6 E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

A.8.23.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of inter frequency measurement. This test will partly verify the TDD inter-frequency cell search requirements in clause 8.8.4.

The test parameters are given in Table A.8.23.6.1-1, A.8.23.6.1-2, A.8.23.6.1-3 and A.8.23.6.1-4 below. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is PCell, Cell2 is PSCell and Cell3 is a neighbour cell. In the measurement control information it is indicated to the UE that event-triggered reporting with Events A3 (PCell) is used. The test consists of two successive time periods, with duration of T1 and T2, respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. During T1 the UE shall not have any information on Cell3. Prior to the start of the time duration T1, DRX configurations on MCG and SCG are enabled and DRX inactivity timers for MCG and SCG have already been expired.

In this test, UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time aligment timer to keep UE uplink time alignment in Cell1. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.8.23.6.1-1: General test parameters for E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2, 3	Three radio channels are used for this test.
Active PCell			Cell1	PCell on RF channel number 1.
Configured PSCell			Cell2	PSCell on RF channel number 2.
Neighbour cell			Cell3	Neighbour cell on RF channel number 3.
A3	Hysteresis	dB	0	Hysteresis for evaluation of event A3.
	A3-offset	dB	-6	
	Time To Trigger	s	0	
CP length			Normal	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
DRX			ON	DRX related parameters are defined in Table A.8.23.4.1-3
Measurement gap pattern Id			0	
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of Cell2.
Cell-individual offset for cells on RF channel number 3		dB	0	Individual offset for cells on carrier frequency of Cell3.
Filter coefficient			0	L3 filtering is not used
T1		s	5	
T2		s	5	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				

Table A.8.23.4.1-2: Cell specific test parameters for E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Parameter	Unit	Cell1		Cell2		Cell3	
		T1	T2	T1	T2	T1	T2
E-UTRA RF Channel Number		1		2		3	
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD		-	
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD		5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	
PBCH_RA	dB	0		0		0	
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_PB	dB						
PDCCH_RA	dB						
PDCCH_PB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
N_{oc} Note 2	dBm/15 KHz	-101		-101		N/A	-101
$\hat{E}_s/N_{oc}$	dB	4	4	4	4	-infinity	7
$\hat{E}_s/I_{ot}$	dB	4	4	4	4	-infinity	7
RSRP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94
SCH_RP Note 3	dBm/15 KHz	-97	-97	-97	-97	-infinity	-94
Io Note 3	dBm/Ch BW	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	-67.76 +10log ($N_{RB,c}$ /50)	N/A	-65.43 +10log ($N_{RB,c}$ /50)
Propagation Condition		ETU70		ETU70		ETU70	
Correlation Matrix and Antenna Configuration		1x2 Low		1x2 Low		1x2 Low	
Receive Time offset to cell1 Note 4	µs	-		33		-	
Time offset to cell1	µs	-		-		3	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.

Table A.8.23.6.1-3: DRX-Configuration for E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	As specified in clause 6.3.2 in TS 36.331
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf80	sf1280	
shortDRX	disable	disable	

Table A.8.23.6.1-4: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD DC inter-frequency event triggered reporting with DRX in synchronous DC

Field	Cell1	Cell2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	As specified in clause 6.3.2 in TS 36.331
sr-ConfigIndex	0	0	For further information see clause 6.3.2 in TS 36.331 and section10.1 in TS 36.213.

A.8.23.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report for Cell 3 on PCell, with a measurement reporting delay less than 3.84s from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

A.8.23.7 E-UTRAN FDD-FDD Addition and Release Delay of known PSCell in Synchronous DC

A.8.23.7.1 Test Purpose and Environment

The purpose of this test is to verify that the PSCell addition and release delays under synchronous dual connectivity are within the requirements stated in section 7.14 for the case when the PSCell is known by the UE at the time of addition.

The test parameters are given in Tables A.8.23.7.1-1 and cell-specific parameters in A.8.23.7.1-2 below. The test consists of five successive time periods with duration of T1, T2, T3, T4 and T5 respectively. There are two carriers each with one cell. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. During T1 only Cell1 is known to the UE.

Before the start of T2 it is indicated to the UE in the measurement control information that event-triggered reporting with Event A4 is configured for neighbour cell (Cell2). Before the start of T2 the UE is configured with the measurement gaps (gap pattern Id # 0). The Cell2 becomes known to the UE during T2. Therefore during T2 the UE shall report Event A4. After receiving the Event A4, the test system shall send a RRC message to the UE to release the measurement gaps.

The test system shall send a RRC message to the UE to add PSCell (Cell 2) on radio channel 2. The RRC message (to add PSCell) also includes a request for the UE to start periodic CSI reporting for the PSCell after the PSCell has been successfully added. The RRC message to add PSCell shall be sent to the UE during period T2, after the measurement gaps are released by the test system. The point in time at which the RRC message to add PSCell (Cell2) is received at the UE antenna connector defines the start of time period T3.

The test system shall observe the periodic reporting of CSI for PSCell during T4. The point in time at which the UE has sent PRACH to the PSCell (Cell 2) defines the start of time period T4.

The test system shall send a RRC message to the UE to release PSCell (Cell 2) on radio channel 2. The RRC message to release PSCell (Cell2) shall be sent to the UE during time period T4, after the UE has sent at least one CQI report with non-zero CQI index for PSCell (Cell 2). The point in time at which the RRC message to release PSCell (Cell2) is received at the UE antenna connector defines the start of time period T5.

Table A.8.23.7.1-1: General test parameters for known PSCell addition and release case

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Initial Condition	Active PCell		Cell1	PCell on RF channel number 1.
	Neighbour cell		Cell2	Neighbour cell on RF channel number 2.
Final Condition	Active PCell		Cell1	PCell on RF channel number 1.
	PSCell		Cell2	PSCell on RF channel number 2.
A4	Hysteresis	dB	0	Hysteresis for evaluation of event A4.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A4. Needs to take absolute accuracy tolerance in section 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
Measurement gap pattern Id			0	Gaps are configured before T2 and released before T3.
CQI/PMI periodicity and offset configuration index on cell2			0	CQI reporting for PSCell every second subframe
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of cell2.
T1		s	5	During this time the PCell shall be known and cell2 shall be unknown.
T2		s	≤ 5	During this time the UE shall identify neighbour cell (cell2) and report event A4.
T3		s	1	During this time the UE adds the PSCell.
T4		s	1	During this time the UE sends CSI reports for PSCell.
T5		s	1	During this time the UE releases the PSCell.
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: A UE capable of both synchronous and asynchronous DC operations is not required to pass this test case in accordance with the principle defined in section A.3.6.11.				

Table A.8.23.7.1-2: Cell specific test parameters for E-UTRAN FDD known PSCell addition and release

Parameter	Unit	Cell 1					Cell 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					2				
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD					-				
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD					5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD					5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD				
PBCH_RA	dB	0					0				
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDCCH_RA	dB										
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA Note 1	dB										
OCNG_RB Note 1	dB										
N_{oc} Note 2	dBm/15 kHz	-101					N/A	-85			
$\hat{E}_s/N_{oc}$	dB	19	19	19	19	19	-infinity	0	0	0	0
$\hat{E}_s/I_{ot}$	dB	19	19	19	19	19	infinity	0	0	0	0
RSRP Note 3	dBm/15 kHz	-82	-82	-82	-82	-82	-infinity	-85	-85	-85	-85
SCH_RP Note 3	dBm/15 kHz	-82	-82	-82	-82	-82	-infinity	-85	-85	-85	-85
Io Note 3	dBm/Ch BW	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	N/A	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)
Propagation Condition		AWGN					AWGN				
Antenna Configuration		1x2					1x2				
Receive time offset to cell1 Note 4	µs	-					33				
PRACH configuration Index Note 5		4					2				

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: $\hat{E}_s/I_{ot}$, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.
Note 5: As specified in table 5.7.1-2 in TS 36.211.
Note 6: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T4.

A.8.23.7.2 Test Requirements

The UE shall transmit the PRACH to PSCell at latest 115 ms into T3.

The UE shall send at least one CSI report for PSCell with non-zero CQI index during T4.

The UE shall stop sending CSI reports for PSCell in at latest 16ms into T5.

All of the above test requirements shall be fulfilled in order for the observed PSCell addition delay and PSCell release delay to be counted as correct. The rate of correct observed PSCell addition delay and PSCell release delay during repeated tests shall be at least 90%.

NOTE: The PSCell addition delay can be expressed as follows as specified in Clause 7.14.2:

$$T_{config\_PSCell} = 15ms + T_{activation\_time} + 50ms + T_{PCell\_DU} + T_{PSCell\_DU}$$

Where:

Tactivation_time = 20 ms (cell2 is known to the UE);

T_{PCell_DU} = 0 (due to PRACH configurations in cell1 and cell2 being orthogonal in time, i.e. non-overlapping in time);

T_{PSCell_DU} = 30 ms (delay due to PRACH transmission to cell2).

This gives a total of 115 ms.

A.8.23.8 E-UTRAN FDD-FDD Addition and Release Delay of known PSCell in Asynchronous DC

A.8.23.8.1 Test Purpose and Environment

The purpose of this test is to verify that the PSCell addition and release delays under asynchronous dual connectivity are within the requirements stated in section 7.14 for the case when the PSCell is known by the UE at the time of addition.

The test parameters are given in Tables A.8.23.8.1-1 and cell-specific parameters in A.8.23.8.1-2 below. The test consists of five successive time periods with duration of T1, T2, T3, T4 and T5 respectively. There are two carriers each with one cell. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. During T1 only Cell1 is known to the UE.

Before the start of T2 it is indicated to the UE in the measurement control information that event-triggered reporting with Event A4 is configured for neighbour cell (Cell2). Before the start of T2 the UE is configured with the measurement gaps (gap pattern Id # 0). The Cell2 becomes known to the UE during T2. Therefore during T2 the UE shall report Event A4. After receiving the Event A4, the test system shall send a RRC message to the UE to release the measurement gaps.

The test system shall send a RRC message to the UE to add PSCell (Cell 2) on radio channel 2. The RRC message (to add PSCell) also includes a request for the UE to start periodic CSI reporting for the PSCell after the PSCell has been successfully added. The RRC message to add PSCell shall be sent to the UE during period T2, after the measurement gaps are released by the test system. The point in time at which the RRC message to add PSCell (Cell2) is received at the UE antenna connector defines the start of time period T3.

The test system shall observe the periodic reporting of CSI for PSCell during T4. The point in time at which the UE has sent PRACH to the PSCell (Cell 2) defines the start of time period T4.

The test system shall send a RRC message to the UE to release PSCell (Cell 2) on radio channel 2. The RRC message to release PSCell (Cell2) shall be sent to the UE during time period T4, after the UE has sent at least one CQI report with non-zero CQI index for PSCell (Cell 2). The point in time at which the RRC message to release PSCell (Cell2) is received at the UE antenna connector defines the start of time period T5.

Table A.8.23.8.1-1: General test parameters for known PSCell addition and release case

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Initial Condition	Active PCell		Cell1	PCell on RF channel number 1.
	Neighbour cell		Cell2	Neighbour cell on RF channel number 2.
Final Condition	Active PCell		Cell1	PCell on RF channel number 1.
	PSCell		Cell2	PSCell on RF channel number 2.
A4	Hysteresis	dB	0	Hysteresis for evaluation of event A4.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A4. Needs to take absolute accuracy tolerance in section 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
Measurement gap pattern Id			0	Gaps are configured before T2 and released before T3.
CQI/PMI periodicity and offset configuration index on cell2			0	CQI reporting for PSCell every second subframe
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of cell2.
T1		s	5	During this time the PCell shall be known and cell2 shall be unknown.
T2		s	≤ 5	During this time the UE shall identify neighbour cell (cell2) and report event A4.
T3		s	1	During this time the UE adds the PSCell.
T4		s	1	During this time the UE sends CSI reports for PSCell.
T5		s	1	During this time the UE releases the PSCell.
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Even a UE capable of both synchronous and asynchronous DC operations is required to pass this test case in accordance with the principle defined in section A.3.11.				

Table A.8.22.8.1-2: Cell specific test parameters for E-UTRAN FDD known PSCell addition and release

Parameter	Unit	Cell 1					Cell 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					2				
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD					-				
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD					5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD				
OCNG Patterns		5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD					5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD				
PBCH_RA	dB	0					0				
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDCCH_RA	dB										
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA Note 1	dB										
OCNG_RB Note 1	dB										
N_{oc} Note 2	dBm/15 kHz	-101					N/A	-85			
$\hat{E}_s/N_{oc}$	dB	19	19	19	19	19	-infinity	0	0	0	0
$\hat{E}_s/I_{ot}$	dB	19	19	19	19	19	infinity	0	0	0	0
RSRP Note 3	dBm/15 kHz	-82	-82	-82	-82	-82	-infinity	-85	-85	-85	-85
SCH_RP Note 3	dBm/15 kHz	-82	-82	-82	-82	-82	-infinity	-85	-85	-85	-85
Io Note 3	dBm/Ch BW	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	N/A	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)
Propagation Condition		AWGN					AWGN				
Antenna Configuration		1x2					1x2				
Receive time offset to cell1 Note 4	µs	-					500				
PRACH configuration Index Note 5		4					2				

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: $\hat{E}_s/I_{ot}$, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.
Note 5: As specified in table 5.7.1-2 in TS 36.211
Note 6: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T4.

A.8.23.8.2 Test Requirements

The UE shall transmit the PRACH to PSCell at latest 115 ms into T3.

The UE shall send at least one CSI report for PSCell with non-zero CQI index during T4.

The UE shall stop sending CSI reports for PSCell in at latest 16ms into T5.

All of the above test requirements shall be fulfilled in order for the observed PSCell addition delay and PSCell release delay to be counted as correct. The rate of correct observed PSCell addition delay and PSCell release delay during repeated tests shall be at least 90%.

NOTE: The PSCell addition delay can be expressed as follows as specified in Clause 7.14.2:

$T_{config\_PSCell} = 15ms + T_{activation\_time} + 50ms + T_{PCell\_ DU} + T_{PSCell\_ DU}$

Where:

Tactivation_time = 20 ms (cell2 is known to the UE);

$T_{PCell\_ DU}$ = 0 (due to PRACH configurations in cell1 and cell2 being orthogonal in time, i.e. non-overlapping in time);

$T_{PSCell\_ DU}$ = 30 ms (delay due to PRACH transmission to cell2).

This gives a total of 115 ms.

A.8.23.9 E-UTRAN TDD Addition and Release Delay of known PSCell in Synchronous DC

A.8.23.9.1 Test Purpose and Environment

The purpose of this test is to verify that the PSCell addition and release delays under synchronous dual connectivity are within the requirements stated in section 7.14 for the case when the PSCell is known by the UE at the time of addition.

The test parameters are given in Tables A.8.23.9.1-1 and cell-specific parameters in A.8.23.9.1-2 below. The test consists of five successive time periods, with duration of T1, T2, T3, T4 and T5 respectively. There are two carriers each with one cell. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) but is not aware of Cell 2 on radio channel 2. The UE is only monitoring the PCC. During T1 only Cell1 is known to the UE.

Before the start of T2 it is indicated to the UE in the measurement control information that event-triggered reporting with Event A4 is configured for neighbour cell (Cell2). Before the start of T2 the UE is configured with the measurement gaps (gap pattern Id # 0). The Cell2 becomes known to the UE during T2. Therefore during T2 the UE shall report Event A4. After receiving the Event A4, the test system shall send a RRC message to the UE to release the measurement gaps.

The test system shall send a RRC message to the UE to add PSCell (Cell 2) on radio channel 2. The RRC message (to add PSCell) also includes a request for the UE to start periodic CSI reporting for the PSCell after the PSCell has been successfully added. The RRC message to add PSCell shall be sent to the UE during period T2, after the measurement gaps are released by the test system. The point in time at which the RRC message to add PSCell (Cell2) is received at the UE antenna connector defines the start of time period T3.

The test system shall observe the periodic reporting of CSI for PSCell during T4. The point in time at which the UE has sent PRACH to the PSCell (Cell 2) defines the start of time period T4.

The test system shall send a RRC message to the UE to release PSCell (Cell 2) on radio channel 2. The RRC message to release PSCell (Cell2) shall be sent to the UE during time period T4, after the UE has sent at least one CQI report with non-zero CQI index for PSCell (Cell 2). The point in time at which the RRC message to release PSCell (Cell2) is received at the UE antenna connector defines the start of time period T5.

Table A.8.23.9.1-1: General test parameters for known PSCell addition and release case

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1, 2	Two radio channels are used for this test
Initial Condition	Active PCell		Cell1	PCell on RF channel number 1.
	Neighbour cell		Cell2	Neighbour cell on RF channel number 2.
Final Condition	Active PCell		Cell1	PCell on RF channel number 1.
	PSCell		Cell2	PSCell on RF channel number 2.
A4	Hysteresis	dB	0	Hysteresis for evaluation of event A4.
	Threshold RSRP	dBm	-93	Actual RSRP threshold for event A4. Needs to take absolute accuracy tolerance in section 9.1.11.1 into account plus margin.
	Time To Trigger	s	0	
CP length			Normal	
DRX			OFF	Continuous monitoring of primary cell
Measurement gap pattern Id			0	Gaps are configured before T2 and released before T3.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration on cell2			53	As specified in table 5.7.1-3 in TS 36.211
CQI/PMI periodicity and offset configuration index on cell2			0	CQI reporting for PSCell every uplink subframe
Cell-individual offset for cells on RF channel number 1		dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on RF channel number 2		dB	0	Individual offset for cells on carrier frequency of cell2.
T1		s	5	During this time the PCell shall be known and cell2 shall be unknown.
T2		s	≤ 5	During this time the UE shall identify neighbour cell (cell2) and report event A4.
T3		s	1	During this time the UE adds the PSCell.
T4		s	1	During this time the UE sends CSI reports for PSCell.
T5		s	1	During this time the UE releases the PSCell.
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.11.				

Table A.8.23.9.1-2: Cell specific test parameters for E-UTRAN TDD known PSCell addition and release

Parameter	Unit	Cell 1					Cell 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1					2				
$BW_{channel}$	MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100					5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100				
PDSCH parameters: DL Reference Measurement Channel		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD					-				
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel		5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD					5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD				
OCNG Patterns		5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD					5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD				
PBCH_RA	dB	0					0				
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDCCH_RA	dB										
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA Note 1	dB										
OCNG_RB Note 1	dB										
N_{oc} Note 2	dBm/15 kHz	-101					N/A	-85			
$\hat{E}_s/N_{oc}$	dB	19	19	19	19	19	-infinity	0	0	0	0
$\hat{E}_s/I_{ot}$	dB	19	19	19	19	19	infinity	0	0	0	0
RSRP Note 3	dBm/15 kHz	-82	-82	-82	-82	-82	-infinity	-85	-85	-85	-85
SCH_RP Note 3	dBm/15 kHz	-82	-82	-82	-82	-82	-infinity	-85	-85	-85	-85
Io Note 3	dBm/Ch BW	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	-54.16 +10log ($N_{RB,c}$/50)	N/A	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)	-54.21 +10log ($N_{RB,c}$/50)
Propagation Condition		AWGN					AWGN				
Antenna Configuration		1x2					1x2				
Receive time offset to cell1 Note 4	µs	-					33				
PRACH configuration Index Note 5		56					50				

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: $\hat{E}_s/I_{ot}$, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: Receive time difference between subframe boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.
Note 5: As specified in table 5.7.1-3 in TS 36.211
Note 6: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T4.

A.8.23.9.2 Test Requirements

The UE shall transmit the PRACH to PSCell at latest 115 ms into T3.

The UE shall send at least one CSI report for PSCell with non-zero CQI index during T4.

The UE shall stop sending CSI reports for PSCell in at latest 16ms into T5.

All of the above test requirements shall be fulfilled in order for the observed PSCell addition delay and PSCell release delay to be counted as correct. The rate of correct observed PSCell addition delay and PSCell release delay during repeated tests shall be at least 90%.

NOTE: The PSCell addition delay can be expressed as follows as specified in Clause 7.14.2:

$$T_{config\_PSCell} = 15ms + T_{activation\_time} + 50ms + T_{PCell\_DU} + T_{PSCell\_DU}$$

Where:

Tactivation_time = 20 ms (cell2 is known to the UE);

T_{PCell_DU} = 0 (due to PRACH configurations in cell1 and cell2 being orthogonal in time, i.e. non-overlapping in time);

T_{PSCell_DU} = 30 ms (delay due to PRACH transmission to cell2).

This gives a total of 115 ms.

A.8.24 Proximity-based Services

A.8.24.1 E-UTRAN FDD - Initiation/Cease of SLSS Transmission with ProSe Direct Discovery

The purpose of this test is to verify the requirements related to the maximum evaluation time allowed to initiate and cease SLSS transmissions defined in clause 8.10.2.1. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN. This test is applicable for a UE capable of ProSe Direct Discovery and also SLSS transmission and reception (indicated using *disc-SLSS*).

For this test, the UE is triggered by the test loop function or the upper layers to announce ProSe Direct Discovery.

The test parameters are given in Table A.8.24.1.1-1. Table A.8.24.1.1-2 and Table A.8.24.1.1-3 below. There is one active cell (PCell) in this test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, the RSRP of the PCell is above *syncTxThreshIC* and the UE is not expected to be transmitting SLSS. During T2, the RSRP of the PCell is lowered below *syncTxThreshIC* and the UE is expected to initiate SLSS transmissions. During T3, the RSRP of the PCell is increased back to be above *syncTxThreshIC* and the UE is expected to cease SLSS transmissions.

A.8.24.1.1 Test Purpose and Environment

Table A.8.24.1.1-1: Test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	5	
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal	
Layer 3 filtering		Disabled	L3 filtering is not used
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
T1	s	3	
T2	s	5.24	
T3	s	5.24	

Table A.8.24.1.1-2: ProSe Direct Discovery configuration for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	UL carrier frequency
Channel Bandwidth ($BW_{channel}$)	MHz	5	
ProSe Direct Discovery resource pool configuration		As specified in Table A.3.12.4-1 (Configuration #1)	IE values unless specified otherwise in this test.
networkControlledSyncTx		Not configured	
syncTxThreshIC	dBm/15 kHz	-95	In SIB19

Table A.8.24.1.1-3: Cell specific test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	5		
OCNG Pattern (defined in clause A.3.2)		OP.16 FDD		
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0		
N_{oc} Note2	dBm/15 kHz	-95		
$\hat{E}_s/N_{oc}$	dB	4.5	-4.5	4.5
RSRP Note3	dBm/15 kHz	-90.5	-99.5	-90.5
SCH_RP Note 3	dBm/15 kHz	-90.5	-99.5	-90.5
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.24.1.2 Test Requirements

The SLSS transmission initiation delay is defined as the time from the beginning of time period T2 up to the moment when the UE initiates the SLSS transmission.

The SLSS transmission initiation delay shall be less than 2.24 s.

The SLSS transmission cease delay is defined as the time from the beginning of time period T3 up to the moment when the UE ceases the SLSS transmission.

The SLSS transmission cease delay shall be less than 2.24 s.

The rate of correct initiation/cease delay of SLSS transmissions observed during repeated tests shall be at least 90%.

NOTE: The initiation/cease delay of SLSS transmissions can be expressed as: $T_{evaluate,SLSS}$ + *discPeriod*,

Where:

$T_{evaluate,SLSS}$ is the evaluation time for initiate/cease of SLSS, and is 1.92 sec (see Table 8.10.2.1-1 in clause 8.10.2.1) for the parameters in this test;

discPeriod is the discovery period (set as 320ms in this test).

A.8.24.2 E-UTRAN TDD - Initiation/Cease of SLSS Transmission with ProSe Direct Discovery

The purpose of this test is to verify the requirements related to the maximum evaluation time allowed to initiate and cease SLSS transmissions defined in clause 8.10.2.1. In the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN. This test is applicable for a UE capable of ProSe Direct Discovery and also SLSS transmission and reception (indicated using *disc-SLSS*).

For this test, the UE is triggered by the test loop function or the upper layers to announce ProSe Direct Discovery.

The test parameters are given in Table A.8.24.2.1-1. Table A.8.24.2.1-2 and Table A.8.24.2.1-3 below. There is one active cell (PCell) in this test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, the RSRP of the PCell is above *syncTxThreshIC* and the UE is not expected to be transmitting SLSS. During T2, the RSRP of the PCell is lowered below *syncTxThreshIC* and the UE is expected to initiate SLSS transmissions. During T3, the RSRP of the PCell is increased back to be above *syncTxThreshIC* and the UE is expected to cease SLSS transmissions.

A.8.24.2.1 Test Purpose and Environment

Table A.8.24.2.1-1: Test parameters for initiation/cease of SLSS transmissions test for E-UTRAN TDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	5	
Active cell		Cell 1	E-UTRA TDD Cell1 on RF channel number 1
Uplink/Downlink Configuration		Config 0	
Special Subframe Configuration		6	
CP length of Cell 1		Normal	
Layer 3 filtering		Disabled	L3 filtering is not used
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
T1	s	3	
T2	s	5.24	
T3	s	5.24	

Table A.8.24.1.1-2: ProSe Direct Discovery configuration for initiation/cease of SLSS transmissions test for E-UTRAN TDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth ($BW_{channel}$)	MHz	5	
ProSe Direct Discovery resource pool configuration		As specified in Table A.3.12.4-3 (Configuration #3)	IE values unless specified otherwise in this test.
networkControlledSyncTx		Not configured	
syncTxThreshIC	dBm/15 kHz	-95	In SIB19

Table A.8.24.2.1-3: Cell specific test parameters for initiation/cease of SLSS transmissions test for E-UTRAN TDD

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$	MHz	5		
OCNG Pattern (defined in clause A.3.2)		OP.10 TDD		
PBCH_RA	dB	0		
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note 1				
OCNG_RB Note 1				
N_{oc} Note2	dBm/15 kHz	-95		
$\hat{E}_s/N_{oc}$	dB	4.5	-4.5	4.5
RSRP Note3	dBm/15 kHz	-90.5	-99.5	-90.5
SCH_RP Note 3	dBm/15 kHz	-90.5	-99.5	-90.5
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.8.24.2.2 Test Requirements

The SLSS transmission initiation delay is defined as the time from the beginning of time period T2 up to the moment when the UE initiates the SLSS transmission.

The SLSS transmission initiation delay shall be less than 2.24 s.

The SLSS transmission cease delay is defined as the time from the beginning of time period T3 up to the moment when the UE ceases the SLSS transmission.

The SLSS transmission cease delay shall be less than 2.24 s.

The rate of correct initiation/cease delay of SLSS transmissions observed during repeated tests shall be at least 90%.

NOTE: The initiation/cease delay of SLSS transmissions can be expressed as: $T_{evaluate,SLSS}$ + *discPeriod*,

Where:

$T_{evaluate,SLSS}$ is the evaluation time for initiate/cease of SLSS, and is 1.92 sec (see Table 8.10.2.1-1 in clause 8.10.2.1) for the parameters in this test;

discPeriod is the discovery period (set as 320ms in this test).

A.8.24.3 E-UTRAN FDD - Initiation/Cease of SLSS Transmission with ProSe Direct Communication

The purpose of this test is to verify that the ProSe UE meets the requirements related to the maximum evaluation time allowed to initiate and cease SLSS transmissions defined in clause 8.10.2.2. This test is applicable for a UE capable of ProSe Direct CommunicationIn the test the UE under test is configured for ProSe operation only on PCell and also the UE is configured only for PCell for WAN.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A.8.24.3.1-1, Table A.8.24.3.1-2 and Table A.8.24.3.1-3 below. There is one active cell (PCell) in this test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, the RSRP of the PCell is above *syncTxThreshIC* and the UE is not expected to be transmitting SLSS. During T2, the RSRP of the PCell is lowered below *syncTxThreshIC* and the UE is expected to initiate SLSS transmissions. During T3, the RSRP of the PCell is increased back to be above *syncTxThreshIC* and the UE is expected to cease SLSS transmissions.

A.8.24.3.1 Test Purpose and Environment

Table A.8.24.3.1-1: Test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell		Cell 1	E-UTRA FDD Cell1 on RF channel number 1
CP length of Cell 1		Normal	
Layer 3 filtering		Disabled	L3 filtering is not used
drx-Configuration		DRX_P1	As specified in Table A.3.12.2-1
T1	s	3	
T2	s	5.24	
T3	s	5.24	

Table A.8.24.3.1-2: ProSe Direct Communication configuration for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	UL carrier frequency
Channel Bandwidth ($BW_{channel}$)	MHz	5 or 10	According to principle defined in clause A.3.12.3
ProSe Direct Communication configuration		As specified in Table A.3.12.5-1 (Configuration #1)	IE values unless specified otherwise in this test.
networkControlledSyncTx		Not configured	
syncTxThreshIC	dBm/15 kHz	-95	In SIB18

Table A.8.24.3.1-3: Cell specific test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Cell 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$ Note 4	MHz	5 or 10		
OCNG Patterns defined in A.3.2.1.2 Note 4		5MHz: OP.16 FDD 10 MHz: OP.2 FDD		
PBCH_RA	dB	0		
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note 1				
OCNG_RB Note 1				
N_{oc} Note2	dBm/15 kHz	-95		
$\hat{E}_s/N_{oc}$	dB	4.5	-4.5	4.5
RSRP Note3	dBm/15 kHz	-90.5	-99.5	-90.5
SCH_RP Note 3	dBm/15 kHz	-90.5	-99.5	-90.5
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: This test is according to the principle defined in section A.3.12.3.

A.8.24.3.2 Test Requirements

The SLSS transmission initiation delay is defined as the time from the beginning of time period T2 up to the moment when the UE initiates the SLSS transmission.

The SLSS transmission initiation delay shall be less than 1.96 s.

The SLSS transmission cease delay is defined as the time from the beginning of time period T3 up to the moment when the UE ceases the SLSS transmission.

The SLSS transmission cease delay shall be less than 1.96 s.

The rate of correct initiation/cease delay of SLSS transmissions observed during repeated tests shall be at least 90%.

NOTE: The initiation/cease delay of SLSS transmissions can be expressed as: $T_{evaluate,SLSS}$ + SLSS period,

Where:

$T_{evaluate,SLSS}$ is the evaluation time for initiate/cease of SLSS, and is 1.92 sec (see Table 8.10.2.1-1 in clause 8.10.2.1) for the parameters in this test;

SLSS period is set to 40ms.

A.9 Measurement Performance Requirements

Unless explicitly stated otherwise:

- Reported measurements shall be within defined range of accuracy limits defined in Clause 9 for at least 90 % of the reported cases. If multiple measurement performance requirements are verified in the same test, the reported measurements for each requirement shall be within defined range of accuracy limits of the corresponding requirement defined in Clause 9 for at least 90% of the reported cases.
- Cell 1 is the PCell.
- Measurements are performed in RRC_CONNECTED state.
- The reference channels assume transmission of PDSCH with a maximum number of 5 HARQ transmissions unless otherwise specified.

A.9.1 RSRP

A.9.1.1 FDD Intra frequency case

A.9.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.1 and 9.1.2.2 for FDD intra frequency measurements.

A.9.1.1.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.1.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.1.2-1: RSRP FDD Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-106	-106	-88	-88	-116	
	Bands FDD_B						-115.5	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 5						-114	
	Bands FDD_G Note 7						-113	
	Bands FDD_H						-112.5	
$\hat{E}_s/I_{ot}$		dB	2.5	-6	2.5	-6	0.46	-5.76
RSRP Note3	Bands FDD_A	dBm/15 kHz	-100	-105	-82	-87	-113	-117
	Bands FDD_B						-112.5	-116.5
	Bands FDD_C						-112	-116
	Bands FDD_D						-111.5	-115.5
	Bands FDD_E, FDD_F Note 5						-111	-115
	Bands FDD_G Note 7						-110	-114
	Bands FDD_H						-109.5	-113.5
Io Note3	Bands FDD_A	dBm/9 MHz	-70.27	-70.27	-52.27	-52.27	-82.43	
	Bands FDD_B						-81.93	
	Bands FDD_C						-81.43	
	Bands FDD_D						-80.93	
	Bands FDD_E, FDD_F Note 5						-80.43	
	Bands FDD_G Note 7						-79.43	
	Bands FDD_H						-78.93	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.

A.9.1.1.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.2.1 and 9.1.2.2.

A.9.1.2 TDD Intra frequency case

A.9.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.1 and 9.1.2.2 for TDD intra frequency measurements.

A.9.1.2.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.2.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.2.2-1: RSRP TDD Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Special subframe configuration[Note1]			6		6		6	
Uplink/downlink configuration[Note1]			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA[Note2]								
OCNG_RB[Note2]								
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-106	-106	-88	-88	-116	
	Bands TDD_C						-115	
	Bands TDD_E						-114	
$\hat{E}_s/I_{ot}$		dB	2.5	-6	2.5	-6	0.5	-5.76
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-100	-105	-82	-87	-113	-117
	Bands TDD_C						-112	-116
	Bands TDD_E						-111	-115
Io[Note4]	Bands TDD_A	dBm/9 MHz	-70.27	-70.27	-52.27	-52.27	-82.43	
	Bands TDD_C						-81.43	
	Bands TDD_E						-80.43	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.2.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.2.1 and 9.1.2.2.

A.9.1.3 FDD—FDD Inter frequency case

A.9.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.3.1 and 9.1.3.2 for FDD—FDD inter frequency measurements.

A.9.1.3.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.3.2-1 In all test cases, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.3.2-1: RSRP FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1		Test 2	
			Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2
$BW_{channel}$		MHz	10	10	10	10
Gap Pattern Id			0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RANote1 OCNG_RBNote		dB	0	0	0	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-88.65	-88.65	(N_{oc} for Channel 2 +8dB)	-117
	Bands FDD_B					-116.5
	Bands FDD_C					-116
	Bands FDD_D					-115.5
	Bands FDD_E, FDD_F Note 5					-115
	Bands FDD_G Note 7					-114
	Bands FDD_H					-113.5
$\hat{E}_s/I_{ot}$		dB	10	10	13	-4
RSRPNote3	Bands FDD_A	dBm/15 kHz	-78.65	-78.65	(RSRP for Cell 2 +25dB)	-121
	Bands FDD_B					-120.5
	Bands FDD_C					-120
	Bands FDD_D					-119.5
	Bands FDD_E, FDD_F Note 5					-119
	Bands FDD_G Note 7					-118
	Bands FDD_H					-117.5
IoNote3	Bands FDD_A	dBm/9 MHz	-50.45	-50.45	(Io for Channel 2 +19.75dB)	-87.76
	Bands FDD_B					-87.26
	Bands FDD_C					-86.76
	Bands FDD_D					-86.26
	Bands FDD_E, FDD_F Note 5					-85.76
	Bands FDD_G Note 7					-84.76
	Bands FDD_H					-84.26
$\hat{E}_s/N_{oc}$		dB	10	10	13	-4
Propagation condition		-	AWGN		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed						

	to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.

A.9.1.3.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.3.1 and 9.1.3.2.

A.9.1.4 TDD—TDD Inter frequency case

A.9.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.3.1 and 9.1.3.2 for TDD—TDD inter frequency measurements.

A.9.1.4.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.4.2-1 for TDD configuration 1 and in Table A.9.1.4.2-2 for TDD configuration 0. In all test cases, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.4.2-1: RSRP TDD—TDD Inter frequency test parameters for TDD configuration 1

Parameter		Unit	Test 1		Test 2	
			Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2
$BW_{channel}$		MHz	10	10	10	10
Special subframe configuration[Note1]			6		6	
Uplink-downlink configuration[Note1]			1		1	
Gap Pattern Id			0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0	0
PBCH_RB						
PSS_RA						
SSS_RA						
PCFICH_RB						
PHICH_RA						
PHICH_RB						
PDCCH_RA						
PDCCH_RB						
PDSCH_RA						
PDSCH_RB						
OCNG_RA[Note2]						
OCNG_RB[Note2]						
N_{oc} Note3	Bands TDD_A	dBm/15 kHz	-88.65	-88.65	(N_{oc} for Channel 2 +8dB)	-117
	Bands TDD_C					-116
	Bands TDD_E					-115
$\hat{E}_s/I_{ot}$		dB	10	10	13	-4
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-78.65	-78.65	(RSRP for Cell 2 +25dB)	-121
	Bands TDD_C					-120
	Bands TDD_E					-119
Io[Note4]	Bands TDD_A	dBm/9 MHz	-50.45	-50.45	(Io for Channel 2 +19.75dB)	-87.76
	Bands TDD_C					-86.76
	Bands TDD_E					-85.76
$\hat{E}_s/N_{oc}$		dB	10	10	13	-4
Propagation condition		-	AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.

Table A.9.1.4.2-2: RSRP TDD—TDD Inter frequency test parameters for *TDD configuration 0*

Parameter		Unit	Test 1		Test 2	
			Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2
$BW_{channel}$		MHz	10	10	10	10
Special subframe configuration[Note1]			6		6	
Uplink-downlink configuration[Note1]			0		0	
Gap Pattern Id			0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.5 TDD	-	R.5 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0	0
PBCH_RB						
PSS_RA						
SSS_RA						
PCFICH_RB						
PHICH_RA						
PHICH_RB						
PDCCH_RA						
PDCCH_RB						
PDSCH_RA						
PDSCH_RB						
OCNG_RA[Note2]						
OCNG_RB[Note2]						
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-88.65	-88.65	(N_{oc} for Channel 2 +8dB)	-117
	Bands TDD_C					-116
	Bands TDD_E					-115
$\hat{E}_s/I_{ot}$		dB	10	10	13	-4
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-78.65	-78.65	(RSRP for Cell 2 +25dB)	-121
	Bands TDD_C					-120
	Bands TDD_E					-119
Io[Note4]	Bands TDD_A	dBm/9 MHz	-50.45	-50.45	(Io for Channel 2 +19.75dB)	-87.76
	Bands TDD_C					-86.76
	Bands TDD_E					-85.76
$\hat{E}_s/N_{oc}$		dB	10	10	13	-4
Propagation condition		-	AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.4.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.3.1 and 9.1.3.2.

A.9.1.5 FDD—TDD Inter frequency case

A.9.1.5.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.3.1 and 9.1.3.2 for FDD—TDD inter frequency measurements.

A.9.1.5.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP inter frequency measurements are tested by using the parameters in Table A.9.1.5.2-1 and Table A.9.1.5.2-2. In all test cases, Cell 1 is the serving cell and Cell 2 the target cell. Cell 1 is FDD cell and Cell 2 is TDD cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.5.2-1: RSRP FDD—TDD Inter frequency test parameters (FDD Cell1)

Parameter	Unit	Test 1		Test 2	
		Cell 1		Cell 1	
E-UTRA RF Channel Number		1		1	
$BW_{channel}$	MHz	10		10	
Gap Pattern Id		0		0	
Measurement bandwidth	n_{PRB}	22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD		R.0 FDD	
PDSCH allocation	n_{PRB}	13—36		13—36	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)		OP.1 FDD		OP.1 FDD	
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RANote1 OCNG_RBNote	dB	0	0	0	0
N_{oc} Note2	dBm/15 kHz	-88.65		-104	
$\hat{E}_s/I_{ot}$	dB	10		13	
RSRP Note3	dBm/15 kHz	-78.65		-91	
Io Note3	dBm/9 MHz	-50.45		-63.01	
$\hat{E}_s/N_{oc}$	dB	10		13	
Propagation condition	-	AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table A.9.1.5.2-2: RSRP FDD—TDD Inter frequency test parameters (TDD cell2)

Parameter	Unit	Test 1	Test 2
		Cell 2	Cell 2
E-UTRA RF Channel Number		2	2
$BW_{channel}$	MHz	10	10
Special subframe configuration[Note1]		6	6
Uplink-downlink configuration[Note1]		1	1
Gap Pattern Id		-	-
Measurement bandwidth	n_{PRB}	22—27	22—27
PDSCH Reference measurement channel defined in A.3.1.1.2		-	-
PDSCH allocation	n_{PRB}	-	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6 TDD	R.6 TDD
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]	dB	0	0
N_{oc} [Note3]	dBm/15 kHz	-88.65	-112
$\hat{E}_s/I_{ot}$	dB	10	-4
RSRP[Note4]	dBm/15 kHz	-78.65	-116
Io[Note4]	dBm/9 MHz	-50.45	-82.76
$\hat{E}_s/N_{oc}$	dB	10	-4
Propagation condition	-	AWGN	AWGN
Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211. Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.			

A.9.1.5.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.3.1 and 9.1.3.2.

A.9.1.6 FDD RSRP for E-UTRAN Carrier Aggregation

A.9.1.6.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2. The test will also verify the primary and secondary component carrier relative RSRP accuracy requirement defined in Clause 9.1.11.3.

A.9.1.6.2 Test parameters

In this set of cases cell1 is PCell on the primary component carrier, cell2 is SCell on the secondary component carrier and activated, and cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.6.2-1.

Table A.9.1.6.2-1: RSRP FDD carrier aggregation test parameters

Parameter		Unit	Test 1		
			Cell 1	**Cell 2**	**Cell3**
E-UTRA RF Channel Number			1	2	2
$BW_{channel}$		MHz	10	10	10
Timing offset to cell1		µs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	-
Measurement bandwidth		n_{PRB}	22—27		
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RANote1					
OCNG_RBNote					
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands FDD_B		-116.5		
	Bands FDD_C		-116		
	Bands FDD_D		-115.5		
	Bands FDD_E, FDD_F Note 6		-115		
	Bands FDD_G		-114		
	Bands FDD_H		-113.5		
$\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76
RSRP Note3	Bands FDD_A	dBm/15 kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands FDD_B		-120.5		
	Bands FDD_C		-120		
	Bands FDD_D		-119.5		
	Bands FDD_E, FDD_F Note 6		-119		
	Bands FDD_G		-118		
	Bands FDD_H		-117.5		
Io Note3	Bands FDD_A	dBm/9 MHz	-87.76	(Io for Channel 1 +5.33dB)	
	Bands FDD_B		-87.26		
	Bands FDD_C		-86.76		
	Bands FDD_D		-86.26		
	Bands FDD_E, FDD_F Note 6		-85.76		
	Bands FDD_G		-84.76		
	Bands FDD_H		-84.26		

$\hat{E}_s/N_{oc}$	dB	-4	3	-1
Propagation condition	-	AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs. Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 7: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 8: E-UTRA operating band groups are as defined in Section 3.5.				

A.9.1.6.3 Test Requirements

In the test, the performance of RSRP measurements is verified from following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.

- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

A.9.1.7 TDD RSRP for E-UTRAN Carrier Aggregation

The test case in this clause are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.1.7.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the absolute RSRP accuracy on PCell defined in clause 9.1.11.1, the absolute RSRP accuracy on Scell defined in clause 9.1.11.2, the relative RSRP accuracy between SCell and Cell 3 defined in clause 9.1.11.2, and the relative RSRP accuracy between PCell and SCell defined in clause 9.1.11.3.

A.9.1.7.2 Test parameters

In this set of test cases there are three cells on two carrier frequencies. Cell 1 is PCell on channel 1, Cell 2 is activated SCell on channel 2, and Cell 3 is neighbour cell which is also on channel 2. The parameters for the test are listed in Table A.9.1.7.2-1.

Table A.9.1.7.2-1: Carrier aggregation RSRP test parameters for TDD

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	
$BW_{channel}$		MHz	10		
Special subframe configuration[Note1]			6		
Uplink/downlink configuration[Note1]			1		
Timing offset to Cell 1		µs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
Measurement bandwidth		n_{PRB}	22—27		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA[Note2]					
OCNG_RB[Note2]					
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands TDD_C		-116		
	Bands TDD_E		-115		
$\hat{E}_s/I_{ot}$		dB	-4	0.5	-5.76
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands TDD_C		-120		
	Bands TDD_E		-119		
Io[Note4]	Bands TDD_A	dBm/9 MHz	-87.76	(Io for Channel 1 +5.33dB)	
	Bands TDD_C		-86.76		
	Bands TDD_E		-85.76		
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
Propagation condition		-	AWGN		

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: The selection of the bands for testing depends on the configuration of the carrier

	aggregation supported by the UEs.
Note 7:	This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.7.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.

- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3

A.9.1.8 FDD RSRP under Time-Domain Measurement Resource Restriction with Non-MBSFN ABS

A.9.1.8.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.3 and 9.1.2.4 for FDD intra-frequency RSRP measurements under time-domain measurement resource restriction with non-MBSFN ABS configured in the aggressor cell.

A.9.1.8.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.8.2-1 and A.9.1.8.2-2.

In the tests there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 2. Cell 2 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 2 are measured for RSRP relative accuracy. Non-MBSFN ABS pattern is configured for Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.1.8.2-1: General test parameters for E-UTRAN FDD RSRP intra frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 µs	Synchronous cells
Physical cell ID PCI		$(PCI_{cell1} - PCI_{cell2})mod6 != 0$	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met
ABS pattern		‘1000000010000000100000001000000010000000’	Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes in Cell 1.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		‘1000000010000000100000001000000010000000’	Configured for Cell 2 measurements by measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		‘0100000001000000010000000100000001000000’	Configured for measurements on Cell 1.

Table A.9.1.8.2-2: Cell-specific test parameters for E-UTRAN FDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and A.3.2.1.6 (OP.6 FDD)			OP.5 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-106		-88		-116	
	Bands FDD_B						-115.5	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 7						-114	
	Bands FDD_G Note 9						-113	
	Bands FDD_H						-112.5	
CRS $\hat{E}_s / N_{oc}$		dB	5	-2	5	-4	5	-4
CRS $\left(\hat{E}_s / I_{ot}\right)_{meas}$ Note 5		dB	2.88	-2	3.54	-4	3.54	-4
SCH $\hat{E}_s / I_{ot}$		dB	-1.12	-5.54	-0.46	-7.54	-0.46	-7.54
RSRP Note3,4,5	Bands FDD_A	dBm/15 kHz	-101	-108	-83	-92	-111	-120
	Bands FDD_B						-110.5	-119.5
	Bands FDD_C						-110	-119
	Bands FDD_D						-109.5	-118.5
	Bands FDD_E, FDD_F Note 7						-109	-118
	Bands FDD_G Note 9						-108	-117
	Bands FDD_H						-107.5	-116.5
$(\text{Io})_{meas}$ Note 3	Bands FDD_A	dBm/9 MHz	-71.41	-74.88	-53.63	-57.37	-81.63	-85.37
	Bands FDD_B						-81.13	-84.87
	Bands FDD_C						-80.63	-84.37
	Bands FDD_D						-80.13	-83.87
	Bands FDD_E, FDD_F Note 7						-79.63	-83.37
	Bands FDD_G Note 9						-78.63	-82.37
	Bands FDD_H						-78.13	-81.87
Propagation condition			AWGN		AWGN		AWGN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	Applies to restricted measurement subframes of the respective cell.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.
Note 9:	Except Band 29 and Band 32.

A.9.1.8.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.3 and 9.1.2.4, respectively.

A.9.1.9 TDD RSRP under Time-Domain Measurement Resource Restriction with Non-MBSFN ABS

A.9.1.9.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.3 and 9.1.2.4 for TDD intra-frequency RSRP measurements under time-domain measurement resource restriction with non-MBSFN ABS configured in the aggressor cell.

A.9.1.9.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.9.2-1 and A.9.1.9.2-2.

In the tests there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 2. Cell 2 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 2 are measured for RSRP relative accuracy. Non-MBSFN ABS pattern is configured for Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.1.9.2-1: General test parameters for E-UTRAN TDD RSRP intra frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	Also the aggressor cell.
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe configurations see Table 4.2-1 in [16].
Uplink/downlink subframe configuration		1	For Cell 1 and Cell 2. For uplink-downlink subframe configurations see Table 4.2-2 in [16].
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 µs	Synchronous cells
Physical cell ID PCI		$(PCI_{cell1} - PCI_{cell2})mod6$!=0	Cell PCIs for Cell 1 and Cell 2 are randomly selected so that the condition is met
ABS pattern		'00000000010000000001'	Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes in Cell 1.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'00000000010000000001'	Configured for Cell 2 measurements by measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'10000000001000000000'	Configured for Cell 1 measurements.

Table A.9.1.9.2-2: Cell-specific test parameters for E-UTRAN TDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
N_{oc} Note 2	Bands TDD_A	dBm/15 kHz	-106		-88		-116	
	Bands TDD_C						-115	
	Bands TDD_E						-114	
CRS $\hat{E}_s / N_{oc}$		dB	5	-2	5	-4	5	-4
CRS $\left(\hat{E}_s / I_{ot}\right)_{meas}$ Note 5		dB	2.88	-2	3.54	-4	5	-4
SCH $\hat{E}_s / I_{ot}$		dB	-1.12	-5.54	-0.46	-7.54	-0.46	-7.54
RSRP Note3,4,5	Bands TDD_A	dBm/15 kHz	-101	-108	-83	-92	-111	-120
	Bands TDD_C						-110	-119
	Bands TDD_E						-109	-118
$(\text{Io})_{meas}$ Note 3	Bands TDD_A	dBm/9 MHz	-71.41	-74.88	-53.63	-57.37	-81.6	-85.4
	Bands TDD_C						-80.6	-84.4
	Bands TDD_E						-79.6	-83.4
Propagation condition			AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: Applies to restricted measurement subframes of the respective cell.
Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.9.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.3 and 9.1.2.4, respectively.

A.9.1.10 FDD RSRP under Time-Domain Measurement Resource Restriction with MBSFN ABS

A.9.1.10.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.3 and 9.1.2.4 for FDD intra-frequency RSRP measurements under time-domain measurement resource restriction with MBSFN ABS configured in the aggressor cell.

A.9.1.10.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.10.2-1 and A.9.1.10.2-2.

In the tests there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 2. Cell 2 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 2 are measured for RSRP relative accuracy. MBSFN ABS pattern is configured in Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.1.10.2-1: General test parameters for E-UTRAN FDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.1-1
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 µs	Synchronous cells
Physical cell ID PCI		(PCI_{cell1} - PCI_{cell2})mod6 =0, PCI_{cell1} not equal to PCI_{cell2}	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met
ABS pattern		'0100000010000000100000000010000001000000'	MBSFN ABS pattern. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. All ABS subframes are MBSFN subframes.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'0100000010000000100000000010000001000000'	Configured for Cell 2 measurements by measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'0001000000010000000100000001000000010000'	Configured for measurements on Cell 1.

Table A.9.1.10.2-2: Cell-specific test parameters for E-UTRAN FDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.8 (OP.8 FDD) and A.3.2.1.6 (OP.6 FDD)			OP.8 FDD	OP.6 FDD	OP.8 FDD	OP.6 FDD	OP.8 FDD	OP.6 FDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
N_{oc} Note 2	Bands FDD_A	dBm/15 kHz	-106		-88		-116	
	Bands FDD_B						-115.5	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 8						-114	
	Bands FDD_G Note 10						-113	
	Bands FDD_H						-112.5	
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-4	5	-4
CRS $(\hat{E}_s/Iot)_{meas}$ Note 5, 7 in the 1st OFDM symbol		dB	2.88	-8.19	3.54	-10.19	3.54	-10.19
CRS $(\hat{E}_s/Iot)_{meas}$ Note 5 in OFDM symbols 4,7,11		dB	2.88	-2	3.54	-4	3.54	-4
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-0.46	-7.54	-0.46	-7.54
RSRP Note 3,4	Bands FDD_A	dBm/15 kHz	-101	-108	-83	-92	-111	-120
	Bands FDD_B						-110.5	-119.5
	Bands FDD_C						-110	-119
	Bands FDD_D						-109.5	-118.5
	Bands FDD_E, FDD_F Note 8						-109	-118
	Bands FDD_G Note 10						-108	-117
	Bands FDD_H						-107.5	-116.5
$(\mathrm{Io})_{meas}$ Note 3 in the 1st OFDM symbol	Bands FDD_A	dBm/9 MHz	-71.41	-74.88	-53.63	-57.37	-81.63	-85.37
	Bands FDD_B						-81.13	-84.87
	Bands FDD_C						-80.63	-84.37
	Bands FDD_D						-80.13	-83.87
	Bands FDD_E, FDD_F Note 8						-79.63	-83.37
	Bands FDD_G Note 10						-78.63	-82.37

	Bands FDD_H						-78.13	-81.87
$(\mathrm{Io})_{meas}$ Note 3 in OFDM symbols other than the 1st one	Bands FDD_A	dBm/9 MHz	-71.41	-76.09	-53.63	-58.76	-81.63	-86.76
	Bands FDD_B						-81.13	-86.26
	Bands FDD_C						-80.63	-85.76
	Bands FDD_D						-80.13	-85.26
	Bands FDD_E, FDD_F Note 8						-79.63	-84.76
	Bands FDD_G Note 10						-78.63	-83.76
	Bands FDD_H						-78.13	-83. 26
Propagation condition			AWGN		AWGN		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: Applies to restricted measurement subframes of the respective cell. Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.1-1. Note 7: In the 1st OFDM symbol, Cell 2 is not expected to meet the Es/Iot side condition in 9.1.2.3 and 9.1.2.4. Note 8: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 9: E-UTRA operating band groups are as defined in Section 3.5. Note 10: Except Band 29 and Band 32.								

A.9.1.10.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.3 and 9.1.2.4, respectively.

A.9.1.11 TDD RSRP under Time-Domain Measurement Resource Restriction with MBSFN ABS

A.9.1.11.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.3 and 9.1.2.4 for TDD intra-frequency RSRP measurements under time-domain measurement resource restriction with MBSFN ABS configured in the aggressor cell.

A.9.1.11.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.11.2-1 and A.9.1.11.2-2.

In the tests there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 2. Cell 2 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 2 are measured for RSRP relative accuracy. MBSFN ABS pattern is configured in Cell 1 during the test. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.1.11.2-1: General test parameters for E-UTRAN TDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.1-1
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe configurations see Table 4.2-1 in [16].
Uplink/downlink subframe configuration		1	For Cell 1 and Cell 2. For uplink-downlink subframe configurations see Table 4.2-2 in [16].
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		$(PCI_{cell1} - PCI_{cell2})mod6 = 0$, PCI_{cell1} not equal to PCI_{cell2}	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met
ABS pattern		'00001000000000100000'	MBSFN ABS pattern. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. All ABS subframes are MBSFN subframes.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'00001000000000100000'	Configured for Cell 2 measurements by measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'10000000001000000000'	Configured for measurements on Cell 1.

Table A.9.1.11.2-2: Cell-specific test parameters for E-UTRAN TDD RSRP intra-frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.5 (OP.5 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.5 TDD	OP.2 TDD	OP.5 TDD	OP.2 TDD	OP.5 TDD	OP.2 TDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
N_{oc} Note 2	Bands TDD_A	dBm/15 kHz	-106		-88		-116	
	Bands TDD_C						-115	
	Bands TDD_E						-114	
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-4	5	-4
CRS $(\hat{E}_s/Iot)_{meas}$ note 5, note 7 in the 1st OFDM symbol		dB	2.88	-8.19	3.54	-10.19	3.54	-10.19
CRS $(\hat{E}_s/Iot)_{meas}$ note 5 in OFDM symbols 4,7,11		dB	2.88	-2	3.54	-4	3.54	-4
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-0.46	-7.54	-0.46	-7.54
RSRP Note 3,4	Bands TDD_A	dBm/15 kHz	-101	-108	-83	-92	-111	-120
	Bands TDD_C						-110	-119
	Bands TDD_E						-109	-118
$(\mathrm{Io})_{meas}$ Note 3 in the 1st OFDM symbol	Bands TDD_A	dBm/9 MHz	-71.41	-74.88	-53.63	-57.37	-81.63	-85.37
	Bands TDD_C						-80.63	-84.37
	Bands TDD_E						-79.63	-83.37
$(\mathrm{Io})_{meas}$ Note 3 in OFDM symbols other than the 1st one	Bands TDD_A	dBm/9 MHz	-71.41	-76.09	-53.63	-58.76	-81.63	-86.76
	Bands TDD_C						-80.63	-85.76
	Bands TDD_E						-79.63	-84.76
Propagation condition			AWGN		AWGN		AWGN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port
Note 5:	Applies to restricted measurement subframes of the respective cell.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.1-1.
Note 7:	In the 1st OFDM symbol, Cell 2 is not expected to meet the Es/Iot side condition in 9.1.2.3 and 9.1.2.4.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.11.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.3 and 9.1.2.4, respectively.

A.9.1.12 FDD RSRP for E-UTRAN Carrier Aggregation for 20MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.1.12.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.6.1.

A.9.1.12.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.12.2-1 will replace the values of corresponding parameters in Tables A.9.1.6.2-1.

Table A.9.1.12.2-1: RSRP FDD carrier aggregation test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
$BW_{channel}$ Note 1		MHz	20	20	20
Measurement bandwidth		n_{PRB}	47—52		
PDSCH Reference measurement channel defined in A.3.1.1.1			R.4 FDD	R.4 FDD	N/A
PDSCH allocation		n_{PRB}	38—61	38—61	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.10 FDD		
OCNG Patterns defined in A.3.2.1.11 (OP.11 FDD) and A.3.2.1.12 (OP.12 FDD)			OP.11 FDD	OP.11 FDD	OP.12 FDD
Io Note2	Bands FDD_A Note 5	dBm/18 MHz	-84.75	(Io for Channel 1 +5.33dB)	
	Bands FDD_B Note 5		-84.25		
	Bands FDD_C Note 5		-83.75		
	Bands FDD_D Note 5		-83.25		
	Bands FDD_E Note 5		-82.75		
	Bands FDD_G Note 5		-81.75		
	Bands FDD_H Note 5		-81.25		
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 3: See Table A.9.1.6.2-1 for the other parameters. Note 4: E-UTRA operating band groups are as defined in Section 3.5. Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 20 MHz channel bandwidth.					

A.9.1.12.3 Test Requirements

The test requirements defined in section A.9.1.6.3 shall apply to this test case.

A.9.1.13 TDD RSRP for E-UTRAN Carrier Aggregation for 20MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.1.13.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.7.1.

A.9.1.13.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.13.2-1 will replace the values of corresponding parameters in Tables A.9.1.7.2-1.

Table A.9.1.13.2-1: Carrier aggregation RSRP test parameters for TDD

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Test 1</th></tr>
<tr><th>Cell 1</th><th>Cell 2</th><th>Cell 3</th></tr>
<tr><td colspan="2">$BW_{channel}$ Note 1</td><td>MHz</td><td colspan="3">20</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>n_{PRB}</td><td colspan="3">47—52</td></tr>
<tr><td colspan="2">PDSCH Reference measurement channel defined in A.3.1.1.2</td><td></td><td>R.3 TDD</td><td>R.3 TDD</td><td>N/A</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>n_{PRB}</td><td>38—61</td><td>38—61</td><td>N/A</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2</td><td></td><td colspan="3">R.10 TDD</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and A.3.2.2.8 (OP.8 TDD)</td><td></td><td>OP.7 TDD</td><td>OP.7 TDD</td><td>OP.8 TDD</td></tr>
<tr><td rowspan="3">Io Note2</td><td>Bands TDD_A Note 5</td><td rowspan="3">dBm/18 MHz</td><td>-84.75</td><td colspan="2" rowspan="3">(Io for Channel 1 +5.33dB)</td></tr>
<tr><td>Bands TDD_C Note 5</td><td>-83.75</td></tr>
<tr><td>Bands TDD_E Note 5</td><td>-82.75</td></tr>
<tr><td colspan="6">Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 3: See Table A.9.1.7.2-1 for the other parameters.
Note 4: E-UTRA operating band groups are as defined in Section 3.5.
Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 20 MHz channel bandwidth.</td></tr>
</table>

A.9.1.13.3 Test Requirements

The test requirements defined in section A.9.1.7.3 shall apply to this test case.

A.9.1.14 FDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.9.1.14.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.5 and 9.1.2.6 for FDD intra-frequency RSRP measurements under time-domain measurement resource restriction with CRS Assistance Information and non-MBSFN ABS configured in the aggressor cells.

A.9.1.14.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.14.2-1 and A.9.1.14.2-2.

In the tests there are three synchronous cells, Cell 1, Cell2 and Cell 3, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 3. Cell 2 is the neighbour aggressor cell without CRS colliding to Cell 3. Cell 3 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 3 are measured for RSRP relative accuracy. Non-MBSFN ABS pattern is configured for Cell 1 and Cell 2 during the test.

The UE is configured by higher layers with a time domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells, namely Cell 3 measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement pattern and the CRS assistance information shall be provided via RRC to the UE before the measurements start.

Note: It's up to eNB's implementation whether the time domain measurement resource restriction pattern for PCell measurements is configured or not.

Table A.9.1.14.2-1: General test parameters for FDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

<table>
<tr><th colspan="2">Parameter</th><th>Unit</th><th>Value</th><th>Comment</th></tr>
<tr><td colspan="2">Serving cell (PCell)</td><td></td><td>Cell 1</td><td>The aggressor cell to Cell 3</td></tr>
<tr><td colspan="2">Neighbour cell</td><td></td><td>Cell 2</td><td>The aggressor cell to Cell 3</td></tr>
<tr><td colspan="2">Neighbour cell</td><td></td><td>Cell 3</td><td>Cell to be measured</td></tr>
<tr><td colspan="2">PCell ABS configuration</td><td></td><td>Non-MBSFN ABS</td><td>As defined in Table A.3.4.1.1-1</td></tr>
<tr><td colspan="2">CP length</td><td></td><td>Normal</td><td>For three cells in the test</td></tr>
<tr><td colspan="2">DRX</td><td></td><td></td><td>OFF</td></tr>
<tr><td colspan="2">Cell 2 time offset with respect to Cell 1</td><td></td><td>0µs</td><td>Synchronous cells</td></tr>
<tr><td colspan="2">Cell 3 time offset with respect to Cell 1</td><td></td><td>-2.5 µs</td><td>Synchronous cells</td></tr>
<tr><td colspan="2">Physical cell ID PCI</td><td></td><td>Colliding CRS: (PCI_{cell1} – PCI_{cell3})mod6=0, PCI_{cell1} not equal to PCI_{cell3}
Non-colliding CRS: (PCI_{cell2} – PCI_{cell3})mod6 !=0</td><td>Cell PCIs for three cells are selected randomly so that all conditions are met</td></tr>
<tr><td colspan="2">ABS pattern</td><td></td><td>'1000000010000000100000001000000010000000'</td><td>Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1.
The first/leftmost bit corresponds to the Pcell subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes in Cell 1.</td></tr>
<tr><td colspan="2">Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1</td><td></td><td>'1000000010000000100000001000000010000000'</td><td>Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5.
Configured before the measurements start. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.</td></tr>
<tr><td colspan="2">Time-domain measurement resource restriction pattern for serving cell measurements</td><td></td><td>'0100000001000000010000000100000001000000'</td><td>Configured for measurements on Cell 1.</td></tr>
<tr><td rowspan="3">CRS assistance information</td><td>physCellId</td><td rowspan="3"></td><td>see PCI conditions above</td><td rowspan="3">The CRS assistance information is provided for Cell 2 only in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation one Frame='000000'.</td></tr>
<tr><td>antennaPortsCount</td><td>1</td></tr>
<tr><td>mbsfn-SubframeConfigList</td><td>oneFrame = '000000'</td></tr>
</table>

Table A.9.1.14.2-2: Cell-specific test parameters for FDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter		Unit	Test 1			Test 2			Test 3		
			Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1			1			1		
$BW_{channel}$		MHz	10			10			10		
Measurement bandwidth		n_{PRB}	22—27			22—27			22—27		
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	-	R.0 FDD	-	-	R.0 FDD	-	-
PDSCH allocation		n_{PRB}	13—36	-	-	13—36	-	-	13—36	-	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD			R.6 FDD			R.6 FDD		
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and A.3.2.1.6 (OP.6 FDD)			OP.5 FDD	OP.6 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	OP.6 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	Note 6	0	Note 6	Note 6	0	Note 6	Note 6	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-106			-88			-116		
	Bands FDD_B								-115.5		
	Bands FDD_C								-115		
	Bands FDD_D								-114.5		
	Bands FDD_E, FDD_F Note 7								-114		
	Bands FDD_G Note 9								-113		
	Bands FDD_H								-112.5		
CRS $\hat{E}_s / N_{oc}$		dB	4	2	-1.5	4	2	-4	4	2	-4
CRS $\left(\hat{E}_s / I_{ot}\right)_{meas}$ Note 5		dB	-1.18	-0.32	-6.96	-0.75	0.54	-9.46	-0.75	0.54	-9.46
RSRP Note3,4,5	Bands FDD_A	dBm/15 kHz	-102	-104	-107.5	-84	-86	-92	-112	-114	-120
	Bands FDD_B								-111.5	-113.5	119.5
	Bands FDD_C								-111	-113	-119
	Bands FDD_D								-110.5	-112.5	-118.5
	Bands FDD_E, FDD_F Note 7								-110	-112	-118
	Bands FDD_G Note 9								-109	-111	-117
	Bands FDD_H								-108.5	-110.5	-116.5
$(\mathrm{Io})_{meas}$ Note 3,5	Bands FDD_A	dBm/9 MHz	-70.58	-74.43		-52.82	-57.04		-80.82	-85.04	
	Bands FDD_B								-80.32	-84.54	
	Bands FDD_C								-79.82	-84.04	
	Bands FDD_D								-79.32	-83.54	
	Bands FDD_E, FDD_F Note 7								-78.82	-83.04	
	Bands FDD_G Note 9								-77.82	-82.04	
	Bands FDD_H								-77.32	-81.54	
Propagation condition			AWGN			AWGN			AWGN		

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	Applies to restricted measurement subframes for only Cell 2 and Cell 3. For Cell 1, the corresponding value is derived from the normal subframes other than the subframes indicated in the time domain measurement resource restriction pattern for intra-frequency measurements.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.
Note 9:	Except Band 29 and Band 32.

A.9.1.14.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.5 and 9.1.2.6, respectively.

A.9.1.15 TDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.9.1.15.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.5 and 9.1.2.6 for TDD intra-frequency RSRP measurements under time-domain measurement resource restriction with CRS Assistance Information and non-MBSFN ABS configured in the aggressor cells.

A.9.1.15.2 Test parameters

In this set of test cases all cells are on the same carrier frequency as PCell. Both absolute and relative accuracy of RSRP intra-frequency measurements are tested, with test parameters specified in Tables A.9.1.15.2-1 and A.9.1.15.2-2.

In the tests there are three synchronous cells, Cell 1, Cell2 and Cell 3, on the same RF channel. In all test cases, Cell 1 is the serving cell (PCell) and also the aggressor cell to Cell 3. Cell 2 is the neighbour aggressor cell without CRS colliding to Cell 3. Cell 3 is the cell to be measured for RSRP absolute accuracy, whilst both Cell 1 and Cell 3 are measured for RSRP relative accuracy. Non-MBSFN ABS pattern is configured for Cell 1 and Cell 2 during the test.

The UE is configured by higher layers with a time domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells, namely Cell 3 measurements. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement pattern and the CRS assistance information shall be provided via RRC to the UE before the measurements start.

Note: It's up to eNB's implementation whether the time domain measurement resource restriction pattern for PCell measurements is configured or not.

Table A.9.1.15.2-1: General test parameters for TDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter		Unit	Value	Comment
Serving cell (PCell)			Cell 1	The aggressor cell to Cell 3
Neighbour cell			Cell 2	The aggressor cell to Cell 3
Neighbour cell			Cell 3	Cell to be measured
PCell ABS configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length			Normal	For three cells in the test
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
DRX				OFF
Cell 2 time offset with respect to Cell 1			0μs	Synchronous cells
Cell 3 time offset with respect to Cell 1			-2.5 μs	Synchronous cells
Physical cell ID PCI			Colliding CRS: (PCI_{cell1} – PCI_{cell3})mod6=0, PCI_{cell1} not equal to PCI_{cell3} Non-colliding CRS: (PCI_{cell2} – PCI_{cell3})mod6 !=0	Cell PCIs for three cells are selected randomly so that all conditions are met
ABS pattern			'00000000010000000001'	TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes. Provided to the UE for Cell 1 and Cell 2 before the measurements start.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1			'00000000010000000001'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Configured before the measurements start. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements			'10000000001000000000'	Configured for Cell 1 measurements.
CRS assistance information	physCellId		see PCI conditions above	The CRS assistance information is provided for Cell 2 only in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation *one Frame*='000000'.
	antennaPortsCount		1	
	mbsfn-SubframeConfigList		*oneFrame* = '000000'	

Table A.9.1.15.2-2: Cell-specific test parameters for TDD RSRP under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

Parameter		Unit	Test 1			Test 2			Test 3		
			Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1			1			1		
$BW_{channel}$		MHz	10			10			10		
Measurement bandwidth		n_{PRB}	22—27			22—27			22—27		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	-	R.0 TDD	-	-	R.0 TDD	-	-
PDSCH allocation		n_{PRB}	13—36	-	-	13—36	-	-	13—36	-	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD			R.6 TDD			R.6 TDD		
OCNG Patterns defined in A.3.2.2.5 (OP.5 TDD) and A.3.2.2.6 (OP.6 TDD)			OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6		0	Note 6		0	Note 6		0
N_{oc} Note2	Bands TDD_A	dBm/15 kHz	-106			-88			-116		
	Bands TDD_C								-115		
	Bands TDD_E								-114		
CRS $\hat{E}_s / N_{oc}$		dB	4	2	-1.5	4	2	-4	4	2	-4
CRS $\left(\hat{E}_s / I_{ot}\right)_{meas}$ Note 5		dB	-1.18	-0.32	-6.96	-0.75	0.54	-9.46	-0.75	0.54	-9.46
RSRP Note3,4,5	Bands TDD_A	dBm/15 kHz	-102	-104	-107.5	-84	-86	-92	-112	-114	-120
	Bands TDD_C								-111	-113	-119
	Bands TDD_E								-110	-112	-118
$(\mathrm{Io})_{meas}$ Note 3, 5	Bands TDD_A	dBm/9 MHz	-70.58	-74.43		-52.82	-57.04		-80.82	-85.04	
	Bands TDD_C								-79.82	-84.04	
	Bands TDD_E								-78.82	-83.04	
Propagation condition			AWGN			AWGN			AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: Applies to restricted measurement subframes for only Cell 2 and Cell 3. For Cell 1, the corresponding value is derived from the normal subframes other than the subframes indicated in the time domain measurement resource restriction pattern for intra-frequency measurements.
Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.15.3 Test Requirements

The absolute RSRP measurement accuracy and relative RSRP measurement accuracy shall fulfill the requirements in Sections 9.1.2.5 and 9.1.2.6, respectively.

A.9.1.16 FDD Intra frequency case for 5MHz Bandwidth

A.9.1.16.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.2.1 and 9.1.2.2 for FDD intra frequency measurements.

A.9.1.16.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.16.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.16.2-1: RSRP FDD Intra frequency test parameters for 5MHz Bandwidth

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	5		5		5	
Measurement bandwidth		n_{PRB}	10—15		10—15		10—15	
PDSCH Reference measurement channel defined in A.3.1.1.1-1			R.5 FDD	-	R.5 FDD	-	R.5 FDD	-
PDSCH allocation		n_{PRB}	7—17	-	7-17	-	7-17	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in **A.3.1.2.1-1**			R.11 FDD		R.11 FDD		R.11 FDD	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)			OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands FDD_N	dBm/15 kHz	-103		-83		-109.5	
$\hat{E}_s/I_{ot}$		dB	2.46	-5.97	2.46	-5.97	0.46	-5.76
RSRP Note3	Bands FDD_N	dBm/15 kHz	-97	-102	-77	-82	-106.5	-110.5
Io Note3	Bands FDD_N	dBm/4.5 MHz	-70.28		-50.28		-78.94	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.1.16.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.2.1 and 9.1.2.2.

A.9.1.17 FDD—FDD Inter frequency case for 5MHz Bandwidth

A.9.1.17.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.3.1 and 9.1.3.2 for FDD—FDD inter frequency measurements.

A.9.1.17.2 Test parameters

In this set of test cases the cells are on different carrier frequencies. Both absolute and relative accuracy of RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.17.2-1 In all test cases, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.1.17.2-1: RSRP FDD—FDD Inter frequency test parameters for 5MHz Bandwidth

Parameter		Unit	Test 1		Test 2	
			Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2
$BW_{channel}$		MHz	5	5	5	5
Gap Pattern Id			0	-	0	-
Measurement bandwidth		n_{PRB}	10—15		10—15	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.5 FDD	-	R.5 FDD	-
PDSCH allocation		n_{PRB}	7—17	-	7-17	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.11 FDD		R.11 FDD	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)			OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD
PBCH_RA		dB	0	0	0	0
PBCH_RB						
PSS_RA						
SSS_RA						
PCFICH_RB						
PHICH_RA						
PHICH_RB						
PDCCH_RA						
PDCCH_RB						
PDSCH_RA						
PDSCH_RB						
OCNG_RA Note1						
OCNG_RB Note1						
N_{oc} Note2	Cell 2: Bands FDD_N	dBm/15 kHz	-85.65	-85.65	-102.5	-110.5
$\hat{E}_s/I_{ot}$		dB	10	10	13	-4
RSRP Note3	Cell 2: Bands FDD_N	dBm/15 kHz	-75.65	-75.65	-89.5	-114.5
Io Note3	Cell 2: Bands FDD_N	dBm/4.5 MHz	-50.46	-50.46	-64.52	-84.27
$\hat{E}_s/N_{oc}$		dB	10	10	13	-4
Propagation condition		-	AWGN		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: For Band 26, the tests shall be performed with the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 6: This test is only applicable for testing inter-frequency requirements for Bands FDD_N. Cell 2 is on the Band under test, and Cell 1 is on another band supported by the UE.						

Table A.9.1.17.2-1: Void

A.9.1.17.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.3.1 and 9.1.3.2.

A.9.1.18 FDD RSRP for E-UTRAN Carrier Aggregation for 10MHz + 5MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.1.18.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.6.1.

A.9.1.18.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.18.2-1 will replace the values of corresponding parameters in Tables A.9.1.6.2-1.

Table A.9.1.18.2-1: RSRP FDD carrier aggregation test parameters

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Test 1</th></tr>
<tr><th>Cell 1</th><th>Cell 2</th><th>Cell 3</th></tr>
<tr><td colspan="2">$BW_{channel}$ Note 1</td><td>MHz</td><td>10</td><td colspan="2">5</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>n_{PRB}</td><td>22-27</td><td colspan="2">10-15</td></tr>
<tr><td colspan="2">PDSCH Reference measurement channel defined in A.3.1.1.1</td><td></td><td>R.0 FDD</td><td>R.5 FDD</td><td>N/A</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>n_{PRB}</td><td>13-36</td><td>7-17</td><td>N/A</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1</td><td></td><td>R.6 FDD</td><td colspan="2">R.11 FDD</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.1 (FDD)</td><td></td><td>OP.1 FDD</td><td>OP.15 FDD</td><td>OP.16 FDD</td></tr>
<tr><td rowspan="8">N_{oc} Note2</td><td>Bands FDD_A</td><td rowspan="8">dBm/15 kHz</td><td>-117</td><td colspan="2" rowspan="8">(N_{oc} for Channel 1 +1dB)</td></tr>
<tr><td>Bands FDD_B</td><td>-116.5</td></tr>
<tr><td>Bands FDD_C</td><td>-116</td></tr>
<tr><td>Bands FDD_D</td><td>-115.5</td></tr>
<tr><td>Bands FDD_E, FDD_F</td><td>-115</td></tr>
<tr><td>Bands FDD_G</td><td>-114</td></tr>
<tr><td>Bands FDD_H</td><td>-113.5</td></tr>
<tr><td>Bands FDD_N</td><td>N/A</td></tr>
<tr><td rowspan="8">RSRP Note2</td><td>Bands FDD_A</td><td rowspan="8">dBm/15 kHz</td><td>-121</td><td rowspan="8">(RSRP for Cell 1 +8dB)</td><td rowspan="8">(RSRP for Cell 1 +4dB)</td></tr>
<tr><td>Bands FDD_B</td><td>-120.5</td></tr>
<tr><td>Bands FDD_C</td><td>-120</td></tr>
<tr><td>Bands FDD_D</td><td>-119.5</td></tr>
<tr><td>Bands FDD_E, FDD_F</td><td>-119</td></tr>
<tr><td>Bands FDD_G</td><td>-118</td></tr>
<tr><td>Bands FDD_H</td><td>-117.5</td></tr>
<tr><td>Bands FDD_N</td><td>N/A</td></tr>
<tr><td rowspan="15">Io Note2</td><td>Bands FDD_A</td><td rowspan="7">dBm/9 MHz</td><td>-87.76</td><td colspan="2" rowspan="7">N/A</td></tr>
<tr><td>Bands FDD_B</td><td>-87.26</td></tr>
<tr><td>Bands FDD_C</td><td>-86.76</td></tr>
<tr><td>Bands FDD_D</td><td>-86.26</td></tr>
<tr><td>Bands FDD_E, FDD_F</td><td>-85.76</td></tr>
<tr><td>Bands FDD_G</td><td>-84.76</td></tr>
<tr><td>Bands FDD_H</td><td>-84.26</td></tr>
<tr><td>Bands FDD_A</td><td rowspan="8">dBm/4.5 MHz</td><td rowspan="8">N/A</td><td colspan="2" rowspan="7">(Io for Channel 1 +2.32dB)</td></tr>
<tr><td>Bands FDD_B</td></tr>
<tr><td>Bands FDD_C</td></tr>
<tr><td>Bands FDD_D</td></tr>
<tr><td>Bands FDD_E, FDD_F</td></tr>
<tr><td>Bands FDD_G</td></tr>
<tr><td>Bands FDD_H</td></tr>
<tr><td>Bands FDD_N</td><td colspan="2">-80.94</td></tr>
<tr><td colspan="6">Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 3: See Table A.9.1.6.2-1 for the other parameters.</td></tr>
</table>

A.9.1.18.3 Test Requirements

The test requirements defined in section A.9.1.6.3 shall apply to this test case.

A.9.1.19 TDD RSRP for E-UTRAN Carrier Aggregation for 10MHz + 5MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.1.19.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.7.1.

A.9.1.19.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.19.2-1 will replace the values of corresponding parameters in Tables A.9.1.7.2-1.

Table A.9.1.19.2-1: Carrier aggregation RSRP test parameters for TDD

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
$BW_{channel}$ Note 1		MHz	10	5	
Measurement bandwidth		n_{PRB}	22-27	10-15	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.5 TDD	N/A
PDSCH allocation		n_{PRB}	13-36	7-17	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	R.11 TDD	
OCNG Patterns defined in A.3.2.2 (TDD)			OP.1 TDD	OP.9 TDD	OP.10 TDD
Io Note2	Bands TDD_A	dBm/9 MHz	-87.76	N/A	
	Bands TDD_C		-86.76		
	Bands TDD_E		-85.76		
	Bands TDD_A	dBm/4.5MHz	N/A	(Io for Channel 1 +2.32dB)	
	Bands TDD_C				
	Bands TDD_E				
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 3: See Table A.9.1.7.2-1 for the other parameters.					

A.9.1.19.3 Test Requirements

The test requirements defined in section A.9.1.7.3 shall apply to this test case.

A.9.1.20 FDD RSRP for E-UTRAN Carrier Aggregation for 5MHz + 5MHz bandwidth

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.1.20.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.6.1.

A.9.1.20.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.20.2-1 will replace the values of corresponding parameters in Tables A.9.1.6.2-1.

Table A.9.1.20.2-1: RSRP FDD carrier aggregation test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
$BW_{channel}$ Note 1		MHz	5	5	5
Measurement bandwidth		n_{PRB}	10-15	10-15	10-15
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.5 FDD	N/A
PDSCH allocation		n_{PRB}	7-17	7-17	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.11 FDD	R.11 FDD	R.11 FDD
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.26 (OP.16 FDD)			OP.15 FDD	OP.15 FDD	OP.16 FDD
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands FDD_B		-116.5		
	Bands FDD_C		-116		
	Bands FDD_D		-115.5		
	Bands FDD_E, FDD_F		-115		
	Bands FDD_G		-114		
	Bands FDD_H		-113.5		
	Bands FDD_N		-110.5		
RSRP Note2	Bands FDD_A	dBm/15 kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands FDD_B		-120.5		
	Bands FDD_C		-120		
	Bands FDD_D		-119.5		
	Bands FDD_E, FDD_F		-119		
	Bands FDD_G		-118		
	Bands FDD_H		-117.5		
	Bands FDD_N		-114.5		
Io Note2	Bands FDD_A Note 5	dBm/4.5 MHz	-90.76	(Io for Channel 1 +5.33dB)	
	Bands FDD_B Note 5		-90.26		
	Bands FDD_C Note 5		-89.76		
	Bands FDD_D Note 5		-89.26		
	Bands FDD_E, FDD_F Note 5		-88.76		
	Bands FDD_G Note 5		-87.76		
	Bands FDD_H Note 5		-87.26		
	Bands FDD_N Note 5		-84.26		

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 2: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 3: See Table A.9.1.6.2-1 for the other parameters.
Note 4: E-UTRA operating band groups are as defined in Section 3.5.
Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 5MHz + 5MHz channel bandwidth.

A.9.1.20.3 Test Requirements

The test requirements defined in section A.9.1.6.3 shall apply to this test case.

A.9.1.21 TDD RSRP for E-UTRAN Carrier Aggregation for 5MHz + 5MHz bandwidth

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.1.21.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.7.1.

A.9.1.21.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.21.2-1 will replace the values of corresponding parameters in Tables A.9.1.7.2-1.

Table A.9.1.21.2-1: Carrier aggregation RSRP test parameters for TDD

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Test 1</th></tr>
<tr><th>Cell 1</th><th>Cell 2</th><th>Cell 3</th></tr>
<tr><td colspan="2">$BW_{channel}$ Note 1</td><td>MHz</td><td>5</td><td>5</td><td>5</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>n_{PRB}</td><td>10-15</td><td>10-15</td><td>10-15</td></tr>
<tr><td colspan="2">PDSCH Reference measurement channel defined in A.3.1.1.2</td><td></td><td>R.4 TDD</td><td>R.4 TDD</td><td>N/A</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>n_{PRB}</td><td>7-17</td><td>7-17</td><td>N/A</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2</td><td></td><td colspan="3">R.11 TDD</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.1.2.9 (OP.9 TDD) and A.3.2.2.10 (OP.10 TDD)</td><td></td><td>OP.9 TDD</td><td>OP.9 TDD</td><td>OP.10 TDD</td></tr>
<tr><td rowspan="3">Io Note2</td><td>Bands TDD_A Note 5</td><td rowspan="3">dBm/4.5MHz</td><td>-90.76</td><td colspan="2" rowspan="3">(Io for Channel 1 +5.33dB)</td></tr>
<tr><td>Bands TDD_C Note 5</td><td>-89.76</td></tr>
<tr><td>Bands TDD_E Note 5</td><td>-88.76</td></tr>
<tr><td colspan="6">Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 3: See Table A.9.1.7.2-1 for the other parameters.
Note 4: E-UTRA operating band groups are as defined in Section 3.5.
Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 5MHz + 5MHz channel bandwidth.</td></tr>
</table>

A.9.1.21.3 Test Requirements

The test requirements defined in section A.9.1.7.3 shall apply to this test case.

A.9.1.22 RSRP for E-UTRAN TDD-FDD Carrier Aggregation with PCell in FDD

A.9.1.22.1 Test Purpose and Environment

The test case is applicable for TDD-FDD carrier aggregation capable UEs which have been configured with a downlink PCell in FDD and a downlink SCell in TDD.

The purpose of this test is to verify that the RSRP absolute and relative measurements accuracy in TDD-FDD carrier aggregation is within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2, the relative RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2 between the SCell and a neighbour cell, and the relative RSRP accuracy requirements of the PCell compared to the SCell defined in Clause 9.1.11.3.

A.9.1.22.2 Test parameters

In this test case, Cell 1 is the PCell on the FDD primary component carrier, Cell 2 is the configured and activated SCell on the TDD secondary component carrier, and Cell 3 is the neighboring cell on the TDD secondary component carrier. The test parameters are given in Table A.9.1.22.2-1.

Table A.9.1.22.2-1: RSRP TDD-FDD carrier aggregation test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell3
E-UTRA RF Channel Number			1	2	2
$BW_{channel}$			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
Special subframe configuration[Note9]			-	6	6
Uplink-downlink configuration[Note9]			-	1	1
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reference measurement channel defined in A.3.1.1.1 and A.3.1.1.2			5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	-
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1 and A.3.1.2.2			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD), A.3.2.2.1 (OP.1 TDD), and A.3.2.2.2 (OP.2 TDD)			5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD
N_{oc} [Note2]	Bands FDD_A	dBm/15 kHz	-117	-	
	Bands FDD_B		-116.5	-	
	Bands FDD_C		-116	-	
	Bands FDD_D		-115.5	-	
	Bands FDD_E, FDD_F [Note 6]		-115	-	
	Bands FDD_G		-114	-	
	Bands FDD_H		-113.5	-	
	Bands TDD_A		-	(N_{oc} for Channel 1 +1dB)	
	Bands TDD_C		-		
	Bands TDD_E		-		
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
$\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76
RSRP[Note3]	Bands FDD_A	dBm/15 kHz	-121	-	-
	Bands FDD_B		-120.5	-	-
	Bands FDD_C		-120	-	-
	Bands FDD_D		-119.5	-	-

	Bands FDD_E, FDD_F [Note 6]		-119	-	-
	Bands FDD_G		-118	-	-
	Bands FDD_H		-117.5	-	-
	Bands TDD_A		-	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands TDD_C		-		
	Bands TDD_E		-		
Io [Note3]	Bands FDD_A	$dBm/BW_{channel}$	$-87.76 + 10\log(N_{RB,c}/50)$	-	
	Bands FDD_B		$-87.26 + 10\log(N_{RB,c}/50)$	-	
	Bands FDD_C		$-86.76+ 10\log(N_{RB,c}/50)$	-	
	Bands FDD_D		$-86.26+ 10\log(N_{RB,c}/50)$	-	
	Bands FDD_E, FDD_F [Note 6]		$-85.76+ 10\log(N_{RB,c}/50)$	-	
	Bands FDD_G		$-84.76+ 10\log(N_{RB,c}/50)$	-	
	Bands FDD_H		$-84.26+ 10\log(N_{RB,c}/50)$	-	
	Bands TDD_A		-	(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel2}$ / $N_{RB\ channel\ 1}$))	
	Bands TDD_C		-		
	Bands TDD_E		-		
Propagation condition		-	AWGN	AWGN	AWGN
Antenna Configuration		-	1x2	1x2	1x2
Timing offset to cell 1		µs	-	0	3
Time alignment error relative to cell 1 [Note 8]		-	-	≤ TAE	-

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.
Note 4: Es/Iot, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 8: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.22.3 Test Requirements

In the test, the performance of RSRP measurements is verified from following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.

- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.A.9.1.23 RSRP for E-UTRAN TDD-FDD Carrier Aggregation with PCell in TDD

A.9.1.23.1 Test Purpose and Environment

The test case is applicable for TDD-FDD carrier aggregation capable UEs which have been configured with a downlink PCell in TDD and a downlink SCell in FDD.

The purpose of this test is to verify that the RSRP absolute and relative measurements accuracy in TDD-FDD carrier aggregation is within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2, the relative RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.11.2 between the SCell and a neighbour cell, and the relative RSRP accuracy requirements of the PCell compared to the SCell defined in Clause 9.1.11.3.

A.9.1.23.2 Test parameters

In this test case, Cell 1 is the PCell on the TDD primary component carrier, Cell 2 is the configured and activated SCell on the FDD secondary component carrier, and Cell 3 is the neighboring cell on the FDD secondary component carrier. The test parameters are given in Table A.9.1.23.2-1.

Table A.9.1.23.2-1: RSRP TDD-FDD carrier aggregation test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell3
E-UTRA RF Channel Number			1	2	2
$BW_{channel}$			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
Special subframe configuration Note1			6	-	-
Uplink-downlink configuration Note1			1	-	-
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reference measurement channel defined in A.3.1.1.1 and A.3.1.1.2			5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	-
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1 and A.3.1.2.2			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD), A.3.2.2.1 (OP.1 TDD), and A.3.2.1.2 (OP.2 FDD)			5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD
N_{oc} Note 3	Bands FDD_A	dBm/15 kHz	-	(N_{oc} for Channel 1 +1dB)	
	Bands FDD_B		-		
	Bands FDD_C		-		
	Bands FDD_D		-		
	Bands FDD_E, FDD_F Note 9		-		
	Bands FDD_G		-		
	Bands FDD_H		-		
	Bands TDD_A		-117	-	
	Bands TDD_C		-116	-	
	Bands TDD_E		-115	-	
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
$\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76
RSRP Note 4	Bands FDD_A	dBm/15 kHz	-	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands FDD_B		-		
	Bands FDD_C		-		
	Bands FDD_D		-		

	Bands FDD_E, FDD_F Note 9		-		
	Bands FDD_G		-		
	Bands FDD_H		-		
	Bands TDD_A		-121	-	-
	Bands TDD_C		-120		
	Bands TDD_E		-119		
Io Note 4	Bands FDD_A	dBm/ $BW_{channel}$	-	(Io for Channel 1 +5.33dB+10log ($N_{RB\ channel2}$ / $N_{RB\ channel\ 1}$))	
	Bands FDD_B		-		
	Bands FDD_C		-		
	Bands FDD_D		-		
	Bands FDD_E, FDD_F Note 9		-		
	Bands FDD_G		-		
	Bands FDD_H		-		
	Bands TDD_A		-87.76 + 10log($N_{RB,c}$/50)	-	
	Bands TDD_C		-86.76 + 10log($N_{RB,c}$/50)	-	
	Bands TDD_E		-85.76 + 10log($N_{RB,c}$/50)	-	
Propagation condition		-	AWGN	AWGN	AWGN
Antenna Configuration		-	1x2	1x2	1x2
Timing offset to cell 1		µs	-	0	3
Time alignment error relative to cell 1 Note 8		-	-	≤ TAE	-

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Es/Iot, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 8: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.23.3 Test Requirements

In the test, the performance of RSRP measurements is verified from following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.

- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.A.9.1.24 TDD RSRP for E-UTRAN Carrier Aggregation for 20MHz + 10MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.1.24.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.1.7.1.

A.9.1.24.2 Test parameters

The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.1.24.2-1 will replace the values of corresponding parameters in Tables A.9.1.7.2-1.

Table A.9.1.24.2-1: Carrier aggregation RSRP test parameters for TDD

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
$BW_{channel}$ Note 1		MHz	20	10	
Measurement bandwidth		n_{PRB}	47-52	22-27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.3 TDD	R.0 TDD	N/A
PDSCH allocation		n_{PRB}	38-61	13-36	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.10 TDD	R.6 TDD	
OCNG Patterns defined in A.3.2.2 (TDD)			OP.7 TDD	OP.1 TDD	OP.2 TDD
Io Note2	Bands TDD_A	dBm/18 MHz	-84.76	N/A	
	Bands TDD_C		-83.76		
	Bands TDD_E		-82.76		
	Bands TDD_A	dBm/9MHz	N/A	(Io for Channel 1 +2.33dB)	
	Bands TDD_C				
	Bands TDD_E				
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 3: See Table A.9.1.7.2-1 for the other parameters.					

A.9.1.24.3 Test Requirements

The test requirements defined in section A.9.1.7.3 shall apply to this test case.

A.9.1.25 FDD intra-frequency absolute and relative RSRP accuracies in CRS based discovery signal

A.9.1.25.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative measurement accuracies in CRS based discovery signal are within the specified limits. This test will verify the requirements in Sections 9.1.14.2.

A.9.1.25.2 Test parameters

In this test case, all cells are on the same carrier frequency. Both absolute and relative accuracies of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.25.2-1. In this test case, Cell 1 is the PCell and Cell 2 is the target cell. The Cell 2 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.1.25.2-1: RSRP FDD Intra frequency test parameters

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	
$BW_{channel}$		MHz	10	
Measurement bandwidth		n_{PRB}	22—27	
DTMC period		ms	N/A	160
DTMC period offset			N/A	10
Discovery signal occasion duration		ms	N/A	1
Time offset between cells		µs	2.3	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note1				
OCNG_RB Note1				
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-106	-106
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, FDD_F Note 5			
	Bands FDD_G Note 7			
	Bands FDD_H			
$\hat{E}_s/I_{ot}$		dB	2.5	-6
RSRP Note3	Bands FDD_A	dBm/15 kHz	-100	-105
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, FDD_F Note 5			
	Bands FDD_G Note 7			
	Bands FDD_H			
Io Note3	Bands FDD_A	dBm/9 MHz	-70.27	-70.27
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, FDD_F Note 5			
	Bands FDD_G Note 7			
	Bands FDD_H			
$\hat{E}_s/N_{oc}$		dB	6	1
Propagation condition		-	AWGN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.

A.9.1.25.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.2.

A.9.1.26 TDD intra-frequency absolute and relative RSRP accuracies in CRS based discovery signal

A.9.1.26.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP absolute and relative measurement accuracies in CRS based discovery signal are within the specified limits. This test will verify the requirements in Sections 9.1.14.2.

A.9.1.26.2 Test parameters

In this test case all cells are on the same carrier frequency. Both absolute and relative accuracies of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.26.2-1. In this test case, Cell 1 is the PCell and Cell 2 is the target cell. The Cell 2 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.1.26.2-1: RSRP TDD Intra frequency test parameters

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Test 1</th></tr>
<tr><th>Cell 1</th><th>Cell 2</th></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td colspan="2">1</td></tr>
<tr><td colspan="2">$BW_{channel}$</td><td>MHz</td><td colspan="2">10</td></tr>
<tr><td colspan="2">Special subframe configuration[Note1]</td><td></td><td colspan="2">6</td></tr>
<tr><td colspan="2">Uplink/downlink configuration[Note1]</td><td></td><td colspan="2">1</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>n_{PRB}</td><td colspan="2">22—27</td></tr>
<tr><td colspan="2">DTMC period</td><td>ms</td><td>N/A</td><td>160</td></tr>
<tr><td colspan="2">DTMC period offset</td><td></td><td>N/A</td><td>10</td></tr>
<tr><td colspan="2">Discovery signal occasion duration</td><td>ms</td><td>N/A</td><td>2</td></tr>
<tr><td colspan="2">Time offset between cells</td><td>µs</td><td colspan="2">2.3</td></tr>
<tr><td colspan="2">PDSCH Reference measurement channel defined in A.3.1.1.2</td><td></td><td>R.0 TDD</td><td>-</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>n_{PRB}</td><td>13—36</td><td>-</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2</td><td></td><td colspan="2">R.6 TDD</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)</td><td></td><td>OP.1 TDD</td><td>OP.2 TDD</td></tr>
<tr><td colspan="2">PBCH_RA</td><td rowspan="13">dB</td><td rowspan="13">0</td><td rowspan="13">0</td></tr>
<tr><td colspan="2">PBCH_RB</td></tr>
<tr><td colspan="2">PSS_RA</td></tr>
<tr><td colspan="2">SSS_RA</td></tr>
<tr><td colspan="2">PCFICH_RB</td></tr>
<tr><td colspan="2">PHICH_RA</td></tr>
<tr><td colspan="2">PHICH_RB</td></tr>
<tr><td colspan="2">PDCCH_RA</td></tr>
<tr><td colspan="2">PDCCH_RB</td></tr>
<tr><td colspan="2">PDSCH_RA</td></tr>
<tr><td colspan="2">PDSCH_RB</td></tr>
<tr><td colspan="2">OCNG_RA[Note2]</td></tr>
<tr><td colspan="2">OCNG_RB[Note2]</td></tr>
<tr><td rowspan="3">N_{oc} [Note3]</td><td>Bands TDD_A</td><td rowspan="3">dBm/15 kHz</td><td rowspan="3">-106</td><td rowspan="3">-106</td></tr>
<tr><td>Bands TDD_C</td></tr>
<tr><td>Bands TDD_E</td></tr>
<tr><td colspan="2">$\hat{E}_s/I_{ot}$</td><td>dB</td><td>2.5</td><td>-6</td></tr>
<tr><td rowspan="3">RSRP[Note4]</td><td>Bands TDD_A</td><td rowspan="3">dBm/15 kHz</td><td rowspan="3">-100</td><td rowspan="3">-105</td></tr>
<tr><td>Bands TDD_C</td></tr>
<tr><td>Bands TDD_E</td></tr>
<tr><td rowspan="3">Io[Note4]</td><td>Bands TDD_A</td><td rowspan="3">dBm/9 MHz</td><td rowspan="3">-70.27</td><td rowspan="3">-70.27</td></tr>
<tr><td>Bands TDD_C</td></tr>
<tr><td>Bands TDD_E</td></tr>
<tr><td colspan="2">$\hat{E}_s/N_{oc}$</td><td>dB</td><td>6</td><td>1</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td colspan="2">AWGN</td></tr>
</table>

Note 1:	For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.26.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14. 2.

A.9.1.27 FDD—FDD inter-frequency absolute and relative RSRP accuracies in CRS based discovery signal

A.9.1.27.1 Test Purpose and Environment

The purpose of this test is to verify that the CRS RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.2 for FDD—FDD inter frequency measurements.

A.9.1.27.2 Test parameters

In this set of test case the cells are on different carrier frequencies. Both absolute and relative accuracy of CRS RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.27.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap and a DMTC configuation.

Table A.9.1.27.2-1: CRS RSRP FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	2
$BW_{channel}$		MHz	10	10
Gap Pattern Id			0	-
gapOffset		ms	9	
DMTC period		ms	-	160
DMTC period offset		ms	-	10
Discovery signal occasion duration		ms	-	1
Time offset between cells		µs	-	3
Measurement bandwidth		n_{PRB}	22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note1				
OCNG_RB Note1				
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	(N_{oc} for Channel 2 +6dB)	-115
	Bands FDD_B			-114.5
	Bands FDD_C			-114
	Bands FDD_D			-113.5
	Bands FDD_E, FDD_F Note 5			-113
	Bands FDD_G Note 7			-112
	Bands FDD_H			-111.5
$\hat{E}_s/I_{ot}$		dB	13	-6
RSRP Note3	Bands FDD_A	dBm/15 kHz	(RSRP for Cell 2 +25dB)	-121
	Bands FDD_B			-120.5
	Bands FDD_C			-120
	Bands FDD_D			-119.5
	Bands FDD_E, FDD_F Note 5			-119
	Bands FDD_G Note 7			-118
	Bands FDD_H			-117.5
Io Note3	Bands FDD_A	dBm/9 MHz	(Io for Channel 2 +19.68dB)	-86.25
	Bands FDD_B			-85.75
	Bands FDD_C			-85.25
	Bands FDD_D			-84.75
	Bands FDD_E, FDD_F Note 5			-84.25
	Bands FDD_G Note 7			-83.25
	Bands FDD_H			-82.75

$\hat{E}_s/N_{oc}$	dB	13	-6
Propagation condition	-	AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: For Band 26, the tests shall be performed with the carrier frequency of assigned E-UTRA channel bandwidth within 865-894 MHz. Note 6: E-UTRA operating band groups are as defined in Section 3.5. Note 7: Except Band 29 and Band 32. Note 8: DMTC is provided to the UE in the *measDS-Config* (in TS36.331) before the beginning of the test			

A.9.1.27.3 Test Requirements

The CRS RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.2.

A.9.1.28 TDD—TDD inter-frequency absolute and relative RSRP accuracies in CRS based discovery signal

A.9.1.28.1 Test Purpose and Environment

The purpose of this test is to verify that the CRS RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.2 for TDD—TDD inter frequency measurements.

A.9.1.28.2 Test parameters

In this set of test case the cells are on different carrier frequencies. Both absolute and relative accuracy of CRS RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.28.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap and a DMTC configuation.

Table A.9.1.28.2-1: CRS RSRP TDD—TDD Inter frequency test parameters

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Test 1</th></tr>
<tr><th>Cell 1</th><th>Cell 2</th></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>2</td></tr>
<tr><td colspan="2">$BW_{channel}$</td><td>MHz</td><td>10</td><td>10</td></tr>
<tr><td colspan="2">Special subframe configuration[Note1]</td><td></td><td colspan="2">6</td></tr>
<tr><td colspan="2">Uplink-downlink configuration[Note1]</td><td></td><td colspan="2">1</td></tr>
<tr><td colspan="2">Gap Pattern Id</td><td></td><td>0</td><td>-</td></tr>
<tr><td colspan="2">gapOffset</td><td>ms</td><td>9</td><td></td></tr>
<tr><td colspan="2">DMTC period</td><td>ms</td><td>-</td><td>160</td></tr>
<tr><td colspan="2">DMTC period offset</td><td>ms</td><td>-</td><td>10</td></tr>
<tr><td colspan="2">Discovery signal occasion duration</td><td>ms</td><td>-</td><td>2</td></tr>
<tr><td colspan="2">Time offset between cells</td><td>µs</td><td>-</td><td>3</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>n_{PRB}</td><td colspan="2">22—27</td></tr>
<tr><td colspan="2">PDSCH Reference measurement channel defined in A.3.1.1.2</td><td></td><td>R.0 TDD</td><td>-</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>n_{PRB}</td><td>13—36</td><td>-</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2</td><td></td><td colspan="2">R.6 TDD</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)</td><td></td><td>OP.1 TDD</td><td>OP.2 TDD</td></tr>
<tr><td colspan="2">PBCH_RA</td><td rowspan="13">dB</td><td rowspan="13">0</td><td rowspan="13">0</td></tr>
<tr><td colspan="2">PBCH_RB</td></tr>
<tr><td colspan="2">PSS_RA</td></tr>
<tr><td colspan="2">SSS_RA</td></tr>
<tr><td colspan="2">PCFICH_RB</td></tr>
<tr><td colspan="2">PHICH_RA</td></tr>
<tr><td colspan="2">PHICH_RB</td></tr>
<tr><td colspan="2">PDCCH_RA</td></tr>
<tr><td colspan="2">PDCCH_RB</td></tr>
<tr><td colspan="2">PDSCH_RA</td></tr>
<tr><td colspan="2">PDSCH_RB</td></tr>
<tr><td colspan="2">OCNG_RA[Note2]</td></tr>
<tr><td colspan="2">OCNG_RB[Note2]</td></tr>
<tr><td rowspan="3">N_{oc} [Note3]</td><td>Bands TDD_A</td><td rowspan="3">dBm/15 kHz</td><td rowspan="3">(N_{oc} for Channel 2 +6dB)</td><td>-115</td></tr>
<tr><td>Bands TDD_C</td><td>-114</td></tr>
<tr><td>Bands TDD_E</td><td>-113</td></tr>
<tr><td colspan="2">$\hat{E}_s/I_{ot}$</td><td>dB</td><td>13</td><td>-6</td></tr>
<tr><td rowspan="3">RSRP[Note4]</td><td>Bands TDD_A</td><td rowspan="3">dBm/15 kHz</td><td rowspan="3">(RSRP for Cell 2 +25dB)</td><td>-121</td></tr>
<tr><td>Bands TDD_C</td><td>-120</td></tr>
<tr><td>Bands TDD_E</td><td>-119</td></tr>
<tr><td rowspan="3">Io[Note4]</td><td>Bands TDD_A</td><td rowspan="3">dBm/9 MHz</td><td rowspan="3">(Io for Channel 2 +19.68dB)</td><td>-86.25</td></tr>
<tr><td>Bands TDD_C</td><td>-85.25</td></tr>
<tr><td>Bands TDD_E</td><td>-84.25</td></tr>
<tr><td colspan="2">$\hat{E}_s/N_{oc}$</td><td>dB</td><td>13</td><td>-6</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td colspan="2">AWGN</td></tr>
<tr><td colspan="5">Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.</td></tr>
</table>

Note 4:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	DMTC is provided to the UE in the measDS-Config (in TS36.331) before the beginning of test

A.9.1.28.3 Test Requirements

The CRS RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.2.

A.9.1.29 FDD intra frequency absolute and relative CSI-RSRP accuracies in CSI-RS based discovery signal

A.9.1.29.1 Test Purpose and Environment

The purpose of this test is to verify that the CSI- RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.3 for FDD intra frequency measurements.

A.9.1.29.2 Test parameters

In this set of test case all cells are on the same carrier frequencies. Both absolute and relative accuracy of CSI- RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.29.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The intra frequency measurements are supported by a DMTC configuration.

Table A.9.1.29.2-1: CSI-RSRP FDD Intra frequency test parameters

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	
$BW_{channel}$		MHz	10	
DMTC period		ms	160	
DMTC period offset		ms	10	
Discovery signal occasion duration		ms	1	
CSI-RS resource configuration			2	4
CSI-RS periodicity		ms	10	
CSI-RS subframe offset		ms	0	
CSI-RS individual offset[2]		dB	0	0
CSI-RS muting			Enable	Enable
Time offset between cells		μs	-	2.3
Measurement bandwidth		n_{PRB}	22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note1				
OCNG_RB Note1				
p-C-r10[2]		dB	6	6
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-116	
	Bands FDD_B		-115.5	
	Bands FDD_C		-115	
	Bands FDD_D		-114.5	
	Bands FDD_E, FDD_F Note 5		-114	
	Bands FDD_G Note 7		-113	
	Bands FDD_H		-112.5	
CRS $\hat{E}_s/I_{ot}$		dB	0.46	-5.76
CSI-RS $\hat{E}_s/I_{ot}$		dB	6.46	0.24
RSRP Note3	Bands FDD_A	dBm/15 kHz	-113	-117
	Bands FDD_B		-112.5	-116.5
	Bands FDD_C		-112	-116
	Bands FDD_D		-111.5	-115.5
	Bands FDD_E, FDD_F Note 5		-111	-115
	Bands FDD_G Note 7		-110	-114
	Bands FDD_H		-109.5	-113.5
CSI-RSRP Note3	Bands FDD_A	dBm/15 kHz	(RSRP for Cell 1 +6dB)	(RSRP for Cell 2 +6dB)
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			

	Bands FDD_E, FDD_F Note 5			
	Bands FDD_G Note 7			
	Bands FDD_H			
Io Note3	Bands FDD_A	dBm/9 MHz	-82.43	
	Bands FDD_B		-81.93	
	Bands FDD_C		-81.43	
	Bands FDD_D		-80.93	
	Bands FDD_E, FDD_F Note 5		-80.43	
	Bands FDD_G Note 7		-79.43	
	Bands FDD_H		-78.93	
CRS $\hat{E}_s/N_{oc}$		dB	3	-1
CSI-RS $\hat{E}_s/N_{oc}$		dB	9	5
Propagation condition		-	AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: For Band 26, the tests shall be performed with the carrier frequency of assigned E-UTRA channel bandwidth within 865-894 MHz. Note 6: E-UTRA operating band groups are as defined in Section 3.5. Note 7: Except Band 29 and Band 32. Note 8: DMTC is provided to the UE in the *measDS-Config* (in TS36.331) before the beginning of the test				

A.9.1.29.3 Test Requirements

The CSI- RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.3.

A.9.1.30 TDD intra frequency absolute and relative CSI-RSRP accuracies in CSI-RS based discovery signal

A.9.1.30.1 Test Purpose and Environment

The purpose of this test is to verify that the CSI- RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.3 for TDD intra frequency measurements.

A.9.1.30.2 Test parameters

In this set of test case all cells are on the same carrier frequencies. Both absolute and relative accuracy of CSI- RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.30.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The intra frequency measurements are supported by a DMTC configuation.

Table A.9.1.30.2-1: CSI-RSRP TDD Intra frequency test parameters

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	
$BW_{channel}$		MHz	10	
Special subframe configuration[Note1]			6	
Uplink-downlink configuration[Note1]			1	
DMTC period		ms	160	
DMTC period offset		ms	10	
Discovery signal occasion duration		ms	2	
CSI-RS resource configuration			2	4
CSI-RS periodicity		ms	10	
CSI-RS subframe offset		ms	0	
CSI-RS individual offset[2]		dB	0	0
CSI-RS muting			Enable	Enable
Time offset between cells		µs	-	2.3
Measurement bandwidth		n_{PRB}	22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA[Note1]				
OCNG_RB[Note1]				
p-C-r10[2]		dB	6	6
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-116	
	Bands TDD_C		-115	
	Bands TDD_E		-114	
CRS $\hat{E}_s / I_{ot}$		dB	0.46	-5.76
CSI-RS $\hat{E}_s / I_{ot}$		dB	6.46	0.24
RSRP[Note3]	Bands TDD_A	dBm/15 kHz	-113	-117
	Bands TDD_C		-112	-116
	Bands TDD_E		-111	-115
CSI-RSRP [Note3]	Bands TDD_A	dBm/15 kHz	(RSRP for Cell 1 +6dB)	(RSRP for Cell 2 +6dB)
	Bands TDD_C			
	Bands TDD_E			
Io[Note3]	Bands TDD_A	dBm/9 MHz	-82.43	
	Bands TDD_C		-81.43	
	Bands TDD_E		-80.43	
CRS $\hat{E}_s / N_{oc}$		dB	3	-1
CSI-RS $\hat{E}_s / N_{oc}$		dB	9	5
Propagation condition		-	AWGN	
Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211. Note 2: OCNG shall be used such that both cells are fully allocated and a				

	constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	DMTC is provided to the UE in the *measDS-Config* (in TS36.331) before the beginning of the test.

A.9.1.30.3 Test Requirements

The CSI- RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.3.

A.9.1.31 FDD—FDD inter-frequency absolute and relative CSI-RSRP accuracies in CSI-RS based discovery signal

A.9.1.31.1 Test Purpose and Environment

The purpose of this test is to verify that the CSI-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.3 for FDD—FDD inter frequency measurements.

A.9.1.31.2 Test parameters

In this set of test case the cells are on different carrier frequencies. Both absolute and relative accuracy of CSI-RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.31.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap and two DMTC configurations which one is for cell1 and the other is for cell2.

Table A.9.1.31.2-1: CSI-RSRP FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	2
$BW_{channel}$		MHz	10	10
Gap Pattern Id			0	-
gapOffset		ms	9	
DMTC period		ms	160	160
DMTC period offset		ms	0	10
Discovery signal occasion duration		ms	1	1
CSI-RS resource configuration			2	4
CSI-RS periodicity		ms	10	
CSI-RS subframe offset		ms	0	
CSI-RS individual offset[2]		dB	0	0
CSI-RS muting			Enable	Enable
Time offset between cells		µs	-	3
Measurement bandwidth		n_{PRB}	22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note1				
OCNG_RB Note1				
p-C-r10[2]		dB	0	6
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	(N_{oc} for Channel 2 +6dB)	-115
	Bands FDD_B			-114.5
	Bands FDD_C			-114
	Bands FDD_D			-113.5
	Bands FDD_E, FDD_F Note 5			-113
	Bands FDD_G Note 7			-112
	Bands FDD_H			-111.5
CRS $\hat{E}_s/I_{ot}$		dB	13	-6
CSI-RS $\hat{E}_s/I_{ot}$		dB	13	0
RSRP Note3	Bands FDD_A	dBm/15 kHz	(RSRP for Cell 2 +25dB)	-121
	Bands FDD_B			-120.5
	Bands FDD_C			-120
	Bands FDD_D			-119.5
	Bands FDD_E, FDD_F Note 5			-119
	Bands FDD_G Note 7			-118
	Bands FDD_H			-117.5

CSI-RSRP Note3	Bands FDD_A	dBm/15 kHz	(RSRP for Cell 1 +0dB)	(RSRP for Cell 2 +6dB)
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, FDD_F Note 5			
	Bands FDD_G Note 7			
	Bands FDD_H			
Io Note3	Bands FDD_A	dBm/9 MHz	(Io for Channel 2 +19.68dB)	-86.25
	Bands FDD_B			-85.75
	Bands FDD_C			-85.25
	Bands FDD_D			-84.75
	Bands FDD_E, FDD_F Note 5			-84.25
	Bands FDD_G Note 7			-83.25
	Bands FDD_H			-82.75
CRS $\hat{E}_s/N_{oc}$		dB	13	-6
CSI-RS $\hat{E}_s/N_{oc}$		dB	13	0
Propagation condition		-	AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: For Band 26, the tests shall be performed with the carrier frequency of assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.
Note 7: Except Band 29 and Band 32.
Note 8: DMTC is provided to the UE in the *measDS-Config* (in TS36.331) before the beginning of the test

A.9.1.31.3 Test Requirements

The CSI-RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.3.

A.9.1.32 TDD—TDD inter-frequency absolute and relative CSI-RSRP accuracies in CSI-RS based discovery signal

A.9.1.32.1 Test Purpose and Environment

The purpose of this test is to verify that the CSI-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.14.3 for TDD—TDD inter frequency measurements.

A.9.1.32.2 Test parameters

In this set of test case the cells are on different carrier frequencies. Both absolute and relative accuracy of CSI-RSRP inter-frequency measurements are tested by using the parameters in Table A.9.1.32.2-1. In this test case, Cell 1 is the PCell and Cell 2 the target cell. The inter frequency measurements are supported by a measurement gap and two DMTC configurations which one is for cell 1 and the other is for cell2.

Table A.9.1.32.2-1: CSI-RSRP TDD—TDD Inter frequency test parameters

Parameter		Unit	Test 1 Cell 1	Test 1 Cell 2
E-UTRA RF Channel Number			1	2
$BW_{channel}$		MHz	10	10
Special subframe configuration[Note1]			6	
Uplink-downlink configuration[Note1]			1	
Gap Pattern Id			0	-
gapOffset		ms	9	
DMTC period		ms	160	160
DMTC period offset		ms	0	10
Discovery signal occasion duration		ms	2	2
CSI-RS resource configuration			2	4
CSI-RS periodicity		ms	10	
CSI-RS subframe offset		ms	0	
CSI-RS individual offset[2]		dB	0	0
CSI-RS muting			Enable	Enable
Time offset between cells		µs	-	3
Measurement bandwidth		n_{PRB}	22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA[Note2]				
OCNG_RB[Note2]				
p-C-r10[2]		dB	0	6
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	(N_{oc} for Channel 2 +6dB)	-115
	Bands TDD_C			-114
	Bands TDD_E			-113
CRS $\hat{E}_s/I_{ot}$		dB	13	-6
CSI-RS $\hat{E}_s/I_{ot}$		dB	13	0
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	(RSRP for Cell 2 +25dB)	-121
	Bands TDD_C			-120
	Bands TDD_E			-119
CSI-RSRP [Note3]	Bands TDD_A	dBm/15 kHz	(RSRP for Cell 1 +0dB)	(RSRP for Cell 2 +6dB)
	Bands TDD_C			
	Bands TDD_E			
Io[Note4]	Bands TDD_A	dBm/9 MHz	(Io for Channel 2 +19.68dB)	-86.25
	Bands TDD_C			-85.25
	Bands TDD_E			-84.25

CRS $\hat{E}_s/N_{oc}$	dB	13	-6
CSI-RS $\hat{E}_s/N_{oc}$	dB	13	0
Propagation condition	-	AWGN	
Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211. Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe. Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 6: E-UTRA operating band groups are as defined in Section 3.5. Note 7: DMTC is provided to the UE in the measDS-Config (in TS36.331) before the beginning of test.			

A.9.1.32.3 Test Requirements

The CSI-RSRP measurement accuracy shall fulfil the requirements in sections 9.1.14.3.

A.9.1.33 FDD absolute and relative RSRP accuracies for E-UTRAN Carrier Aggregation in CRS based discovery signal

A.9.1.33.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative measurement accuracies in carrier aggregation in CRS based discovery signal are within the specified limits. This test will verify the absolute RSRP accuracy requirement of the secondary component carrier defined in clause 9.1.15.1.2, and the relative RSRP accuracy requirement of the secondary component carrier defined in clause 9.1.15.1.2. The test will also verify the primary and secondary component carrier relative RSRP accuracy requirement defined in Clause 9.1.15.1.3.

A.9.1.33.2 Test parameters

In this test case, Cell1 is PCell on the primary component carrier, Cell2 is SCell on the secondary component carrier and activated, and Cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.33.2-1. The Cell 3 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.1.33.2-1: RSRP FDD carrier aggregation test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell3
E-UTRA RF Channel Number			1	2	2
$BW_{channel}$		MHz	10	10	10
DMTC period		ms	N/A	N/A	160
DMTC period offset			N/A	N/A	10
Discovery signal occasion duration		ms	N/A	N/A	1
Timing offset to cell1		µs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	-
Measurement bandwidth		n_{PRB}	22—27		
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RANote1 OCNG_RBNote		dB	0	0	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands FDD_B		-116.5		
	Bands FDD_C		-116		
	Bands FDD_D		-115.5		
	Bands FDD_E, FDD_F Note 6		-115		
	Bands FDD_G		-114		
	Bands FDD_H		-113.5		
$\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76
RSRP Note3	Bands FDD_A	dBm/15 kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands FDD_B		-120.5		
	Bands FDD_C		-120		
	Bands FDD_D		-119.5		
	Bands FDD_E, FDD_F Note 6		-119		
	Bands FDD_G		-118		
	Bands FDD_H		-117.5		
Io Note3	Bands FDD_A	dBm/9 MHz	-87.76	(Io for Channel 1 +5.33dB)	
	Bands FDD_B		-86.26		
	Bands FDD_C		-86.76		
	Bands FDD_D		-86.26		
	Bands FDD_E, FDD_F Note 6		-85.76		

	Bands FDD_G		-84.76		
	Bands FDD_H		-84.26		
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
Propagation condition		-	AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs. Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 7: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 8: E-UTRA operating band groups are as defined in Section 3.5.					

A.9.1.33.3 Test Requirements

In the test, the performance of RSRP measurements is verified from following three perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 3 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.1.2.

- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.1.2

- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 3 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.15.1.3.

A.9.1.34 TDD absolute and relative RSRP accuracies for E-UTRAN Carrier Aggregation in CRS based discovery signal

A.9.1.34.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD RSRP absolute and relative measurement accuracies in carrier aggregation in CRS based discovery signal are within the specified limits. This test will verify the absolute RSRP accuracy requirement of the secondary component carrier defined in clause 9.1.15.1.2, and the relative RSRP accuracy requirement of the secondary component carrier defined in clause 9.1.15.1.2. The test will also verify the primary and secondary component carrier relative RSRP accuracy requirement defined in Clause 9.1.15.1.3.

A.9.1.34.2 Test parameters

In this test case, Cell1 is PCell on the primary component carrier, Cell2 is SCell on the secondary component carrier and activated, and Cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.34.2-1. The Cell 3 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.1.34.2-1: Carrier aggregation RSRP test parameters for TDD

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	2
$BW_{channel}$		MHz	10	10	10
DMTC period		ms	N/A	N/A	160
DMTC period offset			N/A	N/A	10
Discovery signal occasion duration		ms	N/A	N/A	2
Special subframe configuration[Note1]			6		
Uplink/downlink configuration[Note1]			1		
Timing offset to Cell 1		μs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
Measurement bandwidth		n_{PRB}	22—27		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands TDD_C		-116		
	Bands TDD_E		-115		
$\hat{E}_s/I_{ot}$		dB	-4	0.5	-5.76
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands TDD_C		-120		
	Bands TDD_E		-119		
Io[Note4]	Bands TDD_A	dBm/9 MHz	-87.76	(Io for Channel 1 +5.33dB)	
	Bands TDD_C		-86.76		
	Bands TDD_E		-85.76		
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
Propagation condition		-	AWGN		

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes.

	They are not settable parameters themselves.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7:	This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.34.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following three perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 3 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.1.2.

- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.1.2

- The relative accuracy of inter-frequency RSRP measurements between the primary and secondary component carriers for Cell 3 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.15.1.3.

A.9.1.35 FDD absolute and relative CSI-RSRP accuracies for E-UTRAN Carrier Aggregation in CSI-RS based discovery signal

A.9.1.35.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD CSI-RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute CSI-RSRP accuracy requirements of the primary component carrier defined in clause 9.1.15.2.1, the absolute CSI-RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.15.2.2, and the relative CSI-RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.15.2.2. The test will also verify the primary and secondary component carrier relative CSI-RSRP accuracy requirement defined in Clause 9.1.15.2.3.

A.9.1.35.2 Test parameters

In this set of cases cell1 is PCell on the primary component carrier, cell2 is SCell on the secondary component carrier and activated, and cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.35.2-1. This set is supported by two DMTC configurations which one is for cell1 and the other is for cell2 and cell3.

Table A.9.1.35.2-1: CSI-RSRP FDD carrier aggregation test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell3
E-UTRA RF Channel Number			1	2	2
$BW_{channel}$		MHz	10	10	10
Timing offset to cell1		µs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	-
DMTC period		ms	160	160	
DMTC period offset		ms	0	10	
Discovery signal occasion duration		ms	1	1	
CSI-RS resource configuration			2	4	6
CSI-RS periodicity		ms	10	10	10
CSI-RS subframe offset		ms	0	0	0
CSI-RS individual offset[2]		dB	0	0	0
CSI-RS muting			Enable	Enable	Enable
Measurement bandwidth		n_{PRB}	22—27		
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RANote1					
OCNG_RBNote					
p-C-r10[2]		dB	6	6	6
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands FDD_B		-116.5		
	Bands FDD_C		-116		
	Bands FDD_D		-115.5		
	Bands FDD_E, FDD_F Note 6		-115		
	Bands FDD_G		-114		
	Bands FDD_H		-113.5		
CRS $\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76
CSI-RS $\hat{E}_s/I_{ot}$		dB	2	6.46	0.24
RSRP Note3	Bands FDD_A	dBm/15 kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands FDD_B		-120.5		
	Bands FDD_C		-120		
	Bands FDD_D		-119.5		
	Bands FDD_E, FDD_F Note 6		-119		

	Bands FDD_G		-118		
	Bands FDD_H		-117.5		
CSI-RSRP Note3	Bands FDD_A	dBm/15 kHz	-115	(CSI-RSRP for Cell 1 +8dB)	(CSI-RSRP for Cell 1 +4dB)
	Bands FDD_B		-114.5		
	Bands FDD_C		-114		
	Bands FDD_D		-113.5		
	Bands FDD_E, FDD_F Note 6		-113		
	Bands FDD_G		-112		
	Bands FDD_H		-111.5		
Io Note3	Bands FDD_A	dBm/9 MHz	-87.76	(Io for Channel 1 +5.33dB)	
	Bands FDD_B		-87.26		
	Bands FDD_C		-86.76		
	Bands FDD_D		-86.26		
	Bands FDD_E, FDD_F Note 6		-85.76		
	Bands FDD_G		-84.76		
	Bands FDD_H		-84.26		
CRS $\hat{E}_s/N_{oc}$		dB	-4	3	-1
CSI-RS $\hat{E}_s/N_{oc}$		dB	2	9	5
Propagation condition		-	AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 7: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 8: E-UTRA operating band groups are as defined in Section 3.5.
Note9: DMTC configurations are provided to the UE in the *measDS-Config* (in TS36.331) before the beginning of the test.

A.9.1.35.3 Test Requirements

In the test, the performance of CSI-RSRP measurements is verified from following four perspectives:

- The absolute accuracy of intra-frequency CSI-RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.15.2.1.
- The absolute accuracy of intra-frequency CSI-RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.2.2.
- The relative accuracy of intra-frequency CSI-RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.2.2.
- The relative accuracy of inter-frequency CSI-RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.15.2.3.

A.9.1.36 TDD absolute and relative CSI-RSRP accuracies for E-UTRAN Carrier Aggregation in CSI-RS based discovery signal

A.9.1.36.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD CSI-RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute CSI-RSRP accuracy requirements of the primary component carrier defined in clause 9.1.15.2.1, the absolute CSI-RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.15.2.2, and the relative CSI-RSRP accuracy requirements of the secondary component carrier defined in clause 9.1.15.2.2. The test will also verify the primary and secondary component carrier relative CSI-RSRP accuracy requirement defined in Clause 9.1.15.2.3.

A.9.1.36.2 Test parameters

In this set of cases cell1 is PCell on the primary component carrier, cell2 is SCell on the secondary component carrier and activated, and cell3 is the neighboring cell on the secondary component carrier. The test parameters are given in Table A.9.1.36.2-1. This set is supported by two DMTC configurations which one is for cell1 and the other is for cell2 and cell3.

Table A.9.1.36.2-1: CSI-RSRP TDD carrier aggregation test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	
$BW_{channel}$		MHz	10		
Special subframe configuration[Note1]			6		
Uplink/downlink configuration[Note1]			1		
Timing offset to Cell 1		μs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
DMTC period		ms	160	160	
DMTC period offset		ms	0	10	
Discovery signal occasion duration		ms	2	2	
CSI-RS resource configuration			2	4	6
CSI-RS periodicity		ms	10	10	10
CSI-RS subframe offset		ms	0	0	0
CSI-RS individual offset[2]		dB	0	0	0
CSI-RS muting			Enable	Enable	Enable
Measurement bandwidth		n_{PRB}	22—27		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA[Note2]					
OCNG_RB[Note2]					
p-C-r10[2]		dB	6	6	6
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands TDD_C		-116		
	Bands TDD_E		-115		
CRS $\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76
CSI-RS $\hat{E}_s/I_{ot}$		dB	2	6.46	0.24
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands TDD_C		-120		
	Bands TDD_E		-119		
CSI-RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-115	(CSI-RSRP for Cell 1 +8dB)	(CSI-RSRP for Cell 1 +4dB)
	Bands TDD_C		-114		
	Bands TDD_E		-113		
Io[Note4]	Bands TDD_A	dBm/9 MHz	-87.76	(Io for Channel 1 +5.33dB)	
	Bands TDD_C		-86.76		
	Bands TDD_E		-85.76		

CRS $\hat{E}_s/N_{oc}$	dB	-4	3	-1
CSI-RS $\hat{E}_s/N_{oc}$	dB	2	9	5
Propagation condition	-	AWGN		
Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211. Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement subframe. Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs. Note 7: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 8: E-UTRA operating band groups are as defined in Section 3.5. Note9: DMTC configurations are provided to the UE in the *measDS-Config* (in TS36.331) before the beginning of the test				

A.9.1.36.3 Test Requirements

In the test, the performance of CSI-RSRP measurements is verified from following four perspectives:

- The absolute accuracy of intra-frequency CSI-RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.15.2.1.

- The absolute accuracy of intra-frequency CSI-RSRP measurements for Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.2.2.

- The relative accuracy of intra-frequency CSI-RSRP measurements for Cell 3 relative to Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.15.2.2.

- The relative accuracy of inter-frequency CSI-RSRP measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.15.2.3.

A.9.1.37 3 DL PCell in FDD RSRP for E-UTRAN in Carrier Aggregation

A.9.1.37.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD-FDD RSRP absolute and relative accuracy requirements in carrier aggregation with PCell in FDD are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2. The test will also verify the primary and secondary component carriers' relative RSRP accuracy requirement defined in Clause 9.1.11.3.

A.9.1.37.2 Test parameters

In this set of cases cell 1 is PCell on the primary component carrier, and cell 2 and cell 4 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. Cell 3 and cell 5 are neighbouring cells on secondary component carriers SCC1 and SCC2 respectively. The test parameters are given in Table A.9.1.37.2-1.

Table A.9.1.37.2-1: 3 Downlink PCell in FDD RSRP carrier aggregation test parameters

Parameter		Unit	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5
E-UTRA RF Channel Number			1	2		3	
$BW_{channel}$		MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
Special subframe configuration[Note1]			-	6		6	
Uplink/downlink configuration[Note1]			-	1		1	
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52		5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	
PDSCH Reference measurement channel defined in A.3.1.1.			5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	-	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	-
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
OCNG Patterns defined in A.3.2.			5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.7 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD
PBCH_RA		dB	0	0	0	0	0
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA							
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
PDSCH_RA							
PDSCH_RB							
OCNG_RA[Note2]							
OCNG_RB[Note2]							
N_{oc} Note3	Bands TDD_A	dBm/15 kHz	-	(N_{oc} for Channel 1 +1dB)		(N_{oc} for Channel 1 +1dB)	
	Bands TDD_C						
	Bands TDD_E						
	Bands FDD_A		-117	-		-	
	Bands FDD_B		-116.5				
	Bands FDD_C		-116				
	Bands FDD_D		-115.5				
	Bands FDD_E, FDD_F Note 7		-115				
	Bands FDD_G		-114				
	Bands FDD_H		-113.5				
$\hat{E}_s/N_{oc}$		dB	-4	3	-1	3	-1
$\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76	0.46	-5.76
	Bands TDD_A		-	(RSRP for Cell	(RSRP for	(RSRP for	(RSRP for

RSRP[Note4]	Bands TDD_C	dBm/15 kHz		1 +8dB)	Cell 1 +4dB)	Cell 1 +8dB)	Cell 1 +4dB)
	Bands TDD_E						
	Bands FDD_A		-121	-	-	-	-
	Bands FDD_B		-120.5				
	Bands FDD_C		-120				
	Bands FDD_D		-119.5				
	Bands FDD_E, FDD_F [Note 7]		-119				
	Bands FDD_G		-118				
	Bands FDD_H		-117.5				
Io[Note4]	Bands TDD_A	dBm/ $BW_{channel}$	-	(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel2}$ / $N_{RB\ channel\ 1}$))		(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel3}$ / $N_{RB\ channel\ 1}$))	
	Bands TDD_C						
	Bands TDD_E						
	Bands FDD_A		-87.76+10log($N_{RB,c}$/50)	-		-	
	Bands FDD_B		-87.26+10log($N_{RB,c}$/50)				
	Bands FDD_C		-86.76+10log($N_{RB,c}$/50)				
	Bands FDD_D		-86.26+10log($N_{RB,c}$/50)				
	Bands FDD_E, FDD_F [Note 7]		-85.76 +10log($N_{RB,c}$/50)				
	Bands FDD_G		-84.76 +10log($N_{RB,c}$/50)				
	Bands FDD_H		-84.26 +10log($N_{RB,c}$/50)				
Propagation condition		-	AWGN	AWGN	AWGN	AWGN	AWGN
Antenna Configuration		-	1x2	1x2	1x2	1x2	1x2
Timing offset to cell 1		µs	-	0	3	0	3
Time alignment error relative to cell 1 [Note 8]			-	≤ TAE	-	≤ TAE	-
Time alignment error relative to cell 2[Note 8]			-	-	-	≤ TAE	-

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 8: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.37.3 Test Requirements

In the test, the performance of RSRP measurements is verified from the following 7 perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 5 relative to Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between SCC1 and the primary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRP measurements between SCC2 and the primary component carriers for Cell 4 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

A.9.1.38 3 DL PCell in TDD RSRP for E-UTRAN in Carrier Aggregation

A.9.1.38.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD-FDD RSRP absolute and relative accuracy requirements in carrier aggregation with PCell in TDD are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2. The test will also verify the primary and secondary component carriers' relative RSRP accuracy requirement defined in Clause 9.1.11.3.

A.9.1.38.2 Test parameters

In this set of cases cell 1 is PCell on the primary component carrier, and cell 2 and cell 4 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. Cell 3 and cell 5 are neighbouring cells on secondary component carriers SCC1 and SCC2 respectively. The test parameters are given in Table A.9.1.38.2-1.

Table A.9.1.38.2-1: 3 Downlink PCell in TDD RSRP carrier aggregation test parameters

Parameter		Unit	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5
E-UTRA RF Channel Number			1	2		3	
$BW_{channel}$		MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100		5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
Special subframe configuration Note1			6	-		-	
Uplink/downlink configuration Note1			1	-		-	
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52		5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	
PDSCH Reference measurement channel defined in A.3.1.1.			5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	-	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	-
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns defined in A.3.2.			5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0
N_{oc} Note3	Bands FDD_A Bands FDD_B Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 7 Bands FDD_G Bands FDD_H	dBm/15 kHz	-	(N_{oc} for Channel 1 +1dB)		(N_{oc} for Channel 1 +1dB)	
	Bands TDD_A		-117	-		-	
	Bands TDD_C		-116				
	Bands TDD_E		-115				
$\hat{E}_s/N_{oc}$		dB	-4	3	-1	3	-1

$\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76	0.46	-5.76
RSRP[Note4]	Bands FDD_A	dBm/15 kHz	-	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands FDD_B						
	Bands FDD_C						
	Bands FDD_D						
	Bands FDD_E, FDD_F[Note 7]						
	Bands FDD_G						
	Bands FDD_H						
	Bands TDD_A		-121	-	-	-	-
	Bands TDD_C		-120				
	Bands TDD_E		-119				
Io[Note4]	Bands FDD_A	dBm/ $BW_{channel}$	-	(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel2}$ / $N_{RB\ channel\ 1}$))		(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel3}$ / $N_{RB\ channel\ 1}$))	
	Bands FDD_B						
	Bands FDD_C						
	Bands FDD_D						
	Bands FDD_E, FDD_F[Note 7]						
	Bands FDD_G						
	Bands FDD_H						
	Bands TDD_A		-87.76+10log($N_{RB,c}$/50)	-		-	
	Bands TDD_C		-86.76+10log($N_{RB,c}$/50)				
	Bands TDD_E		-85.76+10log($N_{RB,c}$/50)				
Propagation condition		-	AWGN	AWGN	AWGN	AWGN	AWGN
Antenna Configuration		-	1x2	1x2	1x2	1x2	1x2
Timing offset to cell 1		µs	-	0	3	0	3
Time alignment error relative to cell 1[Note 8]			-	≤ TAE	-	≤ TAE	-
Time alignment error relative to cell 2[Note8]			-	-	-	≤ TAE	-

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 8: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.38.3 Test Requirements

In the test, the performance of RSRP measurements is verified from the following 7 perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 5 relative to Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between SCC1 and the primary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.The relative accuracy

of inter-frequency RSRP measurements between SCC2 and the primary component carriers for Cell 4 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

A.9.1.39 3 DL FDD RSRP for E-UTRAN in Carrier Aggregation

A.9.1.39.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2. The test will also verify the primary and secondary component carriers' relative RSRP accuracy requirement defined in Clause 9.1.11.3.

A.9.1.39.2 Test parameters

In this set of test cases there are five cells on three carrier frequencies. Cell 1 is PCell on channel 1, and cell 2 and cell 4 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. Cell 3 and cell 5 are neighbouring cells on secondary component carriers SCC1 and SCC2 respectively. The parameters for the test are listed in Table A.9.1.39.2-1.

Table A.9.1.39.2-1: 3 DL FDD RSRP test parameters for E-UTRAN Carrier aggregation (cell #1, cell #2 and cell #3)

Parameter		Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	
$BW_{channel}$		MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	
PDSCH Reference measurement channel defined in A.3.1.1.1			5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	-
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns defined in A.3.2.1			5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0
N_{oc} Note2	Bands FDD_A	dBm/15kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands FDD_B		-116.5		
	Bands FDD_C		-116		
	Bands FDD_D		-115.5		
	Bands FDD_E, FDD_F Note 6		-115		
	Bands FDD_G		-114		
	Bands FDD_H		-113.5		
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
$\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76
RSRP Note3	Bands FDD_A	dBm/15kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands FDD_B		-120.5		
	Bands FDD_C		-120		
	Bands FDD_D		-119.5		
	Bands FDD_E, FDD_F Note 6		-119		
	Bands FDD_G		-118		
	Bands FDD_H		-117.5		
Io Note3	Bands FDD_A	dBm/$BW_{channel}$	-87.76 +10log($N_{RB,c}$/50)	(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel2}$ / $N_{RB\ channel\ 1}$))	
	Bands FDD_B		-87.26 +10log($N_{RB,c}$/50)		
	Bands FDD_C		-86.76 +10log($N_{RB,c}$/50)		
	Bands FDD_D		-86.26 +10log($N_{RB,c}$/50)		
	Bands FDD_E,		-85.76		

	FDD_F Note 6		+10log($N_{RB,c}$/50)		
	Bands FDD_G		-84.76 +10log($N_{RB,c}$/50)		
	Bands FDD_H		-84.26 +10log($N_{RB,c}$/50)		
Propagation Condition			AWGN	AWGN	AWGN
Antenna Configuration			1x2	1x2	1x2
Timing offset to Cell 1		µs	-	0	3
Time alignment error relative to cell 1 Note 7			-	≤ TAE	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs. Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 7: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation. Note 8: E-UTRA operating band groups are as defined in Section 3.5.					

Table A.9.1.39.2-2: 3 DL FDD RSRP test parameters for E-UTRAN Carrier aggregation (cell #4 and cell #5)

Parameter		Unit	Cell 4	Cell 5
E-UTRA RF Channel Number			3	
$BW_{channel}$		MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	
PDSCH Reference measurement channel defined in A.3.1.1.1			5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	-
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns defined in A.3.2.1			5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.16 FDD 10MHz: OP.2 FDD 20MHz: OP.12 FDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note1				
OCNG_RB Note1				
N_{oc} Note2	Bands FDD_A	dBm/15kHz	(N_{oc} for Channel 1 +1dB)	
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, FDD_F Note 6			
	Bands FDD_G			
	Bands FDD_H			
$\hat{E}_s/N_{oc}$		dB	3	-1
$\hat{E}_s/I_{ot}$		dB	0.46	-5.76
RSRP Note3	Bands FDD_A	dBm/15kHz	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, FDD_F Note 6			
	Bands FDD_G			
	Bands FDD_H			
Io Note3	Bands FDD_A	dBm/$BW_{channel}$	(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel3}$ / $N_{RB\ channel\ 1}$))	
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, FDD_F Note 6			
	Bands FDD_G			
	Bands FDD_H			

Propagation Condition		AWGN	AWGN
Antenna Configuration		1x2	1x2
Timing offset to Cell 1	μs	0	3
Time alignment error relative to cell 1 Note 7		≤ TAE	-
Time alignment error relative to cell 2 Note 7		≤ TAE	-
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs. Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 7: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation. Note 8: E-UTRA operating band groups are as defined in Section 3.5.			

A.9.1.39.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 5 relative to Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between SCC1 and the primary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRP measurements between SCC2 and the primary component carriers for Cell 4 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

A.9.1.40 3 DL TDD RSRP for E-UTRAN in Carrier Aggregation

A.9.1.40.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRP absolute and relative accuracy requirements in carrier aggregation are within the specified limits. This test will verify the absolute RSRP accuracy requirements of the primary component carrier defined in clause 9.1.11.1, the absolute RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2, and the relative RSRP accuracy requirements of the secondary component carriers defined in clause 9.1.11.2. The test will also verify the primary and secondary component carriers' relative RSRP accuracy requirement defined in Clause 9.1.11.3.

A.9.1.40.2 Test parameters

In this set of test cases there are five cells on three carrier frequencies. Cell 1 is PCell on channel 1, and cell 2 and cell 4 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. Cell 3 and cell 5 are neighbouring cells on secondary component carriers SCC1 and SCC2 respectively. The parameters for the test are listed in Table A.9.1.40.2-1.

Table A.9.1.40.2-1: 3 DL TDD RSRP test parameters for E-UTRAN Carrier aggregation (cell #1, cell #2 and cell #3)

Parameter		Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	
$BW_{channel}$			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
Special subframe configuration[Note1]			6		
Uplink/downlink configuration[Note1]			1		
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	
PDSCH Reference measurement channel defined in A.3.1.1.2			5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	-
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
OCNG Patterns defined in A.3.2.2			5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0
N_{oc} [Note3]	Bands TDD_A	dBm/15kHz	-117	(N_{oc} for Channel 1 +1dB)	
	Bands TDD_C		-116		
	Bands TDD_E		-115		
$\hat{E}_s/N_{oc}$		dB	-4	3	-1
$\hat{E}_s/I_{ot}$		dB	-4	0.46	-5.76
RSRP[Note4]	Bands TDD_A	dBm/15kHz	-121	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
	Bands TDD_C		-120		
	Bands TDD_E		-119		
Io[Note4]	Bands TDD_A	dBm/$BW_{channel}$	-87.76 + 10log($N_{RB,c}$/50)	(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel2}$ / $N_{RB\ channel\ 1}$))	
	Bands TDD_C		-86.76 + 10log($N_{RB,c}$/50)		
	Bands TDD_E		-85.76 + 10log($N_{RB,c}$/50)		
Propagation Condition			AWGN	AWGN	AWGN
Antenna Configuration			1x2	1x2	1x2
Timing offset to Cell 1		µs	-	0	3
Time alignment error relative to cell 1 [Note 7]			-	≤ TAE	-

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant

	over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7:	Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

Table A.9.1.40.2-2: 3 DL TDD RSRP test parameters for E-UTRAN Carrier aggregation (cell #4 and cell #5)

Parameter		Unit	Cell 4	Cell 5
E-UTRA RF Channel Number			3	
$BW_{channel}$		MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	
Special subframe configuration Note1			6	
Uplink/downlink configuration Note1			1	
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	
PDSCH Reference measurement channel defined in A.3.1.1.2			5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	N/A
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
OCNG Patterns defined in A.3.2.2			5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note2 OCNG_RB Note2		dB	0	0
N_{oc} Note3	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15kHz	(N_{oc} for Channel 1 +1dB)	
$\hat{E}_s/N_{oc}$		dB	3	-1
$\hat{E}_s/I_{ot}$		dB	0.46	-5.76
RSRP Note4	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/15kHz	(RSRP for Cell 1 +8dB)	(RSRP for Cell 1 +4dB)
Io Note4	Bands TDD_A Bands TDD_C Bands TDD_E	dBm/$BW_{channel}$	(Io for Channel 1 +5.33dB +10log ($N_{RB\ channel3}$ / $N_{RB\ channel\ 1}$))	
Propagation Condition			AWGN	AWGN
Antenna Configuration			1x2	1x2
Timing offset to Cell 1		µs	0	3
Time alignment error relative to cell 1 Note 7			≤ TAE	-
Time alignment error relative to cell 2 Note 7			≤ TAE	
Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211. Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled				

	as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7:	Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.40.3 Test Requirements

In the test, the performance of RSRP measurements is verified form following four perspectives:

- The absolute accuracy of intra-frequency RSRP measurements for Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRP measurements for Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 3 relative to Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of intra-frequency RSRP measurements for Cell 5 relative to Cell 4 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRP measurements between SCC1 and the primary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRP measurements between SCC2 and the primary component carriers for Cell 4 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

A.9.1.41 FD-FDD RSRP Intra frequency case for UE category 0

A.9.1.41.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.13.1 and 9.1.13.2 for FD-FDD intra frequency RSRP measurements for UE category 0.

A.9.1.41.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.41.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.41.2-1: FD-FDD RSRP Intra frequency test parameters for UE category 0

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.3			R.13 FDD	-	R.13 FDD	-	R.13 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-106		-86		-116	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 4						-114	
	Bands FDD_G Note 6						-113	
	Bands FDD_H						-112.5	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
$\hat{E}_s/I_{ot}$		dB	2.5	-6	2.5	-6	0.46	-5.76
RSRP Note3	Bands FDD_A	dBm/15 kHz	-100	-105	-80	-85	-113	-117
	Bands FDD_B						-112.5	-116.5
	Bands FDD_C						-112	-116
	Bands FDD_D						-111.5	-115.5
	Bands FDD_E, FDD_F Note 4						-111	-115
	Bands FDD_G Note 6						-110	-114
	Bands FDD_H						-109.5	-113.5
Io Note3	Bands FDD_A	dBm/9 MHz	-70.27		-50.27		-82.43	
	Bands FDD_B						-81.93	
	Bands FDD_C						-81.43	
	Bands FDD_D						-80.93	
	Bands FDD_E, FDD_F Note 4						-80.43	
	Bands FDD_G Note 6						-79.43	
	Bands FDD_H						-78.93	
Propagation condition		-	AWGN		AWGN		AWGN	
Correlation Matrix and Antenna Configuration			1x1		1x1		1x1	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel

	bandwidth within 865-894 MHz.
Note 5:	E-UTRA operating band groups are as defined in Section 3.5.
Note 6:	Except Band 29 and Band 32.

A.9.1.41.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.13.1 and 9.1.13.2.

A.9.1.42 HD-FDD RSRP Intra frequency case for UE category 0

A.9.1.42.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.13.1 and 9.1.13.2 for HD-FDD intra frequency RSRP measurements for UE category 0.

A.9.1.42.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.42.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.42.2-1: HD-FDD RSRP Intra frequency test parameters for UE category 0

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.4			R.1 HD-FDD	-	R.1 HD-FDD	-	R.1 HD-FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.3			R.3 HD-FDD		R.3 HD-FDD		R.3 HD-FDD	
OCNG Patterns defined in A.3.2.1			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands DD_A	dBm/15 kHz	-106		-86		-116	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 5						-114	
	Bands FDD_G Note 7						-113	
	Bands FDD_H						-112.5	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
$\hat{E}_s/I_{ot}$		dB	2.5	-6	2.5	-6	0.46	-5.76
RSRP Note3	Bands FDD_A	dBm/15 kHz	-100	-105	-80	-85	-113	-117
	Bands FDD_B						-112.5	-116.5
	Bands FDD_C						-112	-116
	Bands FDD_D						-111.5	-115.5
	Bands FDD_E, FDD_F Note 4						-111	-115
	Bands FDD_G Note 6						-110	-114
	Bands FDD_H						-109.5	-113.5
Io Note3	Bands FDD_A	dBm/9 MHz	-70.27		-50.27		-82.43	
	Bands FDD_B						-81.93	
	Bands FDD_C						-81.43	
	Bands FDD_D						-80.93	
	Bands FDD_E, FDD_F Note 4						-80.43	
	Bands FDD_G Note 6						-79.43	
	Bands FDD_H						-78.93	
Propagation condition		-	AWGN		AWGN		AWGN	
Correlation Matrix and Antenna Configuration			1x1		1x1		1x1	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: Es/Iot, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 5:	E-UTRA operating band groups are as defined in Section 3.5.
Note 6:	Except Band 29 and Band 32.

A.9.1.42.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.13.1 and 9.1.13.2.

A.9.1.43 TDD RSRP Intra frequency case for UE category 0

A.9.1.43.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.13.1 and 9.1.13.2 for TDD intra frequency RSRP measurements for UE category 0.

A.9.1.43.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Both absolute and relative accuracy of RSRP intra frequency measurements are tested by using the parameters in Table A.9.1.43.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.1.43.2-1: TDD RSRP Intra frequency test parameters for UE category 0

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Special subframe configuration[Note1]			6		6		6	
Uplink/downlink configuration[Note1]			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.5			R.12 TDD	-	R.12 TDD	-	R.12 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0	0	0	0
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-106		-86		-116	
	Bands TDD_C						-115	
	Bands TDD_E						-114	
$\hat{E}_s/N_{oc}$		dB	6	1	6	1	3	-1
$\hat{E}_s/I_{ot}$		dB	2.5	-6	2.5	-6	0.5	-5.76
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-100	-105	-80	-85	-113	-117
	Bands TDD_C						-112	-116
	Bands TDD_E						-111	-115
Io[Note4]	Bands TDD_A	dBm/9 MHz	-70.27		-50.27		-82.43	
	Bands TDD_C						-81.43	
	Bands TDD_E						-80.43	
Propagation condition		-	AWGN		AWGN		AWGN	
Correlation Matrix and Antenna Configuration			1x1		1x1		1x1	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Es/Iot, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: E-UTRA operating band groups are as defined in Section 3.5.

A.9.1.43.3 Test Requirements

The RSRP measurement accuracy shall fulfil the requirements in sections 9.1.13.1 and 9.1.13.2.

A.9.2 RSRQ

A.9.2.1 FDD Intra frequency case

A.9.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.5.1.

A.9.2.1.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.1.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.1.2-1: RSRQ FDD Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA Note1								
OCNG_RB Note1								
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-84.76	-84.76	-103.85	-103.85	-116	
	Bands FDD_B						-115.5	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 5						-114	
	Bands FDD_G Note 7						-113	
	Bands FDD_H						-112.5	
$\hat{E}_s/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
RSRP Note3	Bands FDD_A	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-120	-120
	Bands FDD_B						-119.5	-119.5
	Bands FDD_C						-119	-119
	Bands FDD_D						-118.5	-118.5
	Bands FDD_E, FDD_F Note 5						-118	-118
	Bands FDD_G Note 7						-117	-117
	Bands FDD_H						-116.5	-116.5
RSRQ Note3	Bands FDD_A	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
	Bands FDD_B							
	Bands FDD_C							
	Bands FDD_D							
	Bands FDD_E, FDD_F Note 5							
	Bands FDD_G Note 7							
	Bands FDD_H							
Io Note3	Bands FDD_A	dBm/9 MHz	-50	-50	-73	-73	-85.67	
	Bands FDD_B						-85.17	
	Bands FDD_C						-84.67	
	Bands FDD_D						-84.17	
	Bands FDD_E, FDD_F Note 5						-83.67	

	Bands FDD_G Note 7						-82.67	
	Bands FDD_H						-82.17	
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.
Note 7: Except Band 29 and Band 32.

A.9.2.1.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.1.

A.9.2.2 TDD Intra frequency case

A.9.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.5.1.

A.9.2.2.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.2.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.2.2-1: RSRQ TDD Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Special subframe configuration[Note1]			6		6		6	
Uplink-downlink configuration[Note1]			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA[Note2]								
OCNG_RB[Note2]								
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-84.76	-84.76	-103.85	-103.85	-116	
	Bands TDD_C						-115	
	Bands TDD_E						-114	
$\hat{E}_s/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-120	-120
	Bands TDD_C						-119	-119
	Bands TDD_E						-118	-118
RSRQ[Note4]	Bands TDD_A, TDD_C, TDD_E	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
Io[Note4]	Bands TDD_A	dBm/9 MHz	-50	-50	-73	-73	-85.67	
	Bands TDD_C						-84.67	
	Bands TDD_E						-83.67	
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.2.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.5.1.

A.9.2.3 FDD—FDD Inter frequency case

A.9.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.6.1 and 9.1.6.2.

A.9.2.3.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.3.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.3.2-1: RSRQ FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2	1	2
$BW_{channel}$		MHz	10	10	10	10	10	10
Gap Pattern Id			0	-	0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA Note1								
OCNG_RB Note1								
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-80	-80	-104.70	-104.70	-119.5	-119.5
	Bands FDD_B						-119	-119
	Bands FDD_C						-118.5	-118.5
	Bands FDD_D						-118	-118
	Bands FDD_E, FDD_F Note 5						-117.5	-117.5
	Bands FDD_G Note 7						-116.5	-116.5
	Bands FDD_H						-116	-116
$\hat{E}_s/I_{ot}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
RSRP Note3	Bands FDD_A	dBm/15 kHz	-81.75	-81.75	-108.70	-108.70	-123.5	-123.5
	Bands FDD_B						-123	-123
	Bands FDD_C						-122.5	-122.5
	Bands FDD_D						-122	-122
	Bands FDD_E, FDD_F Note 5						-121.5	-121.5
	Bands FDD_G Note 7						-120.5	-120.5
	Bands FDD_H						-120	-120
RSRQ Note3	Bands FDD_A	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
	Bands FDD_B							
	Bands FDD_C							
	Bands FDD_D							
	Bands FDD_E, FDD_F Note 5							
	Bands FDD_G Note 7							
	Bands FDD_H							
Io Note3	Bands FDD_A	dBm/9 MHz	-50	-50	-75.46	-75.46	-90.26	-90.26
	Bands FDD_B						-89.76	-89.76
	Bands FDD_C						-89.26	-89.26
	Bands FDD_D						-88.76	-88.76
	Bands FDD_E, FDD_F Note 5						-88.26	-88.26

	Bands FDD_G Note 7						-87.26	-87.26
	Bands FDD_H						-86.76	-86.76
$\hat{E}_s/N_{oc}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		AWGN		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 6: E-UTRA operating band groups are as defined in Section 3.5. Note 7: Except Band 29 and Band 32.								

A.9.2.3.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.6.1 and 9.1.6.2.

A.9.2.4 TDD—TDD Inter frequency case

A.9.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.6.1 and 9.1.6.2.

A.9.2.4.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.4.2-1 for TDD configuration 1 and in Table A.9.2.4.2-2 for TDD configuration 0. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A 9.2.4.2-1: RSRQ TDD—TDD Inter frequency test parameters for TDD configuration 1

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2	1	2
$BW_{channel}$		MHz	10	10	10	10	10	10
Gap Pattern Id			0	-	0	-	0	-
Special subframe configuration Note1			6		6		6	
Uplink-downlink configuration Note1			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note2 OCNG_RB Note2		dB	0	0	0	0	0	0
N_{oc} Note3	Bands TDD_A	dBm/15 kHz	-80	-80	-104.70	-104.70	-119.50	-119.50
	Bands TDD_C						-118.50	-118.50
	Bands TDD_E						-117.50	-117.50
$\hat{E}_s/I_{ot}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
RSRP Note4	Bands TDD_A	dBm/15 kHz	-81.75	-81.75	-108.70	-108.70	-123.50	-123.50
	Bands TDD_C						-122.50	-122.50
	Bands TDD_E						-121.50	-121.50
RSRQ Note4	Bands TDD_A, TDD_C, TDD_E	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
Io Note4	Bands TDD_A	dBm/9 MHz	-50	-50	-75.46	-75.46	-90.26	-90.26
	Bands TDD_C						-89.26	-89.26
	Bands TDD_E						-88.26	-88.26
$\hat{E}_s/N_{oc}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.

Table A 9.2.4.2-2: RSRQ TDD—TDD Inter frequency test parameters for *TDD configuration 0*

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2	1	2
$BW_{channel}$		MHz	10	10	10	10	10	10
Gap Pattern Id			0	-	0	-	0	-
Special subframe configuration Note1			6		6		6	
Uplink-downlink configuration Note1			0		0		0	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.5 TDD	-	R.5 TDD	-	R.5 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note2 OCNG_RB Note2		dB	0	0	0	0	0	0
N_{oc} Note3	Bands TDD_A	dBm/15 kHz	-80	-80	-104.70	-104.70	-119.50	-119.50
	Bands TDD_C						-118.50	-118.50
	Bands TDD_E						-117.50	-117.50
$\hat{E}_s/I_{ot}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
RSRP Note4	Bands TDD_A	dBm/15 kHz	-81.75	-81.75	-108.70	-108.70	-123.50	-123.50
	Bands TDD_C						-122.50	-122.50
	Bands TDD_E						-121.50	-121.50
RSRQ Note4	Bands TDD_A, TDD_C, TDD_E	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
Io Note4	Bands TDD_A	dBm/9 MHz	-50	-50	-75.46	-75.46	-90.26	-90.26
	Bands TDD_C						-89.26	-89.26
	Bands TDD_E						-88.26	-88.26
$\hat{E}_s/N_{oc}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.4.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.6.1 and 9.1.6.2.

A.9.2.4A FDD—TDD Inter frequency case

A.9.2.4A.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.6.1 and 9.1.6.2 for FDD—TDD inter frequency measurements.

A.9.2.4A.2 Test parameters

In this set of test cases the two cells are on different carrier frequencies. Both absolute and relative accuracy of RSRQ inter frequency measurements are tested by using the parameters in Table A.9.2.4A.2-1 and Table A.9.2.4A.2-2. In all test cases, Cell 1 is the PCell and Cell 2 the target cell. Cell 1 is FDD cell and Cell 2 is TDD cell. The inter frequency measurements are supported by a measurement gap.

Table A.9.2.4A.2-1: RSRQ FDD—TDD Inter frequency test parameters (FDD Cell1)

Parameter	Unit	Test 1	Test 2	Test 3
		Cell 1	Cell 1	Cell 1
E-UTRA RF Channel Number		1	1	1
$BW_{channel}$	MHz	10	10	10
Gap Pattern Id		0	0	0
Measurement bandwidth	n_{PRB}	22—27	22—27	22—27
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD	R.0 FDD	R.0 FDD
PDSCH allocation	n_{PRB}	13—36	13—36	13—36
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6 FDD	R.6 FDD	R.6 FDD
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	OP.1 FDD	OP.1 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0	0
N_{oc} Note2	dBm/15 kHz	-80	-104.70	-114.5
$\hat{E}_s/I_{ot}$	dB	-1.75	-4.0	-4.0
RSRP Note3	dBm/15 kHz	-81.75	-108.70	-118.5
RSRQ Note3	dB	-14.76	-16.25	-16.25
Io Note3	dBm/9 MHz	-50	-75.46	-85.26
$\hat{E}_s/N_{oc}$	dB	-1.75	-4.0	-4.0
Propagation condition	-	AWGN	AWGN	AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table A.9.2.4A.2-2: RSRQ FDD—TDD Inter frequency test parameters (TDD cell2)

Parameter	Unit	Test 1	Test 2	Test 3
		Cell 2	Cell 2	Cell 2
E-UTRA RF Channel Number		2	2	2
$BW_{channel}$	MHz	10	10	10
Gap Pattern Id		-	-	-
Special subframe configuration Note1		6	6	6
Uplink-downlink configuration Note1		1	1	1
Measurement bandwidth	n_{PRB}	22—27	22—27	22—27
PDSCH Reference measurement channel		-	-	-
PDSCH allocation	n_{PRB}	-	-	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6 TDD	R.6 TDD	R.6 TDD
OCNG Patterns defined in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	0	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note2				
OCNG_RB Note2				
N_{oc} Note3	dBm/15 kHz	-80	-104.70	-114.50
$\hat{E}_s/I_{ot}$	dB	-1.75	-4.0	-4.0
RSRP Note4	dBm/15 kHz	-81.75	-108.70	-118.50
RSRQ Note4	dB	-14.76	-16.25	-16.25
Io Note4	dBm/9 MHz	-50	-75.46	-85.26
$\hat{E}_s/N_{oc}$	dB	-1.75	-4.0	-4.0
Propagation condition	-	AWGN	AWGN	AWGN

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.4A.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in sections 9.1.6.1 and 9.1.6.2.

A.9.2.5 FDD RSRQ for E-UTRA Carrier Aggregation

A.9.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRQ measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency

RSRQ measurements for the primary component carrier specified in clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carrier specified in clause 9.1.11.2 and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.11.3.

A.9.2.5.2 Test parameters

In this test case the PCell and the SCell are on different carrier frequencies. There are three cells used in this test case. Both RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.5.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC) and Cell 3 is the neighbouring cell on the SCC. The SCC is configured and activated.

Table A.9.2.5.2-1: FDD RSRQ Carrier Aggregation test parameters

Parameters		Units	Test 1 Cell 1	Test 1 Cell 2	Test 1 Cell 3
E-UTRA RF Channel Number			1	2	2
$BW_{channel\_CA}$		MHz	10	10	10
Timeing offset to Cell 1		µs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
Measurement bandwidth		n_{PRB}	22—27	22—27	22—27
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	R.6FDD	R.6 FDD
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA Note1					
OCNG_RB Note1					
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-119.5	-116	-116
	Bands FDD_B		-119	-115.5	-115.5
	Bands FDD_C		-118.5	-115	-115
	Bands FDD_D		-118	-114.5	-114.5
	Bands FDD_E, FDD_F Note 6		-117.5	-114	-114
	Bands FDD_G		-116.5	-113	-113
	Bands FDD_H		-116	-112.5	-112.5
$\hat{E}_s/I_{ot}$		dB	-4.0	-5.46	-5.46
RSRP Note3	Bands FDD_A	dBm/15 kHz	-123.5	-120	-120
	Bands FDD_B		-123	-119.5	-119.5
	Bands FDD_C		-122.5	-119	-119
	Bands FDD_D		-122	-118.5	-118.5
	Bands FDD_E, FDD_F Note 6		-121.5	-118	-118
	Bands FDD_G		-120.5	-117	-117
	Bands FDD_H		-120	-116.5	-116.5
RSRQ Note3	Bands FDD_A	dB	-16.25	-17.34	-17.34
	Bands FDD_B				
	Bands FDD_C				
	Bands FDD_D				
	Bands FDD_E, FDD_F Note 6				
	Bands FDD_G				
	Bands FDD_H				
Io Note3	Bands FDD_A	dBm/9	-90.26	-85.67	-85.67

	Bands FDD_B	MHz	-89.76	-85.17	-85.17
	Bands FDD_C		-89.26	-84.67	-84.67
	Bands FDD_D		-88.76	-84.17	-84.17
	Bands FDD_E, FDD_F Note 6		-88.26	-83.67	-83.67
	Bands FDD_G		-87.26	-82.67	-82.67
	Bands FDD_H		-86.76	-82.17	-82.17
$\hat{E}_s/N_{oc}$		dB	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 7: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 8: E-UTRA operating band groups are as defined in Section 3.5.					

A.9.2.5.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements specified in clause 9.1.11.1.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2

- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.

A.9.2.6 TDD RSRQ for E-UTRA Carrier Aggregation

The test case in this clause are applicable to carrier aggregation capable UEs which have been configured with a downlink Scell.

A.9.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD RSRQ measurement accuracy in carrier aggregation is within the specified limits in a synchronized network environment with AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier defined in Clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carrier defined in Clause 9.1.11.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers defined in Clause 9.1.11.3.

A.9.2.6.2 Test parameters

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is PCell, Cell 2 is SCell, and Cell 3 is the target cell. PCell and SCell are in different RF channels. Cell 3 is in the same RF channel as Cell 2. The parameters for the test are listed in Table A.9.2.6.2-1.

Table A.9.2.6.2-1: TDD RSRQ test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	2
$BW_{channel}$		MHz	10		
Timing offset to cell 1		μs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
Special subframe configuration[Note1]			6		
Uplink-downlink configuration[Note1]			1		
Measurement bandwidth		n_{PRB}	22—27		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	R.6 TDD	R.6 TDD
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA[Note2]					
OCNG_RB[Note2]					
N_{oc} Note3	Bands TDD_A	dBm/15 kHz	-119.5	-116	
	Bands TDD_C		-118.5	-115	
	Bands TDD_E		-117.5	-114	
$\hat{E}_s/I_{ot}$		dB	-4.0	-5.46	-5.46
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-123.50	-120	-120
	Bands TDD_C		-122.50	-119	-119
	Bands TDD_E		-121.50	-118	-118
RSRQ[Note4]	Bands TDD_A, TDD_C, TDD_E	dB	-16.25	-17.34	
Io[Note4]	Bands TDD_A	dBm/9 MHz	-90.26	-85.67	
	Bands TDD_C		-89.26	-84.67	
	Bands TDD_E		-88.26	-83.67	
$\hat{E}_s/N_{oc}$		dB	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		

Note 1:	For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7:	This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.6.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in section 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

A.9.2.7 FDD RSRQ under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

A.9.2.7.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction is within the specified limits. This test will verify the requirements in Clause 9.1.5.2 for FDD intra frequency measurements under time domain measurement resource restriction.

A.9.2.7.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction is tested by using the parameters in Table A.9.2.7.2-1 and Table A.9.2.7.2-2 for non-MBSFN ABS with non-colliding CRS. In all test cases, Cell 1 is the serving cell and also the aggressor cell to Cell 2. Cell 2 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.2.7.2-1: General test parameters for E-UTRAN FDD RSRQ intra frequency test parameters under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 µs	Synchronous cells
Physical cell ID PCI		(PCI_{cell1} - PCI_{cell2})mod6 !=0	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met.
ABS pattern		‘1000000010000000100000001000000010000000’	Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are cofigured in the ABS subframes in Cell 1.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		‘1000000010000000100000001000000010000000’	Configured for Cell 2 measurements by measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		‘0100000001000000010000000100000001000000’	Configured for measurements on Cell 1.

Table A.9.2.7.2-2: Cell-specific test parameters for E-UTRAN FDD RSRQ intra frequency test parameters under time domain measurement resource restriction with non-MBSFN ABS

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	R.0 FDD	-	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and A.3.2.1.6 (OP.6 FDD)			OP.5 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-84.76		-103.85		-116	
	Bands FDD_B						-115.5	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 7						-114	
	Bands FDD_G Note 9						-113	
	Bands FDD_H						-112.5	
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-2	5	-4
CRS $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note 5		dB	2.88	-2.00	2.88	-2.00	3.54	-4.00
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-1.12	-5.54	-0.46	-7.54
RSRP Note3,4,5	Bands FDD_A	dBm/15 kHz	-79.76	-86.76	-98.85	-105.85	-111	-120
	Bands FDD_B						-110.5	-119.5
	Bands FDD_C						-110	-119
	Bands FDD_D						-109.5	-118.5
	Bands FDD_E, FDD_F Note 7						-109	-118
	Bands FDD_G Note 9						-108	-117
	Bands FDD_H						-107.5	-116.5
$(\mathrm{RSRQ})_{meas}$ Note3,4,5	Bands FDD_A, FDD_B, FDD_C, FDD_E, FDD_F Note 7, FDD_G Note 9, FDD_H	dB	-12.60	-15.30	-12.60	-15.30	-12.38	-16.69
$(\mathrm{Io})_{meas}$ Note3	Bands FDD_A	dBm/9 MHz	-50.17	-53.64	-69.26	-72.73	-81.63	-85.37
	Bands FDD_B						-81.13	-84.87
	Bands FDD_C						-80.63	-84.37

	Bands FDD_D						-80.13	-83.87
	Bands FDD_E, FDD_F Note 7						-79.63	-83.37
	Bands FDD_G Note 9						-78.63	-82.37
	Bands FDD_H						-78.13	-81.87
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.

Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.

Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 5: Applies to restricted measurement subframes of the respective cell.

Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.

Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.

Note 8: E-UTRA operating band groups are as defined in Section 3.5.

Note 9: Except Band 29 and Band 32.

A.9.2.7.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.2.

A.9.2.8 TDD RSRQ under Time Domain Measurement Resource Restriction with Non-MBSFN ABS

A.9.2.8.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction is within the specified limits. This test will verify the requirements in Clause 9.1.5.2 for TDD intra frequency measurements under time domain measurement resource restriction.

A.9.2.8.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction is tested by using the parameters in Table A.9.2.8.2-1 and Table A.9.2.8.2-2 for non-MBSFN ABS with non-colliding CRS. In all test cases, Cell 1 is the serving cell and also the aggressor cell to Cell 2. Cell 2 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.2.8.2-1: General test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	Also the aggressor cell.
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe configurations see Table 4.2-1 in [16].
Uplink/downlink subframe configuration		1	For Cell 1 and Cell 2. For uplink-downlink subframe configurations see Table 4.2-2 in [16].
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		$(PCI_{cell1} - PCI_{cell2})mod6 \ !=0$	Cell PCIs for Cell 1 and Cell 2 are randomly selected so that the condition is met
ABS pattern		'00000000010000000001'	Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are cofigured in the ABS subframes in Cell 1.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'00000000010000000001'	Configured for Cell 2 measurements by measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'10000000001000000000'	Configured for Cell 1 measurements.

Table A.9.2.8.2-2: Cell-specific test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time domain measurement resource restriction with non-MBSFN ABS

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
N_{oc} Note2	Bands TDD_A	dBm/15 kHz	-84.76		-103.85		-116	
	Bands TDD_C						-115	
	Bands TDD_E						-114	
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-2	5	-4
CRS $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note 5		dB	2.88	-2.00	2.88	-2.00	3.54	-4.00
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-1.12	-5.54	-0.46	-7.54
RSRP Note3,4,5	Bands TDD_A	dBm/15 kHz	-79.76	-86.76	-98.85	-105.85	-111	-120
	Bands TDD_C						-110	-119
	Bands TDD_E						-109	-118
$(\mathrm{RSRQ})_{meas}$ Note3,4,5	Bands TDD_A, TDD_C, TDD_E	dB	-12.60	-15.30	-12.60	-15.30	-12.38	-16.70
$(\mathrm{Io})_{meas}$ Note3	Bands TDD_A	dBm/9 MHz	-50.17	-53.64	-69.26	-72.73	-81.63	-85.37
	Bands TDD_C						-80.63	-84.37
	Bands TDD_E						-79.63	-83.37
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: Applies to restricted measurement subframes of the respective cell.
Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7: E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.8.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.2.

A.9.2.9 FDD RSRQ under Time Domain Measurement Resource Restriction with MBSFN ABS

A.9.2.9.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction is within the specified limits under AWGN propagation conditions. This test will verify the absolute FDD RSRQ accuracy under time domain measurement resource restriction specified in Clause 9.1.5.2.

A.9.2.9.2 Test parameters

The test parameters are given in Tables A.9.2.9.2-1 and A.9.2.9.2-2 below. In this test case there are two cells on the same frequency used in this test case. In the test, Cell 1 is the serving cell and also the aggressor cell to Cell 2. Cell 2 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured by higher layers with a time domain measurement restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.2.9.2-1: General test parameters for FDD RSRQ under time domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
Serving cell (PCell)		Cell 1	Also the aggressor cell on E-UTRA RF channel number 1
Neighbour cell		Cell 2	Cell to be identified on E-UTRA RF channel number 1
PCell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.1-1
CP length		Normal	
DRX		OFF	
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		$(PCI_{cell1} - PCI_{cell2})$ mod 6 = 0, PCI_{cell1} not equal to PCI_{cell2}	Cell PCIs are selected so that the condition is met (colliding CRS)
Cell 1 MBSFN ABS pattern		'0100000010000000100000000010000001000000'	ABS subframe is only MBSFN subframe. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. Configured in Cell 1.
Time domain measurement resource restriction pattern for PCell (Cell 1) measurements on RF Channel 1		'0001000000010000000100000001000000010000'	Time domain measurement resource restriction pattern for PCell measurement signalled to the UE in measSubframePatternPCell. The IE MeasSubframePattern is used to specify the time domain measurement resource restriction as defined in TS 36.331 [2], clause 6.3.6. Configured for Cell 1 measurements.
Time domain measurement resource restriction pattern for neighbour cell (Cell 2) measurements on RF Channel 1		'0100000010000000100000000010000001000000'	Time domain measurement resource restriction pattern for neighbour cell measurement signalled to the UE in measSubframePatternNeigh The IE MeasSubframePattern is used to specify the time domain measurement resource restriction as defined in TS 36.331 [2], clause 6.3.6. Configured for Cell 2 measurements.

Table A.9.2.9.2-2: Cell specific test parameters for FDD RSRQ under time domain measurement resource restriction with MBSFN ABS

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
OCNG Patterns defined in A.3.2.1.8 (OP.8 FDD) and A.3.2.1.6 (OP.6 FDD) Note5			OP.8 FDD	OP.6 FDD	OP.8 FDD	OP.6 FDD	OP.8 FDD	OP.6 FDD
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-84.76		-103.85		-116	
	Bands FDD_B						-115.5	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 8						-114	
	Bands FDD_G Note 10						-113	
	Bands FDD_H						-112.5	
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-2	5	-4
CRS $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note 5, 7 in the 1st OFDM symbol		dB	2.88	-8.19	2.88	-8.19	3.54	-10.19
CRS $\left(\hat{E}_s/Iot\right)_{meas}$ note 5 in OFDM symbols 4,7,11		dB	2.88	-2	2.88	-2	3.54	-4
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-1.12	-5.54	-0.46	-7.54
RSRP Note 3,4,5	Bands FDD_A	dBm/15 kHz	-79.76	-86.76	-98.85	-105.85	-111	-120
	Bands FDD_B						-110.5	-119.5
	Bands FDD_C						-110	-119
	Bands FDD_D						-109.5	-118.5
	Bands FDD_E, FDD_F Note 8						-109	-118
	Bands FDD_G Note 10						-108	-117
	Bands FDD_H						-107.5	-116.5
$(RSRQ)_{meas}$ Note 3,4,5	Bands FDD_A	dB	-12.60	-15.02	-12.60	-15.02	-12.38	-16.36
	Bands FDD_B							
	Bands FDD_C							
	Bands FDD_D							
	Bands FDD_E, FDD_F Note 8							
	Bands FDD_G Note 10							
	Bands FDD_H							
$(Io)_{meas}$ Note 3 1st OFDM symbol	Bands FDD_A	dBm/9 MHz	-50.17	-53.64	-69.26	-72.73	-81.63	-85.37
	Bands FDD_B						-81.13	-84.87
	Bands FDD_C						-80.63	-84.37

	Bands FDD_D						-80.13	-83.87
	Bands FDD_E, FDD_F Note 8						-79.63	-83.37
	Bands FDD_G Note 10						-78.63	-82.37
	Bands FDD_H						-78.13	-81.87
(Io) meas Note 3 OFDM symbols other than the 1st one	Bands FDD_A	dBm/9 MHz	-50.17	-54.85	-69.26	-73.94	-81.63	-86.76
	Bands FDD_B						-81.13	-86.26
	Bands FDD_C						-80.63	-85.76
	Bands FDD_D						-80.13	-85.26
	Bands FDD_E, FDD_F Note 8						-79.63	-84.76
	Bands FDD_G Note 10						-78.63	-83.76
	Bands FDD_H						-78.13	-83.26
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: Applies to restricted measurement subframes of the respective cell.
Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.1-1.
Note 7: In the 1st OFDM symbol, Cell 2 is not expected to meet the Es/Iot side condition in 9.1.5.2.
Note 8: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.
Note 10: Except Band 29 and Band 32.

A.9.2.9.3 Test Requirements

In the test, the RSRQ measurement accuracy under time domain measurement resource restriction shall fulfil the requirements in Clause 9.1.5.2

A.9.2.10 TDD Intra frequency case under time domain measurement resource restriction with MBSFN ABS

A.9.2.10.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction is within the specified limits. This test will verify the requirements in Clause 9.1.5.2 for TDD intra frequency measurements under time domain measurement resource restriction.

A.9.2.10.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction is tested by using the parameters in Table A.9.2.10.2-1 and Table A.9.2.10.2-2 for MBSFN ABS with colliding CRS. In all test cases, Cell 1 is the serving cell and also the aggressor cell to Cell 2. Cell 2 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells and provided with a neighbour cell list associated with the pattern, where the cell list includes Cell 2. The UE is also configured with a time-domain measurement resource restriction pattern for the serving cell measurements. The information for both patterns shall be provided to the UE before the measurements start.

Table A.9.2.10.2-1: General test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time-domain measurement resource restriction with MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The aggressor cell to Cell 2
Neighbour cell		Cell 2	Cell to be measured
PCell ABS configuration		MBSFN ABS	As defined in Table A.3.4.2.1-1
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe configurations see Table 4.2-1 in [16].
Uplink/downlink subframe configuration		1	For Cell 1 and Cell 2. For uplink-downlink subframe configurations see Table 4.2-2 in [16].
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells		3 μs	Synchronous cells
Physical cell ID PCI		$(PCI_{cell1} - PCI_{cell2})mod6 = 0$ PCI_{cell1} not equal to PCI_{cell2}	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met
ABS pattern		'00001000000000100000'	MBSFN ABS pattern. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. All ABS subframes are MBSFN subframes.
Time-domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1		'00001000000000100000'	Configured for Cell 2 measurements by measSubframePattern-Neigh IE in measSubframePatternConfig-Neigh, as defined in TS 36.331 [2], clause 6.3.5. measSubframeCellList contains Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'10000000001000000000'	Configured for measurements on Cell 1.

Table A.9.2.10.2-2: Cell-specific test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time domain measurement resource restriction with MBSFN ABS

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.5 (OP.5 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.5 TDD	OP.2 TDD	OP.5 TDD	OP.2 TDD	OP.5 TDD	OP.2 TDD
PBCH_RA PBCH_RB PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	Note 6	0	Note 6	0	Note 6	0
PSS_RA		dB	-4	0	-4	0	-4	0
SSS_RA		dB	-4	0	-4	0	-4	0
N_{oc} Note2	Bands TDD_A	dBm/15 kHz	-84.76		-103.85		-116	
	Bands TDD_C						-115	
	Bands TDD_E						-114	
CRS $\hat{E}_s/N_{oc}$		dB	5	-2	5	-2	5	-4
CRS $(\hat{E}_s/Iot)_{meas}$ Note 5, 7 In the 1st OFDM symbol		dB	2.88	-8.19	2.88	-8.19	3.54	-10.19
CRS $(\hat{E}_s/Iot)_{meas}$ Note 5 in OFDM symbols 4,7,11		dB	2.88	-2	2.88	-2	3.54	-4
SCH $\hat{E}_s/I_{ot}$		dB	-1.12	-5.54	-1.12	-5.54	-0.46	-7.54
RSRP Note 3,4,5	Bands TDD_A	dBm/15 kHz	-79.76	-86.76	-98.85	-105.85	-111	-120
	Bands TDD_C						-110	-119
	Bands TDD_E						-109	-118
$(\mathrm{RSRQ})_{meas}$ Note 3,4,5	Bands TDD_A, TDD_C, TDD_E	dB	-12.60	-15.02	-12.60	-15.02	-12.38	-16.36
$(\mathrm{Io})_{meas}$ Note 3 in the 1st OFDM symbol	Bands TDD_A	dBm/9 MHz	-50.17	-53.64	-69.26	-72.73	-81.63	-85.37
	Bands TDD_C						-80.63	-84.37
	Bands TDD_E						-79.63	-83.37
$(\mathrm{Io})_{meas}$ Note 3 in OFDM symbols other than the 1st one	Bands TDD_A	dBm/9 MHz	-50.17	-54.85	-69.26	-73.94	-81.63	-86.76
	Bands TDD_C						-80.63	-85.76
	Bands TDD_E						-79.63	-84.76
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3:	RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	Applies to restricted measurement subframes of the respective cell.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.2.1-1.
Note 7:	In the 1st OFDM symbol, Cell 2 is not expected to meet the Es/Iot side condition in 9.1.5.2.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.10.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in clause 9.1.5.2.

A.9.2.11 FDD RSRQ for E-UTRA Carrier Aggregation (20MHz bandwidth)

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.11.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.5.1.

A.9.2.11.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.5.2 except that the values of the parameters in the Table A.9.2.11.2-1 will replace the values of the corresponding parameters in A.9.2.5.2-1.

Table A.9.2.11.2-1: FDD RSRQ Carrier Aggregation test parameters

Parameters		Test 1			
		Units	Cell 1	Cell 2	Cell 3
$BW_{channel\_CA}$ Note 1		MHz	20	20	20
Measurement bandwidth		n_{PRB}	47-52	47-52	47-52
PDSCH Reference measurement channel defined in A.3.1.1.1			R.4 FDD	R.4 FDD	-
PDSCH allocation		n_{PRB}	38-61	38-61	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.10 FDD	R.10 FDD	R.10 FDD
OCNG Patterns defined in A.3.2.1.11 (OP.11 FDD) and A.3.2.1.12 (OP.12 FDD)			OP.11 FDD	OP.11 FDD	OP.12 FDD
Io Note2	Bands FDD_A Note 5	dBm/18 MHz	-87.26	-82.67	
	Bands FDD_B Note 5		-86.76	-82.17	
	Bands FDD_C Note 5		-86.26	-81.67	
	Bands FDD_D Note 5		-85.76	-81.17	
	Bands FDD_E Note 5		-85.26	-80.67	
	Bands FDD_G Note 5		-84.26	-79.67	
	Bands FDD_H Note 5		-83.76	-79.17	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves Note 3: See Table A.9.2.5.2-1 for the other parameters Note 4: E-UTRA operating band groups are as defined in Section 3.5. Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 20 MHz channel bandwidth.					

A.9.2.11.3 Test Requirements

The test requirements defined in section A.9.2.5.3 shall apply in this test case.

A.9.2.12 TDD RSRQ for E-UTRA Carrier Aggregation (20MHz bandwidth)

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.12.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.6.1.

A.9.2.12.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.6.2 except that the values of the parameters in the Table A.9.2.12.2-1 will replace the values of the corresponding parameters in A.9.2.6.2-1.

Table A.9.2.12.2-1: TDD RSRQ Carrier Aggregation test parameters

<table>
<tr><th colspan="2" rowspan="2">Parameters</th><th colspan="4">Test 1</th></tr>
<tr><th>Units</th><th>Cell 1</th><th>Cell 2</th><th>Cell 3</th></tr>
<tr><td colspan="2">$BW_{channel\_CA}$ Note1</td><td>MHz</td><td>20</td><td>20</td><td>20</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>n_{PRB}</td><td>47-52</td><td>47-52</td><td>47-52</td></tr>
<tr><td colspan="2">PDSCH Reference measurement channel defined in A.3.1.1.2</td><td></td><td>R.3 TDD</td><td>R.3 TDD</td><td>-</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>n_{PRB}</td><td>38-61</td><td>38-61</td><td>-</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2</td><td></td><td>R.10 TDD</td><td>R.10 TDD</td><td>R.10 TDD</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and A.3.2.2.8 (OP.8 TDD)</td><td></td><td>OP.7 TDD</td><td>OP.7 TDD</td><td>OP.8 TDD</td></tr>
<tr><td rowspan="3">Io Note2</td><td>Bands TDD_A Note 5</td><td rowspan="3">dBm/18 MHz</td><td>-87.26</td><td colspan="2">-82.67</td></tr>
<tr><td>Bands TDD_C Note 5</td><td>-86.26</td><td colspan="2">-81.67</td></tr>
<tr><td>Bands TDD_E Note 5</td><td>-85.26</td><td colspan="2">-80.67</td></tr>
<tr><td colspan="6">Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves
Note 3: See Table A.9.2.6.2-1 for the other parameters.
Note 4: E-UTRA operating band groups are as defined in Section 3.5.
Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 20 MHz channel bandwidth.</td></tr>
</table>

A.9.2.12.3 Test Requirements

The test requirements defined in section A.9.2.6.3 shall apply in this test case.

A.9.2.13 Void

A.9.2.13.1 Void

A.9.2.13.2 Void

Table A.9.2.13.2-1: Void

A.9.2.13.3 Void

A.9.2.14 Void

A.9.2.14.1 Void

A.9.2.14.2 Void

Table A.9.2.14.2-1: Void

A.9.2.14.3 Void

A.9.2.15 FDD RSRQ under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.9.2.15.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction with CRS assistance information is within the specified limits. This test will verify the requirements in Clause 9.1.5.3 for FDD intra frequency measurements under time domain measurement resource restriction with CRS assistance information.

A.9.2.15.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction with CRS assistance information is tested by using the parameters in Table A.9.2.15.2-1 and Table A.9.2.15.2-2 for non-MBSFN ABS with colliding CRS between Cell1 and Cell3 and non-colliding CRS between Cell1 and Cell2. In all test cases, Cell 1 is the serving/aggressor cell, Cell2 is the neighbour/aggressor cell and Cell3 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell 1 with a time domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on neighbour cells, namely Cell 3 measurements with a neighbour cell list, where the cell list includes Cell 3. The UE is also provided via higher layers with the CRS assistance information of Cell 2. The information for both measurement pattern and the CRS assistance information shall be provided to the UE before the measurements start.

Note: It's up to eNB's implementation whether the time domain measurement resource restriction pattern for PCell measurements is configured or not.

Table A.9.2.15.2-1: General test parameters for E-UTRAN FDD RSRQ intra frequency test parameters under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter		Unit	Value	Comment
PCell			Cell 1	Serving/aggressor cell
Neighbour cells			Cell 2	Neighbour/aggressor cell
			Cell3	Cell to be measured
ABS transmission configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
CP length			Normal	For all cells in the test
DRX				OFF
Time offset between cells		µs	Cell 2 offset with respect to Cell 1: 0 Cell 3 offset with respect to Cell 1: -2.5	Three synchronous cells
Physical cell IDs			$(PCI_{cell1} - PCI_{cell3})mod6 = 0$ $(PCI_{cell2} - PCI_{cell3})mod6 != 0$ PCI_{cell1} not equal to PCI_{cell3}	Cell PCIs are selected so that all conditions are met
ABS pattern			'1000000010000000100000 001000000010000000'	FDD ABS Pattern Info IE, as defined in TS 36.423[28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes. Configured in Cell 1 and Cell 2.
Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1			'1000000010000000100000 001000000010000000'	Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5. Configured for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements			'0100000001000000010000 000100000001000000'	Configured for measurements on Cell 1.
CRS assistance information	physCellId		see PCI conditions above	Only the CRS information of cell 2 is provided in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation *one Frame*='000000'.
	antennaPortsCount		1	
	mbsfn-SubframeConfigList		*oneFrame* = '000000'	

Table A.9.2.15.2-2: Cell-specific test parameters for E-UTRAN FDD RSRQ intra frequency test parameters under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter		Unit	Test 1			Test 2			Test 3		
			Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1			1			1		
$BW_{channel}$		MHz	10			10			10		
Measurement bandwidth		n_{PRB}	22—27			22—27			22—27		
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-		R.0 FDD	-		R.0 FDD	-	
PDSCH allocation		n_{PRB}	13—36	-		13—36	-		13—36	-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD			R.6 FDD			R.6 FDD		
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and A.3.2.1.6 (OP.6 FDD)			OP.5 FDD	OP.6 FDD	OP.6 FDD	OP.5 FDD	OP.6 FDD	OP.6 FDD	OP.5 FDD	OP.6FDD	OP.6 FDD
PBCH_RA		dB	Note 6	0		Note 6	0		Note 6	0	
PBCH_RB											
PSS_RA											
SSS_RA											
PCFICH_RB											
PHICH_RA											
PHICH_RB											
PDCCH_RA											
PDCCH_RB											
PDSCH_RA											
PDSCH_RB											
OCNG_RA Note 1											
OCNG_RB Note 1											
N_{oc} Note 2	Bands FDD_A	dBm/15 kHz	-84.76			-103.85			-116		
	Bands FDD_B								-115.5		
	Bands FDD_C								-115		
	Bands FDD_D								-114.5		
	Bands FDD_E, FDD_F Note 7								-114		
	Bands FDD_G Note 9								-113		
	Bands FDD_H								-112.5		
CRS $\hat{E}_s/N_{oc}$		dB	4	2	-1.5	4	2	-1.5	4	2	-4
CRS $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note 5		dB	-1.18	-0.32	-6.96	-1.18	-0.32	-6.96	-0.75	0.54	-9.46
RSRP Note 3,4,5	Bands FDD_A	dBm/15 kHz	-80.76	-82.76	-86.26	-99.85	-101.85	-105.35	-112	-114	-120
	Bands FDD_B								111.5	113.5	119.5
	Bands FDD_C								-111	-113	-119
	Bands FDD_D								110.5	112.5	118.5
	Bands FDD_E, FDD_F Note 7								-110	-112	-118
	Bands FDD_G Note 9								-109	-111	-117
	Bands FDD_H								108.5	110.5	116.5
$(\text{RSRQ})_{meas}$ Note 3,4,5	Bands FDD_A, FDD_B, FDD_C, FDD_D, FDD_E, FDD_F Note 7, FDD_G Note 9, FDD_H	dB	-14.43	-11.59	-15.09	-14.43	-11.59	-15.09	-14.19	-10.81	-16.81

$(\mathrm{Io})_{meas}$ Note 3	Bands FDD_A	dBm/9 MHz	-49.34	-53.19	-68.43	-72.28	-80.82	-85.03
	Bands FDD_B						-80.32	-84.54
	Bands FDD_C						-79.82	-84.04
	Bands FDD_D						-79.32	-83.54
	Bands FDD_E, FDD_F Note 7						-78.82	-83.04
	Bands FDD_G Note 9						-77.82	-82.04
	Bands FDD_H						-77.32	-81.54
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: Applies to restricted measurement subframes for only Cell 2 and Cell 3. For Cell 1, the corresponding value is derived from the normal subframes other than the subframes indicated in the time domain measurement resource restriction pattern for intra-frequency measurements.
Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 8: E-UTRA operating band groups are as defined in Section 3.5.
Note 9: Except Band 29 and Band 32.

A.9.2.15.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.3.

A.9.2.16 TDD RSRQ under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.9.2.16.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy under time domain measurement resource restriction with CRS assistance information is within the specified limits. This test will verify the requirements in Clause 9.1.5.3 for TDD intra frequency measurements under time domain measurement resource restriction with CRS assistance information.

A.9.2.16.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurements under time domain measurement resource restriction with CRS assistance information is tested by using the parameters in Table A.9.2.16.2-1 and Table A.9.2.16.2-2 for non-MBSFN ABS with colliding CRS between Cell1 and Cell3 and non-colliding CRS between Cell1 and Cell2. In all test cases, Cell 1 is the serving/aggressor cell, Cell2 is the neighbour/aggressor cell and Cell3 is the target cell to be measured for RSRQ.

The UE is configured by higher layers via Cell1 with a time domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on neighbour cells, namely Cell 3 measurements with a neighbour cell list, where the cell list includes Cell 3. The UE is also provided via higher layers with the CRS assistance information of Cell 2. The information for both measurement pattern and the CRS assistance information shall be provided to the UE before the measurements start.

Note: It's up to eNB's implementation whether the time domain measurement resource restriction pattern for PCell measurements is configured or not.

Table A.9.2.16.2-1: General test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

<table>
<tr><th colspan="2">Parameter</th><th>Unit</th><th>Value</th><th>Comment</th></tr>
<tr><td colspan="2">PCell</td><td></td><td>Cell 1</td><td>Serving/aggressor cell</td></tr>
<tr><td colspan="2" rowspan="2">Neighbour cells</td><td rowspan="2"></td><td>Cell 2</td><td>Neighbour/aggressor cell</td></tr>
<tr><td>Cell3</td><td>Cell to be measured</td></tr>
<tr><td colspan="2">Special subframe configuration</td><td></td><td>6</td><td>For Cell 1, Cell 2 and Cell 3. For special subframe configurations see Table 4.2-1 in [16].</td></tr>
<tr><td colspan="2">Uplink/downlink subframe configuration</td><td></td><td>1</td><td>For Cell 1, Cell 2 and Cell 2. For uplink-downlink subframe configurations see Table 4.2-2 in [16].</td></tr>
<tr><td colspan="2">ABS transmission configuration</td><td></td><td>Non-MBSFN ABS</td><td>As defined in Table A.3.4.1.1-1</td></tr>
<tr><td colspan="2">CP length</td><td></td><td>Normal</td><td>For all cells in the test</td></tr>
<tr><td colspan="2">DRX</td><td></td><td></td><td>OFF</td></tr>
<tr><td colspan="2">Time offset between cells</td><td>μs</td><td>Cell 2 offset with respect to Cell 1: 0
Cell 3 offset with respect to Cell 1: -2.5</td><td>Three synchronous cells</td></tr>
<tr><td colspan="2">Physical cell IDs</td><td></td><td>$(PCI_{cell1} - PCI_{cell3})mod6 = 0$
$(PCI_{cell2} - PCI_{cell3})mod6 != 0$
PCI_{cell1} not equal to PCI_{cell3}</td><td>Cell PCIs are selected so that all conditions are met</td></tr>
<tr><td colspan="2">ABS pattern</td><td></td><td>'00000000010000000001'</td><td>TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.
The first/leftmost bit corresponds to the Pcell subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes.
Provided fto the UE for Cell 1 and Cell 2.</td></tr>
<tr><td colspan="2">Time domain measurement resource restriction pattern for neighbour cell measurements on RF Channel 1</td><td></td><td>'00000000010000000001'</td><td>Time domain measurement resource restriction pattern for neighbor cell measurement signalled to the UE in measSubframePatternNeigh IE in measSubframePatternConfigNeigh, as defined in TS 36.331, clause 6.3.5.
Provided to the UE for Cell 3 measurements. The cell list in measSubframeCellList IE shall contain Cell 3 but not Cell 2.</td></tr>
<tr><td colspan="2">Time-domain measurement resource restriction pattern for serving cell measurements</td><td></td><td>'10000000001000000000'</td><td>Configured for Cell 1 measurements.</td></tr>
<tr><td rowspan="3">CRS assistance information</td><td>physCellId</td><td></td><td>see PCI conditions above</td><td rowspan="3">Only the CRS assistance information of cell 2 is provided for Cell 2 only in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation one Frame='000000'.</td></tr>
<tr><td>antennaPortsCount</td><td></td><td>1</td></tr>
<tr><td>mbsfn-SubframeConfigList</td><td></td><td>oneFrame = '000000'</td></tr>
</table>

Table A.9.2.16.2-2: Cell-specific test parameters for E-UTRAN TDD RSRQ intra frequency test parameters under time domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter		Unit	Test 1			Test 2			Test 3		
			Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1			1			1		
$BW_{channel}$		MHz	10			10			10		
Measurement bandwidth		n_{PRB}	22—27			22—27			22—27		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-		R.0 TDD	-		R.0 TDD	-	
PDSCH allocation		n_{PRB}	13—36	-		13—36	-		13—36	-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD			R.6 TDD			R.6 TDD		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA		dB	Note 6	0		Note 6	0		Note 6	0	
PBCH_RB											
PSS_RA											
SSS_RA											
PCFICH_RB											
PHICH_RA											
PHICH_RB											
PDCCH_RA											
PDCCH_RB											
PDSCH_RA											
PDSCH_RB											
OCNG_RA Note1											
OCNG_RB Note1											
N_{oc} Note2	Bands TDD_A	dBm/15 kHz	-84.76			-103.85			-116		
	Bands TDD_C								-115		
	Bands TDD_E								-114		
CRS $\hat{E}_s/N_{oc}$		dB	4	2	-1.5	4	2	-1.5	4	2	-4
CRS $(\hat{E}_s/I_{ot})_{meas}$ Note 5		dB	-1.18	-0.32	-6.96	-1.18	-0.32	-6.96	-0.75	0.54	-9.46
RSRP Note3,4,5	Bands TDD_A	dBm/15 kHz	-80.76	-82.76	-86.26	-99.85	-101.85	-105.35	-112	-114	-120
	Bands TDD_C								-111	-113	-119
	Bands TDD_E								-110	-112	-118
$(\text{RSRQ})_{meas}$ Note3,4,5	Bands TDD_A, TDD_C, TDD_E	dB	-14.43	-11.59	-15.09	-14.43	-11.59	-15.09	-14.19	-10.81	-16.81
$(\text{Io})_{meas}$ Note3	Bands TDD_A	dBm/9 MHz	-49.34	-53.19		-68.43	-72.28		-80.82	-85.03	
	Bands TDD_C								-79.82	-84.03	
	Bands TDD_E								-78.82	-83.04	
Propagation condition		-	AWGN			AWGN			AWGN		

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3:	RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io levels are calculated in CRS symbols of measurement restricted subframes.
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	Applies to restricted measurement subframes for only Cell 2 and Cell 3. For Cell 1, the corresponding value is derived from the normal subframes other than the subframes indicated in the time domain measurement resource restriction pattern for intra-frequency measurements.
Note 6:	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
Note 7:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.16.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.3.

A.9.2.17 FDD Intra frequency case for 5 MHz bandwidth

A.9.2.17.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.5.1.

A.9.2.17.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.17.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.17.2-1: RSRQ FDD Intra frequency test parameters, 5MHz

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	5		5		5	
Measurement bandwidth		n_{PRB}	10—15		10—15		10—15	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.5 FDD	-	R.5 FDD	-	R.5 FDD	-
PDSCH allocation		n_{PRB}	7—17	-	7—17	-	7—17	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.11 FDD		R.11 FDD		R.11 FDD	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)			OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands FDD_N	dBm/15 kHz	-81.76		-100.85		-109.5	
$\hat{E}_s/I_{ot}$		dB	-1.76	-1.76	-4.70	-4.70	-5.46	-5.46
RSRP Note3	Bands FDD_N	dBm/15 kHz	-78.76	-78.76	-103.75	-103.75	-113.50	-113.50
RSRQ Note3	Bands FDD_N	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
Io Note3	Bands FDD_N	dBm/4.5 MHz	-50.01		-73.01		-82.19	
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.17.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.5.1.

A.9.2.18 FDD—FDD Inter frequency case for 5MHz bandwidth

A.9.2.18.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Sections 9.1.6.1 and 9.1.6.2.

A.9.2.18.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.18.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.18.2-1: RSRQ FDD—FDD Inter frequency test parameters, 5MHz

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2	1	2
$BW_{channel}$		MHz	5	5	5	5	5	5
Gap Pattern Id			0	-	0	-	0	-
Measurement bandwidth		n_{PRB}	10—15		10—15		10—15	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.5 FDD	-	R.5 FDD	-	R.6 FDD	-
PDSCH allocation		n_{PRB}	7—17	-	7—17	-	7—17	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.11 FDD		R.11 FDD		R.11 FDD	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)			OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD	OP.15 FDD	OP.16 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-77	-77	-101.70	-101.70	-119.5	N/A
	Bands FDD_B						-119	N/A
	Bands FDD_C						-118.5	N/A
	Bands FDD_D						-118	N/A
	Bands FDD_E, FDD_F Note 5						-117.5	N/A
	Bands FDD_G						-116.5	N/A
	Bands FDD_H						-116	N/A
	Bands FDD_N						- N/A	-113
$\hat{E}_s/I_{ot}$		dB	-1.75	-1.75	-4.00	-4.00	-4.00	-4.00
RSRP Note3	Bands FDD_A	dBm/15 kHz	-78.75	-78.75	-105.70	-105.70	-123.5	N/A
	Bands FDD_B						-123	N/A
	Bands FDD_C						-122.5	N/A
	Bands FDD_D						-122	N/A
	Bands FDD_E, FDD_F Note 5						-121.5	N/A
	Bands FDD_G						-120.5	N/A
	Bands FDD_H						-120	N/A
	Bands FDD_N						N/A	-117
RSRQ Note3	Bands FDD_A Bands FDD_B Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 5 Bands FDD_G Bands FDD_H Bands FDD_N	dB	-14.76	-14.76	-16.25	-16.25	-16.25	-16.25
Io Note3	Bands FDD_A	dBm/4.5 MHz	-50.01	-50.01	-75.47	-75.47	-93.27	N/A
	Bands FDD_B						-92.77	N/A
	Bands FDD_C						-92.27	N/A
	Bands FDD_D						-91.77	N/A
	Bands FDD_E, FDD_F Note 5						-91.27	N/A

	Bands FDD_G						-90.27	N/A
	Bands FDD_H						-89.77	N/A
	Bands FDD_N						N/A	-86.77
$\hat{E}_s/N_{oc}$		dB	-1.75	-1.75	-4.0	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: For Band 26, the tests shall be performed with the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6: This test is only applicable for testing inter-frequency requirements for Bands FDD_N. Cell 2 is on the Band under test, and Cell 1 is on another band supported by the UE.
Note 7: E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.18.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.6.1 and 9.1.6.2.

A.9.2.19 FDD-FDD Inter Frequency WB-RSRQ

A.9.2.19.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. In the test the UE shall also be configured with the *AllowedMeasBandwidth* parameter defined in TS 36.331 [2]. The test shall verify the WB-RSRQ inter frequency absolute accuracy requirements defined in Section 9.1.6.3.

A.9.2.19.2 Test parameters

In this test case the two cells are on two different carrier frequencies and measurement gaps are provided. The WB-RSRQ inter frequency absolute accuracy requirement is tested by using test parameters in Table A.9.2.19.2-1. In the test, Cell 1 is the PCell and Cell 2 the target cell on which the UE shall be ordered to measure WB-RSRQ.

Table A.9.2.19.2-1: WB-RSRQ FDD-FDD Inter frequency test parameters

Parameter		Unit	Test 1 Cell 1	Test 1 Cell 2	
E-UTRA RF Channel Number			1	2	
$BW_{channel}$		MHz	10	10	
Antenna Configuration			1x2	1x2	
Gap Pattern Id			0	-	
PBCH_RA		dB	0	0	
PBCH_RB				0	
PSS_RA				0	
SSS_RA				0	
PCFICH_RB				-∞	
PHICH_RA				-∞	
PHICH_RB				-∞	
PDCCH_RA				-∞	
PDCCH_RB				-∞	
PDSCH_RA				-∞	
PDSCH_RB				-∞	
OCNG_RA Note1				-∞	
OCNG_RB Note1				-∞	
AllowedMeasBandwidth in TS 36.331 [2]		RB	6	50	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-	
PDSCH allocation		n_{PRB}	13-36	-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	-	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)			OP.1 FDD	-	
I_{ot} Note2	bandwidth	n_{PRB}	0-49	0-21 28-49	22-27
		dBm/15 kHz	-94	-87	-110
$\hat{E}_s/I_{ot}$	bandwidth	n_{PRB}	0-49	0-21 28-49	22-27
		dB	-4	-3	20
RSRP Note3		dBm/15 kHz	-98	-90	
RSRQ Note3		dB	-16.25	-	
$WB\text{-}RSRQ_0$ Note3 in subframe 0		dB	-	-13.68	
$WB\text{-}RSRQ_1$ Note3 in subframe ≠ 0		dB	-	-13.63	
Io Note3		dBm/ 9 MHz	-64.76	-	
Io Note3 in symbol 0, 4, 11 of subframe 0		dBm/ 9 MHz	-	-82.38	
Io Note3 in symbol 7 of subframe 0		dBm/ 9 MHz	-	-82.20	
Io Note3 in symbol 0, 4, 7, 11 of subframes ≠ 0		dBm/ 9 MHz	-	-82.38	
Propagation condition		-	AWGN	AWGN	

Note 1: OCNG shall be used such that Cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells not specified in the test, assumed to be constant over time and modelled as noise.
Note 3: RSRQ, RSRP, WB-RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The stated values represent the weighted average over the allowed measurement bandwidth, and the WB-RSRQ values assume averaging over symbols 0, 4, 7 and 11 of the subframe.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: This test case is applicable to all FDD frequency bands except band 31.

A.9.2.19.3 Test Requirements

The WB-RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.6.3, compared with $\text{WB-RSRQ}_{0.}$ or WB-RSRQ_1.

A.9.2.20 TDD—TDD Inter Frequency WB-RSRQ

A.9.2.20.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits when the measurement configuration message received by the UE contains *widebandRSRQ-Meas* parameter in TS 36.331 [2]. In the test the UE shall also be configured with the *AllowedMeasBandwidth* parameter defined in TS 36.331 [2]. The test shall verify the WB-RSRQ inter frequency absolute accuracy requirements defined in Section 9.1.6.3.

A.9.2.20.2 Test parameters

In this test case the two cells are on two different carrier frequencies and measurement gaps are provided. The WB-RSRQ inter frequency absolute accuracy requirement is tested by using test parameters in Table A.9.2.20.2-1. In the test, Cell 1 is the PCell and Cell 2 the target cell on which the UE shall be ordered to measure WB-RSRQ.

Table A.9.2.20.2-1: WB-RSRQ TDD-TDD Inter frequency test parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	
E-UTRA RF Channel Number			1	2	
$BW_{channel}$		MHz	10	10	
Special subframe configuration Note1			6	6	
Uplink-downlink configuration Note1			1	1	
Antenna Configuration			1x2	1x2	
Gap Pattern Id			0	-	
PBCH_RA		dB	0	0	
PBCH_RB				0	
PSS_RA				0	
SSS_RA				0	
PCFICH_RB				-∞	
PHICH_RA				-∞	
PHICH_RB				-∞	
PDCCH_RA				-∞	
PDCCH_RB				-∞	
PDSCH_RA				-∞	
PDSCH_RB				-∞	
OCNG_RA Note2				-∞	
OCNG_RB Note2				-∞	
AllowedMeasBandwidth in TS 36.331 [2]		RB	6	50	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	
PDSCH allocation		n_{PRB}	13-36	-	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	-	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)			OP.1 TDD	-	
I_{ot} Note3	bandwidth	n_{PRB}	0-49	0-21 28-49	22-27
		dBm/15 kHz	-94	-87	-110
$\hat{E}_s/I_{ot}$	bandwidth	n_{PRB}	0—49	0-21 28-49	22-27
		dB	-4	-3	20
RSRP Note4		dBm/15 kHz	-98	-90	
RSRQ Note4		dB	-16.25	-	
$WB\text{-}RSRQ_0$ Note4 in subframe 0		dB	-	-13.68	
$WB\text{-}RSRQ_1$ Note4 in subframe ≠ 0		dB	-	-13.63	
Io Note4		dBm/ 9 MHz	-64.76	-	
Io Note4 in symbol 0, 4, 11 of subframe 0		dBm/ 9 MHz	-	-82.38	
Io Note4 in symbol 7 of subframe 0		dBm/ 9 MHz	-	-82.20	
Io Note4 in symbol 0, 4, 7, 11 of subframes ≠ 0		dBm/ 9 MHz	-	-82.38	
Propagation condition		-	AWGN	AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that Cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells not specified in the test, assumed to be constant over time and modelled as noise.
Note 4: RSRQ, RSRP, WB-RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The stated values represent the weighted average over the allowed measurement bandwidth, and the WB-RSRQ values assume averaging over symbols 0, 4, 7 and 11 of the subframe.

Note 5:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.20.3 Test Requirements

The WB-RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.6.3, compared with $WB\text{-}RSRQ_{0.}$ or $WB\text{-}RSRQ_1$.

A.9.2.21 FDD RSRQ for E-UTRAN Carrier Aggregation for 10MHz+5MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.21.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.5.1.

A.9.2.21.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.5.2 except that the values of the parameters in the Table A.9.2.21.2-1 will replace the values of the corresponding parameters in A.9.2.5.2-1.

Table A.9.2.21.2-1: FDD RSRQ Carrier Aggregation test parameters

Parameters		Units	Test 1 Cell 1	Test 1 Cell 2	Test 1 Cell 3
$BW_{channel\_CA}$ Note 1		MHz	10	5	
Measurement bandwidth		n_{PRB}	22-27	10-15	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.5 FDD	-
PDSCH allocation		n_{PRB}	13-36	7-17	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	R.11 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD), A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)			OP.1 FDD	OP.15 FDD	OP.16 FDD
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-119.5	-116	-116
	Bands FDD_B		-119	-115.5	-115.5
	Bands FDD_C		-118.5	-115	-115
	Bands FDD_D		-118	-114.5	-114.5
	Bands FDD_E, FDD_F		-117.5	-114	-114
	Bands FDD_G		-116.5	-113	-113
	Bands FDD_H		-116	-112.5	-112.5
	Bands FDD_N		N/A	-109.5	-109.5
RSRP Note2	Bands FDD_A	dBm/15 kHz	-123.5	-120	-120
	Bands FDD_B		-123	-119.5	-119.5
	Bands FDD_C		-122.5	-119	-119
	Bands FDD_D		-122	-118.5	-118.5
	Bands FDD_E, FDD_F		-121.5	-118	-118
	Bands FDD_G		-120.5	-117	-117
	Bands FDD_H		-120	-116.5	-116.5
	Bands FDD_N		N/A	-113.5	-113.5
RSRQ Note2	Bands FDD_A	dB	-16.25	-17.34	-17.34
	Bands FDD_B				
	Bands FDD_C				
	Bands FDD_D				
	Bands FDD_E, FDD_F				
	Bands FDD_G				

	Bands FDD_H				
	Bands FDD_N				
Io^{Note2}	Bands FDD_A	dBm/9MHz	-90.26	N/A	
	Bands FDD_B		-89.76		
	Bands FDD_C		-89.26		
	Bands FDD_D		-88.76		
	Bands FDD_E, FDD_F		-88.26		
	Bands FDD_G		-87.26		
	Bands FDD_H		-86.76		
	Bands FDD_A	dBm/4.5MHz	N/A	-88.67	
	Bands FDD_B			-88.17	
	Bands FDD_C			-87.67	
	Bands FDD_D			-87.17	
	Bands FDD_E, FDD_F			-86.67	
	Bands FDD_G			-85.67	
	Bands FDD_H			-85.17	
	Bands FDD_N			-82.17	
Note 1:	This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.				
Note 2:	RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				
Note 3:	See Table A.9.2.5.2-1 for the other parameters				

A.9.2.21.3 Test Requirements

The test requirements defined in section A.9.2.5.3 shall apply in this test case.

A.9.2.22 TDD RSRQ for E-UTRAN Carrier Aggregation for 10MHz+5MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.22.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.6.1.

A.9.2.22.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.6.2 except that the values of the parameters in the Table A.9.2.22.2-1 will replace the values of the corresponding parameters in A.9.2.6.2-1.

Table A.9.2.22.2-1: TDD RSRQ Carrier Aggregation test parameters

Parameters		Test 1			
		Units	**Cell 1**	**Cell 2**	**Cell 3**
$BW_{channel\_CA}$ Note1		MHz	10	5	
Measurement bandwidth		n_{PRB}	22-27	10-15	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.4TDD	-
PDSCH allocation		n_{PRB}	13-36	7-17	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	R.11 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD), A.3.2.2.9 (OP.9 TDD) and A.3.2.2.10 (OP.10 TDD)			OP.1 TDD	OP.9 TDD	OP.10 TDD
Io Note2	Bands TDD_A	dBm/9MHz	-90.26	N/A	
	Bands TDD_C		-89.26		
	Bands TDD_E		-88.26		
	Bands TDD_A	dBm/4.5MHz	N/A	-88.67	
	Bands TDD_C			-87.67	
	Bands TDD_E			-86.67	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves Note 3: See Table A.9.2.6.2-1 for the other parameters					

A.9.2.22.3 Test Requirements

The test requirements defined in section A.9.2.6.3 shall apply in this test case.

A.9.2.23 FDD RSRQ for E-UTRA Carrier Aggregation (5MHz + 5MHz bandwidth)

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.23.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.5.1.

A.9.2.23.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.5.2 except that the values of the parameters in the Table A.9.2.23.2-1 will replace the values of the corresponding parameters in A.9.2.5.2-1.

Table A.9.2.23.2-1: FDD RSRQ Carrier Aggregation test parameters

Parameters		Units	Test 1 Cell 1	Test 1 Cell 2	Test 1 Cell 3
$BW_{channel\_CA}$ Note 1		MHz	5	5	5
Measurement bandwidth		n_{PRB}	10-15	10-15	10-15
PDSCH Reference measurement channel defined in A.3.1.1.1			R.5 FDD	R.5 FDD	N/A
PDSCH allocation		n_{PRB}	7-17	7-17	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.11 FDD	R.11 FDD	R.11 FDD
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD) and A.3.2.1.16 (OP.16 FDD)			OP.15 FDD	OP.15 FDD	OP.16FDD
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-119.5	-116	-116
	Bands FDD_B		-119	-115.5	-115.5
	Bands FDD_C		-118.5	-115	-115
	Bands FDD_D		-118	-114.5	-114.5
	Bands FDD_E, FDD_F		-117.5	-114	-114
	Bands FDD_G		-116.5	-113	-113
	Bands FDD_H		-116	-112.5	-112.5
	Bands FDD_N		-113	-109.5	-109.5
RSRP Note2	Bands FDD_A	dBm/15 kHz	-123.5	-120	-120
	Bands FDD_B		-123	-119.5	-119.5
	Bands FDD_C		-122.5	-119	-119
	Bands FDD_D		-122	-118.5	-118.5
	Bands FDD_E, FDD_F		-121.5	-118	-118
	Bands FDD_G		-120.5	-117	-117
	Bands FDD_H		-120	-116.5	-116.5
	Bands FDD_N		-117	-113.5	-113.5
RSRQ Note2	Bands FDD_A	dB	-16.25	-17.34	-17.34
	Bands FDD_B				
	Bands FDD_C				
	Bands FDD_D				
	Bands FDD_E, FDD_F				
	Bands FDD_G				
	Bands FDD_H				
	Bands FDD_N				
Io Note2	Bands FDD_A Note 5	dBm/4.5MHz	-93.26	-88.67	
	Bands FDD_B Note 5		-92.76	-88.17	
	Bands FDD_C Note 5		-92.26	-87.67	
	Bands FDD_D		-91.76	-87.17	
	Bands FDD_E, FDD_F Note 5		-91.26	-86.67	
	Bands FDD_G Note 5		-90.26	-85.67	
	Bands FDD_H Note 5		-89.76	-85.17	
	Bands FDD_N Note 5		-86.76	-82.76	

Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 2: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 3: See Table A.9.2.5.2-1 for the other parameters
Note 4: E-UTRA operating band groups are as defined in Section 3.5.

Note 5:	The test applies for E-UTRA operating bands in this band group which are supporting 5MHz + 5MHz channel bandwidth.

A.9.2.23.3 Test Requirements

The test requirements defined in section A.9.2.5.3 shall apply in this test case.

A.9.2.24 TDD RSRQ for E-UTRA Carrier Aggregation (5MHz + 5MHz bandwidth)

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.24.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.6.1.

A.9.2.24.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.6.2 except that the values of the parameters in the Table A.9.2.24.2-1 will replace the values of the corresponding parameters in A.9.2.6.2-1.

Table A.9.2.24.2-1: TDD RSRQ Carrier Aggregation test parameters

Parameters		Test 1			
		Units	Cell 1	Cell 2	Cell 3
$BW_{channel\_CA}$ Note1		MHz	10	5	5
Measurement bandwidth		n_{PRB}	10-15	10-15	10-15
PDSCH Reference measurement channel defined in A.3.1.1.1			R.4 TDD	R.4 TDD	N/A
PDSCH allocation		n_{PRB}	7-17	7-17	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.11 TDD	R.11 TDD	R.11 TDD
OCNG Patterns defined in A.3.2.2.9 (OP.9 TDD) and A.3.2.2.10 (OP.10 TDD)			OP.9 TDD	OP.9 TDD	OP.10 TDD
Io Note2	Bands TDD_A Note 5	dBm4.5MHz	-93.26	-88.67	
	Bands TDD_C Note 5		-92.26	-87.67	
	Bands TDD_E Note 5		-91.26	-86.67	
Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 3: See Table A.9.2.6.2-1 for the other parameters Note 4: E-UTRA operating band groups are as defined in Section 3.5. Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 5MHz + 5MHz channel bandwidth.					

A.9.2.24.3 Test Requirements

The test requirements defined in section A.9.2.6.3 shall apply in this test case.

A.9.2.25 RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in FDD

The test case in this section are applicable to TDD-FDD carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.25.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in FDD measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of RSRQ measurements for the primary component carrier defined in clause 9.1.11.1, the absolute accuracy of RSRQ measurements for the secondary component carrier defined in clause 9.1.11.2, and also the relative RSRQ accuracy requirement between primary and secondary component carriers defined in clause 9.1.11.3.

A.9.2.25.2 Test parameters

In this test case the PCell is FDD and SCell is TDD. Both RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.25.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC). The SCC is configured and activated.

The parameters of this test are given in Table A.9.2.25.2-1.

Table A.9.2.25.2-1: RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in FDD test parameters

Parameter		Unit	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2
$BW_{channel}$			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
Special subframe configuration Note1			-	6
Uplink-downlink configuration Note1			-	1
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reference measurement channel defined in A.3.1.1			5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
OCNG Patterns defined in A.3.2			5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note2 OCNG_RB Note2		dB	0	0
N_{oc} Note3	Bands TDD_A	dBm/15 kHz	-	-116
	Bands TDD_C		-	-115
	Bands TDD_E		-	-114
	Bands FDD_A		-119.5	-
	Bands FDD_B		-119	-
	Bands FDD_C		-118.5	-
	Bands FDD_D		-118	-
	Bands FDD_E, Bands FDD_F Note 6		-117.5	-
	Bands FDD_G		-116.5	-
	Bands FDD_H		-116	-
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0
$\hat{E}_s/I_{ot}$		dB	-6.0	-6.0
RSRP Note4	Bands TDD_A	dBm/15 kHz	-	-122
	Bands TDD_C		-	-121
	Bands TDD_E		-	-120
	Bands FDD_A		-125.5	-
	Bands FDD_B		-123	-
	Bands FDD_C		-124.5	-
	Bands FDD_D		-124	-

	Bands FDD_E, Bands FDD_F Note 6		-123.5	-
	Bands FDD_G		-122.5	-
	Bands FDD_H		-122	-
RSRQ Note4	Bands TDD_A	dB	-	-17.77
	Bands TDD_C			
	Bands TDD_E			
	Bands FDD_A		-17.77	-
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, Bands FDD_F Note 6			
	Bands FDD_G			
	Bands FDD_H			
Io Note4	Bands TDD_A	dBm/$BW_{channel}$	-	-87.25 + 10log($N_{RB,c}$/50)
	Bands TDD_C		-	-86.25 + 10log($N_{RB,c}$/50)
	Bands TDD_E		-	-85.25 + 10log($N_{RB,c}$/50)
	Bands FDD_A		-90.75 + 10log($N_{RB,c}$/50)	-
	Bands FDD_B		89.76	-
	Bands FDD_C		-89.75 + 10log($N_{RB,c}$/50)	-
	Bands FDD_D		-89.25 + 10log($N_{RB,c}$/50)	-
	Bands FDD_E, Bands FDD_F Note 6		-88.75 + 10log($N_{RB,c}$/50)	-
	Bands FDD_G		-87.75 + 10log($N_{RB,c}$/50)	-
	Bands FDD_H		-87.25 + 10log($N_{RB,c}$/50)	-
Propagation Condition			AWGN	AWGN
Antenna Configuration			1x2	1x2
Timing offset to Cell 1		µs	-	0
Time alignment error relative to cell 1 Note 10			-	≤ TAE

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Es/Iot, RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 7: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 8: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.
Note 10: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.9.2.25.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements specified in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.

A.9.2.26 RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in TDD

The test case in this section are applicable to TDD-FDD carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.26.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in TDD measurement accuracy in carrier aggregation is within the specified limits. This test will verify the absolute accuracy of RSRQ measurements for the primary component carrier defined in Clause 9.1.11.1, the absolute accuracy of RSRQ measurements for the secondary component carrier defined in Clause 9.1.11.2, and also the relative RSRQ accuracy requirement between primary and secondary component carriers defined in Clause 9.1.11.3.

A.9.2.26.2 Test parameters

In this test case the PCell is TDD and SCell is FDD. Both RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.26.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC). The SCC is configured and activated.

The parameters of this test are given in Table A.9.2.26.2-1.

Table A.9.2.26.2-1: RSRQ for E-UTRAN TDD-FDD Carrier Aggregation with PCell in TDD test parameters

Parameter		Unit	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2
$BW_{channel}$			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
Special subframe configuration[Note1]			6	-
Uplink-downlink configuration[Note1]			1	-
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reference measurement channel defined in A.3.1.1			5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns defined in A.3.2			5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-119.5	-
	Bands TDD_C		-118.5	-
	Bands TDD_E		-117.5	-
	Bands FDD_A		-	-116
	Bands FDD_B		-	-115.5
	Bands FDD_C		-	-115
	Bands FDD_D		-	-114.5
	Bands FDD_E, Bands FDD_F Note 6		-	-114
	Bands FDD_G		-	-113
	Bands FDD_H		-	-112.5
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0
$\hat{E}_s/I_{ot}$		dB	-6.0	-6.0
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-125.50	-
	Bands TDD_C		-124.50	-
	Bands TDD_E		-123.50	-
	Bands FDD_A		-	-122
	Bands FDD_B		-	-119.5
	Bands FDD_C		-	-121
	Bands FDD_D		-	-120.5

	Bands FDD_E, Bands FDD_F Note 6		-	-120
	Bands FDD_G		-	-119
	Bands FDD_H		-	-118.5
RSRQ Note4	Bands TDD_A	dB	-17.77	-
	Bands TDD_C			
	Bands TDD_E			
	Bands FDD_A		-	-17.77
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, Bands FDD_F Note 6			
	Bands FDD_G			
	Bands FDD_H			
Io Note4	Bands TDD_A	$dBm/BW_{channel}$	$-90.75 + 10\log(N_{RB,c}/50)$	-
	Bands TDD_C		$-89.75 + 10\log(N_{RB,c}/50)$	-
	Bands TDD_E		$-88.75 + 10\log(N_{RB,c}/50)$	-
	Bands FDD_A		-	$-87.25 + 10\log(N_{RB,c}/50)$
	Bands FDD_B			-85.17
	Bands FDD_C		-	$-86.25 + 10\log(N_{RB,c}/50)$
	Bands FDD_D		-	$-85.75 + 10\log(N_{RB,c}/50)$
	Bands FDD_E, Bands FDD_F Note 6		-	$-85.25 + 10\log(N_{RB,c}/50)$
	Bands FDD_G		-	$-84.25 + 10\log(N_{RB,c}/50)$
	Bands FDD_H		-	$-83.75 + 10\log(N_{RB,c}/50)$
Propagation Condition			AWGN	AWGN
Antenna Configuration			1x2	1x2
Timing offset to Cell 1		μs	-	0
Time alignment error relative to cell 1 Note 10			-	≤ TAE

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Es/Iot, RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 7: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 8: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.
Note 10: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.9.2.26.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in section 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.A.9.2.27 TDD RSRQ for E-UTRAN Carrier Aggregation for 20MHz+10MHz

The test case in this section are applicable to carrier aggregation capable UEs which have been configured with a downlink SCell.

A.9.2.27.1 Test Purpose and Environment

The purpose of this test is the same as defined in Subclause A.9.2.6.1.

A.9.2.27.2 Test parameters

The parameters of this test are the same as defined in Subclause A.9.2.6.2 except that the values of the parameters in the Table A.9.2.27.2-1 will replace the values of the corresponding parameters in A.9.2.6.2-1.

Table A.9.2.27.2-1: TDD RSRQ Carrier Aggregation test parameters

<table>
<tr><th colspan="2" rowspan="2">Parameters</th><th colspan="4">Test 1</th></tr>
<tr><th>Units</th><th>Cell 1</th><th>Cell 2</th><th>Cell 3</th></tr>
<tr><td colspan="2">$BW_{channel\_CA}$ Note1</td><td>MHz</td><td>20</td><td colspan="2">10</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>n_{PRB}</td><td>47-52</td><td colspan="2">22-27</td></tr>
<tr><td colspan="2">PDSCH Reference measurement channel defined in A.3.1.1.2</td><td></td><td>R.3 TDD</td><td>R.0 TDD</td><td>-</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>n_{PRB}</td><td>38-61</td><td>13-36</td><td>-</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2</td><td></td><td>R.10 TDD</td><td colspan="2">R.6 TDD</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD), A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)</td><td></td><td>OP.7 TDD</td><td>OP.1 TDD</td><td>OP.2 TDD</td></tr>
<tr><td rowspan="6">Io Note2</td><td>Bands TDD_A</td><td rowspan="3">dBm/18MHz</td><td>-87.26</td><td colspan="2" rowspan="3">N/A</td></tr>
<tr><td>Bands TDD_C</td><td>-86.26</td></tr>
<tr><td>Bands TDD_E</td><td>-85.26</td></tr>
<tr><td>Bands TDD_A</td><td rowspan="3">dBm/9MHz</td><td rowspan="3">N/A</td><td colspan="2">-85.67</td></tr>
<tr><td>Bands TDD_C</td><td colspan="2">-84.67</td></tr>
<tr><td>Bands TDD_E</td><td colspan="2">-83.67</td></tr>
<tr><td colspan="6">Note 1: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves
Note 3: See Table A.9.2.6.2-1 for the other parameters</td></tr>
</table>

A.9.2.27.3 Test Requirements

The test requirements defined in section A.9.2.6.3 shall apply in this test case.

A.9.2.28 FDD intra-frequency absolute RSRQ accuracy with CRS based discovery signal

A.9.2.28.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.14.4.

A.9.2.28.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement for Cell 2 is tested by using the parameters in Table A.9.2.28.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell. Cell 2 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.28.2-1: RSRQ FDD Intra frequency test parameters

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	
$BW_{channel}$		MHz	10	
Measurement bandwidth		n_{PRB}	22—27	
DMTC period		ms	N/A	160
DMTC period offset		ms	N/A	10
Discovery signal occasion duration		ms	N/A	1
Time offset between cell 1 and cell 2		µs	0	2.3
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-
PDSCH allocation		n_{PRB}	*13—36*	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-116	
	Bands FDD_B		-115.5	
	Bands FDD_C		-115	
	Bands FDD_D		-114.5	
	Bands FDD_E, FDD_F Note 5		-114	
	Bands FDD_G Note 7		-113	
	Bands FDD_H		-112.5	
$\hat{E}_s / I_{ot}$		dB	-5.46	-5.46
RSRP Note3	Bands FDD_A	dBm/15 kHz	-120	-120
	Bands FDD_B		-119.5	-119.5
	Bands FDD_C		-119	-119
	Bands FDD_D		-118.5	-118.5
	Bands FDD_E, FDD_F Note 5		-118	-118
	Bands FDD_G Note 7		-117	-117
	Bands FDD_H		-116.5	-116.5
RSRQ Note3	Bands FDD_A Bands FDD_B Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 5 Bands FDD_G Note 7 Bands FDD_H	dB	-17.34	-17.34
Io Note3	Bands FDD_A	dBm/9 MHz	-85.67	
	Bands FDD_B		-85.17	
	Bands FDD_C		-84.67	
	Bands FDD_D		-84.17	
	Bands FDD_E, FDD_F Note 5		-83.67	
	Bands FDD_G Note 7		-82.67	
	Bands FDD_H		-82.17	
$\hat{E}_s / N_{oc}$		dB	-4	-4
Propagation condition		-	AWGN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3:	RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	Except Band 29 and Band 32.

A.9.2.28.3 Test Requirements

The absolute accuracy of RSRQ intra frequency measurement for Cell 2 shall fulfil the requirements in Clause 9.1.14.4.

A.9.2.29 TDD intra-frequency absolute RSRQ accuracy with CRS based discovery signal

A.9.2.29.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.14.4.

A.9.2.29.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement for Cell 2 is tested by using the parameters in Table A.9.2.29.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell. Cell 2 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.29.2-1: RSRQ TDD Intra frequency test parameters

Parameter		Unit	Test 1 Cell 1	Test 1 Cell 2
E-UTRA RF Channel Number			1	
$BW_{channel}$		MHz	10	
Special subframe configuration[Note1]			6	
Uplink-downlink configuration[Note1]			1	
Measurement bandwidth		n_{PRB}	22—27	
DMTC period		ms	N/A	160
DMTC period offset		ms	N/A	10
Discovery signal occasion duration		ms	N/A	2
Time offset between cell 1 and cell 2		µs	0	2.3
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA[Note1]				
OCNG_RB[Note1]				
N_{oc} [Note2]	Bands FDD_A	dBm/15 kHz	-116	
	Bands FDD_B		-115.5	
	Bands FDD_C		-115	
	Bands FDD_E		-114	
$\hat{E}_s/I_{ot}$		dB	-5.46	-5.46
RSRP[Note3]	Bands FDD_A	dBm/15 kHz	-120	-120
	Bands FDD_B		-119.5	-119.5
	Bands FDD_C		-119	-119
	Bands FDD_E		-118	-118
RSRQ[Note3]	Bands FDD_A	dB	-17.34	-17.34
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_E			
Io[Note3]	Bands FDD_A	dBm/9 MHz	-85.67	
	Bands FDD_B		-85.17	
	Bands FDD_C		-84.67	
	Bands FDD_E		-83.67	
$\hat{E}_s/N_{oc}$		dB	-4	-4
Propagation condition		-	AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4:	RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.29.3 Test Requirements

The absolute accuracy of RSRQ intra frequency measurement for Cell 2 shall fulfil the requirements in Clause 9.1.14.4.

A.9.2.30 FDD-FDD inter-frequency absolute and relative RSRQ accuracies with CRS based discovery signal

A.9.2.30.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute and relative accuracy of RSRQ measurement in discovery signal occasions is within the specified limits. This test will verify the requirements in Sections 9.1.14.4.

A.9.2.30.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.30.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell. For measurement of the carrier frequency of Cell 2, DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.30.2-1: RSRQ in discovery signal occasions FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	2
$BW_{channel}$		MHz	10	10
Gap Pattern Id			0	-
Gap Offset		ms	9	-
DMTC period		ms	-	160
DMTC period offset		ms	-	10
Discovery signal occasion duration		ms	-	1
Time offset between cell 2 and cell 1		µs	3	
Measurement bandwidth		n_{PRB}	22-27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-
PDSCH allocation		n_{PRB}	13-36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note1				
OCNG_RB Note1				
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-117.5	-117.5
	Bands FDD_B		-117	-117
	Bands FDD_C		-116.5	-116.5
	Bands FDD_D		-116	-116
	Bands FDD_E, FDD_F Note 5		-115.5	-115.5
	Bands FDD_G Note 7		-114.5	-114.5
	Bands FDD_H		-114	-114
$\hat{E}_s/I_{ot}$		dB	-6	-6
RSRP Note3	Bands FDD_A	dBm/15 kHz	-123.5	-123.5
	Bands FDD_B		-123	-123
	Bands FDD_C		-122.5	-122.5
	Bands FDD_D		-122	-122
	Bands FDD_E, FDD_F Note 5		-121.5	-121.5
	Bands FDD_G Note 7		-120.5	-120.5
	Bands FDD_H		-120	-120
RSRQ Note3	Bands FDD_A	dB	-17.77	-17.77
	Bands FDD_B			
	Bands FDD_C			
	Bands FDD_D			
	Bands FDD_E, FDD_F Note 5			
	Bands FDD_G Note 7			
	Bands FDD_H			
Io Note3	Bands FDD_A	dBm/ 9 MHz	-88.75	-88.75
	Bands FDD_B		-88.25	-88.25
	Bands FDD_C		-87.75	-87.75
	Bands FDD_D		-87.25	-87.25
	Bands FDD_E,		-86.75	-86.75

	FDD_F Note 5			
	Bands FDD_G Note 7		-85.75	-85.75
	Bands FDD_H		-85.25	-85.25
$\hat{E}_s/N_{oc}$		dB	-6	-6
Propagation condition		-	AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 6: E-UTRA operating band groups are as defined in Section 3.5. Note 7: Except Band 29 and Band 32.				

A.9.2.30.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.14.4.

A.9.2.31 TDD-TDD inter-frequency absolute and relative RSRQ accuracies with CRS based discovery signal

A.9.2.31.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy in discovery signal occasions is within the specified limits. This test will verify the requirements in Sections 9.1.14.4.

A.9.2.31.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.31.2-1 for TDD configuration 1. In all tests, Cell 1 is the PCell and Cell 2 the target cell. DMTC configuration for Cell 2 is provided to UE in the *measDS-Config* before the start of the test.

Table A 9.2.31.2-1: RSRQ TDD—TDD Inter frequency test parameters for TDD configuration 1

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	2
$BW_{channel}$		MHz	10	10
Gap Pattern Id			0	-
Gap Offset			9	-
DMTC period		ms	-	160
DMTC period offset		ms	-	10
Discovery signal occasion duration		ms	-	2
Time offset between cells		µs	0	3
Special subframe configuration Note1			6	
Uplink-downlink configuration Note1			1	
Measurement bandwidth		n_{PRB}	22-27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note2				
OCNG_RB Note2				
N_{oc} Note3	Bands TDD_A	dBm/15 kHz	-117.50	-117.50
	Bands TDD_C		-116.50	-116.50
	Bands TDD_E		-115.50	-115.50
$\hat{E}_s/I_{ot}$		dB	-6.0	-6.0
RSRP Note4	Bands TDD_A	dBm/15 kHz	-123.50	-123.50
	Bands TDD_C		-122.50	-122.50
	Bands TDD_E		-121.50	-121.50
RSRQ Note4	Bands TDD_A, TDD_C, TDD_E	dB	-17.77	-17.77
Io Note4	Bands TDD_A	dBm/9 MHz	-88.75	-88.75
	Bands TDD_C		-87.75	-87.75
	Bands TDD_E		-86.75	-86.75
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0
Propagation condition		-	AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent

	interference and noise at each receiver antenna port.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.31.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Sections 9.1.14.4.

A.9.2.32 FDD absolute and relative RSRQ accuracy for E-UTRAN Carrier Aggregation in CRS based discovery signal

A.9.2.32.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRQ measurement accuracy for carrier aggregation in CRS based discovery signal is within the specified limits under AWGN propagation conditions. This test will verify the absolute and relative accuracy of intra-frequency RSRQ measurements for the secondary component carrier specified in clause 9.1.15.1.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.15.1.3.

A.9.2.32.2 Test parameters

In this test case the PCell and the SCell are on different carrier frequencies. There are three cells used in this test case. RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.32.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC) and Cell 3 is the neighbouring cell on the SCC. Cell 2 on SCC is configured and activated. Cell 3 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.32.2-1: FDD RSRQ Carrier Aggregation Test Parameters

Parameters		Test 1			
		Units	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	2
$BW_{channel\_CA}$		MHz	10	10	10
DMTC period			N/A	N/A	160
DMTC period offset			N/A	N/A	10
Discovery signal occasion duration			N/A	N/A	1
Timeing offset to Cell 1		µs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
Measurement bandwidth		n_{PRB}	22—27	22—27	22—27
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	R.0 FDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	R.6FDD	R.6 FDD
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA Note1					
OCNG_RB Note1					
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-119.5	-116	-116
	Bands FDD_B		-119	-115.5	-115.5
	Bands FDD_C		-118.5	-115	-115
	Bands FDD_D		-118	-114.5	-114.5
	Bands FDD_E, FDD_F Note 6		-117.5	-114	-114
	Bands FDD_G		-116.5	-113	-113
	Bands FDD_H		-116	-112.5	-112.5
$\hat{E}_s/I_{ot}$		dB	-4.0	-5.46	-5.46
RSRP Note3	Bands FDD_A	dBm/15 kHz	-123.5	-120	-120
	Bands FDD_B		-123	-119.5	-119.5
	Bands FDD_C		-122.5	-119	-119
	Bands FDD_D		-122	-118.5	-118.5
	Bands FDD_E, FDD_F Note 6		-121.5	-118	-118
	Bands FDD_G		-120.5	-117	-117
	Bands FDD_H		-120	-116.5	-116.5
RSRQ Note3	Bands FDD_A	dB	-16.25	-17.34	-17.34
	Bands FDD_B				
	Bands FDD_C				
	Bands FDD_D				
	Bands FDD_E, FDD_F Note 6				

	Bands FDD_G				
	Bands FDD_H				
Io[Note3]	Bands FDD_A	dBm/9 MHz	-90.26	-85.67	-85.67
	Bands FDD_B		-89.76	-85.17	-85.17
	Bands FDD_C		-89.26	-84.67	-84.67
	Bands FDD_D		-88.76	-84.17	-84.17
	Bands FDD_E, FDD_F[Note 6]		-88.26	-83.67	-83.67
	Bands FDD_G		-87.26	-82.67	-82.67
	Bands FDD_H		-86.76	-82.17	-82.17
$\hat{E}_s/N_{oc}$		dB	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 7: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1. Note 8: E-UTRA operating band groups are as defined in Section 3.5.					

A.9.2.32.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.15.1.1, 9.1.15.1.2, and 9.1.15.1.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.15.1.2.

- The relative accuracy of inter-frequency RSRQ measurements between Cell 1 on primary component carriers and Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.15.1.3.

A.9.2.33 TDD absolute and relative RSRQ accuracy for E-UTRAN Carrier Aggregation in CRS based discovery signal

A.9.2.33.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD RSRQ measurement accuracy for carrier aggregation in CRS based discovery signal is within the specified limits under AWGN propagation conditions. This test will verify the absolute and relative accuracy of intra-frequency RSRQ measurements for the secondary component carrier specified in clause 9.1.15.1.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.15.1.3.

A.9.2.33.2 Test parameters

In this test case the PCell and the SCell are on different carrier frequencies. There are three cells used in this test case. RSRQ absolute and relative accuracy requirements of the primary and secondary component carrier are tested by using test parameters specified in Table A.9.2.33.2-1. In the test, Cell 1 is the PCell, Cell 2 is the SCell on the Secondary Component Carrier (SCC) and Cell 3 is the neighbouring cell on the SCC. Cell 2 on SCC is configured and activated. Cell 3 DMTC configuration is provided to the UE in the *measDS-Config* before the start of the test.

Table A.9.2.33.2-1: TDD RSRQ Carrier Aggregation Test Parameters

Parameter		Unit	Test 1		
			Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	2
$BW_{channel}$		MHz	10		
DMTC period			N/A	N/A	160
DMTC period offset			N/A	N/A	10
Discovery signal occasion duration			N/A	N/A	2
Timing offset to cell 1		µs	-	0	3
Time alignment error between cell 2 and cell 1			-	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1	-
Special subframe configuration[Note1]			6		
Uplink-downlink configuration[Note1]			1		
Measurement bandwidth		n_{PRB}	22—27		
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD	R.6 TDD	R.6 TDD
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA[Note2]					
OCNG_RB[Note2]					
N_{oc} Note3	Bands TDD_A	dBm/15 kHz	-119.5	-116	
	Bands TDD_C		-118.5	-115	
	Bands TDD_E		-117.5	-114	
$\hat{E}_s/I_{ot}$		dB	-4.0	-5.46	-5.46
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-123.50	-120	-120
	Bands TDD_C		-122.50	-119	-119
	Bands TDD_E		-121.50	-118	-118
RSRQ[Note4]	Bands TDD_A, TDD_C, TDD_E	dB	-16.25	-17.34	
Io[Note4]	Bands TDD_A	dBm/9 MHz	-90.26	-85.67	
	Bands TDD_C		-89.26	-84.67	
	Bands TDD_E		-88.26	-83.67	
$\hat{E}_s/N_{oc}$		dB	-4.0	-4.0	-4.0
Propagation condition		-	AWGN		

Note 1:	For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6:	The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7:	This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 8:	E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.33.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.15.1.1, 9.1.15.1.2, and 9.1.15.1.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.15.1.2.

- The relative accuracy of inter-frequency RSRQ measurements between Cell 1 on primary component carriers and Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.15.1.3.

A.9.2.34 FDD—FDD Inter frequency new RSRQ

A.9.2.34.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute accuracy of RSRQ measurement is within the specified limits when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2]. This test will verify the requirements in Sections 9.1.16.

A.9.2.34.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. The new RSRQ inter frequency absolute accuracy requirement is tested by using test parameters in Table A.9.2.34.2-1. In the test, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.34.2-1: New RSRQ FDD—FDD Inter frequency test parameters

Parameter		Unit	Test 1	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	2
$BW_{channel}$		MHz	10	10
Gap Pattern Id			0	-
Antenna Configuration			1x2	1x2
Time offset between cell 2 and cell 1		µs	3	
Measurement bandwidth		n_{PRB}	22-27	
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD	-
PDSCH allocation		n_{PRB}	-	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD	-
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)			OP.1 FDD	-
PBCH_RA		dB	0	0
PBCH_RB				0
PSS_RA				0
SSS_RA				0
PCFICH_RB				-∞
PHICH_RA				-∞
PHICH_RB				-∞
PDCCH_RA				-∞
PDCCH_RB				-∞
PDSCH_RA				-∞
PDSCH_RB				-∞
OCNG_RA[Note1]				-∞
OCNG_RB[Note1]				-∞
I_{ot} [Note2]	Symbols with CRS, PSS, SSS or PBCH	dBm/15 kHz	-103.85	-103.85
	All the other symbols		-94.75	-94.75
$\hat{E}_s/I_{ot}$		dB	-3	-3
RSRP[Note3]		dBm/15 kHz	-106.85	-106.85
RSRQ[Note3]	Subframe 0	dB	-14.54	-14.54
	Subframes other than 0		-14.14	-14.14
New RSRQ[Note3]	Subframe 0	dB	-19.57	-19.57
	Subframe 5		-20.93	-20.93
	Subframe other than 0 or 5		-21.66	-21.66
Io in subframe 0[Note3]	Symbol 0/4/11	dBm/ 9 MHz	-75.72	-75.72
	Symbol 1/2/3/12/13		-66.97	-66.97
	Symbol 5/6/8/9/10		-75.81	-75.81
	Symbol 7		-75.52	-75.52
Io in subframe 5[Note3]	Symbol 0/4/7/11	dBm/ 9 MHz	-75.72	-75.72
	Symbol 1/2/3/8/9/10/12/13		-66.97	-66.97
	Symbol 5/6		-75.81	-75.81
Io in subframes other than 0 or 5 [Note3]	Symbol 0/4/7/11	dBm/ 9 MHz	-75.72	-75.72
	Symbol 1/2/3/5/6/8/9/10/12/13		-66.97	-66.97
Propagation condition		-	AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRQ, RSRP, new RSRQ and Io levels have been derived from other				

	parameters for information purposes. They are not settable parameters themselves. The new RSRQ values assume RSSI averaging over all OFDM symbols of the subframe.
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.34.3 Test Requirements

The new RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.16, compared with any nominal new RSRQ value in subframe 0, 5 or others.

A.9.2.35 TDD—TDD Inter frequency new RSRQ

A.9.2.35.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute accuracy of RSRQ measurement is within the specified limits when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2]. This test will verify the requirements in Sections 9.1.16.

A.9.2.35.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. The new RSRQ inter frequency absolute accuracy requirement is tested by using test parameters in Table A.9.2.35.2-1. In the test, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.35.2-1: New RSRQ TDD—TDD Inter frequency test parameters

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Test 1</th></tr>
<tr><th>Cell 1</th><th>Cell 2</th></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>2</td></tr>
<tr><td colspan="2">$BW_{channel}$</td><td>MHz</td><td>10</td><td>10</td></tr>
<tr><td colspan="2">Special subframe configuration Note1</td><td></td><td>6</td><td>6</td></tr>
<tr><td colspan="2">Uplink-downlink configuration Note1</td><td></td><td>1</td><td>1</td></tr>
<tr><td colspan="2">Gap Pattern Id</td><td></td><td>0</td><td>-</td></tr>
<tr><td colspan="2">Antenna Configuration</td><td></td><td>1x2</td><td>1x2</td></tr>
<tr><td colspan="2">Time offset between cell 2 and cell 1</td><td>µs</td><td colspan="2">3</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>n_{PRB}</td><td colspan="2">22-27</td></tr>
<tr><td colspan="2">PDSCH Reference measurement channel defined in A.3.1.1.2</td><td></td><td>R.0 TDD</td><td>-</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>n_{PRB}</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2</td><td></td><td>R.6 TDD</td><td>-</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)</td><td></td><td>OP.1 TDD</td><td>-</td></tr>
<tr><td colspan="2">PBCH_RA</td><td rowspan="13">dB</td><td rowspan="13">0</td><td>0</td></tr>
<tr><td colspan="2">PBCH_RB</td><td>0</td></tr>
<tr><td colspan="2">PSS_RA</td><td>0</td></tr>
<tr><td colspan="2">SSS_RA</td><td>0</td></tr>
<tr><td colspan="2">PCFICH_RB</td><td>-∞</td></tr>
<tr><td colspan="2">PHICH_RA</td><td>-∞</td></tr>
<tr><td colspan="2">PHICH_RB</td><td>-∞</td></tr>
<tr><td colspan="2">PDCCH_RA</td><td>-∞</td></tr>
<tr><td colspan="2">PDCCH_RB</td><td>-∞</td></tr>
<tr><td colspan="2">PDSCH_RA</td><td>-∞</td></tr>
<tr><td colspan="2">PDSCH_RB</td><td>-∞</td></tr>
<tr><td colspan="2">OCNG_RA Note1</td><td>-∞</td></tr>
<tr><td colspan="2">OCNG_RB Note1</td><td>-∞</td></tr>
<tr><td rowspan="2">I_{ot} Note2</td><td>Symbols with CRS, PSS, SSS or PBCH</td><td rowspan="2">dBm/15 kHz</td><td>-103.85</td><td>-103.85</td></tr>
<tr><td>All the other symbols</td><td>-94.75</td><td>-94.75</td></tr>
<tr><td colspan="2">$\hat{E}_s / I_{ot}$</td><td>dB</td><td>-3</td><td>-3</td></tr>
<tr><td colspan="2">RSRP Note3</td><td>dBm/15 kHz</td><td>-106.85</td><td>-106.85</td></tr>
<tr><td rowspan="2">RSRQ Note3</td><td>Subframe 0</td><td rowspan="2">dB</td><td>-14.54</td><td>-14.54</td></tr>
<tr><td>Subframes other than 0</td><td>-14.14</td><td>-14.14</td></tr>
<tr><td rowspan="4">New RSRQ Note3</td><td>Subframe 0</td><td rowspan="4">dB</td><td>-20.08</td><td>-20.08</td></tr>
<tr><td>Subframe 5</td><td>-21.31</td><td>-21.31</td></tr>
<tr><td>Subframe 1 or 6</td><td>-20.82</td><td>-20.82</td></tr>
<tr><td>Subframe other than 0, 1, 5 or 6</td><td>-21.66</td><td>-21.66</td></tr>
<tr><td rowspan="4">Io in subframe 0 Note3</td><td>Symbol 0/4/11</td><td rowspan="4">dBm/ 9 MHz</td><td>-75.72</td><td>-75.72</td></tr>
<tr><td>Symbol 1/2/3/5/6/12</td><td>-66.97</td><td>-66.97</td></tr>
<tr><td>Symbol 8/9/10/13</td><td>-75.81</td><td>-75.81</td></tr>
<tr><td>Symbol 7</td><td>-75.52</td><td>-75.52</td></tr>
<tr><td rowspan="3">Io in subframe 5 Note3</td><td>Symbol 0/4/7/11</td><td rowspan="3">dBm/ 9 MHz</td><td>-75.72</td><td>-75.72</td></tr>
<tr><td>Symbol 1/2/3/5/6/8/9/10/12</td><td>-66.97</td><td>-66.97</td></tr>
<tr><td>Symbol 13</td><td>-75.81</td><td>-75.81</td></tr>
<tr><td rowspan="3">Io in subframe 1 or 6 Note3</td><td>Symbol 0/4/7</td><td rowspan="3">dBm/ 9 MHz</td><td>-75.72</td><td>-75.72</td></tr>
<tr><td>Symbol 1/3/5/6/8</td><td>-66.97</td><td>-66.97</td></tr>
<tr><td>Symbol 2</td><td>-75.81</td><td>-75.81</td></tr>
<tr><td rowspan="2">Io in subframes other than 0, 1, 5 or 6 Note3</td><td>Symbol 0/4/7/11</td><td rowspan="2">dBm/ 9 MHz</td><td>-75.72</td><td>-75.72</td></tr>
<tr><td>Symbol 1/2/3/5/6/8/9/10/12/13</td><td>-66.97</td><td>-66.97</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td colspan="2">AWGN</td></tr>
</table>

Note 1:	For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4:	RSRQ, RSRP, new RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The new RSRQ values assume RSSI averaging over all OFDM symbols of the subframe.
Note 5:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.35.3 Test Requirements

The new RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.16, compared with any nominal new RSRQ value in subframe 0, 5, 1, 6 or others.

A.9.2.36 FDD—FDD Inter frequency RSRQ measured on all OFDM symbols

A.9.2.36.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute accuracy of RSRQ measurement is within the specified limits when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2]. This test will verify the requirements in Section 9.1.16.

A.9.2.3 is also conducted even if UE is capable of measuring RSRQ on all OFDM symbols.

A.9.2.36.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ measured on all OFDM symbols inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.36.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.36.2-1: FDD—FDD Inter frequency test parameters

Parameter	Unit	Test 1	
		Cell 1	**Cell 2**
E-UTRA RF Channel Number		1	2
$BW_{channel}$	MHz	10	10
Gap Pattern Id		0	-
Antenna Configuration		1x2	1x2
Time offset between cell 2 and cell 1	µs	3	
Measurement bandwidth	n_{PRB}	22-27	
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD	-
PDSCH allocation	n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)		OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0
N_{oc} Note2	dBm/15 kHz	-80	-80
$\hat{E}_s/I_{ot}$	dB	-1.75	-1.75
RSRP Note3	dBm/15 kHz	-81.75	-81.75
RSRQ Note3	dB	-14.76	-14.76
Io Note3	dBm/ 9 MHz	-50	-50
$\hat{E}_s/N_{oc}$	dBm/ 9 MHz	-1.75	-1.75
Propagation condition	-	AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The RSRQ values assume RSSI averaging over all OFDM symbols of the subframe. Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.			

A.9.2.36.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Section 9.1.16.

A.9.2.37 TDD—TDD Inter frequency RSRQ measurement on all OFDM symbols

A.9.2.37.1 Test Purpose and Environment

The purpose of this test is to verify that the absolute accuracy of RSRQ measurement is within the specified limits when measurement configuration message received by the UE contains *measRSRQ-OnAllSymbols-r12* parameter in TS 36.331 [2]. This test will verify the requirements in Section 9.1.16.

A.9.2.4 is also conducted even if UE is capable of measuring RSRQ on all OFDM symbols..

A.9.2.37.2 Test parameters

In this test case the two cells are on different carrier frequencies and measurement gaps are provided. Both RSRQ measured on all OFDM symbols inter frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.2.37.2-1. In all tests, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.37.2-1: TDD-TDD Inter frequency test parameters

Parameter	Unit	Test 1	
		Cell 1	Cell 2
E-UTRA RF Channel Number		1	2
$BW_{channel}$	MHz	10	10
Special subframe configuration Note1		6	6
Uplink-downlink configuration Note1		1	1
Gap Pattern Id		0	-
Antenna Configuration		1x2	1x2
Time offset between cell 2 and cell 1	µs	3	
Measurement bandwidth	n_{PRB}	22-27	
PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	-
PDSCH allocation	n_{PRB}	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	0
PBCH_RB			
PSS_RA			
SSS_RA			
PCFICH_RB			
PHICH_RA			
PHICH_RB			
PDCCH_RA			
PDCCH_RB			
PDSCH_RA			
PDSCH_RB			
OCNG_RA Note1			
OCNG_RB Note1			
N_{oc} Note2	dBm/15 kHz	-80	-80
$\hat{E}_s/I_{ot}$	dB	-1.75	-1.75
RSRP Note3	dBm/15 kHz	-81.75	-81.75
RSRQ Note3	dB	-14.76	-14.76
Io Note3	dBm/ 9 MHz	-50	-50
$\hat{E}_s/N_{oc}$	dBm/ 9 MHz	-1.75	-1.75
Propagation condition	-	AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The RSRQ values assume RSSI averaging over all OFDM symbols of the subframe.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

A.9.2.37.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Section 9.1.16.

A.9.2.38 3 DL PCell in FDD RSRQ for E-UTRAN in Carrier Aggregation

The test case in this clause is applicable to carrier aggregation capable UEs which have been configured with two downlink SCells.

A.9.2.38.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier specified in clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carrier specified in clause 9.1.11.2 and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.11.3.

A.9.2.38.2 Test parameters

In this set of test cases there are three cells on three carrier frequencies. Cell 1 is PCell on channel 1, Cell 2 is activated SCell on channel 2, and Cell 3 is activated SCell on channel 3. The parameters for the test are listed in Table A.9.2.38.2-1.

Table A.9.2.38.2-1: 3 DL PCell in FDD RSRQ for E-UTRAN in Carrier Aggregation test parameters (cell #1, cell #2 and cell #3)

Parameter		Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	3
$BW_{channel}$			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
Special subframe configuration^{Note1}			-	6	6
Uplink/downlink configuration^{Note1}			-	1	1
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reference measurement channel defined in A.3.1.1			5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2			5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD
OCNG Patterns defined in A.3.2			5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA^{Note2} OCNG_RB^{Note2}		dB	0	0	0
N_{oc} ^{Note3}	Bands TDD_A	dBm/15kHz	-	-116	-116
	Bands TDD_C		-	-115	-115
	Bands TDD_E		-	-114	-114
	Bands FDD_A		-119.5	-	-
	Bands FDD_B		-119	-	-
	Bands FDD_C		-118.5	-	-
	Bands FDD_D		-118	-	-
	Bands FDD_E, Bands FDD_F Note 6		-117.5	-	-
	Bands FDD_G		-116.5	-	-
	Bands FDD_H		-116	-	-
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0	-6.0
$\hat{E}_s/I_{ot}$		dB	-6.0	-6.0	-6.0
RSRP^{Note4}	Bands TDD_A	dBm/15kHz	-	-122	-122
	Bands TDD_C		-	-121	-121
	Bands TDD_E		-	-120	-120
	Bands FDD_A		-125.5	-	-
	Bands FDD_B		-125	-	-
	Bands FDD_C		-124.5	-	-
	Bands FDD_D		-124	-	-

	Bands FDD_E, Bands FDD_F Note 6		-123.5	-	-
	Bands FDD_G		-122.5	-	-
	Bands FDD_H		-122	-	-
RSRQ[Note4]	Bands TDD_A	dB	-	-17.77	-17.77
	Bands TDD_C				
	Bands TDD_E				
	Bands FDD_A		-17.77	-	-
	Bands FDD_B				
	Bands FDD_C				
	Bands FDD_D				
	Bands FDD_E, Bands FDD_F Note 6				
	Bands FDD_G				
	Bands FDD_H				
Io[Note4]	Bands TDD_A	dBm/ $BW_{channel}$	-	-87.25 + 10log($N_{RB,c}$/50)	-87.25 + 10log($N_{RB,c}$/50)
	Bands TDD_C		-	-86.25 + 10log($N_{RB,c}$/50)	-86.25 + 10log($N_{RB,c}$/50)
	Bands TDD_E		-	-85.25 + 10log($N_{RB,c}$/50)	-85.25 + 10log($N_{RB,c}$/50)
	Bands FDD_A		-90.75 + 10log($N_{RB,c}$/50)	-	-
	Bands FDD_B		-90.25 + 10log($N_{RB,c}$/50)	-	-
	Bands FDD_C		-89.75 + 10log($N_{RB,c}$/50)	-	-
	Bands FDD_D		-89.25 + 10log($N_{RB,c}$/50)	-	-
	Bands FDD_E, Bands FDD_F Note 6		-88.75 + 10log($N_{RB,c}$/50)	-	-
	Bands FDD_G		-87.75 + 10log($N_{RB,c}$/50)	-	-
	Bands FDD_H		-87.25 + 10log($N_{RB,c}$/50)	-	-
Propagation Condition			AWGN	AWGN	AWGN
Antenna Configuration			1x2	1x2	1x2
Timing offset to Cell 1		µs	-	0	0
Time alignment error relative to cell 1 Note 10			-	≤ TAE	≤ TAE
Time alignment error relative to cell 2 Note 10			≤ TAE	-	≤ TAE

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 7: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 8: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.
Note 10: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends

upon the type of carrier aggregation.

A.9.2.38.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements specified in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 3 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.

A.9.2.39 3 DL PCell in TDD RSRQ for E-UTRAN in Carrier Aggregation

The test case in this clause is applicable to carrier aggregation capable UEs which have been configured with two downlink SCells.

A.9.2.39.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD-FDD RSRQ measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier defined in Clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carrier defined in Clause 9.1.11.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers defined in Clause 9.1.11.3.

A.9.2.39.2 Test parameters

In this set of cases cell 1 is PCell on the primary component carrier, and cell 2 and cell 3 are activated SCells on secondary component carriers SCC1 and SCC2 respectively. The test parameters for the test are listed in Table A.9.2.39.2-1.

Table A.9.2.39.2-1: 3 Downlink TDD-FDD RSRQ carrier aggregation test parameters with PCell in TDD (cell #1, cell #2 and cell #3)

Parameter		Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	3
$BW_{channel}$			5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
Special subframe configuration[Note1]			6	-	-
Uplink/downlink configuration[Note1]			1	-	-
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reference measurement channel defined in A.3.1.1.1 and A.3.1.1.2			5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD	5MHz: R.5 FDD 10MHz: R.0 FDD 20MHz: R.4 FDD
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1 and A.3.1.2.2			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns defined in A.3.2.1 and A.3.2.2			5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD	5MHz: OP.15 FDD 10MHz: OP.1 FDD 20MHz: OP.11 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0
N_{oc} Note3	Bands TDD_A	dBm/15kHz	-119.5	-	-
	Bands TDD_C		-118.5	-	-
	Bands TDD_E		-117.5	-	-
	Bands FDD_A		-	-116	-116
	Bands FDD_B		-	-115.5	-115.5
	Bands FDD_C		-	-115	-115
	Bands FDD_D		-	-114.5	-114.5
	Bands FDD_E, Bands FDD_F Note 6		-	-114	-114
	Bands FDD_G		-	-113	-113
	Bands FDD_H		-	-112.5	-112.5
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0	-6.0
$\hat{E}_s/I_{ot}$		dB	-6.0	-6.00	-6.00
RSRP[Note4]	Bands TDD_A	dBm/15kHz	-125.50	-	-
	Bands TDD_C		-124.50	-	-
	Bands TDD_E		-123.50	-	-
	Bands FDD_A		-	-122	-122
	Bands FDD_B		-	-121.5	-121.5
	Bands FDD_C		-	-121	-121
	Bands FDD_D		-	-120.5	-120.5

	Bands FDD_E, Bands FDD_F Note 6		-	-120	-120
	Bands FDD_G		-	-119	-119
	Bands FDD_H		-	-118.5	-118.5
RSRQ Note4	Bands TDD_A	dB	-17.77	-	-
	Bands TDD_C				
	Bands TDD_E				
	Bands FDD_A		-	-17.77	-17.77
	Bands FDD_B				
	Bands FDD_C				
	Bands FDD_D				
	Bands FDD_E, Bands FDD_F Note 6				
	Bands FDD_G				
	Bands FDD_H				
Io Note4	Bands TDD_A	dBm/ $BW_{channel}$	-90.75 + $10\log(N_{RB,c}/50)$	-	-
	Bands TDD_C		-89.75 + $10\log(N_{RB,c}/50)$	-	-
	Bands TDD_E		-88.75 + $10\log(N_{RB,c}/50)$	-	-
	Bands FDD_A		-	-87.25 + $10\log(N_{RB,c}/50)$	-87.25 + $10\log(N_{RB,c}/50)$
	Bands FDD_B		-	-86.75 + $10\log(N_{RB,c}/50)$	-86.75 + $10\log(N_{RB,c}/50)$
	Bands FDD_C		-	-86.25 + $10\log(N_{RB,c}/50)$	-86.25 + $10\log(N_{RB,c}/50)$
	Bands FDD_D		-	-85.75 + $10\log(N_{RB,c}/50)$	-85.75 + $10\log(N_{RB,c}/50)$
	Bands FDD_E, Bands FDD_F Note 6		-	-85.25 + $10\log(N_{RB,c}/50)$	-85.25 + $10\log(N_{RB,c}/50)$
	Bands FDD_G		-	-84.25 + $10\log(N_{RB,c}/50)$	-84.25 + $10\log(N_{RB,c}/50)$
	Bands FDD_H		-	-83.75 + $10\log(N_{RB,c}/50)$	-83.75 + $10\log(N_{RB,c}/50)$
Propagation Condition			AWGN	AWGN	AWGN
Antenna Configuration			1x2	1x2	1x2
Timing offset to Cell 1		μs	-	0	0
Time alignment error relative to cell 1 Note 10			-	≤ TAE	≤ TAE
Time alignment error relative to cell 2 Note 10			≤ TAE	-	≤ TAE

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 7: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 8: This test verifies the RRM requirement which is independent of channel bandwidth and is performed according to the principle defined in section A.3.6.1.
Note 9: E-UTRA operating band groups are as defined in Section 3.5.
Note 10: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.

A.9.2.39.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements specified in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on the secondary component carrier shall fulfil the requirements specified in clause 9.1.11.2
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 2 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRQ measurements between the primary and secondary component carriers for Cell 3 relative to Cell 1 shall fulfil the requirements specified in clause 9.1.11.3.

A.9.2.40 3 DL FDD RSRQ for E-UTRAN in Carrier Aggregation

A.9.2.40.1 Test Purpose and Environment

The purpose of this test is to verify that the FDD RSRQ measurement accuracy in carrier aggregation is within the specified limits under AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier specified in clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carriers specified in clause 9.1.11.2 and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers specified in clause 9.1.11.3.

A.9.2.40.2 Test parameters

In this test case the PCell and the SCells are on different carrier frequencies. There are three cells used in this test case. Both RSRQ absolute and relative accuracy requirements of the primary and secondary component carriers are tested by using test parameters specified in Table A.9.2.40.2-1. In the test, Cell 1 is the PCell, Cell 2 and Cell 3 are the SCells on secondary component carrier SCC1 and SCC2 respectively. The SCC1 and SCC2 are configured and activated.

Table A.9.2.40.2-1: 3 DL FDD RSRQ carrier aggregation test parameters

Parameter		Unit	Cell 1	Cell 2	Cell 3
E-UTRA RF Channel Number			1	2	3
$BW_{channel}$		MHz	5MHz:$N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz:$N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
Measurement bandwidth		n_{PRB}	5MHz:10-15 10MHz:22-27 20MHz:47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reference measurement channel defined in A.3.1.1.1			5MHz:R.5 FDD 10MHz:R.0 FDD 20MHz:R.4 FDD	5MHz:R.5 FDD 10MHz:R.0 FDD 20MHz:R.4 FDD	5MHz:R.5 FDD 10MHz:R.0 FDD 20MHz:R.4 FDD
PDSCH allocation		n_{PRB}	5MHz:7-17 10MHz:13-36 20MHz:38-61	5MHz:7-17 10MHz:13-36 20MHz:38-61	5MHz:7-17 10MHz:13-36 20MHz:38-61
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			5MHz:R.11 FDD 10MHz:R.6 FDD 20MHz:R.10 FDD	5MHz:R.11 FDD 10MHz:R.6 FDD 20MHz:R.10 FDD	5MHz:R.11 FDD 10MHz:R.6 FDD 20MHz:R.10 FDD
OCNG Patterns defined in A.3.2.1			5MHz:OP.15 FDD 10MHz:OP.1 FDD 20MHz:OP.11 FDD	5MHz:OP.15 FDD 10MHz:OP.1 FDD 20MHz:OP.11 FDD	5MHz:OP.15 FDD 10MHz:OP.1 FDD 20MHz:OP.11 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-119.5	-116	-116
	Bands FDD_B		-119	-115.5	-115.5
	Bands FDD_C		-118.5	-115	-115
	Bands FDD_D		-118	-114.5	-114.5
	Bands FDD_E, FDD_F Note 6		-117.5	-114	-114
	Bands FDD_G		-116.5	-113	-113
	Bands FDD_H		-116	-112.5	-112.5
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0	-6.0
$\hat{E}_s/I_{ot}$ Note3		dB	-6.0	-6.0	-6.0
RSRP Note3	Bands FDD_A	dBm/15 kHz	-125.5	-122	-122
	Bands FDD_B		-125	-121.5	-121.5
	Bands FDD_C		-124.5	-121	-121
	Bands FDD_D		-124	-120.5	-120.5
	Bands FDD_E, FDD_F Note 6		-123.5	-120	-120
	Bands FDD_G		-122.5	-119	-119
	Bands FDD_H		-122	-118.5	-118.5
RSRQ Note3	Bands FDD_A Bands FDD_B Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 6 Bands FDD_G Bands FDD_H	dB	-17.77	-17.77	-17.77
Io Note3	Bands FDD_A	dBm/	-90.75+	-87.25+	-87.25+

		$BW_{channel}$	$10log(N_{RB,c}/50)$	$10log(N_{RB,c}/50)$	$10log(N_{RB,c}/50)$
	Bands FDD_B		-90.25+ $10log(N_{RB,c}/50)$	-86.75+ $10log(N_{RB,c}/50)$	-86.75+ $10log(N_{RB,c}/50)$
	Bands FDD_C		-89.75+ $10log(N_{RB,c}/50)$	-86.25+ $10log(N_{RB,c}/50)$	-86.25+ $10log(N_{RB,c}/50)$
	Bands FDD_D		-89.25+ $10log(N_{RB,c}/50)$	-85.75+ $10log(N_{RB,c}/50)$	-85.75+ $10log(N_{RB,c}/50)$
	Bands FDD_E, FDD_F Note 6		-88.75+ $10log(N_{RB,c}/50)$	-85.25+ $10log(N_{RB,c}/50)$	-85.25+ $10log(N_{RB,c}/50)$
	Bands FDD_G		-87.75+ $10log(N_{RB,c}/50)$	-84.25+ $10log(N_{RB,c}/50)$	-84.25+ $10log(N_{RB,c}/50)$
	Bands FDD_H		-87.25+ $10log(N_{RB,c}/50)$	-83.75+ $10log(N_{RB,c}/50)$	-83.75+ $10log(N_{RB,c}/50)$
Propagation condition		-	AWGN	AWGN	AWGN
Antenna Configuration		-	1x2	1x2	1x2
Timing offset to Cell 1		μs	-	0	0
Time alignment error relative to cell 1 Note 7			-	≤ TAE	≤ TAE
Time alignment error relative to cell 2 Note 7			-	-	≤ TAE

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: Es/Iot, RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 6: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz.
Note 7: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 8: E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.40.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in clause 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.

- The relative accuracy of inter-frequency RSRQ measurements between the primary component carrier and SCC1 for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

- The relative accuracy of inter-frequency RSRQ measurements between the primary component carrier and SCC2 for Cell 3 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

A.9.2.41 3 DL TDD RSRQ for E-UTRAN in Carrier Aggregation

A.9.2.41.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD RSRQ measurement accuracy in carrier aggregation is within the specified limits in a synchronized network environment with AWGN propagation conditions. This test will verify the absolute accuracy of intra-frequency RSRQ measurements for the primary component carrier defined in

Clause 9.1.11.1, the absolute accuracy of intra-frequency RSRQ measurements for the secondary component carriers defined in Clause 9.1.11.2, and also the relative inter-frequency RSRQ accuracy requirement between primary and secondary component carriers defined in Clause 9.1.11.3.

A.9.2.41.2 Test parameters

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is PCell, Cell 2 and Cell 3 are the SCells on secondary component carrier SCC1 and SCC2 respectively. PCell and SCells are in different RF channels. The parameters for the test are listed in Table A.9.2.41.2-1.

Table A.9.2.41.2-1: 3 DL TDD RSRQ carrier aggregation test parameters

Parameter		Unit	Cell 1	Cell2	Cell3
E-UTRA RF Channel Number			1	2	3
$BW_{channel}$		MHz	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100	5MHz: $N_{RB,c}$ = 25 10MHz: $N_{RB,c}$ = 50 20MHz: $N_{RB,c}$ = 100
Special subframe configuration[Note1]			6		
Uplink-downlink configuration[Note1]			1		
Measurement bandwidth		n_{PRB}	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52	5MHz: 10-15 10MHz: 22-27 20MHz: 47-52
PDSCH Reference measurement channel defined in A.3.1.1.1			5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD	5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD
PDSCH allocation		n_{PRB}	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61	5MHz: 7-17 10MHz: 13-36 20MHz: 38-61
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			5MHz: R.11 TDD 10MHz: R.6 TDD 20MHz: R.10 TDD	5MHz:R.11 TDD 10MHz:R.6 TDD 20MHz:R.10 TDD	5MHz:R.11 TDD 10MHz:R.6 TDD 20MHz:R.10 TDD
OCNG Patterns defined in A.3.2.1			5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-119.5	-116	-116
	Bands TDD_C		-118.5	-115	-115
	Bands TDD_E		-117.5	-114	-114
$\hat{E}_s/N_{oc}$		dB	-6.0	-6.0	-6.0
$\hat{E}_s/I_{ot}$ [Note4]		dB	-6.0	-6.0	-6.0
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-125.5	-122	-122
	Bands TDD_C		-124.5	-121	-121
	Bands TDD_E		-123.5	-120	-120
RSRQ[Note4]	Bands TDD_A, TDD_C, TDD_E	dB	-17.77	-17.77	-17.77
Io[Note4]	Bands TDD_A	dBm/ $BW_{channel}$	-90.75+ 10log($N_{RB,c}$ /50)	-87.25+ 10log($N_{RB,c}$ /50)	-87.25+ 10log($N_{RB,c}$ /50)
	Bands TDD_C		-89.75+ 10log($N_{RB,c}$ /50)	-86.25+ 10log($N_{RB,c}$ /50)	-86.25+ 10log($N_{RB,c}$ /50)
	Bands TDD_E		-88.75+ 10log($N_{RB,c}$ /50)	-85.25+ 10log($N_{RB,c}$ /50)	-85.25+ 10log($N_{RB,c}$ /50)
Propagation condition		-	AWGN	AWGN	AWGN
Antenna Configuration		-	1x2	1x2	1x2

Timing offset to Cell 1	µs	-	0	0
Time alignment error relative to cell 1 Note 7		-	≤ TAE	≤ TAE
Time alignment error relative to cell 2 Note 7		-	-	≤ TAE

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: Es/Iot, RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: The selection of the bands for testing depends on the configuration of the carrier aggregation supported by the UEs.
Note 7: Time alignment error (TAE) as specified in TS 36.104 [30] clause 6.5.3.1. The TAE value depends upon the type of carrier aggregation.
Note 8: E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.41.3 Test Requirements

In the test, the RSRQ measurement accuracy in carrier aggregation shall fulfil the requirements in section 9.1.11.1, 9.1.11.2, and 9.1.11.3.

- The absolute accuracy of intra-frequency RSRQ measurements of Cell 1 on the primary component carrier shall fulfil the requirements defined in clause 9.1.11.1.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 2 on SCC1 shall fulfil the requirements defined in clause 9.1.11.2.
- The absolute accuracy of intra-frequency RSRQ measurements of Cell 3 on SCC2 shall fulfil the requirements defined in clause 9.1.11.2.
- The relative accuracy of inter-frequency RSRQ measurements between the primary component carrier and SCC1 for Cell 2 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.
- The relative accuracy of inter-frequency RSRQ measurements between the primary component carrier and SCC2 for Cell 3 relative to Cell 1 shall fulfil the requirements defined in clause 9.1.11.3.

A.9.2.42 FD-FDD RSRQ Intra frequency case for UE category 0

A.9.2.42.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.13.3 for FD-FDD intra frequency RSRQ measurements for UE category 0.

A.9.2.42.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.42.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.42.2-1: FD-FDD RSRQ Intra frequency test parameters for UE category 0

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.3			R.13 FDD	-	R.13 FDD	-	R.13 FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA Note1								
OCNG_RB Note1								
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-84.76		-103.85		-116	
	Bands FDD_B						-115.5	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 5						-114	
	Bands FDD_G Note 7						-113	
	Bands FDD_H						-112.5	
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
$\hat{E}_s/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
RSRP Note3	Bands FDD_A	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-120	-120
	Bands FDD_B						-119.5	-119.5
	Bands FDD_C						-119	-119
	Bands FDD_D						-118.5	-118.5
	Bands FDD_E, FDD_F Note 4						-118	-118
	Bands FDD_G Note 6						-117	-117
	Bands FDD_H						-116.5	-116.5
RSRQ Note3	Bands FDD_A	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
	Bands FDD_B							
	Bands FDD_C							
	Bands FDD_D							
	Bands FDD_E, FDD_F Note 45							
	Bands FDD_G Note 6							
	Bands FDD_H							
Io Note3	Bands FDD_A	dBm/9 MHz	-50		-73		-85.67	
	Bands FDD_B						-85.17	
	Bands FDD_C						-84.67	
	Bands FDD_D						-84.17	
	Bands FDD_E,						-83.67	

	FDD_F Note 4				
	Bands FDD_G Note 6				-82.67
	Bands FDD_H				-82.17
Propagation condition		-	AWGN	AWGN	AWGN
Correlation Matrix and Antenna Configuration			1x1	1x1	1x1
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 5: E-UTRA operating band groups are as defined in Section 3.5. Note 6: Except Band 29 and Band 32.					

A.9.2.42.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.13.3.

A.9.2.43 HD-FDD RSRQ Intra frequency case for UE category 0

A.9.2.43.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.13.3 for HD-FDD intra frequency RSRQ measurements for UE category 0.

A.9.2.43.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.43.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.43.2-1: HD-FDD RSRQ Intra frequency test parameters for UE category 0

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.4			R.1 HD-FDD	-	R.1 HD-FDD	-	R.1 HD-FDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.3			R.3 HD-FDD		R.3 HD-FDD		R.3 HD-FDD	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-84.76		-103.85		-116	
	Bands FDD_B						-115.5	
	Bands FDD_C						-115	
	Bands FDD_D						-114.5	
	Bands FDD_E, FDD_F Note 4						-114	
	Bands FDD_G Note 7						-113	
	Bands FDD_H						-112.5	
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
$\hat{E}_s/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
RSRP Note3	Bands FDD_A	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-120	-120
	Bands FDD_B						-119.5	-119.5
	Bands FDD_C						-119	-119
	Bands FDD_D						-118.5	-118.5
	Bands FDD_E, FDD_F Note 4						-118	-118
	Bands FDD_G Note 6						-117	-117
	Bands FDD_H						-116.5	-116.5
RSRQ Note3	Bands FDD_A Bands FDD_B Bands FDD_C Bands FDD_D Bands FDD_E, FDD_F Note 4 Bands FDD_G Note 6 Bands FDD_H	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
Io Note3	Bands FDD_A	dBm/9 MHz	-50		-73		-85.67	
	Bands FDD_B						-85.17	
	Bands FDD_C						-84.67	
	Bands FDD_D						-84.17	
	Bands FDD_E,						-83.67	

	FDD_F Note 4				
	Bands FDD_G Note 6				-82.67
	Bands FDD_H				-82.17
Propagation condition		-	AWGN	AWGN	AWGN
Correlation Matrix and Antenna Configuration			1x1	1x1	1x1
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Es/Iot, RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 5: E-UTRA operating band groups are as defined in Section 3.5. Note 6: Except Band 29 and Band 32.					

A.9.2.43.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.13.3.

A.9.2.44 TDD RSRQ Intra frequency case for UE category 0

A.9.2.44.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.13.3 for TDD intra frequency RSRQ measurements for UE category 0.

A.9.2.44.2 Test parameters

In this test case all cells are on the same carrier frequency. The absolute accuracy of RSRQ intra frequency measurement is tested by using the parameters in Table A.9.2.44.2-1. In all test cases, Cell 1 is the PCell and Cell 2 the target cell.

Table A.9.2.44.2-1: TDD RSRQ Intra frequency test parameters for UE category 0

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1		1		1	
$BW_{channel}$		MHz	10		10		10	
Special subframe configuration[Note1]			6		6		6	
Uplink-downlink configuration[Note1]			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.5			R.12 TDD	-	R.12 TDD	-	R.12 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0	0	0	0
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-84.76		-103.85		-116	
	Bands TDD_C						-115	
	Bands TDD_E						-114	
$\hat{E}_s/N_{oc}$		dB	3	3	-2.9	-2.9	-4	-4
$\hat{E}_s/I_{ot}$		dB	-1.76	-1.76	-4.7	-4.7	-5.46	-5.46
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-81.76	-81.76	-106.75	-106.75	-120	-120
	Bands TDD_C						-119	-119
	Bands TDD_E						-118	-118
RSRQ[Note4]	Bands TDD_A, TDD_C, TDD_E	dB	-14.77	-14.77	-16.76	-16.76	-17.34	-17.34
Io[Note4]	Bands TDD_A	dBm/9 MHz	-50		-73		-85.67	
	Bands TDD_C						-84.67	
	Bands TDD_E						-83.67	
Propagation condition		-	AWGN		AWGN		AWGN	
Correlation Matrix and Antenna Configuration			1x1		1x1		1x1	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.

A.9.2.44.3 Test Requirements

The RSRQ measurement accuracy shall fulfil the requirements in Clause 9.1.13.3.

A.9.3 UTRAN FDD CPICH RSCP

A.9.3.1 E-UTRAN FDD

A.9.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH RSCP absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.2.1. There are two different test setups with different UTRAN parameters.

A.9.3.1.2 Parameters

The test parameters are given in Tables A.9.3.1.2-1, A.9.3.1.2-2 and A.9.3.1.2-3 below.

Table A.9.3.1.2-1: General test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRAN RF Channel Number		1	One E-UTRAN FDD carrier frequency is used.
UTRAN RF Channel Number		1	One UTRAN FDD carrier frequency is used.
E-UTRAN Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	E-UTRAN cell 1 on RF channel number 1
Neighbor cells		Cell 2	UTRAN cell 2 on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRAN FDD) measurement quantity		CPICH RSCP	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CP length		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF

Table A.9.3.1.2-2: E-UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD

Parameter	Unit	Test 1	Test 2
E-UTRAN RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD	

PBCH_RA	dB	0
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA Note 1	dB	
OCNG_RB Note 1	dB	
N_{oc} Note 2	dBm/15 kHz	-98
RSRP Note 3	dBm/15 kHz	-94
$\hat{E}_s/I_{ot}$	dB	4
SCH_RP Note 3	dBm/15 kHz	-94
$\hat{E}_s/N_{oc}$	dB	4
Propagation Condition		AWGN
Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.		

Table A.9.3.1.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD

Parameter		Unit	Test 1	Test 2
			Cell 2	Cell 2
CPICH_Ec/Ior		dB	-10	-10
PCCPCH_Ec/Ior		dB	-12	-12
SCH_Ec/Ior		dB	-12	-12
PICH_Ec/Ior		dB	-15	-15
DPCH_Ec/Ior		dB	-	-
OCNS_Ec/Ior		dB	-0.94	-0.94
Ioc	Band I, IV, VI, X, XI, XIX, XXI	dBm/3.84 MHz	-60.00	-94.46
	Band II, V, VII			-92.46
	Band XXV, XXVI			-90.96 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII			-91.46
	Band IX (Note 2)			-93.46
Îor/Ioc		dB	9.54	-9.54
CPICH RSCP, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm	-60.46	-114.0
	Band II, V, VII			-112.0
	Band XXV, XXVI			-110.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII			-111.0
	Band IX (Note 2)			-113.0
Io, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/3.84 MHz	-50.00	-94.0
	Band II, V, VII			-92.0
	Band XXV, XXVI			-90.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII			-91.0
	Band IX (Note 2)			-93.0
Propagation condition		-	AWGN	AWGN
NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves. NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE. NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for test 2 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.				

A.9.3.1.3 Test Requirements

The CPICH RSCP measurement absolute accuracy shall meet the requirements in Clause 9.2.1.

A.9.3.2 E-UTRAN TDD

A.9.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH RSCP absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.2.1. There are three different test setups with different UTRAN parameters.

A.9.3.2.2 Parameters

The test parameters are given in Tables A.9.3.2.2-1, A.9.3.2.2-2 and A.9.3.2.2-3 below.

Table A.9.3.2.2-1: General test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN TDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is used.
UTRAN RF Channel Number		1	One UTRAN FDD carrier frequency is used.
E-UTRAN Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	E-UTRAN cell 1 on RF channel number 1
Neighbor cells		Cell 2	UTRAN cell 2 on RF channel number 1
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRAN FDD) measurement quantity		CPICH RSCP	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CP length		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF

Table A.9.3.2.2-2: E-UTRAN TDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN TDD

Parameter	Unit	Test 1	Test 2
E-UTRAN RF Channel Number		1	
$BW_{channel}$	MHz	10	
Special subframe configuration[Note1]		6	
Uplink-downlink configuration[Note1]		1	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD	

PBCH_RA	dB	
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	0
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA Note 2	dB	
OCNG_RB Note 2	dB	
N_{oc} Note 3	dBm/15 kHz	-98
RSRP Note 4	dBm/15 kHz	-94
$\hat{E}_s/I_{ot}$	dB	4
SCH_RP Note 4	dBm/15 kHz	-94
$\hat{E}_s/N_{oc}$	dB	4
Propagation Condition		AWGN

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.3.2.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN TDD

Parameter		Unit	Test 1	Test 2
			Cell 2	Cell 2
CPICH_Ec/Ior		dB	-10	-10
PCCPCH_Ec/Ior		dB	-12	-12
SCH_Ec/Ior		dB	-12	-12
PICH_Ec/Ior		dB	-15	-15
DPCH_Ec/Ior		dB	-	-
OCNS_Ec/Ior		dB	-0.94	-0.94
Ioc	Band I, IV, VI, X, XI, XIX, XXI	dBm/3.84 MHz	-60.00	-94.46
	Band II, V, VII			-92.46
	Band XXV, XXVI			-90.96 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII			-91.46
	Band IX (Note 2)			-93.46
Îor/Ioc		dB	9.54	-9.54
CPICH RSCP, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm	-60.46	-114.0
	Band II, V, VII			-112.0
	Band XXV, XXVI			-110.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII			-111.0
	Band IX (Note 2)			-113.0
Io, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/3.84 MHz	-50.00	-94.0
	Band II, V, VII			-92.0
	Band XXV, XXVI			-90.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII			-91.0
	Band IX (Note 2)			-93.0
Propagation condition		-	AWGN	AWGN

NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.
NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for test 2 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.

A.9.3.2.3 Test Requirements

The CPICH RSCP measurement absolute accuracy shall meet the requirements in Clause 9.2.1.

A.9.3.3 E-UTRAN FDD for 5MHz Bandwidth

A.9.3.3.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.3.1.1.

A.9.3.3.2 Parameters

The parameters of this test are the same as defined in Subclause A.9.3.1.2 except that the values of the parameters in the Table A.9.3.3.2-1 will replace the values of the corresponding parameters in A.9.3.1.2-1, and the values of E-UTRAN FDD cell specific parameters in the Table A.9.3.3.2-2 shall be adopted, and the values of UTRA FDD cell specific parameters shall be reused as defined in Table A.9.3.1.2-3 of Subclause A.9.3.1.2.

Table A.9.3.3.2-1: General test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD for 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1
E-UTRAN Channel Bandwidth ($BW_{channel}$)	MHz	5	
Note 1: See Table A.9.3.1.2-1 for other general test parameters.			

Table A.9.3.3.2-2: E-UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN FDD for 5MHz bandwidth

Parameter		Unit	Test 1	Test 2
E-UTRAN RF Channel Number			1	
$BW_{\mathbf{channel}}$		MHz	5	
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD)			OP.15 FDD	
PBCH_RA		dB	0	
PBCH_RB		dB		
PSS_RA		dB		
SSS_RA		dB		
PCFICH_RB		dB		
PHICH_RA		dB		
PHICH_RB		dB		
PDCCH_RA		dB		
PDCCH_RB		dB		
PDSCH_RA		dB		
PDSCH_RB		dB		
OCNG_RA Note 1		dB		
OCNG_RB Note 1		dB		
N_{oc} Note 2	Band 31	dBm/15 kHz	-98	
RSRP Note 3	Band 31	dBm/15 kHz	-94	
$\hat{E}_s/I_{ot}$		dB	4	
SCH_RP Note 3	Band 31	dBm/15 kHz	-94	
$\hat{E}_s/N_{oc}$		dB	4	
Io Note3	Band 31	dBm/4.5 MHz	-67.8	
Propagation Condition			AWGN	

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

A.9.3.3.3 Test Requirements

The test requirements defined in section A.9.3.1.3 shall apply to this test case.

A.9.4 UTRAN FDD CPICH Ec/No

A.9.4.1 E-UTRAN FDD

A.9.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH Ec/No absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.2.3. There are three different test setups with different UTRAN parameters.

A.9.4.1.2 Parameters

The test parameters are given in Tables A.9.4.1.2-1, A.9.4.1.2-2 and A.9.4.1.2-3 below.

Table A.9.4.1.2-1: General test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRAN RF Channel Number		1	One E-UTRAN FDD carrier frequency is used.
UTRAN RF Channel Number		1	One UTRAN FDD carrier frequency is used.
E-UTRAN Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	E-UTRAN cell 1 on RF channel number 1
Neighbor cells		Cell 2	UTRAN cell 2 on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRAN FDD) measurement quantity		CPICH Ec/N0	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CP length		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF

Table A.9.4.1.2-2: E-UTRAN FDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD

Parameter	Unit	Test 1	Test 2	Test 3
E-UTRAN RF Channel Number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD		
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note 1	dB			
OCNG_RB Note 1	dB			
N_{oc} Note 2	dBm/15 kHz	-98		
RSRP Note 3	dBm/15 kHz	-94		
$\hat{E}_s/I_{ot}$	dB	4		
SCH_RP Note 3	dBm/15 kHz	-94		
$\hat{E}_s/N_{oc}$	dB	4		
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.4.1.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th>Test 1</th><th>Test 2</th><th>Test 3</th></tr>
<tr><th>Cell 2</th><th>Cell 2</th><th>Cell 2</th></tr>
<tr><td colspan="2">CPICH_Ec/Ior</td><td>dB</td><td>-10</td><td>-10</td><td>-10</td></tr>
<tr><td colspan="2">PCCPCH_Ec/Ior</td><td>dB</td><td>-12</td><td>-12</td><td>-12</td></tr>
<tr><td colspan="2">SCH_Ec/Ior</td><td>dB</td><td>-12</td><td>-12</td><td>-12</td></tr>
<tr><td colspan="2">PICH_Ec/Ior</td><td>dB</td><td>-15</td><td>-15</td><td>-15</td></tr>
<tr><td colspan="2">DPCH_Ec/Ior</td><td>dB</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">OCNS_Ec/Ior</td><td>dB</td><td>-0.94</td><td>-0.94</td><td>-0.94</td></tr>
<tr><td rowspan="5">Ioc</td><td>Band I, IV, VI, X, XI, XIX, XXI</td><td rowspan="5">dBm/ 3.84 MHz</td><td rowspan="5">-52.22</td><td rowspan="5">-87.27</td><td>-94.46</td></tr>
<tr><td>Band II, V, VII</td><td>-92.46</td></tr>
<tr><td>Band XXV, XXVI</td><td>-90.96 (Note 3)</td></tr>
<tr><td>Band III, VIII, XII, XIII, XIV, XX, XXII</td><td>-91.46</td></tr>
<tr><td>Band IX (Note 2)</td><td>-93.46</td></tr>
<tr><td colspan="2">Îor/Ioc</td><td>dB</td><td>-1.75</td><td>-4.7</td><td>-9.54</td></tr>
<tr><td colspan="2">CPICH Ec/Io, Note 1</td><td>dBm</td><td>-14.0</td><td>-16.0</td><td>-20.0</td></tr>
<tr><td rowspan="5">Io, Note 1</td><td>Band I, IV, VI, X, XI, XIX, XXI</td><td rowspan="5">dBm/ 3.84 MHz</td><td rowspan="5">-50</td><td rowspan="5">-86</td><td>-94</td></tr>
<tr><td>Band II, V, VII</td><td>-92.0</td></tr>
<tr><td>Band XXV, XXVI</td><td>-90.5 (Note 3)</td></tr>
<tr><td>Band III, VIII, XII, XIII, XIV, XX, XXII</td><td>-91.0</td></tr>
<tr><td>Band IX (Note 2)</td><td>-93</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td>AWGN</td><td>AWGN</td><td>AWGN</td></tr>
<tr><td colspan="6">NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.
NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.</td></tr>
<tr><td colspan="6">Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.</td></tr>
</table>

A.9.4.1.3 Test Requirements

The CPICH Ec/No measurement absolute accuracy shall meet the requirements in Clause 9.2.3.

The effect of assumed thermal noise and noise generated in the receiver (-99 dBm for frequency bands I, IV, VI, X, XI, XIX and XXI; -98 dBm for frequency band IX, -97dBm for frequency bands II, V and VII; -95.5dBm for frequency band XXV and XXVI; and -96dBm for frequency band III) shall be added into the required accuracy. The test requirements for the absolute CPICH_Ec/Io measurement are shown in Table A.9.4.1.3-1.

Table A.9.4.1.3-1: CPICH_Ec/Io absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3,84 MHz]

CPICH_Ec/Io	dB	-2.7…1.5 for -14 ≤ CPICH Ec/Io -3.2…2 for -16 ≤ CPICH Ec/Io < -14 -4.2…3 for -20 ≤ CPICH Ec/Io < -16	-4.2…3	-94...-87(Band I, IV, VI, X, XI, XIX, XXI) -92…-85 (Band II, V, VII) -90.5…-83.5 (Band XXV, XXVI (Note 2)) -91…-84 (Band III, VIII, XII, XIII, XIV, XX, XXII) 93…-86 (Band IX (Note 1))
		± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-87...-50(Band I, IV, VI, X, XI, XIX, XXI) -85…-50 (Band II, V, VII) -83.5…-50 (Band XXV, XXVI (Note 2)) -84…-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -86…-50 (Band IX (Note 1))
NOTE1: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE. NOTE 2: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				

A.9.4.2 E-UTRAN TDD

A.9.4.2.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH Ec/No absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.2.3. There are three different test setups with different UTRAN parameters.

A.9.4.2.2 Parameters

The test parameters are given in Tables A.9.4.2.2-1, A.9.4.2.2-2 and A.9.4.2.2-3 below.

Table A.9.4.2.2-1: General test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN TDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is used.
UTRAN RF Channel Number		1	One UTRAN FDD carrier frequency is used.
E-UTRAN Channel Bandwidth ($BW_{channel}$)	MHz	10	
Active cell		Cell 1	E-UTRAN cell 1 on RF channel number 1
Neighbor cells		Cell 2	UTRAN cell 2 on RF channel number 1
Gap Pattern Id		0	As specified in TS 36.133 clause 8.1.2.1.
Inter-RAT (UTRAN FDD) measurement quantity		CPICH Ec/N0	
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list.
CP length		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF

Table A.9.4.2.2-2: E-UTRAN TDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN TDD

Parameter	Unit	Test 1	Test 2	Test 3
E-UTRAN RF Channel Number		1		
$BW_{channel}$	MHz	10		
Special subframe configuration[Note1]		6		
Uplink-downlink configuration[Note1]		1		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD		
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA[Note 2]	dB			
OCNG_RB[Note 2]	dB			
N_{oc} [Note 3]	dBm/15 kHz	-98		
RSRP [Note 4]	dBm/15 kHz	-94		
$\hat{E}_s/I_{ot}$	dB	4		
SCH_RP [Note 4]	dBm/15 kHz	-94		
$\hat{E}_s/N_{oc}$	dB	4		
Propagation Condition		AWGN		

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.4.2.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN TDD

Parameter		Unit	Test 1	Test 2	Test 3
			Cell 2	Cell 2	Cell 2
CPICH_Ec/Ior		dB	-10	-10	-10
PCCPCH_Ec/Ior		dB	-12	-12	-12
SCH_Ec/Ior		dB	-12	-12	-12
PICH_Ec/Ior		dB	-15	-15	-15
DPCH_Ec/Ior		dB	-	-	-
OCNS_Ec/Ior		dB	-0.94	-0.94	-0.94
Ioc	Band I, IV, VI, X, XI, XIX, XXI	dBm/ 3.84 MHz	-52.22	-87.27	-94.46
	Band II, V, VII				-92.46
	Band XXV, XXVI				-90.96 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII				-91.46
	Band IX (Note 2)				-93.46
Îor/Ioc		dB	-1.75	-4.7	-9.54
CPICH Ec/Io, Note 1		dBm	-14.0	-16.0	-20.0
Io, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/ 3.84 MHz	-50	-86	-94
	Band II, V, VII				-92.0
	Band XXV, XXVI				-90.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII				-91.0
	Band IX (Note 2)				-93
Propagation condition		-	AWGN	AWGN	AWGN

NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.
NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.

A.9.4.2.3 Test Requirements

The CPICH Ec/No measurement absolute accuracy shall meet the requirements in Clause 9.2.3.

The effect of assumed thermal noise and noise generated in the receiver (-99 dBm for frequency bands I, IV, VI, X, XI, XIX and XXI; -98 dBm for frequency band IX, -97dBm for frequency bands II, V and VII; -95.5dBm for frequency band XXV and XXVI; and -96dBm for frequency band III) shall be added into the required accuracy. The test requirements for the absolute CPICH_Ec/Io measurement are shown in Table A.9.4.2.3-1.

Table A.9.4.2.3-1: CPICH_Ec/Io absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3,84 MHz]

CPICH_Ec/Io	dB	-2.7…1.5 for -14 ≤ CPICH Ec/Io -3.2…2 for -16 ≤ CPICH Ec/Io < -14 -4.2…3 for -20 ≤ CPICH Ec/Io < -16	-4.2…3	-94...-87(Band I, IV, VI, X, XI, XIX, XXI) -92…-85 (Band II, V, VII) -90.5…-83.5 (Band XXV, XXVI (Note 2)) -91…-84 (Band III, VIII, XII, XIII, XIV, XX, XXII) 93…-86 (Band IX (Note 1))
		± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-87...-50(Band I, IV, VI, X, XI, XIX, XXI) -85…-50 (Band II, V, VII) -83.5…-50 (Band XXV, XXVI (Note 2)) -84…-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -86…-50 (Band IX (Note 1))
NOTE1: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE. NOTE 2: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				

A.9.4.3 E-UTRAN FDD for 5MHz Bandwidth

A.9.4.3.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.4.1.1.

A.9.4.3.2 Parameters

The parameters of this test are the same as defined in Subclause A.9.4.1.2 except that the values of the parameters in the Table A.9.4.3.2-1 will replace the values of the corresponding parameters in A.9.4.1.2-1, and the values of E-UTRAN FDD cell specific parameters in the Table A.9.4.3.2-2 shall be adopted, and the values of UTRA FDD cell specific parameters shall be reused as defined in Table A.9.4.1.2-3 of Subclause A.9.4.1.2.

Table A.9.4.3.2-1: General test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD for 5MHz bandwidth

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.5 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.11 FDD	As specified in clause A.3.1.2.1
E-UTRAN Channel Bandwidth ($BW_{channel}$)	MHz	5	
Note 1: See Table A.9.4.1.2-1 for other general test parameters.			

Table A.9.4.3.2-2: E-UTRAN FDD cell specific test parameters for UTRAN FDD CPICH Ec/No absolute measurement accuracy test in E-UTRAN FDD for 5MHz bandwidth

Parameter		Unit	Test 1	Test 2	Test 3
E-UTRAN RF Channel Number			1		
$BW_{channel}$		MHz	5		
OCNG Patterns defined in A.3.2.1.15 (OP.15 FDD)			OP.15 FDD		
PBCH_RA		dB			
PBCH_RB		dB			
PSS_RA		dB			
SSS_RA		dB			
PCFICH_RB		dB			
PHICH_RA		dB			
PHICH_RB		dB	0		
PDCCH_RA		dB			
PDCCH_RB		dB			
PDSCH_RA		dB			
PDSCH_RB		dB			
OCNG_RA Note 1		dB			
OCNG_RB Note 1		dB			
N_{oc} Note 2	Band 31	dBm/15 kHz	-98		
RSRP Note 3	Band 31	dBm/15 kHz	-94		
$\hat{E}_s/I_{ot}$		dB	4		
SCH_RP Note 3	Band 31	dBm/15 kHz	-94		
$\hat{E}_s/N_{oc}$		dB	4		
Io Note3	Band 31	dBm/4.5 MHz	-67.8		
Propagation Condition			AWGN		
Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

A.9.4.3.3 Test Requirements

The test requirements defined in section A.9.4.1.3 shall apply to this test case.

A.9.5 UTRAN TDD measurement

A.9.5.1 P-CCPCH RSCP absolute accuracy for E-UTRAN FDD

A.9.5.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UTRAN TDD P-CCPCH RSCP measurement absolute accuracy is within the specified limits. This test will verify the requirements in clause 9.3.1 and applies to UE supporting this capability.

Gap pattern configuration with id #1 as specified in Table 8.1.2.1-1 is provided. In the measurement control information it is indicated to the UE that periodic reporting of the UTRA TDD P-CCPCH RSRP measurement is used.

A.9.5.1.2 Test parameters

In this set of test cases there are two cells. Cell 1 is a E-UTRA FDD cell and cell 2 is a UTRA TDD cell. The absolute accuracy of P-CCPCH RSCP measurements are tested by using test parameters in Table A.9.5.1-1, Table A.9.5.1-2, and Table A.9.5.1-3. In all test cases, Cell 1 is the PCell and Cell 2 is the target cell.

Table A.9.5.1-1: General test parameters for UTRA TDD P-CCPCH RSCP measurement absolute accuracy in E-UTRAN FDD

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1
E-UTRAN RF Channel Number		1	One E-UTRAN FDD carrier frequency is used.
UTRAN RF Channel Number		2	One UTRAN TDD carrier frequency is used.
E-UTRAN Channel Bandwidth (BWchannel)	MHz	10	
Active cell		Cell 1	E-UTRAN FDD cell 1 on RF channel number 1
Neighbor cells		Cell 2	1.28Mcps UTRA TDD cell 2 on RF channel number 2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
CP length of cell 1		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
Inter-RAT (UTRAN TDD) measurement quantity		P-CCPCH RSRP	

Table A.9.5.1-2: UTRA TDD P-CCPCH RSCP measurement tests parameters (cell 1)

Parameter	Unit	Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1		
BWchannel	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD		
PBCH_RA	dB	0		
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note1				
OCNG_RB Note1				
N_{oc} Note2	dBm/15 kHz	-98		
$\hat{E}_s / I_{ot}$	dB	4		
RSRP Note3	dBm/15 kHz	-94		
Io Note3	dBm/9 MHz	-64.76		
$\hat{E}_s / N_{oc}$	dB	4		
Propagation condition	-	AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.				

Table A.9.5.1-3: UTRA TDD P-CCPCH RSCP measurement tests parameters (cell 2)

Parameter	Unit	Test 1		Test 2		Test 3	
DL timeslot number		0		DwPTS		0	DwPTS
UTRA RF Channel number Note2		Channel 2		Channel 2		Channel 2	
PCCPCH_Ec/Ior	dB	-3		-3		-3	
DwPCH_Ec/Ior	dB		0		0		0
OCNS_Ec/Ior	dB	-3		-3		-3	
Ioc	dBm/1.28MHz	-54.1		-75.2		-97	
Îor/Ioc	dB	2		5		0	
PCCPCH RSCP Note1	dBm	-55.1		-73.2		-100	
Io Note1	dBm/1.28MHz	-50		-69		-94	
Propagation condition		AWGN					
Note 1: PCCPCH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves. Note 2: In the case of multi-frequency network of 1.28 Mcps TDD, the UTRA RF Channel Number can be set for the primary frequency in this test.							

A.9.5.1.3 Test Requirements

The UTRA TDD P-CCPCH RSCP measurement accuracy shall meet the requirements in clause 9.3.1.

A.9.5.2 P-CCPCH RSCP absolute accuracy for E-UTRAN TDD

A.9.5.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UTRAN TDD P-CCPCH RSCP measurement accuracy is within the specified limits. This test will verify the requirements in clause 9.3.1 and applies to UE supporting this capability.

Gap pattern configuration with id #1 as specified in Table 8.1.2.1-1 is provided. In the measurement control information it is indicated to the UE that periodic reporting of the UTRA TDD P-CCPCH RSRP measurement is used.

A.9.5.2.2 Test parameters

In this set of test cases there are two cells. Cell 1 is a E-UTRA TDD cell and cell 2 is a UTRA TDD cell. The absolute accuracy of P-CCPCH RSCP measurements are tested by using test parameters in Table A.9.5.2-1, Table A.9.5.2-2, and Table A.9.5.2-3. In all test cases, Cell 1 is the PCell and Cell 2 is the target cell.

Table A.9.5.2-1: General test parameters for UTRA TDD P-CCPCH RSCP measurement

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is used.
UTRAN RF Channel Number		2	One UTRAN TDD carrier frequency is used.
E-UTRAN Channel Bandwidth (BWchannel)	MHz	10	
Active cell		Cell 1	E-UTRA TDD cell1 on RF channel number 1
Neighbour cell		Cell 2	1.28Mcps UTRA TDD Cell2 on RF channel number 2
Gap Pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1		Normal	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells	ms	3	Asynchronous cells
Inter-RAT (UTRAN TDD) measurement quantity		P-CCPCH RSCP	

Table A.9.5.2-2: UTRA TDD P-CCPCH RSCP measurement tests parameters (cell 1)

Parameter	Unit	Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1		
BWchannel	MHz	10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD		
PBCH_RA	dB	0		
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA Note1				
OCNG_RB Note1				
N_{oc} Note2	dBm/15 kHz	-98		
$\hat{E}_s / I_{ot}$	dB	4		
RSRP Note3	dBm/15 kHz	-94		
Io Note3	dBm/9 MHz	-64.76		
$\hat{E}_s / N_{oc}$	dB	4		
Propagation condition	-	AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table A.9.5.2-3: UTRA TDD P-CCPCH RSCP measurement tests parameters (cell 2)

Parameter	Unit	Test 1		Test 2		Test 3	
DL timeslot number		0		DwPTS		0	DwPTS
UTRA RF Channel number Note2		Channel 2		Channel 2		Channel 2	
PCCPCH_Ec/Ior	dB	-3		-3		-3	
DwPCH_Ec/Ior	dB		0		0		0
OCNS_Ec/Ior	dB	-3		-3		-3	
Ioc	dBm/1.28MHz	-54.1		-75.2		-97	
Îor/Ioc	dB	2		5		0	
PCCPCH RSCP Note1	dBm	-55.1		-73.2		-100	
Io Note1	dBm/1.28MHz	-50		-69		-94	
Propagation condition		AWGN					

Note 1: PCCPCH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.
Note 2: In the case of multi-frequency network of 1.28 Mcps TDD, the UTRA RF Channel Number can be set for the primary frequency in this test.

A.9.5.2.3 Test Requirements

The UTRA TDD P-CCPCH RSCP measurement accuracy shall meet the requirements in clause 9.3.1.

A.9.6 GSM Carrier RSSI

A.9.6.1 E-UTRAN FDD

A.9.6.1.1 Test Purpose and Environment

The purpose of this test is to verify that the GSM Carrier RSSI measurement accuracy is within the specified limits when the active cell is E-UTRAN FDD. This test will verify the requirements in clause 9.4.1. There are 12 different test setups with different signal levels for the GSM cells.

Measurement gaps are configured to measure on the GSM cells. Table A.9.6.1.1-2 defines the cell specific test parameters for the E-UTRAN FDD cell. In the measurement control information it is indicated to the UE that periodic reporting of the GSM RSSI measurement is used. The limits of the GSM test parameters in terms of GSM BCCH received level at the receiver inputs are defined in Table A.9.6.1.1-3.

Table A.9.6.1.1-1: General GSM Carrier RSSI test parameters

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in clause A.3.1.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in clause A.3.1.2.1.
Active cell	-	Cell 1	
DRX	-	OFF	
Gap pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Filtering coefficient	-	0	L3 filtering is not used.
Inter-RAT measurement quantity		GSM Carrier RSSI	
Monitored cell list size		6 GSM neighbours including ARFCN 1	Included in the Measurement control information

Table A.9.6.1.1.-2: E-UTRAN FDD Cell specific test parameters for GSM Carrier RSSI accuracy test in E-UTRAN FDD

Parameter	Unit	Tests 1-12
E-UTRAN RF Channel Number		1
$BW_{channel}$	MHz	10
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)		OP.1 FDD

PBCH_RA	dB	0
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA Note 1	dB	
OCNG_RB Note 1	dB	
N_{oc} Note 2	dBm/15 kHz	-98
RSRP Note 3	dBm/15 kHz	-94
$\hat{E}_s/I_{ot}$	dB	4
SCH_RP Note 3	dBm/15 kHz	-94
$\hat{E}_s/N_{oc}$	dB	4
Propagation Condition		AWGN

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.6.1.1-3: BCCH signal levels at receiver input in dBm

Step	BCCH1	BCCH2	BCCH3	BCCH4	BCCH5	BCCH6
1	-38.5	-38.5	NA	NA	NA	NA
2	-48.5	-48.5	NA	NA	NA	NA
3	-70.5	-70.5	NA	NA	NA	NA
4	-109.5	-109.5	NA	NA	NA	NA
5	-57.5	NA	-54.5	NA	NA	NA
6	-64.5	NA	-59.5	NA	NA	NA
7	-71.5	NA	NA	-64.5	NA	NA
8	-78.5	NA	NA	-69.5	NA	NA
9	-85.5	NA	NA	NA	-74.5	NA
10	-92.5	NA	NA	NA	-79.5	NA
11	-99.5	NA	NA	NA	NA	-84.5
12	-106.5	NA	NA	NA	NA	-89.5

A.9.6.1.2 Test Requirements

The GSM Carrier RSSI measurement accuracy shall meet the requirements in clause 9.4.1.

A.9.6.2 E-UTRAN TDD

A.9.6.2.1 Test Purpose and Environment

The purpose of this test is to verify that the GSM Carrier RSSI measurement accuracy is within the specified limits when the active cell is E-UTRAN TDD. This test will verify the requirements in clause 9.4.1. There are 12 different test setups with different signal levels for the GSM cells.

Measurement gaps are configured to measure on the GSM cells. Table A.9.6.2.1-2 defines the cell specific test parameters for the E-UTRAN TDD cell. In the measurement control information it is indicated to the UE that periodic reporting of the GSM RSSI measurement is used. The limits of the GSM test parameters in terms of GSM BCCH received level at the receiver inputs are defined in Table A.9.6.2.1-3.

Table A.9.6.2.1-1: General GSM Carrier RSSI test parameters

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in clause A.3.1.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in clause A.3.1.2.2.
Active cell	-	Cell 1	
DRX	-	OFF	
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
Gap pattern Id		1	As specified in TS 36.133 clause 8.1.2.1.
Filtering coefficient	-	0	L3 filtering is not used.
Inter-RAT measurement quantity		GSM Carrier RSSI	
Monitored cell list size		6 GSM neighbours including ARFCN 1	Included in the Measurement control information

Table A.9.6.2.1-2: E-UTRAN TDD Cell specific test parameters for GSM Carrier RSSI accuracy test in E-UTRAN TDD

Parameter	Unit	Tests 1 - 12
E-UTRAN RF Channel Number		1
$BW_{channel}$	MHz	10
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)		OP.1 TDD
PBCH_RA	dB	0
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA Note 1	dB	
OCNG_RB Note 1	dB	
N_{oc} Note 2	dBm/15 kHz	-98
RSRP Note 3	dBm/15 kHz	-94
$\hat{E}_s/I_{ot}$	dB	4
SCH_RP Note 3	dBm/15 kHz	-94
$\hat{E}_s/N_{oc}$	dB	4
Propagation Condition		AWGN

Note 1: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.6.2.1-3: BCCH signal levels at receiver input in dBm

Step	BCCH1	BCCH2	BCCH3	BCCH4	BCCH5	BCCH6
1	-38.5	-38.5	NA	NA	NA	NA
2	-48.5	-48.5	NA	NA	NA	NA
3	-70.5	-70.5	NA	NA	NA	NA
4	-109.5	-109.5	NA	NA	NA	NA
5	-57.5	NA	-54.5	NA	NA	NA
6	-64.5	NA	-59.5	NA	NA	NA
7	-71.5	NA	NA	-64.5	NA	NA
8	-78.5	NA	NA	-69.5	NA	NA
9	-85.5	NA	NA	NA	-74.5	NA
10	-92.5	NA	NA	NA	-79.5	NA
11	-99.5	NA	NA	NA	NA	-84.5
12	-106.5	NA	NA	NA	NA	-89.5

A.9.6.2.2 Test Requirements

The GSM Carrier RSSI measurement accuracy shall meet the requirements in clause 9.4.1.

A.9.7 UE Rx – Tx Time Difference

A.9.7.1 E-UTRAN FDD UE Rx – Tx time difference case

A.9.7.1.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD UE Rx – Tx time difference measurement accuracy is within the specified limits in Clause 9.1.9.

There is only one active cell in the test. The tested UE is connected with the PCell, configured to transmit SRS signals periodically, and signaled to report UE Rx – Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE.

A.9.7.1.2 Test parameters

The parameters for this test case are defined in Table A.9.7.1.2-1, and the SRS configuration used is defined in Table A.9.7.1.2-2.

Table A.9.7.1.2-1: FDD UE Rx – Tx time difference test parameters

Parameter	Unit	Test 1	Test 2
E-UTRAN RF Channel Number		1	1
$BW_{channel}$	MHz	1.4	10
DRX		OFF	
PDSCH Reference measurement channel defined in A.3.1.1.1		R.2 FDD	R.0 FDD
PDSCH allocation	n_{PRB}	2—3	13—36
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.8 FDD	R.6 FDD
OCNG Patterns defined in A.3.2.1.3 (OP.3 FDD) and A.3.2.1.1 (OP.1 FDD)		OP.3 FDD	OP.1 FDD
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
N_{oc} Note2	dBm/15 kHz	-98	-98
RSRP Note3	dBm/15 kHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	-3	-3
Io Note3	dBm/1.08 MHz	-77.66	N/A
	dBm/9 MHz	N/A	-68.45
$\hat{E}_s/I_{ot}$	dB	-3	-3
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.7.1.2-2: Sounding Reference Symbol Configuration to be used in FDD UE Rx – Tx time difference test

Field	Test 1	Test 2	Comment
	Value		
srsBandwidthConfiguration	bw7	bw5	
srsSubframeConfiguration	sc1		
ackNackSrsSimultaneousTransmission	FALSE		
srsMaxUpPTS	N/A		Not applicable for FDD
srsBandwidth	0		No hopping
srsHoppingBandwidth	hbw0		
frequencyDomainPosition	0		
Duration	TRUE		Indefinite duration
Srs-ConfigurationIndex	0		SRS periodicity of 2ms for all Tests.
transmissionComb	0		
cyclicShift	cs0		No cyclic shift
SRS-AntennaPort	an1		Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.			

A.9.7.1.3 Test Requirements

The UE Rx – Tx time difference measurement accuracy shall fulfill the requirements in Clause 9.1.9.1.

A.9.7.2 E-UTRA TDD

A.9.7.2.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD UE Rx-Tx time difference measurement accuracy is within the specified limits in clause 9.1.9.

There is only one cell in the test. The tested UE is connected with the PCell, configured to transmit SRS signals periodcally, and signaled to report UE Rx – Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx – Tx measurement reported by the UE.

A.9.7.2.2 Test parameters

The parameters for this test case are defined in Table A.9.7.2.2-1, and the SRS configuration used is defined in Table A.9.7.2.2-2.

Table A.9.7.2.2-1: Cell specific test parameters for UE Rx-Tx time difference measurement

Parameter	Unit	Tests 1	Tests 2
E-UTRAN RF Channel Number	-	1	1
$BW_{channel}$	MHz	1.4	10
Uplink-downlink configuration of cell Note1		1	1
Special subframe configuration of cell Note1		6	6
PDSCH Reference measurement channel defined in A.3.1.1.2	-	R.2 TDD	R.0 TDD
PDSCH allocation	n_{PRB}	2-3	13-36
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2	-	R.8 TDD	R.6 TDD
OCNG Patterns defined in A.3.2.2.3 (OP.3 TDD) and A.3.2.2.1 (OP.1 TDD)	-	OP.3 TDD	OP.1 TDD
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note2	dB		
OCNG_RB Note2	dB		
N_{oc} Note 3	dBm/15 kHz	-98	-98
RSRP Note 4	dBm/15 kHz	-101	-101
$\hat{E}_s/N_{oc}$	dB	-3	-3
Io Note 4	dBm/1.08 MHz	-77.66	N/A
	dBm/9 MHz	N/A	-68.45
$\hat{E}_s/I_{ot}$	dB	-3	-3
Propagation Condition		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table A.9.7.2.2-2: Sounding Reference Symbol Configuration to be used in TDD UE Rx – Tx time difference test

Field	Test 1	Test 2	Comment
	Value		
srsBandwidthConfiguration	bw7	bw5	
srsSubframeConfiguration	sc1		
ackNackSrsSimultaneousTransmission	FALSE		
srsMaxUpPTS	TRUE		
srsBandwidth	0		No hopping
srsHoppingBandwidth	hbw0		
frequencyDomainPosition	0		
Duration	TRUE		Indefinite duration
Srs-ConfigurationIndex	10		SRS periodicity of 10ms for all Tests.
transmissionComb	0		
cyclicShift	cs0		No cyclic shift
SRS-AntennaPort	an1		Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.			

A.9.7.2.3 Test Requirements

The UE Rx – Tx time difference measurement accuracy shall fulfill the requirements in clause 9.1.9.1.

A.9.7.3 E-UTRAN FDD UE Rx–Tx Time Difference under Time-Domain Measurement Resource Restriction with Non-MBSFN ABS

A.9.7.3.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD UE Rx–Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.9.3 when time-domain measurement resource restriction is configured for PCell measurements via higher-layer signalling [2] and non-MBSFN ABS are configured in the interfering cell.

A.9.7.3.2 Test parameters

In this test case, there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. Cell 1 is the PCell on which UE Rx-Tx is measured, and Cell 2 is the interfering cell. Non-MBSFN ABS pattern is configured in Cell 2 during the entire test.

The tested UE is connected to the PCell and configured to transmit SRS signals periodically. The SRS configuration is provided to the UE before the measurement starts. The UE is configured to report UE Rx–Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on PCell. The information for both patterns shall be provided to the UE before the measurement starts.

The general and cell-specific parameters for this test case are defined in Table A.9.7.3.2-1 and Table A.9.7.3.2-2, respectively, and the SRS configuration used is specified in Table A.9.7.3.2-3.

Table A.9.7.3.2-1: General test parameters for FDD UE Rx–Tx time difference measurement under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	The measured cell
Neighbour cell		Cell 2	The cell interfering to Cell 1
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One FDD carrier frequency is used
Downlink Channel Bandwidth ($BW_{channel}$)	MHz	10	For both cells in the test
CP length		Normal	For both cells in the test
DRX			OFF
Time offset between cells	µs	3	Synchronous cells
Physical cell ID PCI		(PCI_{cell1} - PCI_{cell2})mod6 !=0	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met
ABS pattern		‘10000000100000001000 00001000000010000000’	Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod 40 = 0. No MBSFN subframes are cofigured in Cell 1 or Cell 2 during the ABS subframes of Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		‘10000000100000001000 00001000000010000000’	Configured for measurements on Cell 1.

Table A.9.7.3.2-2: Cell-specific test parameters for FDD UE Rx–Tx time difference measurement under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1	Cell 2
E-UTRAN RF Channel Number		1	1
Channel bandwidth ($BW_{channel}$)	MHz	10	10
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD	N/A
PDSCH allocation	n_{PRB}	13—36	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6 FDD	N/A
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.6 (OP.6 FDD)		OP.5 FDD	OP.6 FDD
PBCH_RA	dB	0	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
N_{oc} Note 2	dBm/15 kHz	-98	-98
CRS $\hat{E}_s/N_{oc}$	dB	-3	1
CRS $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note 3	dB	-3	-0.76
CRS $\left(\hat{E}_s/I_{ot}\right)_{nonABS}$ Note 3	dB	-6.54	-0.76
RSRP Note 4	dBm/15 kHz	-101	-97
$(\mathrm{Io})_{meas}$ Note 4	dBm/9 MHz	-67.89	-67.89
$(\mathrm{Io})_{nonABS}$ Note 4	dBm/9 MHz	-65.81	-65.81
Propagation condition		AWGN	

NOTE 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.

Note 3: $\left(\hat{E}_s/I_{ot}\right)_{meas}$ is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $\left(\hat{E}_s/I_{ot}\right)_{nonABS}$ is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.

Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. $(\mathrm{Io})_{meas}$ is calculated in CRS symbols in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $(\mathrm{Io})_{nonABS}$ is calculated in CRS symbols in the subframes not indicated for PCell measurements by measurement resource restriction pattern.

Table A.9.7.3.2-3: Sounding Reference Symbol Configuration to be used in FDD UE Rx–Tx time difference test

Field	Value	Comment
UL bandwidth	50 RBs	Same as the DL bandwidth
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc1	
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	Not applicable for FDD
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
srs-ConfigIndex	0	SRS periodicity of 2ms
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
srsAntennaPort	an1	Number of SRS antenna ports
Note: For further information see clause 6.3.2 in TS 36.331.		

A.9.7.3.3 Test Requirements

The UE Rx–Tx time difference measurement accuracy shall fulfill the requirements in Section 9.1.9.3.

A.9.7.4 E-UTRAN TDD UE Rx-Tx Time Difference under Time-Domain Measurement Resource Restriction with Non-MBSFN ABS

A.9.7.4.1 Test Purpose and Environment

The purpose of this test is to verify that the TDD UE Rx-Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.9.3 when time-domain measurement resource restriction is configured for PCell measurements via higher-layer signalling [2] and non-MBSFN ABS are configured in the interfering cell.

A.9.7.4.2 Test Parameters

In the test, there are two synchronous cells, Cell 1 and Cell 2, on the same RF channel. Cell 1 is the PCell on which UE Rx-Tx is measured, and Cell 2 is the interfering cell. Non-MBSFN ABS pattern is configured in Cell 2 during the entire test.

The tested UE is connected to the PCell and configured to transmit SRS signals periodically. The SRS configuration is provided to the UE before the measurement starts. The UE is configured to report UE Rx–Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD UE Rx-Tx time difference measurements on PCell. The information for both patterns shall be provided to the UE before the measurement starts.

The general and cell-specific parameters for this test case are defined in Table A.9.7.4.2-1 and Table A.9.7.4.2-2, respectively, and the SRS configuration used is defined in Table A.9.7.4.2-3.

Table A.9.7.4.2-1: General test parameters for E-UTRAN TDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Value	Comment
Serving cell (PCell)		Cell 1	Cell to be measured
Neighbour cell		Cell 2	The cell interfering to Cell 1
PCell ABS configuration		Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number		1	One TDD carrier frequency is used
Downlink Channel Bandwidth ($BW_{channel}$)	MHz	10	For both cells in the test
CP length		Normal	For both cells in the test
Special subframe configuration		6	For Cell 1 and Cell 2. For special subframe configurations see Table 4.2-1 in [16].
Uplink/downlink subframe configuration		1	For Cell 1 and Cell 2. For uplink-downlink subframe configurations see Table 4.2-2 in [16].
DRX			OFF
Time offset between cells	μs	3	Synchronous cells
Physical cell ID PCI		$(PCI_{cell1} - PCI_{cell2})mod6$!=0	Cell PCIs for Cell 1 and Cell 2 are selected randomly so that the condition is met.
ABS pattern		'00000000010000000001'	Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the subframe #0 of a radio frame satisfying SFN mod 20 = 0. No MBSFN subframes are cofigured in the ABS subframes in Cell 2.
Time-domain measurement resource restriction pattern for serving cell measurements		'00000000010000000001'	Configured for measurements on Cell 1.

Table A.9.7.4.2-2: Cell-specific test parameters for E-UTRAN TDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with non-MBSFN ABS

Parameter	Unit	Cell 1	Cell 2
PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	N/A
PDSCH allocation	n_{PRB}	13—36	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6 TDD	R.6 TDD
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
N_{oc} Note2	dBm/15 kHz	-98	-98
CRS $\hat{E}_s/N_{oc}$	dB	-3	1
CRS $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note 3	dB	-3	-0.76
CRS $\left(\hat{E}_s/I_{ot}\right)_{nonABS}$ Note 3	dB	-6.54	-0.76
RSRP Note 4	dBm/15 kHz	-101	-97
$(\mathrm{Io})_{meas}$ Note 4	dBm/9 MHz	-67.89	-67.89
$(\mathrm{Io})_{nonABS}$ Note 4	dBm/9 MHz	-65.81	-65.81
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: $\left(\hat{E}_s/I_{ot}\right)_{meas}$ is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $\left(\hat{E}_s/I_{ot}\right)_{nonABS}$ is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.

Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. $(\mathrm{Io})_{meas}$ is calculated in CRS symbols in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $(\mathrm{Io})_{nonABS}$ is calculated in CRS symbols

Table A.9.7.4.2-3: Sounding Reference Symbol Configuration to be used in TDD UE Rx–Tx time difference test

Field	Value	Comment
UL bandwidth	50 RBs	Same as the DL bandwidth
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc1	
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	TRUE	
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	10	SRS periodicity of 10ms for all Tests.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.		

A.9.7.4.3 Test Requirements

The UE Rx–Tx time difference measurement accuracy shall fulfill the requirements in Section 9.1.9.3.

A.9.7.5 E-UTRAN FDD UE Rx–Tx time difference under Time Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.9.7.5.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD UE Rx–Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.9.4 when the UE is provided with a time-domain measurement resource restriction pattern and CRS assistance information, and when non-MBSFN ABS configured in the interfering cells.

A.9.7.5.2 Test parameters

In this test case, there are three synchronous cells, Cell 1, Cell 2 and Cell 3, on the same RF channel. Cell 1 is the PCell on which UE Rx-Tx is measured. Cell 2 and Cell 3 are the interfering cells. A non-MBSFN ABS pattern is configured in each of the Cell 2 and Cell 3 during the entire test.

The tested UE is connected to the PCell and configured to transmit SRS signals periodically. The SRS configuration is provided to the UE before the measurement starts. The UE is configured to report UE Rx–Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN FDD intra-frequency measurements on PCell. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement patterns and the CRS assistance information shall be provided via RRC to the UE before the measurement starts.

The general and cell-specific parameters for this test case are defined in Table A.9.7.5.2-1 and Table A.9.7.5.2-2, respectively, and the SRS configuration used is specified in Table A.9.7.5.2-3.

Table A.9.7.5.2-1: General test parameters for FDD UE Rx–Tx time difference measurement under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

<table>
<tr><th colspan="2">Parameter</th><th>Unit</th><th>Value</th><th>Comment</th></tr>
<tr><td colspan="2">Serving cell (PCell)</td><td></td><td>Cell 1</td><td>The measured cell</td></tr>
<tr><td colspan="2">Neighbour cell</td><td></td><td>Cell 2 and Cell 3</td><td>Cell 2 is the first interfering cell to Cell 1, whilst Cell 3 is the second interfering cell to Cell 1.</td></tr>
<tr><td colspan="2">ABS transmission configuration</td><td></td><td>Non-MBSFN ABS</td><td>As defined in Table A.3.4.1.1-1</td></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>One FDD carrier frequency is used</td></tr>
<tr><td colspan="2">Downlink Channel Bandwidth ($BW_{channel}$)</td><td>MHz</td><td>10</td><td>For all cells in the test</td></tr>
<tr><td colspan="2">CP length</td><td></td><td>Normal</td><td>For all cells in the test</td></tr>
<tr><td colspan="2">DRX</td><td></td><td></td><td>OFF</td></tr>
<tr><td colspan="2">Time offset between cells</td><td>μs</td><td>Cell 2 offset with respect to Cell 1: 3
Cell 3 offset with respect to Cell 1: 2</td><td>Three synchronous cells</td></tr>
<tr><td colspan="2">Physical cell ID PCI</td><td></td><td>(PCI_{cell1} - PCI_{cell2})mod6 =0
(PCI_{cell1} - PCI_{cell3})mod6 !=0</td><td>Cell PCIs are selected so that both conditions are met</td></tr>
<tr><td colspan="2">ABS pattern</td><td></td><td>‘1000000010000000100000001000000010000000’</td><td>Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.
The first/leftmost bit corresponds to the Pcell subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (40) divided by 10. No MBSFN subframes are configured in the ABS subframes. Configured in Cell 2 and Cell 3 during the testing.</td></tr>
<tr><td colspan="2">Time-domain measurement resource restriction pattern for PCell measurements</td><td></td><td>‘1000000010000000100000001000000010000000’</td><td>Configured for measurements on Cell 1.</td></tr>
<tr><td rowspan="3">CRS assistance information</td><td>physCellId</td><td></td><td>see PCI conditions above</td><td rowspan="3">The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation one Frame=’000000’.</td></tr>
<tr><td>antennaPortsCount</td><td></td><td>1</td></tr>
<tr><td>mbsfn-SubframeConfigList</td><td></td><td>*oneFrame* = ‘000000’</td></tr>
</table>

Table A.9.7.5.2-2: Cell-specific test parameters for FDD UE Rx–Tx time difference measurement under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRAN RF Channel Number		1	1	1
PDSCH Reference measurement channel defined in A.3.1.1.1		R.0 FDD	N/A	N/A
PDSCH allocation	n_{PRB}	13—36	N/A	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1		R.6 FDD	N/A	N/A
OCNG Patterns defined in A.3.2.1.5 (OP.5 FDD) and in A.3.2.1.6 (OP.6 FDD)		OP.5 FDD	OP.6 FDD	OP.6 FDD
PBCH_RA	dB	0	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.	
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note1	dB			
OCNG_RB Note1	dB			
N_{oc} Note 2	dBm/15 kHz	-98	-98	-98
CRS $\hat{E}_s/N_{oc}$	dB	-3	3	1
CRS $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note 3	dB	-7.76	1.24	-0.76
CRS $\left(\hat{E}_s/I_{ot}\right)_{nonABS}$ Note 3	dB	-9.29	-1.41	-4.44
RSRP Note 4	dBm/15 kHz	-101	-95	-97
$(\mathrm{Io})_{meas}$ Note 4	dBm/9 MHz	-67.11	-67.11	-67.11
$(\mathrm{Io})_{nonABS}$ Note 4	dBm/9 MHz	-63.45	-63.45	-63.45
Propagation condition		AWGN		

NOTE 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Applies to all subframes.
Note 3: $\left(\hat{E}_s/I_{ot}\right)_{meas}$ is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $\left(\hat{E}_s/I_{ot}\right)_{nonABS}$ is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.
Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. $(\mathrm{Io})_{meas}$ is calculated in CRS symbols in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $(\mathrm{Io})_{nonABS}$ is calculated in CRS symbols in the subframes not indicated for PCell measurements by measurement resource restriction pattern.

Table A.9.7.5.2-3: Sounding Reference Symbol Configuration to be used in FDD UE Rx–Tx time difference test

Field	Value	Comment
UL bandwidth	50 RBs	Same as the DL bandwidth
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc1	
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	N/A	Not applicable for FDD
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
srs-ConfigIndex	0	SRS periodicity of 2ms
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
srsAntennaPort	an1	Number of SRS antenna ports
Note: For further information see clause 6.3.2 in TS 36.331.		

A.9.7.5.3 Test Requirements

The UE Rx–Tx time difference measurement accuracy shall fulfill the requirements in Section 9.1.9.4.

A.9.7.6 E-UTRAN TDD UE Rx-Tx Time Difference under Time-Domain Measurement Resource Restriction with CRS Assistance Information and Non-MBSFN ABS

A.9.7.6.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD UE Rx–Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.9.4 when the UE is provided with a time-domain measurement resource restriction pattern and CRS assistance information, and when non-MBSFN ABS configured in the interfering cells.

A.9.7.6.2 Test Parameters

In this test case, there are three synchronous cells, Cell 1, Cell 2 and Cell 3, on the same RF channel. Cell 1 is the PCell on which UE Rx-Tx is measured. Cell 2 and Cell 3 are the interfering cells. A non-MBSFN ABS pattern is configured in each of the Cell 2 and Cell 3 during the entire test.

The tested UE is connected to the PCell and configured to transmit SRS signals periodically. The SRS configuration is provided to the UE before the measurement starts. The UE is configured to report UE Rx–Tx time difference measurement. The test equipment measures the transmit timing of the UE using the transmitted SRS, and measures the receive timing using the downlink CRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE. The UE is configured by higher layers via Cell 1 with a time-domain measurement resource restriction pattern for performing E-UTRAN TDD intra-frequency measurements on PCell. The UE is also provided via higher layers with the CRS assistance information for Cell 2. The information for both measurement patterns and the CRS assistance information shall be provided via RRC to the UE before the measurement starts.

The general and cell-specific parameters for this test case are defined in Table A.9.7.6.2-1 and Table A.9.7.6.2-2, respectively, and the SRS configuration used is specified in Table A.9.7.6.2-3.

Table A.9.7.6.2-1: General test parameters for E-UTRAN TDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter		Unit	Value	Comment
Serving cell (PCell)			Cell 1	Cell to be measured
Neighbour cell			Cell 2 and Cell 3	Cell 2 is the first interfering cell to Cell 1, whilst Cell 3 is the second interfering cell to Cell 1.
ABS transmission configuration			Non-MBSFN ABS	As defined in Table A.3.4.1.1-1
E-UTRA RF Channel Number			1	One TDD carrier frequency is used
Downlink Channel Bandwidth ($BW_{channel}$)		MHz	10	For all cells in the test
CP length			Normal	For all cells in the test
Special subframe configuration			6	For all cells in the test. For special subframe configurations see Table 4.2-1 in [16].
Uplink/downlink subframe configuration			1	For all cells in the test. For uplink-downlink subframe configurations see Table 4.2-2 in [16].
DRX				OFF
Time offset between cells		µs	Cell 2 offset with respect to Cell 1: 3 Cell 3 offset with respect to Cell 1: 2	Three synchronous cells
Physical cell ID PCI			$(PCI_{cell1} - PCI_{cell2})mod6 = 0$ $(PCI_{cell1} - PCI_{cell3})mod6 != 0$	Cell PCIs are selected so that both conditions are met
ABS pattern			‘00000000010000000001’	Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. The first/leftmost bit corresponds to the Pcell subframe #0 of a radio frame satisfying SFN mod x = 0, where x is the size of the bit string (20) divided by 10. No MBSFN subframes are configured in the ABS subframes. Configured in Cell 2 and Cell 3 during the testing.
Time-domain measurement resource restriction pattern for serving cell measurements			‘00000000010000000001’	Configured for measurements on Cell 1.
CRS assistance information	physCellId		see PCI conditions above	The CRS assistance information is provided for Cell 2 and Cell 3 in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation one Frame=’000000’.
	antennaPortsCount		1	
	mbsfn-SubframeConfigList		*oneFrame* = ‘000000’	

Table A.9.7.6.2-2: Cell-specific test parameters for E-UTRAN TDD UE Rx-Tx time difference measurement under time-domain measurement resource restriction with CRS assistance information and non-MBSFN ABS

Parameter	Unit	Cell 1	Cell 2	Cell 3
E-UTRAN RF Channel Number		1	1	1
PDSCH Reference measurement channel defined in A.3.1.1.2		R.0 TDD	N/A	N/A
PDSCH allocation	n_{PRB}	13—36	N/A	N/A
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2		R.6 TDD	N/A	N/A
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD	OP.2 TDD
PBCH_RA	dB	0	Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.	
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note1	dB			
OCNG_RB Note1	dB			
N_{oc} Note2	dBm/15 kHz	-98	-98	-98
CRS $\hat{E}_s/N_{oc}$	dB	-3	3	1
CRS $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note 3	dB	-7.76	1.24	-0.76
CRS $\left(\hat{E}_s/I_{ot}\right)_{nonABS}$ Note 3	dB	-9.29	-1.41	-4.44
RSRP Note 4	dBm/15 kHz	-101	-95	-97
$(\mathrm{Io})_{meas}$ Note 4	dBm/9 MHz	-67.11	-67.11	-67.11
$(\mathrm{Io})_{nonABS}$ Note 4	dBm/9 MHz	-63.45	-63.45	-63.45
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that the resources in the active cell are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: $\left(\hat{E}_s/I_{ot}\right)_{meas}$ is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $\left(\hat{E}_s/I_{ot}\right)_{nonABS}$ is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.

Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. $(\mathrm{Io})_{meas}$ is calculated in CRS symbols in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $(\mathrm{Io})_{nonABS}$ is calculated in CRS symbols

Table A.9.7.6.2-3: Sounding Reference Symbol Configuration to be used in TDD UE Rx–Tx time difference test

Field	Value	Comment
UL bandwidth	50 RBs	Same as the DL bandwidth
srsBandwidthConfiguration	bw5	
srsSubframeConfiguration	sc1	
ackNackSrsSimultaneousTransmission	FALSE	
srsMaxUpPTS	TRUE	
srsBandwidth	0	No hopping
srsHoppingBandwidth	hbw0	
frequencyDomainPosition	0	
Duration	TRUE	Indefinite duration
Srs-ConfigurationIndex	10	SRS periodicity of 10ms for all Tests.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
SRS-AntennaPort	an1	Number of antenna ports used for SRS transmission
Note: For further information see clause 6.3.2 in TS 36.331.		

A.9.7.6.3 Test Requirements

The UE Rx–Tx time difference measurement accuracy shall fulfill the requirements in Section 9.1.9.4.

A.9.8 RSTD

A.9.8.1 E-UTRAN FDD RSTD intra frequency case

A.9.8.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSTD intra-frequency measurement accuracy is within the specified limits in clause 9.1.10.1 in AWGN channels.

In the test, there are two synchronous cells, Cell 1 as the reference cell and Cell 2 as the neighbour cell on the same frequency.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of measurement period, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data.

A time span of $\mathrm{T_{RSTD\ IntraFreqFDD,\ E\text{-}UTRAN}}$ is provided for the measurement period, and PRS are configured according to I_{PRS} in Tables A.9.8.1.1-1 and A.9.8.1.1-2 during this time.

The test parameters are given in Table A.9.8.1.1-1 and Table A.9.8.1.1-2.

Table A.9.8.1.1-1: General Test Parameters for intra frequency RSTD Tests for E-UTRAN FDD

Parameter	Unit	Value				Comment
		Test1	Test2	Test3	Test4	
PCFICH/PDCCH/PHICH parameters		R.8 FDD		R.6 FDD		As specified in clause A.3.1.2.1
OCNG Patterns defined in A.3.2.1		OP.7 FDD		OP.6 FDD		OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
Reference cell		Cell 1				
Neighbour cell		Cell 2				
E-UTRA RF Channel Number		1				One FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	1.4		10		
PRS Bandwidth	RB	6		50		PRS bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
PRS configuration Index I_{PRS}		12		2		As defined in TS 36.211
Number of consecutive positioning downlink subframes N_{PRS}		6		1		As defined in TS 36.211
prs-MutingInfo		Cell 1: '11110000' Cell 2: '11110000'				See clause 6.5.1.2 in TS 36.355 for more information
Cell ID		(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 0	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 1	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 0	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 3	
expectedRSTD	us	Cell 2: 1 Other neighbour cells: randomly between -3 and 3	Cell 2: -1 Other neighbour cells: randomly between -3 and 3	Cell 2: -1 Other neighbour cells: randomly between -3 and 3	Cell 2: 1 Other neighbour cells: randomly between -3 and 3	
expectedRSTDUncertainty for all neighbour cells	us	5	5	5	5	
CP length		Normal				
DRX		OFF				
Radio frame receive time offset between the cells at the UE antenna connector	us	Cell 2 to Cell 1: -3	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: -3	PRS are transmitted from synchronous cells
Number of cells provided in OTDOA assistance data		16				The number of cells includes the reference cell
$T_{\text{RSTD IntraFreqFDD, E-UTRAN}}$	ms	2560				Derived according to the RSTD measurement requirements specified in Clause 8.1.2.5.1

Table A.9.8.1.1-2: Cell Specific Test Parameters for intra frequency RSTD Tests for E-UTRAN FDD

Parameter	Unit	Test1		Test2		Test3		Test4	
		Cell1	Cell2	Cell1	Cell2	Cell1	Cell2	Cell1	Cell2
E-UTRA RF Channel Number		1							
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0	0	0	0	0	0	0
PRS_RA	dB	0	0	-3	0	0	0	-3	0
N_{oc} Note2	dBm/15 kHz	-98	-98	-98	-98	-98	-98	-98	-98
PRS $\hat{E}_s/N_{oc}$	dB	-2.37	-8.02	-6	-13	-2.37	-8.02	-6	-13
PRS $\hat{E}_s/I_{ot}$ Note3	dB	-3	-10	-6	-13	-3	-10	-6	-13
Io Note3	dBm/1.08 MHz	-78.92	-78.92	-79.21	-79.21	N/A	N/A	N/A	N/A
	dBm/9 MHz	N/A	N/A	N/A	N/A	-69.72	-69.72	-70	-70
PRP Note3	dBm/15kHz	-100.37	-106.02	-104	-111	-100.37	-106.02	-104	-111
$\hat{E}_s/N_{oc}$ Note 3	dB	-2.37	-8.02	-3	-13	-2.37	-8.02	-3	-13
RSRP Note 3	dBm/15kHz	-100.37	-106.02	-101	-111	-100.37	-106.02	-101	-111
Propagation condition		AWGN							

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS

A.9.8.1.2 Test Requirements

The RSTD measurement accuracy shall fulfill the requirements in clause 9.1.10.1.

A.9.8.2 E-UTRAN TDD RSTD intra frequency case

A.9.8.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSTD intra-frequency measurement accuracy is within the specified limits in clause 9.1.10.1 in AWGN channels.

In the test, there are two synchronous cells, Cell 1 as the reference cell and Cell 2 as the neighbour cell on the same frequency.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of measurement period, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data.

A time span of $T_{\text{RSTD IntraFreqTDD, E-UTRAN}}$ is provided for the measurement period, and PRS are configured according to I_{PRS} in Tables A.9.8.2.1-1 and A.9.8.2.1-2 during this time.

The test parameters are given in Table A.9.8.2.1-1 and Table A.9.8.2.1-2.

Table A.9.8.2.1-1: General Test Parameters for intra frequency RSTD Tests for E-UTRAN TDD

Parameter	Unit	Value				Comment
		Test1	Test2	Test3	Test4	
PCFICH/PDCCH/PHICH parameters		R.8 TDD		R.6 TDD		As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2		OP.4 TDD		OP.2 TDD		OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
Reference cell		Cell 1				
Neighbour cell		Cell 2				
E-UTRA RF Channel Number		1				One TDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)	MHz	1.4		10		
PRS Bandwidth	RB	6		50		PRS bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Special subframe configuration		6		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells.
Uplink-downlink configuration		3		1		As specified in table 4.2-2 in TS 36.211 and table 8.1.2.5.2-2. The same configuration in both cells.
PRS configuration Index I_{PRS}		9		14		As defined in TS 36.211
Number of consecutive positioning downlink subframes N_{PRS}		6		1		As defined in TS 36.211
prs-MutingInfo		Cell 1: '11110000' Cell 2: '11110000'				See clause 6.5.1.2 in TS 36.355 for more information
Cell ID		(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 0	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 1	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 0	(Cell ID of cell 1 – Cell ID of cell 2) mod 6 = 3	
expectedRSTD	us	Cell 2: 1 Other neighbour cells: randomly between -3 and 3	Cell 2: -1 Other neighbour cells: randomly between -3 and 3	Cell 2: -1 Other neighbour cells: randomly between -3 and 3	Cell 2: 1 Other neighbour cells: randomly between -3 and 3	
expectedRSTDUncertainty for all neighbour cells	us	5	5	5	5	
CP length		Normal				
DRX		OFF				
Radio frame receive time offset between the cells at the UE antenna connector	us	Cell 2 to Cell 1: -3	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: -3	PRS are transmitted from synchronous cells
Number of cells provided in OTDOA assistance data		16				The number of cells includes the reference cell

$T_{RSTD\ IntraFreqTDD,\ E\text{-}UTRAN}$	ms	2560	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.5.2

Table A.9.8.2.1-2: Cell Specific Test Parameters for intra frequency RSTD Tests for E-UTRAN TDD

Parameter	Unit	Test1		Test2		Test3		Test4	
		Cell1	Cell2	Cell1	Cell2	Cell1	Cell2	Cell1	Cell2
E-UTRA RF Channel Number		1							
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0	0	0	0	0	0	0
PRS_RA	dB	0	0	-3	0	0	0	-3	0
N_{oc} Note2	dBm/15 kHz	-98	-98	-98	-98	-98	-98	-98	-98
PRS $\hat{E}_s/N_{oc}$	dB	-2.37	-8.02	-6	-13	-2.37	-8.02	-6	-13
PRS $\hat{E}_s/I_{ot}$ Note3	dB	-3	-10	-6	-13	-3	-10	-6	-13
Io Note3	dBm/1.08 MHz	-78.92	-78.92	-79.21	-79.21	N/A	N/A	N/A	N/A
	dBm/9 MHz	N/A	N/A	N/A	N/A	-69.72	-69.72	-70	-70
PRP Note3	dBm/15kHz	-100.37	-106.02	-104	-111	-100.37	-106.02	-104	-111
$\hat{E}_s/N_{oc}$ Note 3	dB	-2.37	-8.02	-3	-13	-2.37	-8.02	-3	-13
RSRP Note 3	dBm/15kHz	-100.37	-106.02	-101	-111	-100.37	-106.02	-101	-111
Propagation condition		AWGN							

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

A.9.8.2.2 Test Requirements

The RSTD measurement accuracy shall fulfill the requirements in clause 9.1.10.1.

A.9.8.3 E-UTRAN FDD-FDD RSTD inter frequency case

A.9.8.3.1 Test Purpose and Environment

The purpose of these tests is to verify that the RSTD inter-frequency measurement accuracy is within the specified limits in clause 9.1.10.2 in AWGN channels.

There are two synchronous cells on different carrier frequencies in the test. In all test cases, Cell 1 is the reference cell as well as the PCell and Cell 2 the neighbor cell. The inter frequency measurements on Cell 2 are supported by measurement gaps. PCIs of the two cells are selected randomly.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of measurement period, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data. The measurement gap configuration is known and configured in the UE before the measurements start.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$ is provided for the measurement period, and PRS are configured according to I_{PRS} in Table A.9.8.3.1-1 and Table A.9.8.3.1-2 for each of the two cells during this time.

The test parameters are given in Table A.9.8.3.1-1 and Table A.9.8.3.1-2.

Table A.9.8.3.1-1: General Test Parameters for inter frequency RSTD Tests for E-UTRAN FDD

Parameter	Unit	Value		Comment
		Test1	Test2	
PCFICH/PDCCH/PHICH parameters		R.8 FDD	R.6 FDD	As specified in clause A.3.1.2.1
OCNG Patterns defined in A.3.2.1		OP.7 FDD	OP.6 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
Reference cell		Cell 1		Cell 1 on RF channel number 1
Neighbour cell		Cell 2		Cell 2 on RF channel number 2
E-UTRA RF Channel Number		1,2		Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	1.4	10	
PRS Bandwidth	RB	6	50	PRS bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes N_{PRS}		6	1	As defined in TS 36.211
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000'		See clause 6.5.1.2 in TS 36.355 for more information
expectedRSTD	µs	Cell 2:1 Other neighbour cells: randomly between -3 and 3		The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	µs	5		The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal		
DRX		OFF		
Radio frame transmit time offset between the cells at the UE antenna connector	µs	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: -3	Synchronous cells
Number of cells provided in OTDOA assistance data		16		The list includes the reference cell (received in *OTDOA-ReferenceCellInfo* [24]) on RF channel 1 and 15 other cells on RF channel 2, all received in *OTDOA-ProvideAssistanceData* [24].
$\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$	ms	5120		Derived according to the RSTD measurement requirements specified in Clause 8.1.2.6.1

Table A.9.8.3.1-2: Cell Specific Test Parameters for inter frequency RSTD Tests for E-UTRAN FDD

Parameter	Unit	Test1		Test2	
		Cell1	Cell2	Cell1	Cell2
E-UTRA RF Channel Number		1	2	1	2
GapOffset		18	N/A	11	N/A
Gap Pattern ID		0	N/A	0	N/A
PRS configuration Index I_{PRS}		12	19	2	12
PRS subframe offset		N/A	7	N/A	10
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0	0	0
PRS_RA	dB	-3	0	-3	0
N_{oc} Note2	dBm/15 kHz	-98			
PRS $\hat{E}_s/N_{oc}$	dB	-6	-13	-6	-13
PRS $\hat{E}_s/I_{ot}$ Note3	dB	-6	-13	-6	-13
Io Note3	dBm/1.08 MHz	-79.25	-79.39	N/A	N/A
	dBm/9 MHz	N/A	N/A	-70.04	-70.18
PRP Note3	dBm/15kHz	-104	-111	-104	-111
$\hat{E}_s/N_{oc}$ Note 3	dB	-3	-13	-3	-13
RSRP Note 3	dBm/15kHz	-101	-111	-101	-111
Propagation condition		AWGN			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.					

A.9.8.3.2 Test Requirements

The RSTD measurement accuracy shall fulfill the requirements in clause 9.1.10.2.

A.9.8.4 E-UTRAN TDD-TDD RSTD inter frequency case

A.9.8.4.1 Test Purpose and Environment

The purpose of this test is to verify that the RSTD inter-frequency measurement accuracy is within the specified limits in clause 9.1.10.2 in AWGN channels.

There are two synchronous cells on different carrier frequencies in the test. In all test cases, Cell 1 is the reference cell as well as the PCell and Cell 2 is the neighbour cell. The inter frequency measurements on Cell 2 are supported by a measurement gap. PCIs of the two cells are selected randomly.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of measurement period, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data. The measurement gap configuration is known and configured in the UE before the measurements start.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of $\mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN}}$ is provided for the measurement period, and PRS are configured according to I_{PRS} in Table A.9.8.4.1-1 and Table A.9.8.4.1-2 for each of the two cells during this time.

The test parameters are given in Table A.9.8.4.1-1 and Table A.9.8.4.1-2.

Table A.9.8.4.1-1: General Test Parameters for inter frequency RSTD Tests for E-UTRAN TDD

Parameter	Unit	Value		Comment
		Test1	Test2	
PCFICH/PDCCH/PHICH parameters		R.8 TDD	R.6 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2		OP.4 TDD	OP.2 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).
Reference cell		Cell 1		Cell 1 on RF channel number 1
Neighbour cell		Cell 2		Cell 2 on RF channel number 2
E-UTRA RF Channel Number		1,2		Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	1.4	10	
PRS Bandwidth	RB	6	50	PRS bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211. The same configuration in both cells.
Uplink-downlink configuration		3	1	As specified in table 4.2-2 in TS 36.211 and table 8.1.2.5.2-2.
Number of consecutive positioning downlink subframes N_{PRS}		6	1	As defined in TS 36.211
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000'		PRS muting is not used. See clause 6.5.1.2 in TS 36.355 for more information
expectedRSTD	µs	Cell 2: 1 Other neighbour cells: randomly between -3 and 3		The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	µs	5	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal		
DRX		OFF		
Radio frame receive time offset between the cells at the UE antenna connector	µs	Cell 2 to Cell 1: 3	Cell 2 to Cell 1: -3	PRS are transmitted from synchronous cells
Number of cells provided in OTDOA assistance data		16		The list includes the reference cell (received in *OTDOA-ReferenceCellInfo* [24]) on RF channel 1 and 15 other cells on RF channel 2, all received in *OTDOA-ProvideAssistanceData* [24].
$\mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN}}$	ms	5120		Derived according to the RSTD measurement requirements specified in Clause 8.1.2.6.3

Table A.9.8.4.1-2: Cell Specific Test Parameters for inter frequency RSTD Tests for E-UTRAN TDD

Parameter	Unit	Test1		Test2	
		Cell1	Cell2	Cell1	Cell2
E-UTRA RF Channel Number		1	2	1	2
Gap pattern ID		0	N/A	0	N/A
Gapoffset		34	N/A	13	N/A
PRS configuration Index I_{PRS}		15	35	4	14
PRS subframe offset		N/A	20	N/A	10
PBCH_RA	dB	0			
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
OCNG_RA Note1					
OCNG_RB Note1					
PRS_RA	dB	-3	0	-3	0
N_{oc} Note2	dBm/15 kHz	-98			
PRS $\hat{E}_s/N_{oc}$	dB	-6	-13	-6	-13
PRS $\hat{E}_s/I_{ot}$ Note3	dB	-6	-13	-6	-13
Io Note3	dBm/1.08 MHz	-79.25	-79.39	N/A	N/A
	dBm/9 MHz	N/A	N/A	-70.04	-70.18
PRP Note3	dBm/15kHz	-104	-111	-104	-111
$\hat{E}_s/N_{oc}$ Note 3	dB	-3	-13	-3	-13
RSRP Note 3	dBm/15kHz	-101	-111	-101	-111
Propagation condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, Io, RSRP and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

A.9.8.4.2 Test Requirements

The RSTD measurement accuracy shall fulfill the requirements in clause 9.1.10.2.

A.9.8.5 E-UTRAN FDD RSTD Measurement Accuracy in Carrier Aggregation

A.9.8.5.1 Test Purpose and Environment

The purpose of these tests is to verify that the E-UTRAN FDD RSTD measurement accuracy in carrier aggregation is within the specified limits in clause 9.1.12.

There are three synchronous cells on two different carrier frequencies in the test. Cell 1 is the PCell on primary component carrier F1 (RF channel number 1), Cell 2 is the SCell and reference cell on sceondary component carrier F2 (RF channel number 2), and Cell 3 is the neighbor cell on F2.

Cell2 and Cell3 are included in the OTDOA assistance data, whilst Cell1 is not included in the OTDOA assistance data. The RSTD measurements are performed between Cell 2 and Cell 3 to verify that when both the reference cell and neighbouring cell belong to the secondary component carrier the RSTD measurement accuracy can meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of measurement period, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data. The measurement gap is not configured in the test because of UE carrier aggregation capability.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of $\mathrm{T}_{\mathrm{RSTD\ IntraFreqFDD,\ E\text{-}UTRAN}}$ is provided for the measurement period, and PRS are configured according to I_{PRS} in Table A.9.8.5.1-1 and Table A.9.8.5.1-2 for each of the three cells during this time.

The test parameters are given in Table A.9.8.5.1-1 and Table A.9.8.5.1-2.

Table A.9.8.5.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.6 FDD	As specified in clause A.3.1.2.1
OCNG Patterns defined in A.3.2.1		OP.6 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Assistance data reference cell		Cell 2	Cell 2 is the SCell on RF channel number 2
PCell		Cell 1	Cell 1 on RF channel number 1
Neighbour cell		Cell 3	Cell 3 on RF channel number 2
E-UTRA RF Channel Number		1,2	Two FDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
PRS Bandwidth	RB	50	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes N_{PRS}		1	As defined in TS 36.211
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000' Cell3:'11110000'	See clause 6.5.1.2 in TS 36.355 for more information
Cell ID		(Cell ID of cell 2 – Cell ID of cell 3) mod 6 = 3	PCI of cell 1 is selected randomly.
expectedRSTD	µs	Cell 3:-2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	µs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal	
DRX		OFF	
Radio frame receive time offset between the cells at the UE antenna connector	µs	Cell 1 to Cell 2: -1 Cell 3 to Cell 2:1	PRS are transmitted from synchronous cells
Time alignment error between cell2 and cell1	µs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Number of cells provided in OTDOA assistance data		16	The list includes the assistance-data-reference cell (received in *OTDOA-ReferenceCellInfo* [24]) and 15 other cells, all received in *OTDOA-ProvideAssistanceData* [24]. All cells provided in OTDOA assistance data are on RF channel 2.
$T_{\text{RSTD IntraFreqFDD, E-UTRAN}}$	ms	2560	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.5.1

Table A.9.8.5.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation

Parameter	Unit	Cell1	Cell2	Cell3
E-UTRA RF Channel Number		1	2	2
PRS configuration Index I_{PRS}		2	2	2
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0	0
PRS_RA	dB	-3	0	0
N_{oc} Note2	dBm/15 kHz	-98		
PRS $\hat{E}_s/N_{oc}$	dB	-6	-6	-13
PRS $\hat{E}_s/I_{ot}$	dB	-6	-6	-13
Io Note3	dBm/9 MHz	-70.04	-70.01	-70.01
PRP Note3	dBm/15kHz	-104	-104	-111
RSRP Note3	dBm/15kHz	-101	-104	-111
$\hat{E}_s/N_{oc}$ Note3	dB	-3	-6	-13
Propagation condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: $\hat{E}_s/N_{oc}$, PRS $\hat{E}_s/I_{ot}$, RSRP, Io and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.				

A.9.8.5.2 Test Requirements

The measurement accuracy of RSTD between Cell2 and Cell3 shall fulfill the requirements in clause 9.1.12.

A.9.8.6 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation

A.9.8.6.1 Test Purpose and Environment

The purpose of these tests is to verify that the E-UTRAN TDD RSTD measurement accuracy in carrier aggregation is within the specified limits in clause 9.1.12.

There are three synchronous cells on two different carrier frequencies in the test. Cell 1 is the PCell on primary component carrier F1 (RF channel number 1), Cell 2 is the SCell and reference cell on sceondary component carrier F2 (RF channel number 2), and Cell 3 is the neighbor cell on F2.

Cell2 and Cell3 are included in the OTDOA assistance data, whilst Cell1 is not included in the OTDOA assistance data. The RSTD measurements are performed between Cell 2 and Cell 3 to verify that when both the reference cell and neighbouring cell belong to the secondary component carrier the RSTD measurement accuracy can meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of measurement period, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data. The measurement gap is not configured in the test because of UE carrier aggregation capability.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of $\mathrm{T}_{\mathrm{RSTD\ IntraFreqTDD,\ E\text{-}UTRAN}}$ is provided for the measurement period, and PRS are configured according to I_{PRS} in Table A.9.8.6.1-1 and Table A.9.8.6.1-2 for each of the three cells during this time.

The test parameters are given in Table A.9.8.6.1-1 and Table A.9.8.6.1-2.

Table A.9.8.6.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.6 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2		OP.2 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Assistance data reference cell		Cell 2	Cell 2 is the SCell on RF channel number 2
PCell		Cell 1	Cell 1 on RF channel number 1
Neighbour cell		Cell 3	Cell 3 on RF channel number 2
E-UTRA RF Channel Number		1,2	Two TDD carrier frequencies are used.
Channel Bandwidth ($BW_{channel}$)	MHz	10	
PRS Bandwidth	RB	50	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes N_{PRS}		1	As defined in TS 36.211
Special subframe configuration		**6**	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells.
Uplink-downlink configuration		**1**	As specified in table 4.2-2 in TS 36.211 and table 8.1.2.5.2-2. The same configuration in both cells.
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000' Cell3:'11110000'	See clause 6.5.1.2 in TS 36.355 for more information
Cell ID		(Cell ID of cell 2 – Cell ID of cell 3) mod 6 = 3	PCI of cell 1 is selected randomly.
expectedRSTD	μs	Cell 3:-2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal	
DRX		OFF	
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 1 to Cell 2: -1 Cell 3 to Cell 2:1	PRS are transmitted from synchronous cells
Time alignment error between cell2 and cell1	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
Number of cells provided in OTDOA assistance data		16	The list includes the assistance-data-reference cell (received in *OTDOA-ReferenceCellInfo* [24]) and 15 other cells, all received in *OTDOA-ProvideAssistanceData* [24]. All cells provided in OTDOA assistance data are on RF channel 2.
$T_{RSTD\ IntraFreqTDD,\ E\text{-}UTRAN}$	ms	2560	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.5.2

Table A.9.8.6.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation

Parameter	Unit	Cell1	Cell2	Cell3
E-UTRA RF Channel Number		1	2	2
PRS configuration Index I_{PRS}		14	14	14
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0	0
PRS_RA	dB	-3	0	0
N_{oc} Note2	dBm/15 kHz	-98		
PRS $\hat{E}_s/N_{oc}$	dB	-6	-6	-13
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	-6	-6	-13
Io Note3	dBm/9 MHz	-70.04	-70.01	-70.01
PRP Note3	dBm/15kHz	-104	-104	-111
RSRP Note3	dBm/15kHz	-101	-104	-111
$\hat{E}_s/N_{oc}$ Note3	dB	-3	-6	-13
Propagation condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$, PRS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$, RSRP, Io and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.				

A.9.8.6.2 Test Requirements

The measurement accuracy of RSTD between Cell2 and Cell3 shall fulfill the requirements in clause 9.1.12.

A.9.8.7 E-UTRAN FDD RSTD Measurement Accuracy in Carrier Aggregation for 20MHz bandwidth

A.9.8.7.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.5.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.7.1-1 and A.9.8.7.1-2 will replace the values of corresponding parameters in Tables A.9.8.5.1-1 and A.9.8.5.1-2.

Table A.9.8.7.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 20MHz bandwidth

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.10 FDD	As specified in clause A.3.1.2.1
OCNG Patterns defined in A.3.2.1.14		OP.14 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth ($BW_{channel}$)	MHz	20	
PRS Bandwidth	RB	100	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Note 1: See Table A.9.8.5.1-1 for other general test parameters. Note 2: N/A			

Table A.9.8.7.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 20MHz bandwidth

Parameter	Unit	Cell1	Cell2	Cell3
Io Note1	dBm/18 MHz	-67.03	-67.00	-67.00
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS Note 2: See Table A.9.8.5.1-2 for other cell specific test parameters.				

A.9.8.7.2 Test Requirements

The test requirements defined in section A.9.8.5.2 shall apply to this test case.

A.9.8.8 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 20MHz bandwidth

A.9.8.8.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.6.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.8.1-1 and A.9.8.8.1-2 will replace the values of corresponding parameters in Tables A.9.8.6.1-1 and A.9.8.6.1-2.

Table A.9.8.8.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 20MHz bandwidth

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.10 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2.8		OP.8 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth ($BW_{channel}$)	MHz	20	
PRS Bandwidth	RB	100	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Note 1: See Table A.9.8.6.1-1 for other general test parameters. Note 2: N/A			

Table A.9.8.8.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 20MHz bandwidth

Parameter	Unit	Cell1	Cell2	Cell3
Io ^{Note1}	dBm/18 MHz	-67.03	-67.00	-67.00
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS Note 2: See Table A.9.8.6.1-2 for other cell specific test parameters.				

A.9.8.8.2 Test Requirements

The test requirements defined in section A.9.8.6.2 shall apply to this test case.

A.9.8.9 E-UTRAN FDD RSTD Measurement Accuracy in Carrier Aggregation for 10MHz+5MHz

A.9.8.9.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.5.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.9.1-1 and A.9.8.9.1-2 will replace the values of corresponding parameters in Tables A.9.8.5.1-1 and A.9.8.5.1-2.

Table A.9.8.9.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 10MHz+5MHz

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		Cell1: R.6 FDD Cell2: R.11 FDD Cell3: R.11 FDD	As specified in clause A.3.1.2.1
OCNG Patterns defined in A.3.2.1		Cell1: OP.6 FDD Cell2: OP.19 FDD Cell3: OP.19 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth ($BW_{channel}$)	MHz	Cell1: 10 Cell2: 5 Cell3: 5	
PRS Bandwidth	RB	Cell1: 50 Cell2: 25 Cell3: 25	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes N_{PRS}		2	As defined in TS 36.211
Note 1: See Table A.9.8.5.1-1 for other general test parameters. Note 2: N/A			

Table A.9.8.9.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 10MHz+5MHz

Parameter	Unit	Cell1	Cell2	Cell3
Io Note1	dBm/9 MHz	-70.04	N/A	N/A
	dBm/4.5 MHz	N/A	-73.02	-73.02
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS Note 2: See Table A.9.8.5.1-2 for other cell specific test parameters.				

A.9.8.9.2 Test Requirements

The test requirements defined in section A.9.8.5.2 shall apply to this test case.

A.9.8.10 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 10MHz+5MHz

A.9.8.10.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.6.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.10.1-1 and A.9.8.10.1-2 will replace the values of corresponding parameters in Tables A.9.8.6.1-1 and A.9.8.6.1-2.

Table A.9.8.10.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 10MHz+5MHz

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		Cell1: R.6 TDD Cell2: R.11 TDD Cell3: R.11 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2		Cell1: OP.2 TDD Cell2: OP.10 TDD Cell3: OP.10 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth ($BW_{channel}$)	MHz	Cell1: 10 Cell2: 5 Cell3: 5	
PRS Bandwidth	RB	Cell1: 50 Cell2: 25 Cell3: 25	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes N_{PRS}		2	As defined in TS 36.211
Note 1: See Table A.9.8.6.1-1 for other general test parameters. Note 2: N/A			

Table A.9.8.10.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 10MHz+5MHz

Parameter	Unit	Cell1	Cell2	Cell3
Io Note1	dBm/9 MHz	-70.04	N/A	N/A
	dBm/4.5 MHz	N/A	-73.02	-73.02
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS Note 2: See Table A.9.8.6.1-2 for other cell specific test parameters.				

A.9.8.10.2 Test Requirements

The test requirements defined in section A.9.8.6.2 shall apply to this test case.

A.9.8.11 E-UTRAN FDD RSTD Measurement Accuracy in Carrier Aggregation for 5 + 5MHz bandwidth

A.9.8.11.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.5.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.11.1-1 and A.9.8.11.1-2 will replace the values of corresponding parameters in Tables A.9.8.5.1-1 and A.9.8.5.1-2.

Table A.9.8.11.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 5+5MHz bandwidth

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.11 FDD	As specified in clause A.3.1.2.1
OCNG Patterns defined in A.3.2.1.19		OP.19 FDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth ($BW_{channel}$)	MHz	5	
PRS Bandwidth	RB	25	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes N_{PRS}		2	As defined in TS 36.211
Note 1: See Table A.9.8.5.1-1 for other general test parameters. Note 2: N/A			

Table A.9.8.11.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation for 5+5MHz bandwidth

Parameter	Unit	Cell1	Cell2	Cell3
Io [Note1]	dBm/4.5 MHz	-73.05	-73.02	-73.02
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS Note 2: See Table A.9.8.5.1-2 for other cell specific test parameters.				

A.9.8.11.2 Test Requirements

The test requirements defined in section A.9.8.5.2 shall apply to this test case.

A.9.8.12 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 5+5MHz bandwidth

A.9.8.12.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.6.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.12.1-1 and A.9.8.12.1-2 will replace the values of corresponding parameters in Tables A.9.8.6.1-1 and A.9.8.6.1-2.

Table A.9.8.12.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 5+5MHz bandwidth

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		R.11 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2.10		OP.10 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth ($BW_{channel}$)	MHz	5	
PRS Bandwidth	RB	25	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Number of consecutive positioning downlink subframes N_{PRS}		2	As defined in TS 36.211
Note 1: See Table A.9.8.6.1-1 for other general test parameters. Note 2: N/A			

Table A.9.8.12.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 5+5MHz bandwidth

Parameter	Unit	Cell1	Cell2	Cell3
Io Note1	dBm/4.5 MHz	-73.05	-73.02	-73.02
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS Note 2: See Table A.9.8.6.1-2 for other cell specific test parameters.				

A.9.8.12.2 Test Requirements

The test requirements defined in section A.9.8.6.2 shall apply to this test case.

A.9.8.13 E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 20MHz+10MHz

A.9.8.13.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in subclause A.9.8.6.1. The test parameters are the same except those described in the following section. The listed parameter values in Tables A.9.8.13.1-1 and A.9.8.13.1-2 will replace the values of corresponding parameters in Tables A.9.8.6.1-1 and A.9.8.6.1-2.

Table A.9.8.13.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 20MHz+10MHz

Parameter	Unit	Value	Comment
PCFICH/PDCCH/PHICH parameters		Cell1: R.10 TDD Cell2: R.6 TDD Cell3: R.6 TDD	As specified in clause A.3.1.2.2
OCNG Patterns defined in A.3.2.2		Cell1: OP.8 TDD Cell2: OP.2 TDD Cell3: OP.2 TDD	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). There is no PDSCH allocated in the subframe transmitting PRS.
Channel Bandwidth ($BW_{channel}$)	MHz	Cell1: 20 Cell2: 10 Cell3: 10	
PRS Bandwidth	RB	Cell1: 100 Cell2: 50 Cell3: 50	PRS Bandwidth bandwidth is as indicated in *prs-Bandwidth* in the OTDOA assistance data defined in [24].
Note 1: See Table A.9.8.6.1-1 for other general test parameters. Note 2: N/A			

Table A.9.8.13.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation for 20MHz+10MHz

Parameter	Unit	Cell1	Cell2	Cell3
Io Note1	dBm/ 18MHz	-67.03	N/A	N/A
	dBm/ 9MHz	N/A	-70.01	-70.01
Note 1: Io level has been derived from other parameters for information purposes. It is not settable parameter itself. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS Note 2: See Table A.9.8.6.1-2 for other cell specific test parameters.				

A.9.8.13.2 Test Requirements

The test requirements defined in section A.9.8.6.2 shall apply to this test case.

A.9.8.14 E-UTRAN FDD RSTD Measurement Accuracy in 3DL Carrier Aggregation

A.9.8.14.1 Test Purpose and Environment

The purpose of these tests is to verify that the E-UTRAN FDD RSTD measurement accuracy in carrier aggregation is within the specified limits in clause 9.1.12.

There are four synchronous cells on three different carrier frequencies in the test. Cell 1 is the PCell on primary component carrier F1 (RF channel number 1), Cell 2 is an SCell on secondary component carrier F2 (RF channel number 2), Cell 3 is an SCell and reference cell on secondary component carrier F3 (RF channel number 3), and Cell 4 is the neighbor cell on F3.

Cell 1, Cell2, Cell3, and Cell 4 are included in the OTDOA assistance data. The RSTD measurements are performed

- between Cell 4 and Cell 3 to verify the accuracy of RSTD measurement when the reference cell and neighbouring cell belong to the same secondary component carrier can meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.

- between Cell 1 and Cell 3 to verify the accuracy of RSTD measurement between the PCell and an SCell can meet the inter-frequency RSTD accuracy requirements defined in clause 9.1.10.2.

- between Cell 2 and Cell 3 to verify the accuracy of RSTD measurement between two SCells can meet the inter-frequency RSTD accuracy requirements defined in clause 9.1.10.2.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of measurement period, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data. The measurement gap is not configured in the test because of UE carrier aggregation capability.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$ is provided for the measurement period, and PRS are configured according to I_{PRS} in Table A.9.8.14.1-1 and Table A.9.8.14.1-2 for each of the three cells during this time.

The test parameters are given in Table A.9.8.14.1-1 and Table A.9.8.14.1-2.

Table A.9.8.14.1-1: General Test Parameters for RSTD Tests for E-UTRAN FDD for 3DL Carrier Aggregation

Parameter	Unit	Value	Comment
PCell		Cell 1	Cell 1 on RF channel number 1
SCell 1		Cell 2	Cell 2 is an SCell on RF channel number 2
SCell 2 (Assistance data reference cell)		Cell 3	Cell 3 is an SCell on RF channel number 3
Neighbour cell		Cell 4	Cell 4 on RF channel number 3
PRS configuration index I_{PRS}		171 for all cells on PCC 181 for all cells on SCC1 191 for all cells on SCC2	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\text{PRS}} - 160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000' Cell3:'11110000' Cell4:'11110000'	See clause 6.5.1.2 in TS 36.355 for more information
prs-SubframeOffset		Cells on PCC: 300 Cells on SCC1: 310 Cells on SCC2, except reference cell: 0	Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC1: 0 Cells on SCC2, except reference cell: 0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
Cell ID		(Cell ID of cell 4 – Cell ID of cell 3) mod 6 = 3	PCIs of cell 1 and cell 2 are selected randomly.
expectedRSTD	μs	Cell 1: -2 Cell 2: 0 Cell 4: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal	
DRX		OFF	
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 1 to Cell 2: 1 Cell 3 to Cell 2: -1 Cell 4 to Cell 2: 3	PRS are transmitted from synchronous cells
Time alignment errors between Cell 1, Cell 2, and Cell 3	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.

Number of cells provided in OTDOA assistance data		16	The list includes the assistance-data-reference cell (received in *OTDOA-ReferenceCellInfo* [24]) and 15 other cells, all received in *OTDOA-ProvideAssistanceData* [24]. Cell 1 and Cell 2 appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 4 always appears at random places in the second half of the list.
$T_{\text{RSTD InterFreqFDD, E-UTRAN}}$	ms	4960	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.6.1

Table A.9.8.14.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN FDD for Carrier Aggregation

Parameter	Unit	Cell1	Cell2	Cell3	Cell 4
E-UTRA RF Channel Number		1	2	3	3
Channel Bandwidth ($BW_{channel}$)	MHz	5,10,20	5,10,20	5,10,20	5,10,20
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.1		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD
OCNG Patterns defined in A.3.2.1		5MHz: OP.18 FDD 10MHz: OP.5 FDD 20MHz: OP.13 FDD	5MHz: OP.18 FDD 10MHz: OP.5 FDD 20MHz: OP.13 FDD	5MHz: OP.18 FDD 10MHz: OP.5 FDD 20MHz: OP.13 FDD	5MHz: OP.18 FDD 10MHz: OP.5 FDD 20MHz: OP.13 FDD
PRS Transmission Bandwidth (PRS transmission bandwidth depends on selected channel bandwidth. PRS are transmitted over the system bandwidth)	RB	5MHz: 25 10MHz: 50 20MHz:100	5MHz: 25 10MHz: 50 20MHz:100	5MHz: 25 10MHz: 50 20MHz:100	5MHz: 25 10MHz: 50 20MHz:100
Number of consecutive downlink positioning subframes N_{PRS}. N_{PRS} also depends on selected channel bandwidth. As defined in TS 36.211 [16]. The number of subframes in a positioning occasion		5MHz: 2 10MHz: 1 20MHz:1	5MHz: 2 10MHz: 1 20MHz:1	5MHz: 2 10MHz: 1 20MHz:1	5MHz: 2 10MHz: 1 20MHz:1
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0	0	0
PRS_RA	dB	-3	0	0	0
N_{oc} Note2	dBm/15 kHz	-98			
PRS $\hat{E}_s/N_{oc}$	dB	-6	-6	-6	-13
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	-6	-6	-6	-13
Io Note3	dBm/9 MHz	-70.04 +10log ($N_{RB,c}$ /50)	-70.01 +10log ($N_{RB,c}$ /50)	-70.01 +10log ($N_{RB,c}$ /50)	-70.01 +10log ($N_{RB,c}$ /50)
PRP Note3	dBm/15kHz	-104	-104	-104	-111
RSRP Note3	dBm/15kHz	-101	-104	-104	-111
$\hat{E}_s/N_{oc}$ Note3	dB	-3	-6	-6	-13
Propagation condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes).

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$, PRS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$, RSRP, Io and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.

A.9.8.14.2 Test Requirements

The measurement accuracy of RSTD between Cell1 and Cell3 shall fulfill the requirements in clause 9.1.12.2

The measurement accuracy of RSTD between Cell2 and Cell3 shall fulfill the requirements in clause 9.1.12.2

The measurement accuracy of RSTD between Cell4 and Cell3 shall fulfill the requirements in clause 9.1.12.1.

A.9.8.15 E-UTRAN TDD RSTD Measurement Accuracy in 3DL Carrier Aggregation

A.9.8.15.1 Test Purpose and Environment

The purpose of these tests is to verify that the E-UTRAN TDD RSTD measurement accuracy in carrier aggregation is within the specified limits in clause 9.1.12.

There are four synchronous cells on three different carrier frequencies in the test. Cell 1 is the PCell on primary component carrier F1 (RF channel number 1), Cell 2 is an SCell on secondary component carrier F2 (RF channel number 2), Cell 3 is an SCell and reference cell on secondary component carrier F3 (RF channel number 3), and Cell 4 is the neighbor cell on F3.

Cell 1, Cell2, Cell3, and Cell 4 are included in the OTDOA assistance data. The RSTD measurements are performed

- between Cell 4 and Cell 3 to verify the accuracy of RSTD measurement when the reference cell and neighbouring cell belong to the same secondary component carrier can meet the intra-frequency RSTD accuracy requirements defined in clause 9.1.10.1.
- between Cell 1 and Cell 3 to verify the accuracy of RSTD measurement between the PCell and an SCell can meet the inter-frequency RSTD accuracy requirements defined in clause 9.1.10.2.
- between Cell 2 and Cell 3 to verify the accuracy of RSTD measurement between two SCells can meet the inter-frequency RSTD accuracy requirements defined in clause 9.1.10.2.

The OTDOA assistance data as defined in TS 36.355, Clause 6.5.1.1, shall be provided to the UE before the measurement period. The last TTI containing the OTDOA assistance data shall be provided to the UE ΔT ms before the start of measurement period, where ΔT = 150 ms is the maximum processing time of the OTDOA assistance data. The measurement gap is not configured in the test because of UE carrier aggregation capability.

There is no PDSCH allocated in the subframe transmitting PRS. A time span of $\mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN}}$ is provided for the measurement period, and PRS are configured according to I_{PRS} in Table A.9.8.15.1-1 and Table A.9.8.15.1-2 for each of the three cells during this time.

The test parameters are given in Table A.9.8.15.1-1 and Table A.9.8.15.1-2.

Table A.9.8.15.1-1: General Test Parameters for RSTD Tests for E-UTRAN TDD for 3DL Carrier Aggregation

Parameter	Unit	Value	Comment
PCell		Cell 1	Cell 1 on RF channel number 1
SCell 1		Cell 2	Cell 2 is an SCell on RF channel number 2
SCell 2 (Assistance data reference cell)		Cell 3	Cell 3 is an SCell on RF channel number 3
Neighbour cell		Cell 4	Cell 4 on RF channel number 3
E-UTRA RF Channel Number		1,2,3	Three TDD carrier frequencies are used.
PRS configuration index I_{PRS}		171 for all cells on PCC 181 for all cells on SCC1 191 for all cells on SCC2	This corresponds to periodicity of 320 ms and PRS subframe offset of $I_{\mathrm{PRS}} - 160$ DL subframes, as defined in TS 36.211 [16], Table 6.10.4.3-1
prs-MutingInfo		Cell1:'11110000' Cell2:'11110000' Cell3:'11110000' Cell4:'11110000'	See clause 6.5.1.2 in TS 36.355 for more information
prs-SubframeOffset		Cells on PCC: 300 Cells on SCC1: 310 Cells on SCC2, except reference cell: 0	Subframe offset, counted in full subframes. The corresponding parameter in the OTDOA assistance data is prs-SubframeOffset specified in TS 36.355 [24]
slotNumberOffset		Cells on PCC: 0 Cells on SCC1: 0 Cells on SCC2, except reference cell: 0	The slot number offset at the transmitter between a neighbour cell and the assistance data reference cell. The corresponding parameter in the OTDOA assistance data is slotNumberOffset specified in TS 36.355 [24].
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells.
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211 and table 8.1.2.5.2-2. The same configuration in both cells.
Cell ID		(Cell ID of cell 4 – Cell ID of cell 3) mod 6 = 3	PCIs of cell 1 and cell 2 are selected randomly.
expectedRSTD	μs	Cell 1: -2 Cell 2: 0 Cell 4: 2 Other neighbour cells: randomly between -3 and 3	The expected RSTD is what is expected at the receiver. The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD indicator
expectedRSTDUncertainty for all neighbour cells	μs	5	The corresponding parameter in the OTDOA assistance data specified in TS 36.355 [24] is the expectedRSTD-Uncertainty index
CP length		Normal	
DRX		OFF	
Radio frame receive time offset between the cells at the UE antenna connector	μs	Cell 1 to Cell 2: 1 Cell 3 to Cell 2: -1 Cell 4 to Cell 2: 3	PRS are transmitted from synchronous cells
Time alignment errors between Cell 1, Cell 2, and Cell 3	μs	≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.

Number of cells provided in OTDOA assistance data		16	The list includes the assistance-data-reference cell (received in *OTDOA-ReferenceCellInfo* [24]) and 15 other cells, all received in *OTDOA-ProvideAssistanceData* [24]. Cell 1 and Cell 2 appears at random places in the first half of the neighbour cell list in the OTDOA assistance data. Cell 4 always appears at random places in the second half of the list.
$T_{RSTD\ InterFreqTDD,\ E\text{-}UTRAN}$	ms	4960	Derived according to the RSTD measurement requirements specified in Clause 8.1.2.6.3

Table A.9.8.15.1-2: Cell Specific Test Parameters for RSTD Tests for E-UTRAN TDD for Carrier Aggregation

Parameter	Unit	Cell1	Cell2	Cell3	Cell 4
E-UTRA RF Channel Number		1	2	3	3
Channel Bandwidth ($BW_{channel}$)	MHz	5,10,20	5,10,20	5,10,20	5,10,20
PCFICH/PDCCH/PHICH parameters as specified in clause A.3.1.2.2		5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD	5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD	5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD	5MHz: R11 TDD 10MHz: R6 TDD 20MHz: R10 TDD
OCNG Patterns defined in A.3.2.2 (There is no PDSCH allocated in the subframe transmitting PRS)		5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD	5MHz: OP.10 TDD 10MHz: OP.2 TDD 20MHz: OP.8 TDD
PRS Transmission Bandwidth (PRS transmission bandwidth depends on selected channel bandwidth. PRS are transmitted over the system bandwidth)	RB	5MHz: 25 10MHz: 50 20MHz:100	5MHz: 25 10MHz: 50 20MHz:100	5MHz: 25 10MHz: 50 20MHz:100	5MHz: 25 10MHz: 50 20MHz:100
Number of consecutive downlink positioning subframes N_{PRS}. N_{PRS} also depends on selected channel bandwidth. As defined in TS 36.211 [16]. The number of subframes in a positioning occasion		5MHz: 2 10MHz: 1 20MHz:1	5MHz: 2 10MHz: 1 20MHz:1	5MHz: 2 10MHz: 1 20MHz:1	5MHz: 2 10MHz: 1 20MHz:1
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB OCNG_RA Note1 OCNG_RB Note1	dB	0	0	0	0
PRS_RA	dB	-3	0	0	0
N_{oc} Note2	dBm/15 kHz	-98			
PRS $\hat{E}_s/N_{oc}$	dB	-6	-6	-6	-13
PRS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	-6	-6	-6	-13
Io Note3	dBm/9 MHz	-70.04 +10log ($N_{RB,c}$ /50)	-70.01 +10log ($N_{RB,c}$ /50)	-70.01 +10log ($N_{RB,c}$ /50)	-70.01 +10log ($N_{RB,c}$ /50)
PRP Note3	dBm/15kHz	-104	-104	-104	-111
RSRP Note3	dBm/15kHz	-101	-104	-104	-111
$\hat{E}_s/N_{oc}$ Note3	dB	-3	-6	-6	-13
Propagation condition		AWGN			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols (other than those in the PRS subframes). Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: $\hat{\mathrm{E}}_{\mathrm{s}}/N_{oc}$, PRS $\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$, RSRP, Io and PRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io values are derived in the case that there is no PBCH, PSS or SSS in the OFDM symbols carrying PRS.					

A.9.8.15.2 Test Requirements

The measurement accuracy of RSTD between Cell1 and Cell3 shall fulfill the requirements in clause 9.1.12.2

The measurement accuracy of RSTD between Cell2 and Cell3 shall fulfill the requirements in clause 9.1.12.2

The measurement accuracy of RSTD between Cell4 and Cell3 shall fulfill the requirements in clause 9.1.12.1.

A.9.9 RSRP and RSRQ on the serving cell

A.9.9.1 FDD Intra frequency serving cell case

A.9.9.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP/ RSRQ absolute measurement accuracy is within the specified limits. This test will verify the requirements in Clause 9.1.2.1 and 9.1. 5.1 for FDD intra frequency measurements.

A.9.9.1.2 Test parameters

In this set of test case there is only the serving cell. Absolute accuracy of RSRP/ RSRQ intra frequency measurements for the serving cell is tested by using the parameters in Table A.9.9.1.2-1. In the test case, Cell 1 is the serving cell.

Table A.9.9.1.2-1: RSRP FDD Intra frequency test parameters

Parameter		Unit	Test Cell 1
E-UTRA RF Channel Number			1
$BW_{channel}$		MHz	10
Measurement bandwidth		n_{PRB}	22—27
PDSCH Reference measurement channel defined in A.3.1.1.1			R.0 FDD
PDSCH allocation		n_{PRB}	13—36
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.6 FDD
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)			OP.1 FDD
PBCH_RA		dB	0
PBCH_RB			
PSS_RA			
SSS_RA			
PCFICH_RB			
PHICH_RA			
PHICH_RB			
PDCCH_RA			
PDCCH_RB			
PDSCH_RA			
PDSCH_RB			
OCNG_RA Note1			
OCNG_RB Note1			
N_{oc} Note2	Bands FDD_A	dBm/15 kHz	-122
	Bands FDD_B		-121.5
	Bands FDD_C		-121
	Bands FDD_D		-120.5
	Bands FDD_E, FDD_F Note 5		-120
	Bands FDD_G Note 7		-119
	Bands FDD_H		-118.5
$\hat{E}_s/I_{ot}$		dB	-4
RSRP Note3	Bands FDD_A	dBm/15 kHz	-126
	Bands FDD_B		-125.5
	Bands FDD_C		-125
	Bands FDD_D		-124.5
	Bands FDD_E, FDD_F Note 5		-124
	Bands FDD_G Note 7		-123
	Bands FDD_H		-122.5
RSRQ Note3	Bands FDD_A	dB	-16.25
	Bands FDD_B		
	Bands FDD_C		
	Bands FDD_D		
	Bands FDD_E, FDD_F Note 5		
	Bands FDD_G Note 7		
	Bands FDD_H		
Io Note3	Bands FDD_A	dBm/9 MHz	-92.76
	Bands FDD_B		-92.26
	Bands FDD_C		-91.76
	Bands FDD_D		-91.26
	Bands FDD_E, FDD_F Note 5		-90.76

	Bands FDD_G [Note 7]		-89.76
	Bands FDD_H		-89.26
$\hat{E}_s/N_{oc}$		dB	-4
Propagation condition		-	AWGN
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. Note 5: For Band 26, the tests shall be performed with the carrier frequency of the assigned E-UTRA channel bandwidth within 865-894 MHz. Note 6: E-UTRA operating band groups are as defined in Section 3.5. Note 7: Except Band 29 and Band 32.			

A.9.9.1.3 Test Requirements

The absolute RSRP and RSRQ measurement accuracy shall fulfil the requirements in clause 9.1.2.1 and 9.1.5.1 respectively.

A.9.9.2 TDD Intra frequency serving cell case

A.9.9.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSRP/ RSRQ absolute measurement accuracy is within the specified limits. This test will verify the requirements in Section 9.1.2.1 and 9.1.5.1 for TDD intra frequency measurements.

A.9.9.2.2 Test parameters

In this set of test case there is only the serving cell. Absolute accuracy of RSRP/ RSRQ intra frequency measurements for the serving cell is tested by using the parameters in Table A.9.9.2.2-1. In the test case, Cell 1 is the serving cell.

Table A.9.9.2.2-1: RSRP TDD Intra frequency test parameters

Parameter		Unit	Test
			Cell 1
E-UTRA RF Channel Number			1
$BW_{channel}$		MHz	10
Special subframe configuration[Note1]			6
Uplink/downlink configuration[Note1]			1
Measurement bandwidth		n_{PRB}	22—27
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD
PDSCH allocation		n_{PRB}	13—36
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD)			OP.1 TDD
PBCH_RA		dB	0
PBCH_RB			
PSS_RA			
SSS_RA			
PCFICH_RB			
PHICH_RA			
PHICH_RB			
PDCCH_RA			
PDCCH_RB			
PDSCH_RA			
PDSCH_RB			
OCNG_RA[Note2]			
OCNG_RB[Note2]			
N_{oc} [Note3]	Bands TDD_A	dBm/15 kHz	-122
	Bands TDD_C		-121
	Bands TDD_E		-120
$\hat{E}_s/I_{ot}$		dB	-4
RSRP[Note4]	Bands TDD_A	dBm/15 kHz	-126
	Bands TDD_C		-125
	Bands TDD_E		-124
RSRQ[Note4]	Bands TDD_A	dB	-16.25
	Bands TDD_C		
	Bands TDD_E		
Io[Note4]	Bands TDD_A	dBm/9 MHz	-92.76
	Bands TDD_C		-91.76
	Bands TDD_E		-90.76
$\hat{E}_s/N_{oc}$		dB	-4
Propagation condition		-	AWGN

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.
Note 2: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 6: E-UTRA operating band groups are as defined in Section 3.5.

A.9.9.2.3 Test Requirements

The absolute RSRP and RSRQ measurement accuracy shall fulfil the requirements in section 9.1.2.1 and 9.1.5.1 respectively.

A.10 Proximity-based Services in Any Cell Selection State

A.10.1 E-UTRAN FDD – UE ProSe Direct Communication Transmission Timing Accuracy Test

A.10.1.1 Test Purpose and Environment

The purpose of this test is to verify the timing requirements for ProSe Direct Communication transmissions in Any Cell Selection state defined in clause 11.2.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A.10.1.1-1 below. There is no serving cell and one active SyncRef UE in this test. The test system shall emulate the SyncRef UE to transmit SLSS and MIB-SL every synchronization period.

The test system will configure the ProSe UE to transmit SLSS in each period (40ms) by configuring *syncTxThreshOoC* as +infinity in the pre-configured parameters. The ProSe UE is expected to synchronize to the SyncRef UE and transmit its own SLSS and SL-MIB in accordance to the procedure specified in clause 5.10.7.3 of TS 36.331.

The transmit timing is verified using the transmission timing of SLSS transmissions.

Table A.10.1.1-1: Test parameters for ProSe Transmission Timig Accuracy test for E-UTRAN FDD

Parameter		Unit	Value	Comment
E-UTRA RF Channel Number			1	
Channel Bandwidth ($BW_{channel}$)		MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell			None	
Active SyncRef UE			SyncRef UE 1	Transmitting SLSS+MIB-SL on uplink of RF channel number 1
ProSe Direct Communication preconfiguration			As specified in Table A.3.12.5-2 (Configuration #2)	IE values unless specified otherwise in this test.
syncTxThreshOoC			11 (+infinity)	
N_{oc}		dBm/15 kHz	-98	
SyncRef UE 1	syncCP-Len		Normal	
	syncOffsetIndicator		Set same as *syncOffsetIndicator1* in ProSe Direct Communication preconfiguration	
	slssid		30	
	inCoverage		TRUE	In MIB-SL
	networkControlledSyncTx		ON	
	ProSe Direct Communication resource pool configuration		As specified in Table A.3.12.5-1 (Configuration #1)	IE values unless specified otherwise in this test; Note resource pool is same as Configuration #2 used by ProSe UE.
	$\hat{E}_s/N_{oc}$		3	
	S-RSRP Note1, Note 2		-95	
Propagation condition			AWGN	
Note 1: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 2: SSSS Es/Iot is set the same as PSSS/PSBCH Es/Iot.				

A.10.1.2 Test Requirements

For parameters specified in Tables A.10.1.1-1, the timing accuracy for ProSe Direct Communication transmissions shall be within the limits defined in clause 11.2.2. The timing accuracy is verified using SLSS transmissions.

Prior to start of test, test system is required to ensure that the ProSe UE is synchornized to the SyncRef UE 1 and is transmitting SLSS + MIB-SL as derived from the SLSS + MIB-SL of SyncRef UE 1 as per clause 5.10.7.3 of TS 36.331. For the test configuration, the SLSSID used by the ProSe UE shall be 30 with *inCoverage* IE in MIB-SL set as FALSE.

The following sequence of events shall be used to verify that the requirements are met.

For 5MHz or 10MHz channel bandwith, the test sequence shall be carried out in Any Cell Selection state.

a) After the ProSe UE is synchronized to SyncRef UE 1, the test system shall verify that the ProSe UE SLSS transmission timing offset is within ± $24\times T_S$ with respect to the first detected path (in time) of the corresponding frame of SyncRef UE 1.

b) The test system adjusts the transmit timing of SyncRef UE 1 by $+24\times T_S$ compared to that in (a). The test system shall wait for at least one SLSS period (40ms) before verifying the requirement again in (c).

c) The test system shall verify that the UE SLSS transmissiontiming offset stays within ± $24\times T_S$ with respect to the first detected path (in time) of the corresponding frame of SyncRef UE 1.

A.10.2 E-UTRAN FDD – Initiation/Cease of SLSS Transmission with ProSe Direct Communication

A.10.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to the evaluation time allowed to initiate and cease SLSS transmissions in Any Cell Selection state defined in clause 11.3.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A. X.2.1-1 and Table A.10.2.1-2 below. There are no active cells in this test. There is one active SyncRef UE (SyncRef UE 1) in this test. The test system shall emulate SyncRef UE 1 to transmit SLSS and MIB-SL every synchronization period.

Prior to start of test, test system is required to ensure that the ProSe UE is synchornized to the SyncRef UE 1 and is transmitting SLSS + MIB-SL as derived from the SLSS + MIB-SL of SyncRef UE 1 as per clause 5.10.7.3 of TS 36.331. For the test configuration, the SLSSID used by the ProSe UE shall be 30 with *inCoverage* IE in MIB-SL set as FALSE.

The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, the S-RSRP of SyncRef UE 1 is above *syncTxThreshOOC* and the UE is not expected to be transmitting SLSS. During T2, the S-RSRP of SyncRef UE 1 is lowered below *syncTxThreshOOC* and the UE is expected to initiate SLSS transmissions. During T3, the S-RSRP of SyncRef UE 1 is increased back to be above *syncTxThreshOOC* and the UE is expected to cease SLSS transmissions.

Table A.10.2.1-1: Test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	Value	Comment
E-UTRA RF Channel Number		1	
Channel Bandwidth ($BW_{channel}$)	MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell		None	
Active SyncRef UE		SyncRef UE 1	Transmitting SLSS+MIB-SL on uplink of RF channel number 1
ProSe Direct Communication preconfiguration		As specified in Table A.3.12.5-2 (Configuration #2)	IE values unless specified otherwise in this test.
syncTxThreshOoC	dBm/15 kHz	-95	
T1	s	3	
T2	s	5.24	
T3	s	5.24	

Table A.10.2.1-2: SyncRef UE specific test parameters for initiation/cease of SLSS transmissions test for E-UTRAN FDD

Parameter	Unit	SyncRef UE 1		
		T1	T2	T3
E-UTRA RF Channel Number		1		
$BW_{channel}$ Note 4	MHz	5 or 10		
ProSe Direct Communication resource pool configuration		As specified in Table A.3.12.5-1 (Configuration #1) Note resource pool is same as Configuration #2 used by ProSe UE.		
syncOffsetIndicator		Set same as *syncOffsetIndicator1* in ProSe Direct Communication preconfiguration		
slssid		30		
inCoverage		TRUE		
networkControlledSyncTx		ON		

N_{oc} Note1	dBm/15 kHz	-96		
$\hat{E}_s/N_{oc}$	dB	5.5	-3.5	5.5
S-RSRP Note2, Note3	dBm/15 kHz	-90.5	-99.5	-90.5
Propagation Condition		AWGN		
Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 2: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 3: SSSS Es/Iot is set the same as PSSS/PSBCH Es/Iot. Note 4: This test is according to the principle defined in section A.3.12.3.				

A.10.2.2 Test Requirements

The SLSS transmission initiation delay is defined as the time from the beginning of time period T2 up to the moment when the UE initiates the SLSS transmission.

The SLSS transmission initiation delay shall be less than 0.84 s.

The SLSS transmission cease delay is defined as the time from the beginning of time period T3 up to the moment when the UE ceases the SLSS transmission.

The SLSS transmission cease delay shall be less than 0.84 s.

The rate of correct initiation/cease delay of SLSS transmissions observed during repeated tests shall be at least 90%.

NOTE: The initiation/cease delay of SLSS transmissions can be expressed as: $T_{evaluate,SLSS}$ + SLSS period,

Where:

$T_{evaluate,SLSS}$ is the evaluation time for initiate/cease of SLSS, and is 0.8 sec (clause 11.3.2) for the parameters in this test;

SLSS period is set as 40ms in this test.

A.10.3 E-UTRAN FDD – SyncRef UE Selection / Reselection Test

A.10.3.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to SyncRef UE selection / reselection in Any Cell Selection state defined in clause 11.5.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A. X.3.1-1 and Table A.10.3.1-2 below. There are no active cells in this test. There are two active SyncRef UEs (SyncRef UE 1 and SyncRef UE 2) in this test. The test system shall emulate SyncRef UE 1 and SyncRef UE 2 to transmit SLSS and MIB-SL every SLSS period (40ms).

The test system can verify the selection / reselection of SyncRef UE by monitoring the SLSS ID used by the ProSe UE for its SLSS+MIB-SL transmissions. When the ProSe UE is not synchronized to any SyncRef UE, then the ProSe UE shall use the SLSS ID pre-configured in the ProSe UE. When the ProSe UE is synchronized to a SyncRef UE, the ProSe UE shall derive its SLSS ID from the SLSS ID of the SyncRef UE as per clause 5.10.7.3 of TS 36.331.

The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, both SyncRef UE 1 and SyncRef UE 2 are powered off and the ProSe UE is expected to transmit SLSS as an independent synchronization source. During T1, SyncRef UE 1 is powered ON and the ProSe UE will select SyncRef UE 1 as the synchronization source. During T2, a higher priority SyncRef UE 2 is additionally powered ON and the ProSe UE will reselect to the higher priority SyncRef UE 2 as the synchronization source.

Table A.10.3.1-1: Test parameters for SyncRef UE selection/reselection test for E-UTRAN FDD

Parameter		Unit	Value	Comment
Initial condition	Active synchronization source		Independent synchronization source	UE transmits for ProSe Direct Communication and SLSS+MIB-SL with some random SLSS ID and in-coverage set as FALSE in MIB-SL.
T2 end condition	Active synchronization source		Sync Ref UE 1	UE transmits for ProSe Direct Communication and SLSS+MIB-SL with SLSS ID = 168+59 and in-coverage set as FALSE in MIB-SL.
Final condition	Active synchronization source		Sync Ref UE 2	UE transmits for ProSe Direct Communication and SLSS+MIB-SL with SLSS ID = 30 and in-coverage set as FALSE in MIB-SL.
E-UTRA RF Channel Number			1	
Channel Bandwidth ($BW_{channel}$)		MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell			None	
Active SyncRef UEs			SyncRef UE 1 SyncRef UE 2	Transmitting SLSS+MIB-SL on uplink of RF channel number 1
Timing offset between SyncRef UE 1 and SyncRef UE 2		ms	3	Asynchronous
Frequency offset of SyncRef UE 1		ppm	0	
Frequency offset of SyncRef UE 2		ppm	5	
ProSe Direct Communication preconfiguration			As specified in Table A.3.12.5-2 (Configuration #2)	IE values unless specified otherwise in this test.
syncTxThreshOoC			11 (+infinity)	
T1		s	24	
T2		s	24	
T3		s	24	

Table A.10.3.1-2: SyncRef UE specific test parameters for SyncRef UE selection/reselection test for E-UTRAN FDD

Parameter	Unit	SyncRef UE 1			SyncRef UE 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1					
$BW_{channel}$ Note 4	MHz	5 or 10					
ProSe Direct Communication resource pool configuration		As specified in Table A.3.12.5-2 (Configuration #2)			As specified in Table A.3.12.5-1 (Configuration #1)		
networkControlledSyncTx		N/A			ON		
syncTxThreshOoC	dBm/15 kHz	+infinity			N/A		
slssid		59			30		
inCoverage (in MIB-SL)		FALSE			TRUE		
syncOffsetIndicator		syncOffsetIndicator2			syncOffsetIndicator1		
N_{oc} Note1	dBm/15 kHz	-98					
$\hat{E}_s / N_{oc}$	dB	-infinity	16	16	-infinity	-infinity	13
$\hat{E}_s / I_{ot}$	dB	-infinity	16	2.79	-infinity	-infinity	-3.11
S-RSRP Note2, Note 3	dBm/15 kHz	-infinity	-82	-82	-infinity	-infinity	-85
Propagation Condition		AWGN					

Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 2: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 3: SSSS Es/Iot is set the same as PSSS/PSBCH Es/Iot.
Note 4: This test is according to the principle defined in section A.3.12.3.

A.10.3.2 Test Requirements

SyncRef UE selection delay is defined as the time from the beginning of T2 to the time UE is synchronized to SyncRef UE 1 and changes its SLSS transmissions timing and SLSS ID to follow SyncRef UE 1 as the synchronization source. For the test configuration, the SLSS ID will be changed to 168+59 (with in-coverage IE in MIB-SL set to FALSE) after SyncRef UE selection delay from start of T2.

The SyncRef UE selection delay shall be less than 20.84sec.

SyncRef UE reselection delay is defined as the time from the beginning of T3 to the time UE changes its synchronization source from SyncRef UE 1 to SyncRef UE 2, and changes its SLSS transmissions timing and SLSS ID to follow SyncRef UE 2 as the synchronization source. For the test configuration, the SLSS ID will be changed o 30 (with in-coverage IE in MIB-SL set to FALSE) after SyncRef UE selection delay from start of T3.

The SyncRef UE reselection delay shall be less than 20.84sec.

The rate of correct SyncRef UE selection / reselection observed during repeated tests shall be at least 90%.

The test system will verify that the ProSe UE does not drop or delay more than 2% of its SLSS transmissions during the duration of T1, T2, and T3.

The SyncRef UE selection/reselection delay can be expressed as:

SyncRef UE selection/reselection delay = $T_{detect,SyncRef\ UE}$ + $T_{evaluate,SLSS}$ + SLSS period

Where

- $T_{detect,SyncRef\ UE}$ = 20sec (as specified in sub-clause 11.5.2.2)
- $T_{evaluate,SLSS}$ = 0.8 (as specified in sub-clause 11.3.2)
- SLSS period = 40ms

This gives a total of 20.84 seconds.

A.10.4 E-UTRAN FDD – Cell Identification on downlink frequency associated with ProSe frequency (when UE is transmitting for ProSe)

A.10.4.1 Test Purpose and Environment

The purpose of this test is to verify cell identification delay requirement for a newly detectable cell on the downink frequency associated with the pre-configured ProSe carrier frequency in Any Cell Selection state. This test will verify the requirements in clause 11.4 when the UE is transmitting for ProSe.

For this test, the UE is triggered by the test loop function or the upper layers to transmit for ProSe Direct Communication.

The test parameters are given in Table A. 10.4.1-1, Table A. 10.4.1-2, and Table A.10.4.1-3 below. There is one active cell (Cell 1) and active SyncRef UE (SyncRef UE 1) in this test. The test system shall emulate SyncRef UE 1 to transmit SLSS and MIB-SL every SLSS period (40ms).

The test consists of two successive time periods, with time duration of T1 and T2 respectively. During T1, the cell is powered OFF and the ProSe UE is synchronized to SyncRef UE 1. During T2, the cell is powered ON and the ProSe UE will detect the cell and attempt to camp on the cell.

Prior to start of test, test system is required to ensure that the ProSe UE is synchornized to the SyncRef UE 1 and is transmitting SLSS + MIB-SL as derived from the SLSS + MIB-SL of SyncRef UE 1 as per clause 5.10.7.3 of TS 36.331. For the test configuration, the SLSSID used by the ProSe UE shall be 30 with *inCoverage* IE in MIB-SL set as FALSE.

Table A.10.4.1-1: Test parameters for cell identification test on on downlink frequency associated with ProSe frequency for E-UTRAN FDD (when UE is transmitting for ProSe)

Parameter		Unit	Value	Comment
Initial condition	Active synchronization source		Sync Ref UE 1	
Final condition	Active synchronization source		Cell1	
E-UTRA RF Channel Number			1	
Channel Bandwidth ($BW_{channel}$)		MHz	5 or 10	According to principle defined in clause A.3.12.3
Active cell			Cell1	
Active SyncRef UEs			SyncRef UE 1	Transmitting SLSS+MIB-SL on uplink of RF channel number 1
ProSe Direct Communication preconfiguration			As specified in Table A.3.12.5-2 (Configuration #2)	IE values unless specified otherwise in this test.
syncTxThreshOoC			11 (+infinity)	
T1		s	2	
T2		s	30	

Table A.10.4.1-2: Cell specific test parameters for cell identification test on on downlink frequency associated with ProSe frequency for E-UTRAN FDD (when UE is transmitting for ProSe)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$ Note 4	MHz	5 or 10	
OCNG Patterns defined in A.3.2.1.2 Note 4		5 MHz: OP.16 FDD 10 MHz: OP.2 FDD	
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0	
N_{oc} Note2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	-infinity	-3
RSRP Note3	dBm/15 kHz	-infinity	-101
SCH_RP Note3	dBm/15 kHz	-infinity	-101
Propagation Condition		AWGN	

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: This test is according to the principle defined in section A.3.12.3.

Table A.10.4.1-3: SyncRef UE specific test parameters for cell identification test on on downlink frequency associated with ProSe frequency for E-UTRAN FDD

Parameter	Unit	SyncRef UE 1	
		T1	T2
E-UTRA RF Channel Number		1 (Uplink)	
$BW_{channel}$ Note 4	MHz	5 or 10	
ProSe Direct Communication resource pool configuration		As specified in Table A.3.12.5-1 (Configuration #1)	
networkControlledSyncTx		ON	
slssid		30	
inCoverage (in MIB-SL)		TRUE	
syncOffsetIndicator		syncOffsetIndicator1	
N_{oc} Note1	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	13	
S-RSRP Note2, Note3	dBm/15 kHz	-85	
Propagation Condition		AWGN	
Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 2: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Note 3: SSSS Es/Iot is set the same as PSSS/PSBCH Es/Iot. Note 4: This test is according to the principle defined in section A.3.12.3.			

A.10.4.2 Test Requirements

The cell selection delay to a newly detectable cell on the downlink associated with the preconfigured ProSe carrier is defined as the time from the beginning of T2 to the time UE camps on the cell and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST.

The cell selection delay to a newly detectable cell on the downlink associated with the preconfigured ProSe carrier shall be less than 7.68 s.

The cell selection delay can be expressed as $T_{basic\_identify\_OoC\_ProSe\ Tx\_ON} + T_{SI}$, where

- $T_{basic\_identify\_OoC\_ProSe\ Tx\_ON}$ = 6.4sec as specified in sub-clause 11.4.2.2
- T_{SI} = Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case

This gives a total of 7.68 sec.

Annex B (normative): Conditions for RRM requirements applicability for operating bands

B.1 Conditions for E-UTRAN RRC_IDLE state mobility

B.1.1 Conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection

This clause defines the E-UTRAN intra-frequency RSRP, RSRP Ês/Iot, SCH_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection are defined in Table B.1.1-1.

Table B.1.1-1: Conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection

Parameter	E-UTRA operating band groups Note 3	Minimum RSRP Note 1	Minimum SCH_RP Note 1	RSRP Ês/Iot	SCH Ês/Iot
		dBm/15kHz	dBm/15kHz	dB	dB
Conditions	FDD_A, TDD_A	-124	-124	≥ -4	≥ -4
	FDD_B	-123.5	-123.5		
	FDD_C, TDD_C	-123	-123		
	FDD_D	-122.5	-122.5		
	FDD_E, TDD_E	-122	-122		
	FDD_F	-121.5 Note 2	-121.5 Note 2		
	FDD_G	-121	-121		
	FDD_H	-120.5	-120.5		
	FDD_N	-117.5	-117.5		
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Section B.4.2. NOTE 2: The condition is -122 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.					

B.1.2 Conditions for measurements of inter-frequency E-UTRAN cells for cell re-selection

This clause defines the E-UTRAN inter-frequency RSRP, RSRP Ês/Iot, SCH_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection defined in Table B.1.1-1 also apply for inter-frequency E-UTRAN cells in this section.

B.1.3 Conditions for measurements of intra-frequency E-UTRAN cells for cell re-selection for UE Category M1

This clause defines the E-UTRAN intra-frequency RSRP, RSRP Ês/Iot, SCH_RP and SCH Ês/Iot applicable for a corresponding operating band. The UE category M1 applicability of the conditions in Appendix B.1.3 is defined in Section 3.1.

The conditions for CE mode A measurements of FDD and TDD intra-frequency E-UTRAN cells for cell re-selection are defined in Table B.1.3-1 and for E-UTRAN HD-FDD are defined are defined in Table B.1.3-2.

The conditions for CE mode B measurements of FDD and TDD intra-frequency E-UTRAN cells for cell re-selection are defined in Table B.1.3-3 and for E-UTRAN HD-FDD are defined are defined in Table B.1.3-4.

Table B.1.3-1: E-UTRAN intra-frequency measurements for FDD and TDD for CE mode A

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-124	≥ -4
	FDD_D	-122.5	
	FDD_E, TDD_E	-122	
	FDD_F	-121.5 Note 2	
	FDD_G	-121	
	FDD_N	-117.5	
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.			

Table B.1.3-2: E-UTRAN intra-frequency measurements for HD-FDD for CE mode A

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A	-124	≥ -4
	FDD_D	-122.5	
	FDD_E	-122	
	FDD_F	-121.5 Note 2	
	FDD_G	-121	
	FDD_N	-117.5	
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.			

Table B.1.3-3: E-UTRAN intra-frequency measurements for FDD and TDD for CE mode B

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-124	≥ -13
	FDD_D	-122.5	
	FDD_E TDD_E	-122	
	FDD_F	-121.5 Note 2	
	FDD_G	-121	
	FDD_N	-117.5	
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.			

Table B.1.3-4: E-UTRAN intra-frequency measurements for HD-FDD for CE mode B

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A	-124	≥ -13
	FDD_D	-122.5	
	FDD_E	-122	
	FDD_F	-121.5 Note 2	
	FDD_G	-121	
	FDD_N	-117.5	

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2.
NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.2 Conditions for UE Measurements Procedures in RRC_CONNECTED State

B.2.1 Conditions for E-UTRAN intra-frequency measurements

This clause defines the E-UTRAN intra-frequency SCH_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for intra-frequency E-UTRAN measurements are defined in Table B.2.1-1.

Table B.2.1-1: E-UTRAN intra-frequency measurements

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-127	≥ -6
	FDD_B	-126.5	
	FDD_C, TDD_C	-126	
	FDD_D	-125.5	
	FDD_E, TDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_H	-123.5	
	FDD_N	-120.5	

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2.
NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.2.2 Conditions for E-UTRAN intra-frequency measurements with autonomous gaps

This clause defines the E-UTRAN intra-frequency SCH_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for intra-frequency E-UTRAN measurements with autonomous gap are as in Table B.2.1-1.

Table B.2.2-1: Void

B.2.3 Conditions for E-UTRAN inter-frequency measurements

This clause defines the E-UTRAN inter-frequency SCH_RP, SCH Ês/Iot, RSRP and RSRP Ês/Iot applicable for a corresponding operating band.

The conditions for inter-frequency E-UTRAN measurements with autonomous gap are defined in Table B.2.3-1.

Table B.2.3-1: E-UTRAN inter-frequency measurements

Parameter	E-UTRA operating band groups Note 3	Minimum RSRP Note 1	Minimum SCH_RP Note 1	RSRP Ês/Iot	SCH Ês/Iot
		dBm/15kHz	dBm/15kHz	dB	dB
Conditions	FDD_A, TDD_A	-125	-125	≥ -4	≥ -4
	FDD_B	-124.5	-124.5		
	FDD_C, TDD_C	-124	-124		
	FDD_D	-123.5	-123.5		
	FDD_E, TDD_E	-123	-123		
	FDD_F	-122.5 Note 2	-122.5 Note 2		
	FDD_G	-122	-122		
	FDD_H	-121.5	-121.5		
	FDD_N	-118.5	-118.5		

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -123 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.2.4 Conditions for E-UTRAN inter-frequency measurements with autonomous gaps

This clause defines the E-UTRAN inter-frequency SCH_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for inter-frequency E-UTRAN measurements with autonomous gap are defined in Table B.2.4-1.

Table B.2.4-1: E-UTRAN inter-frequency measurements with autonomous gaps

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-125	≥ -4
	FDD_B	-124.5	
	FDD_C, TDD_C	-124	
	FDD_D	-123.5	
	FDD_E, TDD_E	-123	
	FDD_F	-122.5 Note 2	
	FDD_G	-122	
	FDD_H	-121.5	
	FDD_N	-118.5	

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -123 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.2.5 Conditions for E-UTRAN OTDOA intra-frequency RSTD Measurements

This clause defines the E-UTRAN intra-frequency PRP1,2 applicable for a corresponding operating band

The conditions for E-UTRAN OTDOA intra-frequency RSTD measurements are defined in Table B.2.5-1

Table B.2.5-1: E-UTRAN OTDOA intra-frequency RSTD measurements

Parameter	E-UTRA operating band groups Note 3	Minimum PRP1,2 Note 1
		dBm/15kHz
Conditions	FDD_A, TDD_A	-127
	FDD_B	-126.5
	FDD_C, TDD_C	-126
	FDD_D	-125.5
	FDD_E, TDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.		

B.2.6 Conditions for E-UTRAN OTDOA inter-frequency RSTD Measurements

This clause defines the E-UTRAN inter-frequency PRP1,2 applicable for a corresponding operating band.

The conditions for E-UTRAN OTDOA inter-frequency RSTD measurements are defined in Table B.2.5-1.

B.2.7 Conditions for Measurements of the secondary component carrier with deactivated SCell

This clause defines the SCH_RP and SCH Ês/Iot for measurements in the secondary component carrier applicable for a corresponding operating band.

The conditions for measurements of the secondary component carrier with deactivated SCell are defined in Table B.2.7-1.

Table B.2.7-1: Measurements of the secondary component carrier with deactivated SCell

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-127	≥ -6
	FDD_B	-126.5	
	FDD_C, TDD_C	-126	
	FDD_D	-125.5	
	FDD_E, TDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_H	-123.5	
	FDD_N	-120.5	
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.			

B.2.8 Conditions for E-UTRAN Intra-Frequency Measurements under Time Domain Measurement Resource Restriction

This clause defines the E-UTRAN intra-frequency SCH_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for intra-frequency E-UTRAN measurements under time domain measurement resource restriction are defined in Table B.2.8-1.

Table B.2.8-1: E-UTRAN intra-frequency measurements under time domain measurement resource restriction

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-127	≥ -7.5
	FDD_B	-126.5	
	FDD_C, TDD_C	-126	
	FDD_D	-125.5	
	FDD_E, TDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_H	-123.5	
	FDD_N	-120.5	

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.2.9 Conditions for E-UTRAN Intra-Frequency Measurements under Time Domain Measurement Resource Restriction with CRS Assistance Information

This clause defines the E-UTRAN intra-frequency SCH_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for intra-frequency E-UTRAN measurements under time domain measurement resource restriction with CRS assistance information are defined in Table B.2.9-1.

Table B.2.9-1: E-UTRAN intra-frequency measurements under time domain measurement resource restriction with CRS assistance information

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-127	≥ -11.07
	FDD_B	-126.5	
	FDD_C, TDD_C	-126	
	FDD_D	-125.5	
	FDD_E, TDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_H	-123.5	
	FDD_N	-120.5	

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.2.10 Conditions for E-UTRAN intra-frequency discovery signal measurements

This clause defines the E-UTRAN intra-frequency SCH_RP, SCH Ês/Iot in discovery signal occasions [16], applicable for a corresponding operating band for discovery signal measurements

The conditions for E-UTRAN intra-frequency discovery signal measurements are as in Table B.2.1-1.

B.2.11 Conditions for E-UTRAN inter-frequency discovery signal measurements

B.2.11.1 Conditions for E-UTRAN inter-frequency CRS-based measurements

This clause defines the E-UTRAN inter-frequency SCH_RP, SCH Ês/Iot, RSRP, and Ês/Iot in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for E-UTRAN inter-frequency CRS-based discovery signal measurements in discovery signal occasions are specified in Table B.2.11.1-1.

Table B.2.11.1-1: E-UTRAN inter-frequency discovery signal measurements

Parameter	E-UTRA operating band groups Note 3	Minimum RSRP Note 1	Minimum SCH_RP Note 1	RSRP Ês/Iot	SCH Ês/Iot
		dBm/15kHz	dBm/15kHz	dB	dB
Conditions	FDD_A, TDD_A	-125	-125	≥ -6	≥ -6
	FDD_B	-124.5	-124.5		
	FDD_C, TDD_C	-124	-124		
	FDD_D	-123.5	-123.5		
	FDD_E, TDD_E	-123	-123		
	FDD_F	-122.5 Note 2	-122.5 Note 2		
	FDD_G	-122	-122		
	FDD_H	-121.5	-121.5		
	FDD_N	-118.5	-118.5		

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -123 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.2.11.2 Conditions for E-UTRAN inter-frequency CSI-RS based measurements

This clause defines the E-UTRAN inter-frequency SCH_RP, SCH Ês/Iot, CSI-RSRP, and CSI-RS Ês/Iot in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for E-UTRAN inter-frequency CRS-based discovery signal measurements in discovery signal occasions are specified in Table B.2.11.2-1.

Table B.2.11.2-1: E-UTRAN inter-frequency discovery signal measurements

Parameter	E-UTRA operating band groups Note 3	Minimum CSI-RSRP Note 1	Minimum SCH_RP Note 1	CSI-RS Ês/Iot	SCH Ês/Iot
		dBm/15kHz	dBm/15kHz	dB	dB
Conditions	FDD_A, TDD_A	-125	-125	≥ 0	≥ -6
	FDD_B	-124.5	-124.5		
	FDD_C, TDD_C	-124	-124		
	FDD_D	-123.5	-123.5		
	FDD_E, TDD_E	-123	-123		
	FDD_F	-122.5 Note 2	-122.5 Note 2		
	FDD_G	-122	-122		
	FDD_H	-121.5	-121.5		
	FDD_N	-118.5	-118.5		

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -123 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.2.12 Conditions for E-UTRAN intra-frequency discovery signal measurements under operation with frame structure 3

This section defines the E-UTRAN intra-frequency SCH_RP in discovery signal occasions [16], applicable for a corresponding operating band for discovery signal measurements under frame structure type 3.

The conditions for E-UTRAN intra-frequency discovery signal measurements are defined in Table B.2.12-1.

Table B.2.12-1: E-UTRAN intra-frequency measurements under operation with frame structure 3

Parameter	E-UTRA operating band groups Note 2	Minimum SCH_RP Note 1
		dBm/15kHz
Conditions	FS3_G	-124

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2.
NOTE 2: E-UTRA operating band groups are as defined in Section 3.5.

B.2.13 Conditions for E-UTRAN inter-frequency discovery signal measurements under operation with frame structure 3

B.2.13.1 Conditions for E-UTRAN inter-frequency CRS-based measurements

This section defines the E-UTRAN inter-frequency SCH_RP, SCH Ês/Iot, RSRP, and Ês/Iot in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements under frame structure 3.

The conditions for E-UTRAN inter-frequency CRS-based discovery signal measurements in discovery signal occasions are specified in Table B.2.13.1-1.

Table B.2.13.1-1: E-UTRAN inter-frequency discovery signal measurements

Parameter	E-UTRA operating band groups Note 2	Minimum RSRP Note 1	Minimum SCH_RP Note 1	RSRP Ês/Iot	SCH Ês/Iot
		dBm/15kHz	dBm/15kHz	dB	dB
	FS3_G	-122	-122	≥ -6	≥ -6

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: E-UTRA operating band groups are as defined in Section 3.5.

B.2.13.2 Conditions for E-UTRAN inter-frequency CSI-RS based measurements

This section defines the E-UTRAN inter-frequency SCH_RP, SCH Ês/Iot, CSI-RSRP, and CSI-RS Ês/Iot in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for E-UTRAN inter-frequency CRS-based discovery signal measurements in discovery signal occasions under frame structure 3 are specified in Table B.2.13.2-1.

Table B.2.13.2-1: E-UTRAN inter-frequency discovery signal measurements

Parameter	E-UTRA operating band groups Note 2	Minimum CSI-RSRP Note 1	Minimum SCH_RP Note 1	CSI-RS Ês/Iot	SCH Ês/Iot
		dBm/15kHz	dBm/15kHz	dB	dB
Conditions	FS3_G	-122	-122	≥ 0	≥ -6
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: E-UTRA operating band groups are as defined in Section 3.5.					

B.2.14 Conditions for E-UTRAN intra-frequency measurements by UE Category M1

This clause defines the E-UTRAN intra-frequency SCH_RP and SCH Ês/Iot applicable for a corresponding operating band. The UE category M1 applicability of the conditions in Appendix B.2.14 is defined in Section 3.1.

The conditions for CE mode A intra-frequency E-UTRAN FDD and TDD measurements are defined in Table B.2.14-1 and for E-UTRAN HD-FDD measurements are defined in Table B.2.14-2.

The conditions for CE mode B for intra-frequency E-UTRAN FDD and TDD measurements are defined in Table B.2.14-3 and for E-UTRAN HD-FDD measurements are defined in Table B.2.14-4.

Table B.2.14-1: E-UTRAN intra-frequency measurements for FDD and TDD for CE mode A

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-127	≥ -6
	FDD_D	-125.5	
	FDD_E, TDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_N	-120.5	
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.			

Table B.2.14-2: E-UTRAN intra-frequency measurements for HD-FDD for CE mode A

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A,	-127	≥ -6
	FDD_D	-125.5	
	FDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_N	-120.5	
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.			

Table B.2.14-3: E-UTRAN intra-frequency measurements for FDD and TDD for CE mode B

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A, TDD_A	-127	≥ -15
	FDD_D	-125.5	
	FDD_E, TDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_N	-120.5	
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.			

Table B.2.14-4: E-UTRAN intra-frequency measurements for HD-FDD for CE mode B

Parameter	E-UTRA operating band groups Note 3	Minimum SCH_RP Note 1	SCH Ês/Iot
		dBm/15kHz	dB
Conditions	FDD_A,	-127	≥ -15
	FDD_D	-125.5	
	FDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_N	-120.5	
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.			

B.3 Conditions for measurements performance requirements for UE

B.3.1 Conditions for intra-frequency RSRP and RSRQ Accuracy Requirements

This clause defines the E-UTRAN intra-frequency RSRP applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRP and RSRQ accuracy requirements are defined in Table B.3.1-1.

Table B.3.1-1: Intra-frequency absolute RSRP and RSRQ Accuracy Requirements

Parameter	E-UTRA operating band groups Note 3	Minimum RSRP Note 1
		dBm/15kHz
Conditions	FDD_A, TDD_A	-127
	FDD_B	-126.5
	FDD_C, TDD_C	-126
	FDD_D	-125.5
	FDD_E, TDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.		

B.3.2 Void

B.3.3 Conditions for inter-frequency RSRP and RSRQ Accuracy Requirements

This clause defines the E-UTRAN inter-frequency RSRP applicable for a corresponding operating band.

The conditions for inter-frequency absolute RSRP and RSRQ accuracy requirements are defined in Table B.3.1-1.

B.3.4 Conditions for inter-frequency relative RSRP and RSRQ Accuracy Requirements

This clause defines the E-UTRAN inter-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for inter-frequency relative RSRP and RSRQ accuracy requirements are defined in Table B.3.8-1.

B.3.5 Conditions for UE Rx – Tx time difference

This clause defines the E-UTRAN RSRP applicable for a corresponding operating band.

The conditions for UE Rx-Tx time difference are defined in Table B.3.1-1.

B.3.6 Conditions for intra-frequency Reference Signal Time Difference (RSTD) measurements

This sections defines the E-UTRAN intra-frequency PRP applicable for a corresponding operating band.

The conditions for intra-frequency RSTD measurements are defined in Table B.2.5-1.

B.3.7 Conditions for inter-frequency RSTD measurements

This sections defines the E-UTRAN inter-frequency PRP applicable for a corresponding operating band.

The conditions for inter-frequency RSTD measurements are defined in Table B.2.5-1.

B.3.8 Conditions for Intra-Frequency Relative RSRP Accuracy Requirements

This clause defines the E-UTRAN intra-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for intra-frequency relative RSRP accuracy requirements are specified in Table B.3.8-1.

Table B.3.8-1: Intra-frequency relative RSRP accuracy requirements

Parameter	**E-UTRA operating band groups** Note 3	**Minimum RSRP1,2** Note 1
		dBm/15kHz
Conditions	FDD_A, TDD_A	-127
	FDD_B	-126.5
	FDD_C, TDD_C	-126
	FDD_D	-125.5
	FDD_E, TDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.		

B.3.9 Conditions for Intra-Frequency Absolute RSRP and RSRQ Accuracy Requirements under Time Domain Measurement Resource Restriction

This clause defines the E-UTRAN intra-frequency RSRP applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRP and RSRQ accuracy requirements under time domain measurement resource restriction are as specified in Table B.3.1-1.

B.3.10 Conditions for Intra-Frequency Relative RSRP Accuracy Requirements under Time Domain Measurement Resource Restriction

This clause defines the E-UTRAN intra-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for intra-frequency relative RSRP accuracy requirements under time domain measurement resource restriction are defined in Table B.3.8-1.

B.3.11 Conditions for Intra-Frequency Absolute RSRP and RSRQ Accuracy Requirements under Time Domain Measurement Resource Restriction with CRS Assistance Information

This clause defines the E-UTRAN intra-frequency RSRP applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRP and RSRQ accuracy requirements under time domain measurement resource restriction with CRS assistance information are as specified in Table B.3.1-1.

B.3.12 Conditions for Intra-Frequency Relative RSRP Accuracy Requirements under Time Domain Measurement Resource Restriction with CRS Assistance Information

This clause defines the E-UTRAN intra-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for intra-frequency relative RSRP accuracy requirements under time domain measurement resource restriction with CRS assistance information are as specified in Table B.3.8-1.

B.3.13 Conditions for UE Rx–Tx Time Difference Measurement under Time Domain Measurement Resource Restriction with CRS Assistance Information

This clause defines the E-UTRAN RSRP applicable for a corresponding operating band.

The conditions for UE Rx-Tx time difference measurements, when time domain measurement resource restriction pattern and CRS assistance information are provided, are as defined in Table B.3.1-1.

B.3.14 Conditions for Intra-Frequency Absolute Discovery Signal Measurement Accuracy Requirements

B.3.14.1 Conditions for Intra-frequency CRS-based measurements

This clause defines the intra-frequency RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for intra-frequency absolute RSRP and RSRQ accuracy requirements for CRS-based discovery signal measurements in discovery signal occasions are as in Table B.3.1-1

B.3.14.2 Conditions for Intra-frequency CSI-RS-based measurements

This clause defines the intra-frequency CSI-RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for intra-frequency absolute CSI-RSRP accuracy requirements for CSI-RS-based discovery signal measurements in discovery signal occasions are specified in Table B.3.14.2-1

Table B.3.14.2-1: Intra-frequency Absolute CSI-RSRP Accuracy Requirements

Parameter	E-UTRA operating band groups Note 3	Minimum CSI-RSRP Note 1
		dBm/15kHz
Conditions	FDD_A, TDD_A	-127
	FDD_B	-126.5
	FDD_C, TDD_C	-126
	FDD_D	-125.5
	FDD_E, TDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.

B.3.15 Conditions for Intra-Frequency Relative Discovery Signal Measurement Accuracy Requirements

B.3.15.1 Conditions for Intra-frequency CRS-based measurements

This clause defines the intra-frequency RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for intra-frequency relative RSRP accuracy requirements for CRS-based discovery signal measurements in discovery signal occasions are as in Table B.3.8-1

B.3.15.2 Conditions for Intra-frequency CSI-RS-based measurements

This clause defines the intra-frequency CSI-RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for intra-frequency relative CSI-RSRP accuracy requirements for CSI-RS-based discovery signal measurements in discovery signal occasions are specified in Table B.3.15.2-1

Table B.3.15.2-1: Intra-frequency Relative CSI-RSRP Accuracy Requirements

Parameter	E-UTRA operating band groups Note 3	Minimum CSI-RSRP1,2 Note 1
		dBm/15kHz
Conditions	FDD_A, TDD_A	-127
	FDD_B	-126.5
	FDD_C, TDD_C	-126
	FDD_D	-125.5
	FDD_E, TDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_H	-123.5
	FDD_N	-120.5
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA operating band groups are as defined in Section 3.5.		

B.3.16 Conditions for Inter-Frequency Absolute Discovery Signal Measurement Accuracy Requirements

B.3.16.1 Conditions for Inter-frequency CRS-based measurements

This clause defines the inter-frequency RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for inter-frequency absolute RSRP and RSRQ accuracy requirements for CRS-based discovery signal measurements in discovery signal occasions are as in Table B.3.1-1

B.3.16.2 Conditions for Inter-frequency CSI-RS-based measurements

This clause defines the inter-frequency CSI-RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for inter-frequency absolute CSI-RSRP accuracy requirements for CSI-RS-based discovery signal measurements in discovery signal occasions are as in Table B.3.14.2-1.

B.3.17 Conditions for Inter-Frequency Relative Discovery Signal Measurement Accuracy Requirements

B.3.17.1 Conditions for Inter-frequency CRS-based measurements

This clause defines the inter-frequency RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CRS based discovery signal measurements.

The conditions for inter-frequency relative RSRP and RSRQ accuracy requirements for CRS-based discovery signal measurements in discovery signal occasions are as in Table B.3.8-1

B.3.17.2 Conditions for Inter-frequency CSI-RS-based measurements

This clause defines the inter-frequency CSI-RSRP in discovery signal occasions [16], applicable for a corresponding operating band for CSI-RS based discovery signal measurements.

The conditions for inter-frequency relative CSI-RSRP accuracy requirements for CSI-RS-based discovery signal measurements in discovery signal occasions are as in Table B.3.15.2-1.

B.3.18 Conditions for Intra-frequency Absolute RS-SINR Accuracy Requirements

This clause defines the E-UTRAN intra-frequency RSRP applicable for a corresponding operating band.

The conditions for intra-frequency absolute RS-SINR accuracy requirements are the same as defined in Table B.3.1-1.

B.3.19 Conditions for Inter-frequency Absolute RS-SINR Accuracy Requirements

This clause defines the E-UTRAN inter-frequency RSRP applicable for a corresponding operating band.

The conditions for inter-frequency absolute RS-SINR accuracy requirements are the same as defined in Table B.3.1-1.

B.3.20 Conditions for Inter-frequency Relative RS-SINR Accuracy Requirements

This clause defines the E-UTRAN inter-frequency RSRP1,2 applicable for a corresponding operating band.

The conditions for inter-frequency relative RS-SINR accuracy requirements are the same as defined in Table B.3.8-1.

B.3.21 Conditions for Intra-Frequency Absolute Accuracy Requirements for Measurements under Operation with Frame Structure 3

B.3.21.1 Conditions for RSRP measurements

This clause defines the intra-frequency absolute RSRP during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRP accuracy requirements are defined in Table B.3.21.1-1.

Table B.3.21.1-1: Intra-frequency absolute RSRP requirements

Parameter	E-UTRA operating band groups Note 2	Minimum RSRP Note 1
		dBm/15kHz
Conditions	FS3_G	-124
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: E-UTRA operating band groups are as defined in Section 3.5.		

B.3.21.2 Conditions for RSRQ measurements

This clause defines the intra-frequency absolute RSRQ during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRQ accuracy requirements are the same as defined in Table B.3.21.1-1.

B.3.21.3 Conditions for CSI-RSRP measurements

This clause defines the intra-frequency absolute CSI-RSRP during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for intra-frequency absolute RSRP accuracy requirements are defined in Table B.3.21.3-1.

Table B.3.21.3-1: Intra-frequency absolute CSI-RSRP requirements

Parameter	E-UTRA operating band groups Note 2	Minimum CSI-RSRP Note 1
		dBm/15kHz
Conditions	FS3_G	-124
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: E-UTRA operating band groups are as defined in Section 3.5.		

B.3.22 Conditions for Intra-Frequency Relative Accuracy Requirements for Measurements under Operation with Frame Structure 3

B.3.22.1 Conditions for RSRP measurements

This clause defines the intra-frequency relative RSRP during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for intra-frequency relative RSRP accuracy requirements are as defined in Table B.3.22.1-1.

Table B.3.22.1-1: Intra-frequency relative RSRP requirements

Parameter	E-UTRA operating band groups Note 2	Minimum RSRP1,2 Note 1
		dBm/15kHz
Conditions	FS3_G	-124
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: E-UTRA operating band groups are as defined in Section 3.5.		

B.3.22.2 Conditions for RSRQ measurements

This clause defines the intra-frequency relative RSRQ during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for intra-frequency relative RSRQ accuracy requirements are the same as defined in Table B.3.22.1-1.

B.3.22.3 Conditions for CSI-RSRP measurements

This clause defines the intra-frequency relative CSI-RSRP during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for intra-frequency relative CSI-RSRP accuracy requirements are as defined in Table B.3.22.3-1.

Table B.3.22.3-1: Intra-frequency relative CSI-RSRP requirements

Parameter	E-UTRA operating band groups Note 2	Minimum CSI-RSRP1,2 Note 1
		dBm/15kHz
Conditions	FS3_G	-124
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: E-UTRA operating band groups are as defined in Section 3.5.		

B.3.23 Conditions for Inter-Frequency Absolute Accuracy Requirements for Measurements under Operation with Frame Structure 3

B.3.23.1 Conditions for RSRP measurements

This clause defines the inter-frequency absolute RSRP during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for inter-frequency absolute RSRP accuracy requirements are the same as defined in Table B.3.21.1-1.

B.3.23.2 Conditions for RSRQ measurements

This clause defines the inter-frequency absolute RSRQ during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for inter-frequency absolute RSRQ accuracy requirements are the same as defined in Table B.3.21.1-1.

B.3.23.3 Conditions for CSI-RSRP measurements

This clause defines the inter-frequency absolute CSI-RSRP during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for inter-frequency absolute CSI-RSRP accuracy requirements are the same as defined in Table B.3.21.3-1.

B.3.24 Conditions for Inter-Frequency Relative Accuracy Requirements for Measurements under Operation with Frame Structure 3

B.3.24.1 Conditions for RSRP measurements

This clause defines the inter-frequency relative RSRP during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for inter-frequency relative RSRP accuracy requirements are the same as defined in Table B.3.22.1-1.

B.3.24.2 Conditions for RSRQ measurements

This clause defines the inter-frequency relative RSRQ during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for inter-frequency relative RSRP accuracy requirements are the same as defined in Table B.3.22.1-1.

B.3.24.3 Conditions for CSI-RSRP measurements

This clause defines the inter-frequency relative CSI-RSRP during the configured DMTC occasion [2] under operation with frame structure 3 [16], applicable for a corresponding operating band.

The conditions for inter-frequency relative CSI-RSRP accuracy requirements are the same as defined in Table B.3.22.3-1.

B.4 RRM Requirements Exceptions

B.4.1 General

B.4.2 Receiver sensitivity relaxation for UE supporting CA

For a UE supporting inter-band carrier aggregation configuration with uplink in one E-UTRA band, if there is a relaxation of receiver sensitivity $\Delta R_{IB,c}>0$ dB as defined in TS 36.101 [5], Table 7.3.1-1A, the relevant side conditions specifying received power levels (E-UTRA RSRP, SCH_RP, PRP, CSI-RSRP, and Io) shall be increased by the amount $\Delta=\Delta R_{IB,c}$ defined for each of the downlink E-UTRA bands.

NOTE: This side condition adjustment applies only for a UE supporting a single inter-band LTE CA band combination. For a UE supporting additional inter-band LTE CA band combinations, the $\Delta R_{IB,c}$ for all bands supported by the UE, need to be studied [5].

B.4.3 Receiver sensitivity relaxation for UE configured with CA

B.4.3.1 Inter-band carrier aggregation

In this section, requirements exceptions are described for the UE configured with inter-band carrier aggregation with one uplink active in low operating band.

A relevant side condition (e.g., E-UTRA RSRP, SCH_RP, PRP, CSI-RSRP, and Io) in a requirement shall be increased by the amount Δ=L2-L1, where L1 is the reference sensitivity level specified in 36.101, Table 7.3.1-1, and L2 is the reference sensitivity level specified in 36.101, Table 7.3.1A-0a, when the following conditions are fulfilled,

- both downlink component carriers on different bands are configured with CA and active,
- the single uplink is active in the low operating band,
- the exception requirements specified in TS36.101, Table 7.3.1A-0a, apply.

If the relaxation Δ specified in this section applies, then the relaxation specified in Section B.4.2 should not be applied.

B.4.3.2 Intra-band non-contiguous carrier aggregation

For a UE configured with intra-band non-contiguous carrier aggregation configuration with uplink in one E-UTRA band, if there is a relaxation of receiver sensitivity $\Delta R_{IBNC}>0$ as defined in TS 36.101 [5], Table 7.3.1A-3, the relevant side conditions specifying received power levels (E-UTRA RSRP, SCH_RP, PRP, CSI-RSRP, and Io) shall be increased by the amount $\Delta=\Delta R_{IBNC}$ defined for the downlink SCC, when the following conditions are fulfilled,

- both downlink component carriers are configured with CA and active,

- one uplink carrier is active,
- the exception requirements specified in TS36.101, Table 7.3.1A-3, apply.

If the relaxation Δ specified in this section applies, then the relaxation specified in Section B.4.2 should not be applied.

B.4.3.3 Inter-band carrier aggregation with operating bands without uplink band

In this section, requirements are described for the UE configured with inter-band carrier aggregation involving one operating band without uplink band.

There is no relaxation in relevant side condition (e.g., E-UTRA RSRP, SCH_RP, PRP, CSI-RSRP, and Io) in a requirement, i.e., Δ=0, when the following conditions are fulfilled,

- both downlink component carriers on different bands are configured with CA and active,
- the single uplink is active in the high operating band,
- conditions specified in TS36.101, Table 7.3.1A-0d, apply.

If Δ specified in this section applies, then no other additional relaxation to REFSENS shall be applied.

B.5 Conditions for Measurement Performance Requirements for ProSe UE

B.5.1 Conditions for S-RSRP Accuracy Requirements

This clause defines the S-RSRP applicable for a corresponding operating band.

The conditions for absolute S-RSRP accuracy requirements are defined in Table B.5.1-1.

Table B.5.1-1: Absolute S-RSRP Requirements

Parameter	E-UTRA ProSe operating band groups Note 3	Minimum S-RSRP Note 1
		dBm/15kHz
	FDD_D	-125.5
	FDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_N	-120.5

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.

B.5.2 Conditions for Relative S-RSRP Accuracy Requirements

This clause defines the S-RSRP1,2 applicable for a corresponding operating band.

The conditions for relative S-RSRP accuracy requirements are specified in Table B.5.2-1.

Table B.5.2-1: Relative S-RSRP accuracy requirements

Parameter	E-UTRA ProSe operating band groups Note 3	Minimum S-RSRP1,2 Note 1
		dBm/15kHz
	FDD_D	-125.5
	FDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_N	-120.5

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.

B.5.3 Conditions for Selection/Reselection to Intra-frequency SyncRef UE

This clause defines the ProSe SCH_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for selection/reselection to intra-frequency SyncRef UE are defined in Table B.5.3-1.

Table B.5.3-1: ProSe synchronization measurements

Parameter	E-UTRA ProSe operating band groups Note 3	Minimum ProSe SCH_RP Note 1	ProSe SCH Ês/Iot Note 4
		dBm/15kHz	dB
	FDD_D	-125.5	≥ -4
	FDD_E	-125	
	FDD_F	-124.5 Note 2	
	FDD_G	-124	
	FDD_N	-120.5	

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.
NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.
NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.
NOTE 4: ProSe SCH Ês/Iot for a SyncRef UE is the minimum of the Ês/Iot of PSSS/PSBCH and the Ês/Iot of SSSS

B.5.4 Conditions for SD-RSRP Accuracy Requirements

This clause defines the intra-frequency SD-RSRP applicable for a corresponding operating band.

The conditions for intra-frequency absolute SD-RSRP accuracy requirements are defined in Table B.5.4-1.

Table B.5.4-1: Absolute SD-RSRP Requirements

Parameter	E-UTRA ProSe operating band groups Note 3	Minimum SD-RSRP Note 1 dBm/15kHz
	FDD_D	-125.5
	FDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_N	-120.5

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.

B.5.5 Conditions for Relative SD-RSRP Accuracy Requirements

This clause defines the intra-frequency SD-RSRP applicable for a corresponding operating band.

The conditions for intra-frequency relative S-RSRP accuracy requirements are specified in Table B.5.5-1.

Table B.5.5-1: Relative S-RSRP accuracy requirements

Parameter	**E-UTRA ProSe operating band groups** Note 3	**Minimum SD-RSRP1,2** Note 1 **dBm/15kHz**
	FDD_D	-125.5
	FDD_E	-125
	FDD_F	-124.5 Note 2
	FDD_G	-124
	FDD_N	-120.5
NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3. NOTE 2: The condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. NOTE 3: E-UTRA ProSe operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.		

Annex C (informative): Change history:

Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2007-12	RP#38	RP-071037				Approved version in TSG RAN#38	8.0.0
2008-03	RP#39	RP-080123	2			Updates of TS36.133	8.1.0
2008-05	RP#40	RP-080325	3			Updates of TS36.133	8.2.0
2008-09	RP#41	RP-080644	006	1		E-UTRAN TDD intra frequency measurements when DRX is used	8.3.0
2008-09	RP#41	RP-080644	008	1		E-UTRAN TDD - UTRAN TDD measurements	8.3.0
2008-09	RP#41	RP-080644	012			RSRQ reporting Range	8.3.0
2008-09	RP#41	RP-080644	018	1		Interfrequency and UTRA interRAT DRX peformance requirements	8.3.0
2008-09	RP#41	RP-080644	020	1		Additions to UE transmit timing requirements	8.3.0
2008-09	RP#41	RP-080644	043			Received interference power measurement performance requirement	8.3.0
2008-09	RP#41	RP-080644	044			Cell Synchronization requirement for E-UTRA TDD	8.3.0
2008-09	RP#41	RP-080644	047			Power Headroom Requirements	8.3.0
2008-09	RP#41	RP-080644	048			Event Triggering and Reporting Criteria Capability Requirements	8.3.0
2008-09	RP#41	RP-080642	004			Correction of E-UTRAN to UTRAN TDD handover	8.3.0
2008-09	RP#41	RP-080642	016	1		Definition of Symbols	8.3.0
2008-09	RP#41	RP-080642	019	1		Idle mode requirements updates	8.3.0
2008-09	RP#41	RP-080642	021	1		General updates to 36.133	8.3.0
2008-09	RP#41	RP-080642	023	1		Handover requirements for E-UTRAN to cdma200 HRPD/1x	8.3.0
2008-09	RP#41	RP-080642	024			Inter-frequency and inter-RAT measurement requirements for multiple layer monitoring	8.3.0
2008-09	RP#41	RP-080642	025			Side conditions for UE measurement procedures and measurement performance requirements	8.3.0
2008-09	RP#41	RP-080642	026			Correction to cell reselection Requirement from E-UTRAN to HRPD/cdma200 1x	8.3.0
2008-09	RP#41	RP-080642	027			IRAT Measurement requirements in TS 36.133	8.3.0
2008-09	RP#41	RP-080713	022	1		Corrections to Handover requirements	8.3.0
2008-09	RP#41	RP-080713	028			Measurement reporting requirements	8.3.0
2008-09	RP#41	RP-080713	029	2		RRC re-establishment requirements	8.3.0
2008-09	RP#41	RP-080713	032			Correction to UE measurement requirements	8.3.0
2008-09	RP#41	RP-080713	033			Correction for the definition of interruption time	8.3.0
2008-09	RP#41	RP-080713	040	1		Correction to idle mode higher priority search requirements	8.3.0
2008-09	RP#41	RP-080713	045			E-UTRAN TDD inter frequency measurement requirements	8.3.0
2008-09	RP#41	RP-080713	046			Updates of the Measurement procedures in RRC_Connected state from RAN 4#47bis and RAN 4#48	8.3.0
2008-12	RP#42	RP-080919	53			Introduction of 700MHz Bands 12, 14 and 17	8.4.0
2008-12	RP#42	RP-080928	88	1		CR to 36.133 on Radio Link Failure Monitoring	8.4.0
2008-12	RP#42	RP-080929	51			Correction to idle mode requirements	8.4.0
2008-12	RP#42	RP-080929	52			Definition of out of service area	8.4.0
2008-12	RP#42	RP-080929	54			Measurement requirements for UTRAN TDD cells in idle state	8.4.0
2008-12	RP#42	RP-080929	69	2		Correction of Inter-RAT UTRA cell reselection requirement	8.4.0
2008-12	RP#42	RP-080929	55			Correction of E_UTRAN cell measurement requirements in idle state	8.4.0
2008-12	RP#42	RP-080930	76			Correction to HO Requirements	8.4.0
2008-12	RP#42	RP-080931	71			Random access requirements	8.4.0
2008-12	RP#42	RP-080932	85			Cell phase synchronization error for large cell	8.4.0
2008-12	RP#42	RP-080932	63	4		Synchronization Requirements for E-UTRAN to 1xRTT and HRPD Handovers	8.4.0
2008-12	RP#42	RP-080933	49			E-UTRAN TDD-TDD intra/inter frequency measurement reporting requirements	8.4.0
2008-12	RP#42	RP-080933	50			E-UTRAN FDD – UTRAN FDD Measurement reporting requirements	8.4.0
2008-12	RP#42	RP-080933	58			Measurement requirement for E-UTRAN TDD to UTRAN TDD/FDD when DRX is used	8.4.0
2008-12	RP#42	RP-080933	60			Interfrequency and GSM measurement performance	8.4.0

						requirements in large DRX	
2008-12	RP#42	RP-080933	62			Correction of implementation margin for transmission gap.	8.4.0
2008-12	RP#42	RP-080933	72			Alignement of DRX cycle dependent requirements	8.4.0
2008-12	RP#42	RP-080933	73	1		Alignement of side conditions for mobility measurements	8.4.0
2008-12	RP#42	RP-080933	66	1		Measurement models in RRC_CONNECTED	8.4.0
2008-12	RP#42	RP-080933	78	1		Limitation of maximum number of layers for multiple monitoring	8.4.0
2008-12	RP#42	RP-080933	83	1		GSM Cell identification requirements for parallel monitoring	8.4.0
2008-12	RP#42	RP-080933	87			UE transmit timing requirement	8.4.0
2008-12	RP#42	RP-080933	56			Correction of TS 36.133 clause 8.1.2.1.1.	8.4.0
2008-12	RP#42	RP-080934	77			Correction to RSRQ Report Mapping	8.4.0
2008-12	RP#42		86			Missing side conditions for RSRP and RSRQ	8.4.0
2008-12	RP#42	RP-080935	81	1		Phase I RRM Test Cases	8.4.0
2008-12	RP#42		80	1		Test Configuration for RRM Tests: Measurement Reference Channels and OCNG	8.4.0
2008-12	RP#42	RP-080936	75			Cdma200 1xRTT Measurement Requirements	8.4.0
2008-12	RP#42	RP-080937	74	1		E-UTRA to UTRA cell search requirements for SON	8.4.0
2009-03	RP#43	RP-090182	101	1		Correction of A3-offset parameter in RRM test case	8.5.0
2009-03	RP#43	RP-090182	105			Some Editorial Corrections	8.5.0
2009-03	RP#43	RP-090182	145			Clarifications for the DRX state	8.5.0
2009-03	RP#43	RP-090183	89			Modification on measurements of UTRAN TDD cells	8.5.0
2009-03	RP#43	RP-090183	91			Clarification of the correct behavior when Treselection is not a multiple of idle mode reselection evaluation period	8.5.0
2009-03	RP#43	RP-090183	98			Clarification of ‘Out of Service Area’ Concept and Definition	8.5.0
2009-03	RP#43	RP-090183	118			Radio link monitoring	8.5.0
2009-03	RP#43	RP-090183	142	1		Update of RRC_IDLE state mobility side conditions	8.5.0
2009-03	RP#43	RP-090183	150			UE measurement capability in Idle mode	8.5.0
2009-03	RP#43	RP-090184	133			Removal of RRC re-establishment procedure delay	8.5.0
2009-03	RP#43	RP-090184	138	1		Correction for the UE Re-establishment delay requirement	8.5.0
2009-03	RP#43	RP-090185	92	2		Cell phase synchronization accuracy	8.5.0
2009-03	RP#43	RP-090185	97			Radio link monitoring in DRX	8.5.0
2009-03	RP#43	RP-090185	120			UE Transmit Timing	8.5.0
2009-03	RP#43	RP-090185	137	1		Clarification of the reference point for the UE initial transmission timing control requirement	8.5.0
2009-03	RP#43	RP-090186	90			Correction of clause 8.1.2.2.2.2 in TS36.133	8.5.0
2009-03	RP#43	RP-090186	93	1		cdma2000 1xRTT and HRPD Measurement Requirements	8.5.0
2009-03	RP#43	RP-090186	94			Event Triggered Periodic Reporting Requirements for IRAT Measurements	8.5.0
2009-03	RP#43	RP-090186	95			Measurement Reporting Requirements for E-UTRAN TDD – UTRAN TDD Measurements	8.5.0
2009-03	RP#43	RP-090186	99	1		Clarification of UE behavior when measurement gap is used	8.5.0
2009-03	RP#43	RP-090186	100			E-UTRA to UTRA cell search requirements in DRX for SON	8.5.0
2009-03	RP#43	RP-090186	110	1		Correction to GSM BSIC Requirements for Parallel Monitoring	8.5.0
2009-03	RP#43	RP-090186	117			Alignment of terminology for GAP	8.5.0
2009-03	RP#43	RP-090186	134			Inter frequency and Inter RAT cell search requirement when DRX is used	8.5.0
2009-03	RP#43	RP-090186	139			Correction of E-UTRAN FDD – UTRAN FDD measurements when no DRX	8.5.0
2009-03	RP#43	RP-090186	146			Addition of the definition of “when DRX is used”	8.5.0
2009-03	RP#43	RP-090186	147	1		Corrections to E-UTRAN inter-frequency side conditions	8.5.0

2009-03	RP#43	RP-090187	96			Correction to Intra-frequency RSRP Accuracy Requirements	8.5.0
2009-03	RP#43	RP-090187	136	1		Power Headroom reporting delay	8.5.0
2009-03	RP#43	RP-090370	103	1		E-UTRAN -GSM Handover Test Case	8.5.0
2009-03	RP#43	RP-090370	104	1		E-UTRAN FDD - UTRAN TDD Cell Search Test Cases in Fading	8.5.0
2009-03	RP#43	RP-090370	106	1		E-UTRA FDD to UTRA FDD Handover Test Case	8.5.0
2009-03	RP#43	RP-090370	107	1		Correction of E-UTRA FDD-FDD Intra-frequency cell reselection test case	8.5.0
2009-03	RP#43	RP-090370	108	1		Correction of E-UTRA FDD-FDD priority based Inter-frequency cell reselection test case	8.5.0
2009-03	RP#43	RP-090370	111			E-UTRAN TDD - UTRAN FDD Handover Test Case	8.5.0
2009-03	RP#43	RP-090370	112	1		E-UTRAN FDD - GSM Cell Search Test Case in AWGN	8.5.0
2009-03	RP#43	RP-090370	113			E-UTRAN - UTRAN FDD Cell Search Test Cases in Fading	8.5.0
2009-03	RP#43	RP-090370	114	1		E-UTRAN UE Timing Accuracy Related Test Cases	8.5.0
2009-03	RP#43	RP-090370	115	1		Inclusion of MBSFN Configurations for RRM Test Cases	8.5.0
2009-03	RP#43	RP-090370	116			E-UTRAN FDD HRPD Cell Reselection Test Case; HRPD of Low Priority	8.5.0
2009-03	RP#43	RP-090370	122	1		Clarification on Annex A.9: Measurement performance requirements	8.5.0
2009-03	RP#43	RP-090370	125			E-UTRA TDD – UTRA TDD cell reselection: UTRA is of higher priority	8.5.0
2009-03	RP#43	RP-090370	126			E-UTRA TDD – UTRA TDD cell reselection: UTRA is of lower priority	8.5.0
2009-03	RP#43	RP-090370	127			E-UTRA FDD – UTRA TDD cell reselection	8.5.0
2009-03	RP#43	RP-090370	128	1		E-UTRA TDD-UTRA TDD cell search (fading)	8.5.0
2009-03	RP#43	RP-090370	129	1		E-UTRA TDD-UTRA TDD handover	8.5.0
2009-03	RP#43	RP-090370	132	1		Addition of E-UTRA FDD to UTRA FDD reselection test cases	8.5.0
2009-03	RP#43	RP-090370	141	1		Correction and introduction of some test related parameters	8.5.0
2009-03	RP#43	RP-090370	143			Description of Annex A in TS 36.133	8.5.0
2009-03	RP#43	RP-090370	148			Reselection from E-UTRA to GSM cell test case	8.5.0
2009-03	RP#43	RP-090370	149			Radio Link Monitoring Test Cases	8.5.0
2009-05	RP#44	RP-090546	151			E-UTRA FDD UTRA TDD HO delay test case	8.6.0
2009-05	RP#44	RP-090546	153			Correction of CQI reporting periodicity for TDD RLM test cases	8.6.0
2009-05	RP#44	RP-090546	157			Correction to inter RAT reselection requirements to exclude equal priority. (Technically Endorsed CR in R4-50bis - R4-091092)	8.6.0
2009-05	RP#44	RP-090546	167			Clarification of the number of monitoring carriers in idle mode. (Technically Endorsed CR in R4-50bis - R4-091394)	8.6.0
2009-05	RP#44	RP-090546	180			Correction of Core spec references in A.9 Measurements performance test cases	8.6.0
2009-05	RP#44	RP-090546	984			UTRA FDD-E-UTRA FDD/ TDD handover test cases	8.6.0
2009-05	RP#44	RP-090546	184			SON ANR UTRAN FDD Cell Search Test Case	8.6.0
2009-05	RP#44	RP-090546	187			E-UTRAN FDD cdma2000 1x RTT Cell Reselection Test Case; Cdma2000 1X of Low Priority	8.6.0
2009-05	RP#44	RP-090546	188			E-UTRAN FDD cdma2000 HO Test cases	8.6.0
2009-05	RP#44	RP-090546	190			E-UTRAN Random Access Test Cases	8.6.0
2009-05	RP#44	RP-090546	191			E-UTRAN RRC Re-establishment Test Cases	8.6.0
2009-05	RP#44	RP-090546	192			E-UTRAN TDD - GSM Cell Search Test Case in AWGN	8.6.0
2009-05	RP#44	RP-090546	197			Correction to E-UTRAN FDD - GSM Handover Test case	8.6.0
2009-05	RP#44	RP-090546	173	1		Correction of cell reselection test cases	8.6.0
2009-05	RP#44	RP-090546	179	1		Test cases of E-UTRA TDD intra-frequency cell search in fading environment when DRX is used	8.6.0
2009-05	RP#44	RP-090546	152	1		E-UTRA TDD GSM handover test case	8.6.0
2009-05	RP#44	RP-090546	178	1		Test cases of E-UTRA FDD intra-frequency cell search in fading environment when DRX is used	8.6.0
2009-05	RP#44	RP-090546	201	1		Test case for E-UTRA FDD E-UTRA FDD inter frequency cell search when DRX is used in fading conditions	8.6.0
2009-05	RP#44	RP-090546	185	1		Correction to Radio Link Monitoring Tests	8.6.0
2009-05	RP#44	RP-090546	203			Correction to E-UTRAN FDD to HRPD Cell Reselection Test Case	8.6.0
2009-05	RP#44	RP-090546	177	1		Introduction of New Reference Channels and OCNG	8.6.0

						Patterns for 1.4MHz Bandwidth	
2009-05	RP#44	RP-090546	200	2		Test case for E-UTRA TDD E-UTRA TDD inter frequency cell search when DRX is used in fading conditions	8.6.0
2009-05	RP#44	RP-090547	158			Alignment of inter frequency and inter RAT RRM reselection testcases with core requirements. (Technically Endorsed CR in R4-50bis - R4-091094)	8.6.0
2009-05	RP#44	RP-090547	160			Correction relating E-UTRAN TDD - UE Transmit Timing Accuracy Tests. (Technically Endorsed CR in R4-50bis - R4-091198)	8.6.0
2009-05	RP#44	RP-090547	165			Modifications of T3 and the verification point for in-sync test cases. (Technically Endorsed CR in R4-50bis - R4-091386)	8.6.0
2009-05	RP#44	RP-090547	172			E-UTRAN UE Timing Accuracy Related Test Cases. (Technically Endorsed CR in R4-50bis - R4-091517)	8.6.0
2009-05	RP#44	RP-090547	171	1		Reference measurement Channels for Radio Link Monitoring Tests with 2 Antennas. (Technically Endorsed CR in R4-50bis - R4-091508)	8.6.0
2009-05	RP#44	RP-090548	170			Misalignment between TS36.133 and TS36.321. (Technically Endorsed CR in R4-50bis - R4-091457)	8.6.0
2009-05	RP#44	RP-090548	193			Correction to Inter-RAT HO Interruption Time Definition	8.6.0
2009-05	RP#44	RP-090548	195			CR c2k RRC delay	8.6.0
2009-05	RP#44	RP-090548	196			CR c2k interruption time	8.6.0
2009-05	RP#44	RP-090548	162			Clarifications to UE UL timing requirements. (Technically Endorsed CR in R4-50bis - R4-091357)	8.6.0
2009-05	RP#44	RP-090548	176			Corrections of Random Access Requirements	8.6.0
2009-05	RP#44	RP-090548	154			Correction of TGRP in clause 8.1.2.1.1	8.6.0
2009-05	RP#44	RP-090548	168			Clarifications for the Relative RSRP and RSRQ measurement requirements. (Technically Endorsed CR in R4-50bis - R4-091407)	8.6.0
2009-05	RP#44	RP-090549	161			E-UTRAN UTRAN HO Command Processing Delay. (Technically Endorsed CR in R4-50bis - R4-091291)	8.6.0
2009-05	RP#44	RP-090549	175			Corrections of Cell Reselection Requirements in Idle Mode	8.6.0
2009-05	RP#44	RP-090549	181	2		Removal of [ ] from ranking criteria in Idle mode cell reselection	8.6.0
2009-05	RP#44	RP-090550	156			Correction on the TDD-TDD inter frequency measurements. (Technically Endorsed CR in R4-50bis - R4-091071)	8.6.0
2009-05	RP#44	RP-090550	159			Correction to the Referenced Clause Number for Tinter1. (Technically Endorsed CR in R4-50bis - R4-091153)	8.6.0
2009-05	RP#44	RP-090551	166			Further clarification of DRX/Non-DRX state. (Technically Endorsed CR in R4-50bis - R4-091389)	8.6.0
2009-05	RP#44	RP-090551	202			Correction on reference to 3GPP2 specification	8.6.0
2009-05	RP#44	RP-090551	169			OCNG simplification. (Technically Endorsed CR in R4-50bis - R4-091410)	8.6.0
2009-05	RP#44	RP-090559	155			Introduction of Extended LTE800 requirements. (Technically Endorsed CR in R4-50bis - R4-091063)	9.0.0
2009-05	RP#45	RP-090817	211			Correction to TDD RMC references in RLM test cases	9.1.0
2009-05	RP#45	RP-090880	205			Introduction of Reference DRX configurations	9.1.0
2009-05	RP#45	RP-090880	207			Addition of DRX configurations into non DRX test cases	9.1.0
2009-05	RP#45	RP-090880	225			Correction to HO Test Cases	9.1.0
2009-05	RP#45	RP-090880	227			Correction to E-UTRAN GSM BSIC Identification Requirements with DRX	9.1.0
2009-05	RP#45	RP-090880	259			Corrections of Test Cases	9.1.0
2009-05	RP#45	RP-090880	314			E-UTRA FDD - E-UTRA FDD and UTRA FDD cell search test cases	9.1.0
2009-05	RP#45	RP-090880	315			E-UTRAN Radio Link Monitoring Test Cases in DRX	9.1.0
2009-05	RP#45	RP-090880	316			Inter-frequency E-UTRA - E-UTRA HO test cases: unknown target cell	9.1.0
2009-05	RP#45	RP-090880	263	2		E-UTRA FDD UTRA FDD Blind Handover test case: unknown target cell	9.1.0
2009-05	RP#45	RP-090836	321	1		Small corrections to Measurements performance tests parameters	9.1.0
2009-05	RP#45	RP-090836	285	1		E-UTRAN GSM Cell Search in DRX Test Cases	9.1.0
2009-05	RP#45	RP-090836	267			Set 3.2. E-UTRA TDD to UTRA TDD cell search in DRX under fading	9.1.0
2009-05	RP#45	RP-090836	269			Set 3.6. Test case of E-UTRA TDD to E-UTRA TDD and UTRA TDD combined cell search under fading	9.1.0
2009-05	RP#45	RP-090836	271			Set 3.12. E-UTRA TDD to UTRA TDD blind handover test	9.1.0

2009-05	RP#45	RP-090836	279			E-UTRAN FDD - UTRAN FDD Cell Search in DRX Test Cases	9.1.0
2009-05	RP#45	RP-090836	281			E-UTRAN TDD- E-UTRAN TDD and E-UTRAN TDD Inter-frequency Cell Search Test Case	9.1.0
2009-05	RP#45	RP-090836	283			E-UTRAN GSM Blind Handover Test Cases	9.1.0
2009-05	RP#45	RP-090836	287			E-UTRAN FDD cdma2000 Blind HO Test cases	9.1.0
2009-05	RP#45	RP-090836	302			RRM Test case for multiple E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions	9.1.0
2009-05	RP#45	RP-090836	304			Fading reselection test case between E-UTRA and UTRA (UTRA of lower priority	9.1.0
2009-05	RP#45	RP-090828	233			CR SI HRPD correction	9.1.0
2009-05	RP#45	RP-090879	215	1		Corrections to Measurements of HRPD cells and cdma2000 1X	9.1.0
2009-05	RP#45	RP-090879	231			CR reference correction	9.1.0
2009-05	RP#45	RP-090879	235	1		Corrections to Measurements of GSM cells in RRC_IDLE	9.1.0
2009-05	RP#45	RP-090879	247			Range of Idle Mode Es/Iot side conditions	9.1.0
2009-05	RP#45	RP-090879	249			Removal of [ ] from Tdetect, Tmeasure and Tevaluate	9.1.0
2009-05	RP#45	RP-090879	245	1		Clarification to applicability of RSRP side conditions in Idle mode	9.1.0
2009-05	RP#45	RP-090879	317			CR Idle mode IF measurement condition	9.1.0
2009-05	RP#45	RP-090879	318			CR Idle mode IF measurement period	9.1.0
2009-05	RP#45	RP-090879	217	2		Corrections to E-UTRAN RRC_IDLE state mobility requirements	9.1.0
2009-05	RP#45	RP-090814	265	1		Correction to Random Access	9.1.0
2009-05	RP#45	RP-090816	221			E-UTRAN TDD-TDD inter frequency cell search/measurement requirements when DRX is used	9.1.0
2009-05	RP#45	RP-090816	223			E-UTRAN inter RAT measurement requirements	9.1.0
2009-05	RP#45	RP-090816	229			Correction to Monitoring of Multiple Layers Using Gaps	9.1.0
2009-05	RP#45	RP-090816	219	1		E-UTRAN FDD-FDD inter frequency measurements when DRX is used	9.1.0
2009-05	RP#45	RP-090816	322			CR GSM measurement period	9.1.0
2009-05	RP#45	RP-090816	323			CR cdma2000 1x and HRPD number of carriers	9.1.0
2009-05	RP#45	RP-090816	213	1		Editorial correction on E-UTRAN inter frequency measurements	9.1.0
2009-05	RP#45	RP-090816	261	1		E-UTRAN TDD intra frequency measurements	9.1.0
2009-05	RP#45	RP-090816	319	1		Clarification of the number of monitoring cells for intra frequency measurements	9.1.0
2009-05	RP#45	RP-090815	237			Correction of timing advance adjustment accuracy test case	9.1.0
2009-05	RP#45	RP-090815	291			Correction to UE Transmit Timing Requirements	9.1.0
2009-12	RP-46	RP-091275	329			Defining requirements for UTRA TDD measurements for SON (Technically endorsed at RAN 4 52bis in R4-093512)	9.2.0
2009-12	RP-46	RP-091272	332			Modification of test case of E-UTRA TDD intra frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093552)	9.2.0
2009-12	RP-46	RP-091272	333			Modification of test case of E-UTRA TDD inter frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093553)	9.2.0
2009-12	RP-46	RP-091286	334			Introduction of Extended LTE1500 requirements for TS36.133 (Technically endorsed at RAN 4 52bis in R4-093636)	9.2.0
2009-12	RP-46	RP-091272	336			Addition of E-UTRA TDD to UTRA FDD reselection test cases (Technically endorsed at RAN 4 52bis in R4-093686)	9.2.0
2009-12	RP-46	RP-091271	338			Correction of missing accuracy requirements for UTRAN FDD (Technically endorsed at RAN 4 52bis in R4-093689)	9.2.0
2009-12	RP-46	RP-091275	340			CR cdma2000 HRPD measurement period (Technically endorsed at RAN 4 52bis in R4-093720)	9.2.0
2009-12	RP-46	RP-091275	342			CR cdma2000 1x measurement period (Technically endorsed at RAN 4 52bis in R4-093721)	9.2.0
2009-12	RP-46	RP-091272	344			Correction for E-UTRAN FDD - UTRAN FDD Cell Search in DRX Test Cases (Technically endorsed at RAN 4 52bis in R4-093890)	9.2.0
2009-12	RP-46	RP-091272	346			Revise geometry factors for Intra freq Reselection Test Cases	9.2.0
2009-12	RP-46	RP-091271	348			Corrections on RRM parameters for Bands 12, 14, 17	9.2.0
2009-12	RP-46	RP-091271	351	1		Corrections to PDSCH RMC-s	9.2.0
2009-12	RP-46	RP-091271	353			Corrections of TS36.133	9.2.0

2009-12	RP-46	RP-091275	356	1		UTRA TDD P-CCPCH RSCP absolute accuracy measurement in E-UTRAN	9.2.0
2009-12	RP-46	RP-091275	358	1		E-UTRAN TDD - UTRAN TDD cell search for SON	9.2.0
2009-12	RP-46	RP-091275	361			Cell Search Requirements for Intra-LTE Handover to Unknown Target Cell	9.2.0
2009-12	RP-46	RP-091273	365			Combined E-UTRAN interfrequency and GSM cell search test cases (Scenario set 3.2)	9.2.0
2009-12	RP-46	RP-091271	367	1		Correction in UE UTRA TDD P-CCPCH RSCP measurement capability for R9	9.2.0
2009-12	RP-46	RP-091273	374			E-UTRAN GSM RSSI Measurement Accuracy Tests	9.2.0
2009-12	RP-46	RP-091273	375			E-UTRAN UTRAN FDD CPICH RSCP Measurement Accuracy Tests	9.2.0
2009-12	RP-46	RP-091273	376			E-UTRAN UTRAN FDD CPICH Ec/No Measurement Accuracy Tests	9.2.0
2009-12	RP-46	RP-091275	378			Cell Timing Change Requirements for Event Triggered Reporting	9.2.0
2009-12	RP-46	RP-091271	380			Correction to Power Headroom Requirements	9.2.0
2009-12	RP-46	RP-091271	382			Editorial corrections to 36.133	9.2.0
2009-12	RP-46	RP-091271	387			Editorial corrections to the time units for RRC Re-establishment test cases	9.2.0
2009-12	RP-46	RP-091272	389	1		Introduction of cell search test case in DRX to verify L3 filtering	9.2.0
2009-12	RP-46	RP-091271	391			Correction to ONCG Patterns	9.2.0
2009-12	RP-46	RP-091275	329			Defining requirements for UTRA TDD measurements for SON (Technically endorsed at RAN 4 52bis in R4-093512)	9.2.0
2009-12	RP-46	RP-091272	332			Modification of test case of E-UTRA TDD intra frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093552)	9.2.0
2009-12	RP-46	RP-091272	333			Modification of test case of E-UTRA TDD inter frequency cell reselection (Technically endorsed at RAN 4 52bis in R4-093553)	9.2.0
2010-03	RP-47	RP-100254	410			Idle mode corrections	9.3.0
2010-03	RP-47	RP-100254	405	1		UE measurement capability requirements in Idle and Connected	9.3.0
2010-03	RP-47	RP-100254	423			Correction to UE Measurement Capability Requirements in Idle Mode	9.3.0
2010-03	RP-47	RP-100254	412			Removal of activation time from interRAT handover requirements	9.3.0
2010-03	RP-47	RP-100254	417	1		Correction to UE Transmit Timing Requirements	9.3.0
2010-03	RP-47	RP-100254	402			Correction of E-UTRAN TDD inter frequency measurements_R9	9.3.0
2010-03	RP-47	RP-100254	414	1		Enhanced GSM Requirements for CSFB	9.3.0
2010-03	RP-47	RP-100254	415	1		Enhanced UTRA FDD Requirements for CSFB	9.3.0
2010-03	RP-47	RP-100255	399			Correction of RSRP value in E-UTRAN FDDFDD Inter frequency reselection test	9.3.0
2010-03	RP-47	RP-100255	397			Addition of missing Es/Noc parameters in RRM test cases	9.3.0
2010-03	RP-47	RP-100255	421			Correction to RRC Re-establishment Test Case	9.3.0
2010-03	RP-47	RP-100255	427	1		Correction of UE transmit timing test case	9.3.0
2010-03	RP-47	RP-100255	419	1		Correction to RLM Test Cases	9.3.0
2010-03	RP-47	RP-100262	407			Editorial Corrections in TS36.133(Rel-9)	9.3.0
2010-03	RP-47	RP-100263	413			Introduction of LTE in 800 MHz for Europe requirements in TS 36.133	9.3.0
2010-03	RP-47	RP-100264	395			Corrections for Extended UMTS1500 in TS36.133(Rel-9)	9.3.0
2010-03	RP-47	RP-100269	393			AOA and TA measurement report mappings	9.3.0
2010-03	RP-47	RP-100269	403	2		Mapping of UE RxTx time difference measurement	9.3.0
2010-03	RP-47	RP-100266	425	2		Home eNode B synchronization requirement	9.3.0
2010-03	RP-47	RP-100266	424	2		Minimum requirements on SI reading for HeNB inbound mobility	9.3.0
2010-06	RP-48	RP-100622	473			Clarification on radio link monitoring	9.4.0
2010-06	RP-48	RP-100622	472			Corrections of clause numbering on the test case of E-UTRAN FDD-FDD inter-frequency cell search requirements for L3 fitering	9.4.0
2010-06	RP-48	RP-100622	466	1		Correction to RRM Test Cases	9.4.0
2010-06	RP-48	RP-100622	464			Correction to RRM Requirements	9.4.0
2010-06	RP-48	RP-100622	462	1		Correction to Absolute RSRP/RSRQ Definitions	9.4.0
2010-06	RP-48	RP-100622	457			UE Measurement Capability Requirements for CDMA2000	9.4.0
2010-06	RP-48	RP-100622	455	1		Correction of E-UTRAN Inter-frequency Cell Re-selection Requirements	9.4.0
2010-06	RP-48	RP-100622	451	1		Correction to idle mode requirements(Rel-9)	9.4.0

2010-06	RP-48	RP-100622	449	1		Editorial corrections to 36.133(Rel-9)	9.4.0
2010-06	RP-48	RP-100622	447			Correction to TDD intrafrequency accuracy test case	9.4.0
2010-06	RP-48	RP-100622	441	1		Correction of Io value in E-UTRAN FDD and TDD Inter frequency RSRP tests	9.4.0
2010-06	RP-48	RP-100627	444	2		Corrections to CSG SI reading core requirement	9.4.0
2010-06	RP-48	RP-100627	445	1		RSRQ idle mode requirements	9.4.0
2010-06	RP-48	RP-100630	470	1		Test cases for R9 cell reselection enhancements	9.4.0
2010-06	RP-48	RP-100630	460			Missing E-UTRA - UTRA FDD DRX Requirements	9.4.0
2010-06	RP-48	RP-100631	442	2		Corrections to enhanced cell identification core requirement	9.4.0
2010-06	RP-48	RP-100632	469			Applicability of mobility requirements with inter-frequency RSTD measurements	9.4.0
2010-06	RP-48	RP-100632	439			UE Rx-Tx Time Difference Measurement Requirements for E-CID	9.4.0
2010-06	RP-48	RP-100632	438	2		CR UE RX-TX time-difference measurement requirement	9.4.0
2010-06	RP-48	RP-100632	433	5		RSTD Measurement Requirements for OTDOA	9.4.0
2010-06	RP-48	RP-100632	432	5		RSTD Accuracy Requirements for OTDOA	9.4.0
2010-09	RP-49	RP-100914	477	1		Cell identity change time in RRM Test cases	9.5.0
2010-09	RP-49	RP-100919	537			A clarification text in the RSTD intra-frequency accuracy requirements	9.5.0
2010-09	RP-49	RP-100920	506			Correction of drx-RetransmissionTimer parameters	9.5.0
2010-09	RP-49	RP-100915	508			Correction of Io value in RSRP FDD and TDD Intra frequency test	9.5.0
2010-09	RP-49	RP-100920	521	1		Editorial corrections to 36.133 (R9)	9.5.0
2010-09	RP-49	RP-100914	523			Alignment of REFSENS between 36.101 and 36.133(R9)	9.5.0
2010-09	RP-49	RP-100920	525	1		Correction of Time to Trigger unit for 36.133(R9)	9.5.0
2010-09	RP-49	RP-100915	505	1		Corrections to 36.133(R9)	9.5.0
2010-09	RP-49	RP-100920	528	1		E-UTRAN FDD Intra Frequency RSTD Measurement Accuracy test case	9.5.0
2010-09	RP-49	RP-100919	538	1		Correction to Enhanced BSIC Verification Requirements	9.5.0
2010-09	RP-49	RP-100919	539			Enhanced CSFB Requirements with DRX	9.5.0
2010-09	RP-49	RP-100919	540			Correction to E-CID Requirements	9.5.0
2010-09	RP-49	RP-100920	544	1		Addition of UTRA and GSM enhanced cell identification test cases	9.5.0
2010-09	RP-49	RP-100920	547	1		E-UTRAN FDD UE Rx – Tx Time Difference Measurement Accuracy test case	9.5.0
2010-09	RP-49	RP-100914	479	1		Scrambling code change time in RRM Test cases	9.5.0
2010-09	RP-49	RP-100914	549			Introduction of CSG cell reselection requirements	9.5.0
2010-09	RP-49	RP-100920	527			correction of redundant Hysteresis(Hys) for 36.133(R9)	9.5.0
2010-09	RP-49	RP-100920	488	2		Test case for TDD UE Rx-Tx time difference measurement	9.5.0
2010-09	RP-49	RP-100914	483			Clarification of Radio link monitoring test cases	9.5.0
2010-09	RP-49	RP-100915	485			Test case for E-UTRA TDD event triggered reporting when L3 filtering is used in R9	9.5.0
2010-09	RP-49	RP-100915	487			E-UTRA TDD - UTRA TDD cell reselection in fading propagation conditions: UTRA TDD is of lower priority in R9	9.5.0
2010-09	RP-49	RP-100924	492			Test case for E-UTRAN TDD in the existence of non-allowed CSG cell	9.5.0
2010-09	RP-49	RP-100915	494			PDCCH Aggregation level for RRM tests	9.5.0
2010-09	RP-49	RP-100915	503			Correction of ES/Iot value in E-UTRAN RSRQ FDD intra frequency test	9.5.0
2010-09	RP-49	RP-100915	496			Corrections to RRM OCNG Patterns	9.5.0
2010-09	RP-49	RP-100919	498			RRC timer accuracy requirement	9.5.0
2010-09	RP-49	RP-100915	501			Correction of OCNG	9.5.0
2010-09	RP-49	RP-100914	477	1		Cell identity change time in RRM Test cases	9.5.0
2010-09	RP-49	RP-100919	537			A clarification text in the RSTD intra-frequency accuracy requirements	9.5.0
2010-09	RP-49	RP-100920	506			Correction of drx-RetransmissionTimer parameters	9.5.0
2010-09	RP-49	RP-100915	508			Correction of Io value in RSRP FDD and TDD Intra frequency test	9.5.0
2010-09	RP-49	RP-100920	521	1		Editorial corrections to 36.133 (R9)	9.5.0
2010-09	RP-49	RP-100914	523			Alignment of REFSENS between 36.101 and 36.133(R9)	9.5.0
2010-09	RP-49	RP-100920	525	1		Correction of Time to Trigger unit for 36.133(R9)	9.5.0
2010-09	RP-49	RP-100915	505	1		Corrections to 36.133(R9)	9.5.0
2010-09	RP-49	RP-100920	528	1		E-UTRAN FDD Intra Frequency RSTD Measurement Accuracy test case	9.5.0
2010-09	RP-49	RP-100919	538	1		Correction to Enhanced BSIC Verification	9.5.0

						Requirements	
2010-09	RP-49	RP-100919	539			Enhanced CSFB Requirements with DRX	9.5.0
2010-09	RP-49	RP-100919	540			Correction to E-CID Requirements	9.5.0
2010-09	RP-49	RP-100920	544	1		Addition of UTRA and GSM enhanced cell identification test cases	9.5.0
2010-09	RP-49	RP-100920	547	1		E-UTRAN FDD UE Rx – Tx Time Difference Measurement Accuracy test case	9.5.0
2010-09	RP-49	RP-100914	479	1		Scrambling code change time in RRM Test cases	9.5.0
2010-09	RP-49	RP-100914	549			Introduction of CSG cell reselection requirements	9.5.0
2010-09	RP-49	RP-100920	527			correction of redundant Hysteresis(Hys) for 36.133(R9)	9.5.0
2010-09	RP-49	RP-100920	488	2		Test case for TDD UE Rx-Tx time difference measurement	9.5.0
2010-09	RP-49	RP-100914	483			Clarification of Radio link monitoring test cases	9.5.0
2010-09	RP-49	RP-100915	485			Test case for E-UTRA TDD event triggered reporting when L3 filtering is used in R9	9.5.0
2010-09	RP-49	RP-100915	487			E-UTRA TDD - UTRA TDD cell reselection in fading propagation conditions: UTRA TDD is of lower priority in R9	9.5.0
2010-09	RP-49	RP-100924	492			Test case for E-UTRAN TDD in the existence of non-allowed CSG cell	9.5.0
2010-09	RP-49	RP-100915	494			PDCCH Aggregation level for RRM tests	9.5.0
2010-09	RP-49	RP-100915	503			Correction of ES/Iot value in E-UTRAN RSRQ FDD intra frequency test	9.5.0
2010-09	RP-49	RP-100915	496			Corrections to RRM OCNG Patterns	9.5.0
2010-09	RP-49	RP-100919	498			RRC timer accuracy requirement	9.5.0
2010-09	RP-49	RP-100915	501			Correction of OCNG	9.5.0
2010-09	RP-49	RP-100927	497			CR LTE_TDD_2600_US spectrum band definition additions to TS 36.133	10.0.0
2010-12	RP-50	RP-101331	635			Corrections to 36.133 performance requirements	10.1.0
2010-12	RP-50	RP-101331	638			Correction to intra frequency cell identification time for FDD and TDD	10.1.0
2010-12	RP-50	RP-101331	566	1		Corrections and Clarifications to TS36.133	10.1.0
2010-12	RP-50	RP-101331	592	2		Correction to Radio link monitoring test cases	10.1.0
2010-12	RP-50	RP-101332	563			PDCCH Aggregation Level for RRM Tests	10.1.0
2010-12	RP-50	RP-101332	571			MIMO correlation scenario for RLM test cases	10.1.0
2010-12	RP-50	RP-101332	580			Removal of [ ] from PDSCH and PCFICH/PDCCH/PHICH Measurement Channel references in Annex A.	10.1.0
2010-12	RP-50	RP-101332	585			Enabling HARQ for RRM Tests	10.1.0
2010-12	RP-50	RP-101335	643	1		Completion of CSG cell reselection requirements	10.1.0
2010-12	RP-50	RP-101343	568			Clarification of measurements requirements for HRPD and cdma2000 1x	10.1.0
2010-12	RP-50	RP-101343	589			Addition of Band 18, 19 and 21 into UE Rx - Tx time difference requirements	10.1.0
2010-12	RP-50	RP-101343	604			Correction to Enhanced GSM Cell Identification Requirement	10.1.0
2010-12	RP-50	RP-101343	632			Correction of reselection requirement for UTRAN FDD cells	10.1.0
2010-12	RP-50	RP-101343	640			Correction to Enhanced UTRA FDD Cell Identification Requirements	10.1.0
2010-12	RP-50	RP-101343	645			E-UTRAN TDD Intra Frequency RSTD Measurement Accuracy test case	10.1.0
2010-12	RP-50	RP-101343	621	1		Correction for Measurements of inter-RAT cells	10.1.0
2010-12	RP-50	RP-101343	598	2		E-UTRAN FDD intra-frequency RSTD measurement reporting delay test case	10.1.0
2010-12	RP-50	RP-101343	600	2		E-UTRAN TDD intra-frequency RSTD measurement reporting delay test case	10.1.0
2010-12	RP-50	RP-101356	644			Band 42 and 43 parameters for UMTS/LTE 3500 (TDD) for TS 36.133	10.1.0
2010-12	RP-50	RP-101361	552			Introduction of L-band in TS36.133	10.1.0
2010-12	RP-50	RP-101388	648			Removal of square brackets from scope of TS36.133	10.1.0
2011-04	RP-51	RP-110359	0658	-		Addition of UE RRM capabilities for CA	10.2.0
2011-04	RP-51	RP-110340	0663	-		Correction to E-UTRAN TDD in-sync test requirements	10.2.0
2011-04	RP-51	RP-110348	0665	1		RSTD requirements, RMC and OCNG patterns	10.2.0
2011-04	RP-51	RP-110350	0669	-		CR to 36.133: Aligning relavant RRM requirements for Band 41 with the reference sensitivity values in 36.101	10.2.0
2011-04	RP-51	RP-110339	0676	-		Modification on test case of E-UTRA TDD to UTRA TDD cell reselection(R10)	10.2.0
2011-04	RP-51	RP-110339	0681	1		Value of MS_TXPWR_MAX_CCH for EUTRA-GSM reselection test cases A.4.4.x	10.2.0
2011-04	RP-51	RP-110339	0687	1		Rearrangement of Time periods for EUTRA-UTRA reselection test case A.4.3.1.1	10.2.0

2011-04	RP-51	RP-110339	0690	1		Removal of "Force to Cell 2" during initialisation for EUTRA-UTRA reselection test case A.4.3.1.2	10.2.0
2011-04	RP-51	RP-110340	0693	1		SNR for RRM A.8.x test cases using ETU70	10.2.0
2011-04	RP-51	RP-110408	0697	1		Requirements for Minimaztion of Drive Tests (MDT) in LTE	
2011-04	RP-51	RP-110339	0703	-		Correction to test cases of E-UTRA to UTRA cell reselection when UE is in idle state	10.2.0
2011-04	RP-51	RP-110359	0706	2		Introduction of measurement requirements for carrier aggregation	10.2.0
2011-04	RP-51	RP-110347	0709	1		Addition of test cases for FDD intra-frequency SI reading using autonomous gaps with both non DRX and DRX for Rel-10	10.2.0
2011-04	RP-51	RP-110347	0711	1		Addition of test cases for FDD inter-frequency SI reading using autonomous gaps with both non DRX and DRX for Rel-10	10.2.0
2011-04	RP-51	RP-110359	0713	1		Introduction of core requirements of radio link monitoring in CA	10.2.0
2011-04	RP-51	RP-110339	0719	1		Modification on Test Requirements in E-UTRA - UTRA TDD SON Test Case (A.8.7.3) (R10)	10.2.0
2011-04	RP-51	RP-110348	0727	2		Requirements for reporting criteria with positioning measurements	10.2.0
2011-04	RP-51	RP-110340	0736	-		Correction of RLM evaluation period in DRX	10.2.0
2011-04	RP-51	RP-110340	0739	-		Correction of inter-frequency measurement accuracy test cases	10.2.0
2011-04	RP-51	RP-110339	0744	-		Modification on Test Requirements in E-UTRA GSM cell reselection Test Case (A.4.4) (R10)	10.2.0
2011-04	RP-51	RP-110348	0747	1		Corrections to RSTD measurement for Rel-9	10.2.0
2011-04	RP-51	RP-110348	0748	-		Correction on FDD Intra Frequency RSTD Measurement Accuracy test case	10.2.0
2011-04	RP-51	RP-110348	0751	1		RSTD test case corrections	10.2.0
2011-04	RP-51	RP-110344	0753	-		Correction of serving cell performance requirements for autonomous SI acquisition	10.2.0
2011-06	RP-52	RP-110753	0785	1		Simplification of frequency dependent requirements in 36.133 (Table B.2.2-1 contains erroneous values. These wrong values will be corrected in the RAN#53 meeting.)	10.3.0
2011-06	RP-52	RP-110793	754			E-UTRAN FDD-FDD inter-frequency RSTD measurement reporting delay test case with the reference cell on the serving carrier frequency	10.3.0
2011-06	RP-52	RP-110793	755			E-UTRAN TDD-TDD inter-frequency RSTD measurement reporting delay test case with the reference cell on the serving carrier frequency	10.3.0
2011-06	RP-52	RP-110807	757			Core requirements on RRC connection mobility control in CA	10.3.0
2011-06	RP-52	RP-110807	758			Timing core requirements in CA	10.3.0
2011-06	RP-52	RP-110807	759			Introduction of Handover Requirements for Carrier Aggregation	10.3.0
2011-06	RP-52	RP-110793	760			E-UTRAN FDD Inter Frequency RSTD Measurement Accuracy test case	10.3.0
2011-06	RP-52	RP-110793	761			E-UTRAN TDD Inter Frequency RSTD Measurement Accuracy test case	10.3.0
2011-06	RP-52	RP-110786	765			Rearrangement of Time periods for EUTRA-UTRA reselection test case A.4.3.4.1	10.3.0
2011-06	RP-52	RP-110786	768			Removal of "Force to Cell 2" during initialisation for EUTRA -UTRA reselection test cases	10.3.0
2011-06	RP-52	RP-110807	776			Introduction of UE interruption requirements in SCC measurements with de-activated SCell	10.3.0
2011-06	RP-52	RP-110794	797			Editorial Correction to Cell Re-selection Requirements	10.3.0
2011-06	RP-52	RP-110789	808			Correction to side conditions for TDD inter-frequency CGI identification for Rel-10	10.3.0
2011-06	RP-52	RP-110786	814			Correction to inter-RAT cell identificiation time in DRX for Rel-10	10.3.0
2011-06	RP-52	RP-110787	817			Correction to identification time of UTRA FDD cell for SON in DRX for Rel-10	10.3.0
2011-06	RP-52	RP-110787	822			Correction to requirements of E-UTRAN TDDUTRAN TDD measurements for SON when DRX is used for Rel-10	10.3.0
2011-06	RP-52	RP-110807	829			Corrrection to the side condition for measurements for E-UTRA carrier aggregation	10.3.0
2011-06	RP-52	RP-110803	850			CR Timestamp accuracy requirements for MDT	10.3.0
2011-06	RP-52	RP-110812	778	1		Add 2GHz S-Band (Band 23) in 36.133	10.3.0
2011-06	RP-52	RP-110796	787	1		Clarification on inter-frequency layers for RSTD	10.3.0
2011-06	RP-52	RP-110794	780	1		Correction to RSTD measurement for Rel-10	10.3.0

2011-06	RP-52	RP-110807	852	1		Pcmax,c mapping	10.3.0
2011-06	RP-52	RP-110787	771	1		Clarification of Radio link monitoring test requirements (The CR was not implemented as it is not based on the latest version of the specification)	10.3.0
2011-06	RP-52	RP-110807	793	1		E-CID Measurement Requirements under Pcell Switching	10.3.0
2011-06	RP-52	RP-110807	775	1		Removal of undefined intra-freq RSRQ relative accuracy requirements in CA	10.3.0
2011-06	RP-52	RP-110789	856			Correction on E-UTRAN FDD RSTD intra frequency case	10.3.0
2011-06	RP-52	RP-110796	800	1		Addition of E-UTRAN FDD/TDD cdma2000 1xRTT measurements requirement for SON for Rel-10	10.3.0
2011-06	RP-52	RP-110790	804	1		Addition of test cases for TDD intra-frequency SI reading using autonomous gaps with both non DRX and DRX for Rel-10	10.3.0
2011-06	RP-52	RP-110790	806	1		Addition of test cases for TDD inter-frequency SI reading using autonomous gaps with both non DRX and DRX for Rel-10	10.3.0
2011-06	RP-52	RP-110787	828	1		Addition of missing EsNoc parameters in E-UTRAN TDD UTRAN TDD Measurements test cases for Rel-10	10.3.0
2011-06	RP-52	RP-110807	835	1		Clarification of UE Rx-Tx time difference measurement requirement for carrier aggregation	10.3.0
2011-06	RP-52	RP-110804	859			Expanded 1900 MHz addition to 36.133	10.3.0
2011-06	RP-52	RP-110811	860			Introduction of RLM requirement for eICIC	10.3.0
2011-06	RP-52	RP-110796	794	1		E-CID Measurement Requirements under Handover	10.3.0
2011-06	RP-52	RP-110811	762	1		CR on RLM requirements for eICIC	10.3.0
2011-06	RP-52	RP-110811	788	2		RSRP and RSRQ measurement requirements for eICIC	10.3.0
2011-06	RP-52	RP-110811	851	1		CR on RSRP and RSRQ measurement accuracy requirements for eICIC	10.3.0
2011-06	RP-52	RP-110807	802	2		Addition of OTDOA measurement requirement for E-UTRAN carrier aggregation	10.3.0
2011-09	RP-53	RP-111246	863			Thresholds and margins for reporting of neighbour cells in RRM test A.8.9.1	10.4.0
2011-09	RP-53	RP-111246	902			Thresholds and margins for RRM tests A.5.2.1 and A.5.2.2	10.4.0
2011-09	RP-53	RP-111246	905			Thresholds and margins for RRM tests A.5.2.4 and A.5.2.5	10.4.0
2011-09	RP-53	RP-111247	889			Removing [] in clause 8.1.2.2.2.2 for Rel-10	10.4.0
2011-09	RP-53	RP-111247	915			Adding condition of UTRA TDD measurement report delay requirements applied	10.4.0
2011-09	RP-53	RP-111247	930			Clarify time points and time duration for RLM tests A.7.3.x	10.4.0
2011-09	RP-53	RP-111251	926	1		Adding enhanced UTRA TDD cell identification requirements for Rel-10	10.4.0
2011-09	RP-53	RP-111251	969			CR for E-UTRAN FDD GSM event triggered reporting in AWGN with enhanced BSIC identification in R10	10.4.0
2011-09	RP-53	RP-111252	894			Requirements for RRC Connection Release with Redirection	10.4.0
2011-09	RP-53	RP-111252	960			Missing RSRQ in Intra-frequency measurement requirements	10.4.0
2011-09	RP-53	RP-111252	965	1		Requirements for RRC Connection Release with Redirection for TDD in R10	10.4.0
2011-09	RP-53	RP-111255	946			Introduction of Band 22	10.4.0
2011-09	RP-53	RP-111255	979	1		Modifications of Band 42 and 43	10.4.0
2011-09	RP-53	RP-111263	879	1		Correction to RRC connection mobility control in CA	10.4.0
2011-09	RP-53	RP-111263	895	2		RSTD Measurement Requirements under Handover	10.4.0
2011-09	RP-53	RP-111263	896	2		RSTD Measurement Requirements under Pcell Switching	10.4.0
2011-09	RP-53	RP-111263	920	1		Editorial corrections for 36.133 (Rel-10)	10.4.0
2011-09	RP-53	RP-111263	924	1		Correction to RRC connection mobility control in CA	10.4.0
2011-09	RP-53	RP-111263	927			Modifications on TDD inter frequency measurements with autonomous gaps	10.4.0
2011-09	RP-53	RP-111263	945	1		Frequency band related requirements to 36.133	10.4.0
2011-09	RP-53	RP-111263	949	1		Correction of references	10.4.0
2011-09	RP-53	RP-111263	950			Alignment of the carrier aggregation terminology	10.4.0
2011-09	RP-53	RP-111263	951			Band simplification for core requirements	10.4.0
2011-09	RP-53	RP-111263	952			Clarification in inter-frequency RSTD accuracy tests	10.4.0
2011-09	RP-53	RP-111263	953	1		Editorial corrections for RRM requirements	10.4.0
2011-09	RP-53	RP-111263	961			Missing RSRQ in E-UTRA carrier aggregation measurement requirements	10.4.0
2011-09	RP-53	RP-111265	874	1		Clarification of TDD uplink-downlink subframe configurations applicability for RSTD measurement in CA	10.4.0

2011-09	RP-53	RP-111265	875	3		CR on UE interruption requirements in SCC measurements with de-activated SCell when common DRX is used	10.4.0
2011-09	RP-53	RP-111265	883	1		Alignment of terminology for SCell measurement cycle	10.4.0
2011-09	RP-53	RP-111265	921	1		Introduction of Pcmax,c reporting requirements for carrier aggregation	10.4.0
2011-09	RP-53	RP-111266	849	3		RSTD Accuracy Requirements for Carrier Aggregation	10.4.0
2011-09	RP-53	RP-111266	898	1		Introduction of power headroom reporting requirement for carrier aggregation	10.4.0
2011-09	RP-53	RP-111308	891	1		RSRP and RSRQ measurement requirements for eICIC	10.4.0
2011-12	RP-54	RP-111681	982			Corrections of inter-frequency measurement accuracy RSRP and RSRQ test cases	10.5.0
2011-12	RP-54	RP-111682	984			Removing [] in CSFB requirement for Rel-10	10.5.0
2011-12	RP-54	RP-111693	985			Reference channel for RLM testing with eICIC	10.5.0
2011-12	RP-54	RP-111683	987			Clarification on RSTD test cases	10.5.0
2011-12	RP-54	RP-111690	988			RSRP Measurement performance Io corrections	10.5.0
2011-12	RP-54	RP-111686	989			RLM measurement requirements for eICIC	10.5.0
2011-12	RP-54	RP-111693	990			PDCCH/PCFICH transmission parameters for RLM	10.5.0
2011-12	RP-54	RP-111683	992			Clarification on PRS bandwidth	10.5.0
2011-12	RP-54	RP-111735	993			Missing RSRQ in intra-frequency measurement requirements for eICIC	10.5.0
2011-12	RP-54	RP-111686	994	1		Test case for TDD RSRQ Accuracy for Carrier Aggregation	10.5.0
2011-12	RP-54	RP-111686	995			Cell identification requirements without DRX	10.5.0
2011-12	RP-54	RP-111693	997	1		Test case for cell identification with eICIC in E-UTRAN FDD	10.5.0
2011-12	RP-54	RP-111693	998	1		Test case for cell identification with eICIC in E-UTRAN TDD	10.5.0
2011-12	RP-54	RP-111691	999	1		Carrier aggregation RSRP measurement test case for TDD	10.5.0
2011-12	RP-54	RP-111690	1001			Test case for enhanced UTRA TDD cell identification for R10	10.5.0
2011-12	RP-54	RP-111690	1003			Test case for RRC connection release redirection to UTRA TDD for R10	10.5.0
2011-12	RP-54	RP-111735	1005			Clarification of the Successful Percentage for Measurement Performance Requirements	10.5.0
2011-12	RP-54	RP-111691	1007	2		FDD Absolute and Relative RSRQ Accuracy test in CA	10.5.0
2011-12	RP-54	RP-111691	1011	1		FDD absolute and relative RSRP accuracies test in CA	10.5.0
2011-12	RP-54	RP-111693	1014	1		E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync under time domain measurement resource restriction	10.5.0
2011-12	RP-54	RP-111735	1016			E-UTRAN FDD - UTRAN TDD enhanced cell identification test under AWGN propagation conditions in R10	10.5.0
2011-12	RP-54	RP-111735	1018	1		E-UTRAN FDD RRC connection release with redirection to UTRAN TDD in R10	10.5.0
2011-12	RP-54	RP-111735	1021	1		CR for Inter-RAT SI reading	10.5.0
2011-12	RP-54	RP-111687	1022			Addition of E-UTRAN FDD - TDD Inter frequency cell reselection test case	10.5.0
2011-12	RP-54	RP-111687	1023			Addtion of E-UTRAN TDD - FDD Inter frequency cell reselection test case	10.5.0
2011-12	RP-54	RP-111687	1024			Addtion of E-UTRAN FDD - TDD Inter frequency handover test case	10.5.0
2011-12	RP-54	RP-111687	1025			Addtion of E-UTRAN TDD - FDD Inter frequency handover test case	10.5.0
2011-12	RP-54	RP-111687	1026			Addtion of E-UTRAN TDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells test case	10.5.0
2011-12	RP-54	RP-111687	1027	1		Addtion of E-UTRAN FDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells test case	10.5.0
2011-12	RP-54	RP-111687	1028			Addtion of E-UTRAN FDD - TDD inter frequency measurement accuracy test case	10.5.0
2011-12	RP-54	RP-111681	1031			Correction for the identification time in DRX for UTRA TDD in R10	10.5.0
2011-12	RP-54	RP-111735	1032			Correction the side condition for SCH in R10	10.5.0
2011-12	RP-54	RP-111735	1033	1		Correction to event triggered reporting for TS 36.133 in R10	10.5.0
2011-12	RP-54	RP-111681	1039	1		Correction of E-UTRAN TDD-TDD inter frequency handover test case in R10	10.5.0
2011-12	RP-54	RP-111735	1041			Clarification of Expected RSTD and Expected RSTD uncertainty in RSTD test cases in R10	10.5.0
2011-12	RP-54	RP-111680	1043			Thresholds and margins for RRM tests A.8.11.3 and A.8.11.4	10.5.0

2011-12	RP-54	RP-111683	1046			Thresholds and margins for RRM tests A.8.11.5 and A.8.11.6	10.5.0
2011-12	RP-54	RP-111693	1047	2		RLM Out of Sync Detection Test for eICIC	10.5.0
2011-12	RP-54	RP-111683	1049			RRC Connection Release with Redirection from E-UTRAN FDD to GERAN	10.5.0
2011-12	RP-54	RP-111693	1051			Colliding CRS in non-MBSFN ABS	10.5.0
2011-12	RP-54	RP-111683	1052			RRC Connection Release with Redirection from E-UTRAN TDD to GERAN	10.5.0
2011-12	RP-54	RP-111693	1053	1		RLM In Sync Detection Test for FDD eICIC	10.5.0
2011-12	RP-54	RP-111693	1054	1		RLM In Sync Detection Test for FDD eICIC	10.5.0
2011-12	RP-54	RP-111691	1055	1		FDD Event triggered reporting on deactivated Scell in non-DRX	10.5.0
2011-12	RP-54	RP-111691	1056	1		TDD Event triggered reporting on deactivated Scell in non-DRX	10.5.0
2011-12	RP-54	RP-111683	1058			Adding Band XX	10.5.0
2011-12	RP-54	RP-111690	1061	1		Optional faster higher priority reselection	10.5.0
2011-12	RP-54	RP-111735	1064	1		Addition of a test case at lower RSRP level for the serving cell measurement accuracy	10.5.0
2011-12	RP-54	RP-111683	1066			Test cases for RRC connection release with redirection to UTRAN FDD	10.5.0
2011-12	RP-54	RP-111735	1072			CA definition alignment in test cases	10.5.0
2011-12	RP-54	RP-111683	1074			Applicable PRS BW for RSTD accuracy requirements	10.5.0
2012-03	RP-55	RP-120304	1077	1		RSTD signalling modifications	10.6.0
2012-03	RP-55	RP-120294	1079	1		Test case for E-UTRA TDD RRC connection release redirection to UTRA TDD without SI provided for R10	10.6.0
2012-03	RP-55	RP-120294	1081	1		Test case for E-UTRA FDD RRC connection release redirection to UTRA TDD without SI provided for R10	10.6.0
2012-03	RP-55	RP-120291	1084			Thresholds and margins for E-UTRAN to C2K RRM reselection test cases (Rel-10)	10.6.0
2012-03	RP-55	RP-120294	1087			Addition of E-UTRAN TDD-HRPD Cell Reselection: HRPD is of Lower Priority test case R10	10.6.0
2012-03	RP-55	RP-120293	1089			Addition of E-UTRAN TDD-cdma2000 1X Cell Reselection: cdma2000 1X is of Lower Priority test case R10	10.6.0
2012-03	RP-55	RP-120293	1091			Addition of E-UTRAN TDD-HRPD Handover test case R10	10.6.0
2012-03	RP-55	RP-120294	1093			Addition of E-UTRAN TDD-cdma2000 1X Handover test case R10	10.6.010.6.0
2012-03	RP-55	RP-120294	1099			Addition of E-UTRAN FDD-TDD inter frequency RSRQ measurement accuracy test case R10	10.6.0
2012-03	RP-55	RP-120300	1112	1		RLM test cases with SNRs for OOS and INS for E-UTRAN TDD in eICIC	10.6.0
2012-03	RP-55	RP-120304	1115			Io difference band-independent in Inter-frequency RSRP TDD TC A.9.1.4	10.6.0
2012-03	RP-55	RP-120292	1118	1		Thresholds and margins in RRM test case A.8.11.4	10.6.0
2012-03	RP-55	RP-120292	1121			TDD PRACH Test cases value of PRACH Configuration Index and first preamble power	10.6.0
2012-03	RP-55	RP-120292	1124	1		PDSCH and OCNG pattern in PRACH Test cases A.6.2.1 and A.6.2.3	10.6.0
2012-03	RP-55	RP-120300	1134	1		Clarification of colliding CRS in MBSFN ABS	10.6.0
2012-03	RP-55	RP-120304	1135			Editorial corrections on the test cases of RRC connection release with redirection to UTRAN FDD	10.6.0
2012-03	RP-55	RP-120304	1139	1		Corrections on test case of Event triggered reporting on deactivated Scell in non-DRX CR not implemented as it is based on the wrong version of the spec	10.6.0
2012-03	RP-55	RP-120304	1140			Core requirements for E-UTRAN TDD inter-RAT UTRAN FDD SI acquisition using autonomous gaps	10.6.0
2012-03	RP-55	RP-120304	1143	1		Editorial corrections	10.6.0
2012-03	RP-55	RP-120300	1145	1		Side condition clarification for eICIC with MBSFN	10.6.0
2012-03	RP-55	RP-120300	1146			Clarification on reported cells with eICIC	10.6.0
2012-03	RP-55	RP-120294	1148			Correction of RSTD accuracy test cases for TDD	10.6.0
2012-03	RP-55	RP-120300	1151	2		RLM requirements with autonomous gaps	10.6.0
2012-03	RP-55	RP-120300	1152	1		SNR levels in out-of-sync RLM test cases for eICIC	10.6.0
2012-03	RP-55	RP-120303	1156	1		CR for 36.133: B41 REFSENS and MOP changes to accommodate single filter architecture	10.6.0
2012-03	RP-55	RP-120300	1157			eICIC measurement accuracy	10.6.0
2012-03	RP-55	RP-120307	1154	1		Introduction of Band 26/XXVI to TS 36.133	11.0.0
2012-06	RP-56	RP-120782	1162			Resolve Band 41 omission between R4-120125 and R4-121106	11.1.0
2012-06	RP-56	RP-120770	1165	1		Corrections to FDD-TDD Inter-freq RSRP measurement accuracy test case parameters	11.1.0
2012-06	RP-56	RP-120771	1168			OCNG and PDSCH for FDD-TDD event triggered	11.1.0

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2012-06	RP-56	RP-120771	1171			RRC Connection Release with Redirection from E-UTRAN FDD to GERAN without System Information	11.1.0
2012-06	RP-56	RP-120771	1174			RRC Connection Release with Redirection from E-UTRAN TDD to GERAN without System Information	11.1.0
2012-06	RP-56	RP-120784	1176			OCNG Patterns for MBSFN ABS	11.1.0
2012-06	RP-56	RP-120769	1183			Addition of E-UTRAN TDD-FDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells test case R11	11.1.0
2012-06	RP-56	RP-120769	1186			Addition of E-UTRAN TDD - FDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps test case R11	11.1.0
2012-06	RP-56	RP-120769	1189			Addition of E-UTRAN FDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells R11	11.1.0
2012-06	RP-56	RP-120769	1192			Addition of E-UTRAN FDD - TDD Inter-frequency identification of a new CGI of E-UTRA cell using autonomous gaps test case R11	11.1.0
2012-06	RP-56	RP-120777	1195	1		Addition of E-UTRAN TDD-HRPD event triggered reporting under fading propagation conditions test case R11	11.1.0
2012-06	RP-56	RP-120769	1198			Addition of E-UTRAN TDD-CDMA2000 1X event triggered reporting under fading propagation conditions test case R11	11.1.0
2012-06	RP-56	RP-120770	1201			E-UTRA TDD RRC connection release redirection to UTRA FDD test without SI provided R11	11.1.0
2012-06	RP-56	RP-120784	1205	1		FDD RSRQ under Time Domain Measurement Resource Restriction with Non-MBSFN ABS R11	11.1.0
2012-06	RP-56	RP-120784	1207	1		TDD RSRQ under Time Domain Measurement Resource Restriction with Non-MBSFN ABS R11	11.1.0
2012-06	RP-56	RP-120780	1213			CR to TS36.133 Corrections on RRC signalling in RLM test cases for eICIC	11.1.0
2012-06	RP-56	RP-120773	1223			Test case for event-triggered reporting on deactivated SCell with PCell interruption	11.1.0
2012-06	RP-56	RP-120770	1227	1		Finalization of Rel.9 cell reselection enhancement related test cases	11.1.0
2012-06	RP-56	RP-120770	1231			E-UTRAN FDD to UTRAN FDD RRC connection release with redirection test case when SI is not provided	11.1.0
2012-06	RP-56	RP-120781	1233			No interruptions on PCell at SCell activation/ deactivation when measCycleSCell is smaller than 640 ms	11.1.0
2012-06	RP-56	RP-120780	1235			Editorial corrections	11.1.0
2012-06	RP-56	RP-120782	1237	1		Reporting criteria requirements for carrier aggregation	11.1.0
2012-06	RP-56	RP-120784	1239			Cell identification requirements with DRX	11.1.0
2012-06	RP-56	RP-120784	1241	1		Phase II eICIC FDD: absolute and relative RSRP accuracies in non-MBSFN ABS	11.1.0
2012-06	RP-56	RP-120784	1243	1		Phase II eICIC TDD: absolute and relative RSRP accuracies in non-MBSFN ABS	11.1.0
2012-06	RP-56	RP-120784	1249			RLM requirements with autonomous gaps for DRX	11.1.0
2012-06	RP-56	RP-120779	1251			CR for 36.133: Aligning RSRQ measurement requirements in TS 36.133 with TS 36.101 regarding the modification of B41 REFSENS	11.1.0
2012-06	RP-56	RP-120777	1260			Bands 22, 23, 42 and 43 side conditions for inter-frequency measurements with autonomous gaps	11.1.0
2012-06	RP-56	RP-120772	1261			Clarification on UE Rx-Tx with eICIC	11.1.0
2012-06	RP-56	RP-120767	1271			sr-ConfigIndex in TDD DRX test cases	11.1.0
2012-06	RP-56	RP-120782	1273			Remove [ ] from eICIC RSRP, RSRQ Es/Iot side conditions	11.1.0
2012-06	RP-56	RP-120764	1277	1		RRM: Clarifications to the OCNG patterns	11.1.0
2012-06	RP-56	RP-120784	1279	2		Intra-Frequency FDD RSRQ Accuracy under Time Domain Measurement Resource Restriction with MBSFN ABS	11.1.0
2012-06	RP-56	RP-120784	1286	1		eICIC FDD out-of-sync RLM test case in MBSFN ABS	11.1.0
2012-06	RP-56	RP-120784	1288	1		eICIC TDD out-of-sync RLM test case in MBSFN ABS	11.1.0
2012-06	RP-56	RP-120781	1289	1		On UE behavior in the uplink subframe after measurement GAP	11.1.0
2012-06	RP-56	RP-120773	1293	1		Clarification on the number of monitoring layers for CA UEs	11.1.0
2012-06	RP-56	RP-120784	1299	2		CR on TDD RSRQ test case under Time Domain Measurement Resource Restriction with MBSFN ABS Rel11	11.1.0
2012-06	RP-56	RP-120784	1303	1		In-Sync RLM test case in MBSFN ABS for E-UTRAN	11.1.0

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2012-06	RP-56	RP-120784	1306	1		In-Sync RLM test case in MBSFN ABS for E-UTRAN TDD R11	11.1.0
2012-06	RP-56	RP-120781	1310			Inter-frequency and Inter-RAT Requirements for Measurements without Measurement Gaps	11.1.0
2012-06	RP-56	RP-120788	1318	1		The introduction of Multi-TA timing requirements R11	11.1.0
2012-06	RP-56	RP-120777	1320	1		Addition of E-UTRAN FDD RSTD measurement accuracy test case in carrier aggregation R11	11.1.0
2012-06	RP-56	RP-120777	1322			Addition of E-UTRAN TDD RSTD measurement accuracy test case in carrier aggregation R11	11.1.0
2012-06	RP-56	RP-120779	1328			Correction to RLM requirements in eICIC with Autonomous gaps R11	11.1.0
2012-06	RP-56	RP-120769	1331	1		Correction to E-UTRAN FDD/TDD - UTRAN FDD /TDD enhanced cell identification test case R11	11.1.0
2012-06	RP-56	RP-120770	1336			Correction to E-UTRAN TDD redirection to UTRAN FDD test configuration R11	11.1.0
2012-06	RP-56	RP-120780	1337	1		FDD CA RSTD Measurement Reporting Delay Test Case (Rel-11)	11.1.0
2012-06	RP-56	RP-120782	1338	1		TDD CA RSTD Measurement Reporting Delay Test Case (Rel-11)	11.1.0
2012-06	RP-56	RP-120779	1342			Correction to RSTD measurement reporting delay requirement in CA R11	11.1.0
2012-06	RP-56	RP-120795	1345	1		Add Band 25 Io values R11	11.1.0
2012-06	RP-56	RP-120777	1347	1		Clarification for cell identification condition in inter-RAT SI reading requirement R11	11.1.0
2012-06	RP-56	RP-120793	1349			Introduction of Band 28	11.1.0
2012-06	RP-56	RP-120794	1350	1		Introduction of Band 44	11.1.0
2012-06	RP-56	RP-120780	1355			Editorial corrections	11.1.0
2012-06	RP-56	RP-120766	1361	2		Correction of a timer period in inter-frequency measurement tests	11.1.0
2012-06	RP-56	RP-120764	1363	1		UL Transmit Timing Requirements	11.1.0
2012-06	RP-56	RP-120784	1364	2		Phase IIbis eICIC FDD absolute and relative RSRP accuracy with MBSFN ABS	11.1.0
2012-06	RP-56	RP-120784	1366	2		Phase IIbis eICIC TDD absolute and relative RSRP accuracy with MBSFN ABS	11.1.0
2012-06	RP-56	RP-120784	1368			OCNG correction in Phase I eICIC test cases	11.1.0
2012-06	RP-56	RP-120792	1379			Introduction of e850_LB (Band 27) to TS 36.133	11.1.0
2012-09	RP-57	RP-121301	1385			Identification of Cell 3 in RRM Test cases A.4.2.7 and A.4.2.8	11.2.0
2012-09	RP-57	RP-121301	1390			Making FDD-TDD Inter-freq RSRQ measurement accuracy test case band-agnostic	11.2.0
2012-09	RP-57	RP-121304	1392			Thresholds and margins in RRM test cases A.8.16.1 and A.8.16.2	11.2.0
2012-09	RP-57	RP-121295	1398	1		Modification of Handover Delay Requirement and Test Cases from E-UTRAN to cdma2000 1x (Rel-11)	11.2.0
2012-09	RP-57	RP-121302	1400			Correction to RSRP/RSRQ measurement accuracy tests in MBSFN R11	11.2.0
2012-09	RP-57	RP-121304	1403			Activation/ deactivation core requirement for carrier aggregation R11	11.2.0
2012-09	RP-57	RP-121313	1405			Minor corrections for E-UTRAN â€“ GSM measurements without Measurement Gaps and Rx-Tx measurements when PCell is changed	11.2.0
2012-09	RP-57	RP-121304	1407	3		RRM requirements for CA REFSENSE (Rel-11)	11.2.0
2012-09	RP-57	RP-121304	1409			Square Bracket Removal for RSTD measurement requirement in Pcell changing and Handover R11	11.2.0
2012-09	RP-57	RP-121304	1411			Correction to the E-UTRAN secondary component carrier measurements when common DRX is used R11	11.2.0
2012-09	RP-57	RP-121304	1413			Requirements for Inter-frequency Measurements without Gaps when DRX is used R11	11.2.0
2012-09	RP-57	RP-121304	1415			Clarification on TDD UL-DL subframe configurations in inter-frequency RSTD measurement without gaps R11	11.2.0
2012-09	RP-57	RP-121301	1418			Correction for E-UTRA TDD RRC connection release redirection to UTRA TDD test case R11	11.2.0
2012-09	RP-57	RP-121340	1419			Addition of E-UTRAN FDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps	11.2.0
2012-09	RP-57	RP-121340	1420			Addition of E-UTRAN TDD - UTRAN FDD identification of a new CGI of UTRAN cell using autonomous gaps	11.2.0
2012-09	RP-57	RP-121301	1423			Correction to E-UTRAN TDD-FDD Inter-frequency event triggered reporting test case R11	11.2.0
2012-09	RP-57	RP-121302	1432			Alignment for ABS configurations in RRM Tests R11	11.2.0
2012-09	RP-57	RP-121294	1433	1		Correction to RSRQ accuracy test cases R11	11.2.0
2012-09	RP-57	RP-121297	1438			Radio conditions for PBCH reading in E-UTRA	11.2.0
2012-09	RP-57	RP-121305	1444			Introduction of inter-frequency/ RAT measurements in CA	11.2.0

2012-09	RP-57	RP-121302	1449			ABS signal transmission configuration for RRM tests	11.2.0
2012-09	RP-57	RP-121340	1450	1		Table format update for adding new bands	11.2.0
2012-09	RP-57	RP-121301	1454			Editorial correction RRM	11.2.0
2012-12	RP-58	RP-121899	1458	-		Random Access requirements for SCell	11.3.0
2012-12	RP-58	RP-121861	1459	-		Correction on CA TDD RSTD measurement accuracy test cases R11	11.3.0
2012-12	RP-58	RP-121849	1461	-		Correction to high priority cell measurement of UTRA TDD R11	11.3.0
2012-12	RP-58	RP-121861	1467	-		Clarification of Test Requirements for CA RSRP, RSRQ Test Cases	11.3.0
2012-12	RP-58	RP-121850	1470	-		Remove [ ] from 10% requirement in RRM Test cases A.4.2.7 and A.4.2.8	11.3.0
2012-12	RP-58	RP-121861	1486	1		Clean up for CA	11.3.0
2012-12	RP-58	RP-121911	1487	-		Clarification of CPICH RSCP side conditions	11.3.0
2012-12	RP-58	RP-121867	1489	-		Editorial corrections	11.3.0
2012-12	RP-58	RP-121867	1497	-		Band correction in RRM requirements	11.3.0
2012-12	RP-58	RP-121861	1499	-		Correction to RSTD Measurement Reporting Delay for Carrier Aggregation Test Cases	11.3.0
2012-12	RP-58	RP-121861	1506	-		Band-dependent RRM requirements for CA	11.3.0
2012-12	RP-58	RP-121872	1507	1		CR on RLM Requirements for FeICIC	11.3.0
2012-12	RP-58	RP-121854	1516	-		Correction of OCNG Patterns for UE Rx - Tx Time Difference Test Cases	11.3.0
2012-12	RP-58	RP-121872	1517	1		Cell identification requirements in FeICIC	11.3.0
2012-12	RP-58	RP-121851	1522	-		Time offset correction in CA test cases R11	11.3.0
2012-12	RP-58	RP-121854	1529	1		Clarification on RSTD measurement requirement under HO and Pcell changing	11.3.0
2012-12	RP-58	RP-121910	1530	2		Introduction the IDC requirements in 36.133 Rel-11	11.3.0
2012-12	RP-58	RP-121849	1537	-		Correction on test cases for handover to UTRAN TDD for Rel-11	11.3.0
2012-12	RP-58	RP-121910	1542	-		Updating RRM requirements in 36.133	11.3.0
2012-12	RP-58	RP-121867	1545	-		Editorial corrections RRM	11.3.0
2012-12	RP-58	RP-121852	1549	-		Conditions in CSG reselection requirements	11.3.0
2012-12	RP-58	RP-121852	1553	-		Correcting inconsistency between inter-RAT UTRA measurements and requirements	11.3.0
2012-12	RP-58	RP-121861	1555	-		Refsens requirements for CA capable UE	11.3.0
2012-12	RP-58	RP-121854	1558	1		Intra-frequency RSTD accuracy requirements account for serving cell bandwidth	11.3.0
2012-12	RP-58	RP-121854	1559	1		Clarification on the total number of cells for RSTD inter-frequency measurement	11.3.0
2012-12	RP-58	RP-121860	1561	1		Clarification of the TDM pattern conditions	11.3.0
2012-12	RP-58	RP-121873	1562	1		MDT requirements in Rel-11	11.3.0
2012-12	RP-58	RP-121901	1563	-		Introduction of Band 29	11.3.0
2012-12						Editorial Correction	11.3.1
2013-03	RP-59	RP-130268	1477	1		Correction to Inter-frequency Measurements in CA mode test case R11	11.4.0
2013-03	RP-59	RP-130287	1480	1		Requirements for RSRP and RSRQ for E-CID Positioning	11.4.0
2013-03	RP-59	RP-130263	1566			Secondary Component carrier levels for CA RSRP Test cases A.9.1.6 and A.9.1.7	11.4.0
2013-03	RP-59	RP-130263	1568			Remove intra-frequency relative Requirement for CA RSRQ Test Cases	11.4.0
2013-03	RP-59	RP-130263	1572			Cell timing for CA RSRP and RSRQ Test cases	11.4.0
2013-03	RP-59	RP-130277	1573	1		Editorial correction for introduction of Band 29	11.4.0
2013-03	RP-59	RP-130263	1576			Clarification of retuning interruption in single carrier operation	11.4.0
2013-03	RP-59	RP-130260	1579			RRM: RMC and OCNG pattern for FDD CGI test with autonomous gaps (Rel-11)	11.4.0
2013-03	RP-59	RP-130268	1582			Correction to CSG proximity requirement	11.4.0
2013-03	RP-59	RP-130268	1584			E-UTRAN FDD Proximity Indication RRM Requirements (Rel-11)	11.4.0
2013-03	RP-59	RP-130275	1589	1		Clarification of Cell Identification core requirement in FeICIC	11.4.0
2013-03	RP-59	RP-130283	1591	1		RSRP/RSRQ measurement accuracy requirements in FeICIC	11.4.0
2013-03	RP-59	RP-130263	1598			UE interruption requirements in SCC RSTD measurements with de-activated Scell R11	11.4.0
2013-03	RP-59	RP-130287	1602			Timing offset correction in CA RSTD test cases	11.4.0
2013-03	RP-59	RP-130280	1616			Editorial corrections for IDC	11.4.0
2013-03	RP-59	RP-130262	1618			Editorial corrections for eICIC	11.4.0
2013-03	RP-59	RP-130258	1622			Editorial corrections RRM	11.4.0
2013-03	RP-59	RP-130259	1627			A clarification on measurement gap pattern in RSTD requirements	11.4.0
2013-03	RP-59	RP-130268	1642	1		Modification of PRS configuration for RSTD	11.4.0

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2013-03	RP-59	RP-130261	1644			E-UTRAN FDD Proximity Indication Test Case (Rel-11)	11.4.0
2013-06	RP-60	RP-130763	1648			Correction to test parameters for combined E-UTRA - E-UTRA and GSM cell search - Rel 11	11.5.0
2013-06	RP-60	RP-130770	1649			Remove the Brackets in cell identification of FeICIC	11.5.0
2013-06	RP-60	RP-130763	1657			Clarification on inter-frequency RSTD measurement accuracy requirement R11	11.5.0
2013-06	RP-60	RP-130765	1659	1		RRM test configurations for 20MHz R11	11.5.0
2013-06	RP-60	RP-130763	1668	1		Corrections on RSTD measurement test cases (Rel-11)	11.5.0
2013-06	RP-60	RP-130763	1673			Remove [ ] from GCI identification Test cases A.8.4.4 and A.8.4.5	11.5.0
2013-06	RP-60	RP-130761	1677			Cell 1 levels for RSRP Test cases A.9.1.3 and A.9.1.4	11.5.0
2013-06	RP-60	RP-130765	1679	1		RSRP, RSRQ RRM eICIC Test case cleanup	11.5.0
2013-06	RP-60	RP-130761	1683			Update on the GSM carrier RSSI measurement period when DRX is used	11.5.0
2013-06	RP-60	RP-130763	1692			sr-ConfigIndex in TDD-FDD Inter-frequency event triggered DRX Test case A.8.14.2	11.5.0
2013-06	RP-60	RP-130767	1694			Testing of CA tests with multiple BW combinations	11.5.0
2013-06	RP-60	RP-130767	1696			Reference measurement channels for 20 MHz Tests	11.5.0
2013-06	RP-60	RP-130765	1702			Editorial corrections RRM	11.5.0
2013-06	RP-60	RP-130761	1706			Section numbering correction	11.5.0
2013-06	RP-60	RP-130770	1708	1		Editorial corrections for FeICIC	11.5.0
2013-06	RP-60	RP-130770	1709	1		Removing an eICIC note on measurements	11.5.0
2013-06	RP-60	RP-130770	1713			Clean up for CA	11.5.0
2013-06	RP-60	RP-130763	1716			Editorial corrections in RSTD requirements	11.5.0
2013-06	RP-60	RP-130766	1719			SCell Activation Delay Requirements in CA	11.5.0
2013-06	RP-60	RP-130765	1721			Clarification on supported bandwidth combinations in RSTD requirements with CA	11.5.0
2013-06	RP-60	RP-130770	1723	1		Impact of REFSENS requirements on the core specification	11.5.0
2013-06	RP-60	RP-130770	1724			Correction of the total number of reporting criteria	11.5.0
2013-06	RP-60	RP-130769	1728	1		Condition clarification in MDT requirements	11.5.0
2013-06	RP-60	RP-130769	1732			Band 26 test cases corrections	11.5.0
2013-06	RP-60	RP-130770	1739			CR on Interruptions for Intra-band Non-contiguous Carrier Aggregation	11.5.0
2013-06	RP-60	RP-130763	1744			Time Alignment Timer in Test Case A.8.2.4	11.5.0
2013-06	RP-60	RP-130763	1745			RRM: Adding required measurement gap	11.5.0
2013-06	RP-60	RP-130761	1749			TDD PRACH configuration index for Test Cases A.8.7.2, A.8.15.2	11.5.0
2013-06	RP-60	RP-130763	1752			GSM cell list size for Test Cases A.6.3.10, A.6.3.11	11.5.0
2013-06	RP-60	RP-130763	1755			Neighbour list for Test cases A.8.5.4, A.8.7.4, A.8.9.2	11.5.0
2013-06	RP-60	RP-130763	1758			Additional corrections on intra-frequency RSTD test parameters (Rel-11)	11.5.0
2013-06	RP-60	RP-130763	1760			Additional corrections on inter-frequency RSTD test parameters (Rel-11)	11.5.0
2013-06	RP-60	RP-130767	1762			Phase I CA 20 MHz Tests: Event triggered reporting on deactivating Scells in non-DRX	11.5.0
2013-06	RP-60	RP-130763	1767			Corrections of E-UTRAN FDD CSG Proximity Indication Test Case (Rel-11)	11.5.0
2013-06	RP-60	RP-130770	1770	1		In sync detection with CRS assistance information with non-MBSFN ABS in FDD	11.5.0
2013-06	RP-60	RP-130770	1771	1		In sync detection with CRS assistance information with non-MBSFN ABS in TDD	11.5.0
2013-06	RP-60	RP-130770	1772	1		E-UTRAN FDD RLM Out-of-sync Test of FeICIC	11.5.0
2013-06	RP-60	RP-130770	1773	1		E-UTRAN TDD RLM Out-of-sync Test of FeICIC	11.5.0
2013-06	RP-60	RP-130767	1776			E-UTRAN FDD absolute and relative RSRP accuracies for 20MHz in CA R11	11.5.0
2013-06	RP-60	RP-130767	1778			E-UTRAN TDD absolute and relative RSRP accuracies for 20MHz in CA R11	11.5.0
2013-06	RP-60	RP-130765	1780			Modification of OCNG patterns of RRM test configuration for 20MHz R11	11.5.0
2013-06	RP-60	RP-130761	1782			Clarification of Pcell in 36.133 R11	11.5.0
2013-06	RP-60	RP-130767	1784			FDD Absolute and relative RSRQ accuracies for CA with 20MHz BW (Rel-11)	11.5.0
2013-06	RP-60	RP-130767	1786			TDD Absolute and relative RSRQ accuracies for CA with 20MHz BW (Rel-11)	11.5.0
2013-06	RP-60	RP-130761	1790			Correction on fading propagation condition for CA inter-RAT test cases R11	11.5.0
2013-06	RP-60	RP-130770	1791			Clean up for band 44	11.5.0
2013-06	RP-60	RP-130765	1793	1		E-UTRAN TDD UE Rx-Tx time difference test case in eICIC	11.5.0
2013-06	RP-60	RP-130770	1799	1		Test case for UE Transmit Timing Accuracy for SCell	11.5.0
2013-06	RP-60	RP-130767	1801			CR on measurements without gaps	11.5.0

2013-06	RP-60	RP-130770	1804	1		Editorial corrections RRM	11.5.0
2013-06	RP-60	RP-130765	1806	1		Clarification for UE Rx-Tx with eICIC	11.5.0
2013-06	RP-60	RP-130770	1807	2		Capturing RF requirements in the core specification	11.5.0
2013-06	RP-60	RP-130765	1808	1		Test case for UE Rx-Tx accuracy with eICIC in FDD	11.5.0
2013-06	RP-60	RP-130770	1812	1		RSRP and RSRQ relative accuracy requirements for FeICIC	11.5.0
2013-06	RP-60	RP-130765	1814	1		Adding clarification for begin and end of measurement GAP for Rel-11	11.5.0
2013-06	RP-60	RP-130770	1821			Measurement requirements with interruptions due to CA	11.5.0
2013-06	RP-60	RP-130770	1822			Clarification on antenna ports in the measured and aggressor cells with FeICIC	11.5.0
2013-06	RP-60	RP-130770	1825	1		UE Rx-Tx accuracy requirements with FeICIC	11.5.0
2013-06	RP-60	RP-130770	1826			UE Rx-Tx measurement requirements with FeICIC	11.5.0
2013-06	RP-60	RP-130770	1827	2		Test case for cell identification with FeICIC in FDD	11.5.0
2013-06	RP-60	RP-130770	1828	2		Test case for cell identification with FeICIC in TDD	11.5.0
2013-06	RP-60	RP-130770	1829	1		Corrections on Wideband RSRQ inter-frequency accuracy requirements	11.5.0
2013-06	RP-60	RP-130791	1769	1		Introduction of Band 30	12.0.0
09-2013	RP-61	RP-131303	1830	1		UTRAN FDD CPICH Ec/No measurement accuracy test for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131291	1832			Correction on the test cases for UE Transmit Timing Accuracy for SCell (Rel-12)	12.1.0
09-2013	RP-61	RP-131282	1836			Corrections on RSTD CA test parameters (Rel-12)	12.1.0
09-2013	RP-61	RP-131282	1839			FDD: RSTD measurement reporting test cases for CA with 20MHz BW (Rel-12)	12.1.0
09-2013	RP-61	RP-131282	1842			TDD: RSTD measurement reporting test cases for CA with 20MHz BW (Rel-12)	12.1.0
09-2013	RP-61	RP-131285	1844			Timing and RSRP value corrections in Test cases A.9.2.6 and A.9.2.9	12.1.0
09-2013	RP-61	RP-131285	1846			Corrections to Bands for 20MHz CA Test cases	12.1.0
09-2013	RP-61	RP-131279	1854			Cell time offset in TDD Inter-RAT test cases	12.1.0
09-2013	RP-61	RP-131303	1855			EUTRA FDD-UTRA FDD cell reselection: UTRA FDD is of lower priority	12.1.0
09-2013	RP-61	RP-131282	1860			Rel-12 CRs on synchronization requirements for E-UTRA to CDMA 2000 handover	12.1.0
09-2013	RP-61	RP-131290	1866	1		Correct the SNR values for RLM tests with non-MBSFN ABS in FeICIC R12	12.1.0
09-2013	RP-61	RP-131290	1869	1		E-UTRAN FDD RSRP Measurement Accuracy Test in FeICIC R12	12.1.0
09-2013	RP-61	RP-131290	1871	1		E-UTRAN TDD RSRP Measurement Accuracy Test in FeICIC R12	12.1.0
09-2013	RP-61	RP-131284	1873			E-UTRAN FDD UE Rx-Tx Time difference test in FeICIC R12	12.1.0
09-2013	RP-61	RP-131284	1875			E-UTRAN TDD UE Rx-Tx Time difference test in FeICIC R12	12.1.0
09-2013	RP-61	RP-131284	1881			Clarification on UE Rx-Tx accuracy requirements in FeICIC R12	12.1.0
09-2013	RP-61	RP-131284	1883			Clarification on UE Rx-Tx measurement requirements in FeICIC R12	12.1.0
09-2013	RP-61	RP-131282	1886			Clarification on antenna port for timing and eCID test cases R12	12.1.0
09-2013	RP-61	RP-131282	1889	1		Addition of TDD serving cell measurement accuracy tests R12	12.1.0
09-2013	RP-61	RP-131303	1890			Introduction of Band 31 in 36.133	12.1.0
09-2013	RP-61	RP-131303	1891			Addition of New OCNG Pattern for 5MHz	12.1.0
09-2013	RP-61	RP-131303	1892			E-UTRAN FDD intra-frequency RSRP measurement accuracy for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131303	1893			E-UTRAN FDD-FDD inter-frequency RSRP measurement accuracy for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131303	1894			E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync for 5MHz Bandwidth	12.1.0
09-2013	RP-61	RP-131303	1895			E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in asynchronous cells for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131303	1896			E-UTRAN FDD-FDD intra-frequency Cell Re-selection case for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131303	1897			E-UTRAN FDD intra-frequency RRC re-establishment for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131303	1898			E-UTRAN FDD - Contention Based Random Access Test for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131303	1899	1		E-UTRAN FDD - UE Transmit Timing Accuracy Tests for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131303	1900			E-UTRA FDD- UTRA FDD inter-RAT handover case for 5MHz bandwidth	12.1.0

09-2013	RP-61	RP-131303	1901	1		E-UTRA FDD- UTRA FDD CPICH RSCP measurement accuracy issues	12.1.0
09-2013	RP-61	RP-131285	1903			Clarification of Refesens in WB-RSRQ sections of 36.133 R12	12.1.0
09-2013	RP-61	RP-131290	1905			Remove the brackets of FeICIC side conditions R12	12.1.0
09-2013	RP-61	RP-131282	1908	1		Test cases of E-UTRAN FDD RSTD Measurement Accuracy for Carrier Aggregation for 20MHz R12	12.1.0
09-2013	RP-61	RP-131282	1913	1		Test cases of E-UTRAN TDD RSTD Measurement Accuracy for Carrier Aggregation for 20MHz R12	12.1.0
09-2013	RP-61	RP-131284	1916			Correction to SCH Es/Iot side condition for intra-frequency measurements under time domain measurement resource restriction with CRS assistance information	12.1.0
09-2013	RP-61	RP-131303	1919			E-UTRAN FDD " Non-contention Based Random Access Test for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131282	1921			Modification on the requirement for PCell interruption for Rel-12	12.1.0
09-2013	RP-61	RP-131303	1922			E-UTRAN FDD " Timing Advance Accuracy Test for 5MHz bandwidth	12.1.0
09-2013	RP-61	RP-131282	1928			Phase II CA 20 MHz Tests: Event triggered reporting on deactivating SCell and and interruption probability without DRX	12.1.0
09-2013	RP-61	RP-131303	1945	1		CR on Applicability of 5MHz Test Cases	12.1.0
09-2013	RP-61	RP-131303	1946	1		E-UTRAN FDD Radio Link Monitoring Test for In-Sync for 5MHz	12.1.0
09-2013	RP-61	RP-131303	1947			E-UTRAN FDD Intra-frequency handover test for 5MHz Channel Bandwidth	12.1.0
09-2013	RP-61	RP-131303	1948			E-UTRAN FDD Intra-frequency RSRQ Accuracy Test for 5MHz Channel Bandwidth	12.1.0
09-2013	RP-61	RP-131293	1952			Editorial corrections RRM	12.1.0
09-2013	RP-61	RP-131303	1954			E-UTRAN FDD Inter-frequency RSRQ Accuracy Test for 5MHz Channel Bandwidth	12.1.0
09-2013	RP-61	RP-131293	1955			Clarification of CGI reading requirements	12.1.0
09-2013	RP-61	RP-131303	1958	2		E-UTRAN FDD Radio Link Monitoring Test for In-Sync for 5MHz with DRX	12.1.0
09-2013	RP-61	RP-131285	1961			Editorial corrections in capturing RF requirements	12.1.0
09-2013	RP-61	RP-131282	1964			Clarification on tests for multiple bandwidths	12.1.0
09-2013	RP-61	RP-131282	1969			CR on PCell interrutptions	12.1.0
09-2013	RP-61	RP-131283	1970			Time stamp accuracy for RLF and handover failure reporting with eMDT	12.1.0
09-2013	RP-61	RP-131303	1971			FDD reference measurement channels for 5 MHz tests	12.1.0
09-2013	RP-61	RP-131303	1972			Part II RRM tests: UE intra-frequency measurements with synchronous cells in DRX FDD	12.1.0
09-2013	RP-61	RP-131303	1973			Part II RRM tests: E-UTRAN FDD - UTRAN FDD event triggered reporting under fading propagation conditions	12.1.0
09-2013	RP-61	RP-131284	1978			Correction of cell identification test case with FeICIC	12.1.0
09-2013	RP-61	RP-131284	1984			RLM requirements correction	12.1.0
09-2013	RP-61	RP-131284	1988			Clarification on antenna ports in the measured and aggressor cells for UE Rx-Tx with FeICIC	12.1.0
09-2013	RP-61	RP-131290	1990			FeICIC FDD Test for In-sync With MBSFN ABS for Rel. 12	12.1.0
09-2013	RP-61	RP-131290	1992			FeICIC TDD Test for In-sync With MBSFN ABS for Rel. 12	12.1.0
09-2013	RP-61	RP-131303	1993			Correction of the SNR value of Out of sync RLM test for 5MHz	12.1.0
12-2013	RP-62	RP-131927	1996			Corrections to CA event triggered tests on deactivated SCell with PCell interruption in non-DRX (Rel-12)	12.2.0
12-2013	RP-62	RP-131928	2003			Corrections to CA Interruption Requirements	12.2.0
12-2013	RP-62	RP-131926	2009			CRS Es/Iot for eICIC RSRP, RSRQ with MBSFN ABS Test Cases	12.2.0
12-2013	RP-62	RP-131941	2010			Correction to RSTD measurement accuracy side condition for Band 31	12.2.0
12-2013	RP-62	RP-131928	2013			Amendment on SCell Activation Delay Requirements for other activation actions	12.2.0
12-2013	RP-62	RP-131928	2016			Amendment on SCell Activation Delay Requirements in case no RS for measurement	12.2.0
12-2013	RP-62	RP-131936	2019			Correction to the SNR values for RLM tests with MBSFN ABS in FeICIC R12	12.2.0
12-2013	RP-62	RP-131936	2023			Correction for the RSRP/RSRQ test cases in FeICIC R12	12.2.0
12-2013	RP-62	RP-131928	2031	1		CR on PCell Interruptions For Inter-band CA During Measurements	12.2.0
12-2013	RP-62	RP-131939	2039			Introduction of E-UTRAN TDD WB-RSRQ test case R12	12.2.0
12-2013	RP-62	RP-131925	2044			Correction of Proximity Indication Test Case	12.2.0

						Not implemented as it is not based on the latest version of the spec	
12-2013	RP-62	RP-131939	2053			Clarifications for intra-band non-contiguous CA R12	12.2.0
12-2013	RP-62	RP-131939	2058			Inter-frequency WB-RSRQ FDD test case	12.2.0
12-2013	RP-62	RP-131928	2071			Clarification on Pcell Interruption shall not occur before SF n+5	12.2.0
12-2013	RP-62	RP-131925	2078			Correction in RSTD requirements	12.2.0
12-2013	RP-62	RP-131939	2080			Editorial corrections RRM	12.2.0
12-2013	RP-62	RP-131939	2084	1		Band simplification	12.2.0
12-2013	RP-62	RP-131931	2091			Requirements clarification under different BWs in FeICIC	12.2.0
12-2013	RP-62	RP-131931	2095			Correction in cell search FeICIC test cases	12.2.0
12-2013	RP-62	RP-131936	2097	1		Correct ABS pattern for FeICIC for In-sync with MBSFN ABS for Rel. 12	12.2.0
12-2013	RP-62	RP-131926	2104			Correction to Test cases A.9.2.9 and A.9.2.10	12.2.0
12-2013	RP-62	RP-131942	2106	1		Bands applicability in RSRP, RSRQ FDD-FDD Inter frequency tests for 5MHz Bandwidth	12.2.0
12-2013	RP-62	RP-131925	2111			Corrections to CGI Reading in Autonomous Gap	12.2.0
12-2013	RP-62	RP-131936	2123			Remove the brackets of SNR values in RLM test cases in FeICIC R12	12.2.0
12-2013	RP-62	RP-131967	2129			Correction on RMC pattern for 5MHz UE Transmit Timing Accuracy Tests	12.2.0
12-2013	RP-62	RP-131928	2135			CSI Reporting in SCell Activation Requirements	12.2.0
12-2013	RP-62	RP-131927	2143			Editorial corrections RRM	12.2.0
12-2013	RP-62	RP-131939	2145			Applying band simplification	12.2.0
12-2013	RP-62	RP-131939	2151			Correction to MTA requirements	12.2.0
12-2013	RP-62	RP-131925	2155			Correction in RSTD test cases	12.2.0
12-2013	RP-62	RP-131931	2157			Correction to interference clarification in FeICIC requirements	12.2.0
03-2014	RP-63	RP-140389	2236			Band simplification clean up	12.3.0
03-2014	RP-63	RP-140368	2234			Missing condition in CGI identification requirements	12.3.0
03-2014	RP-63	RP-140368	2224			CSI Reporting in SCell Activation Requirements	12.3.0
03-2014	RP-63	RP-140368	2258			Alignment between interruption requirements for RSTD and mobillity measurements for SCell	12.3.0
03-2014	RP-63	RP-140367	2263			Correction of Proximity Indication Test Case	12.3.0
03-2014	RP-63	RP-140380	2259			Addition of new OCNG pattern for E-UTRA TDD with 5MHz bandwidth	12.3.0
03-2014	RP-63	RP-140380	2260			Addition of new RMC for E-UTRA TDD with 5MHz bandwidth	12.3.0
03-2014	RP-63	RP-140380	2261			Addition of OCNG pattern for E-UTRA FDD with 5MHz bandwidth without MBSFN	12.3.0
03-2014	RP-63	RP-140381	2169			Updates on test case A.9.1.17 FDD—FDD Inter frequency case for 5MHz Bandwidth for R12	12.3.0
03-2014	RP-63	RP-140389	2170			Correction on the SNR values of in-sync RLM test for 5MHz	12.3.0
03-2014	RP-63	RP-140371	2200	1		Clarification of BW applicability in Rx-Tx Time Difference measurement R12	12.3.0
03-2014	RP-63	RP-140389	2182			Clarification on FDD reference measurement channels for 5 MHz tests	12.3.0
03-2014	RP-63	RP-140368	2181			Correction on PDSCH allocation in PRS subframe r12	12.3.0
03-2014	RP-63	RP-140367	2192			PRS_RA corrections	12.3.0
06-2014	RP-64	RP-140650	2331	3		Introduction of test cases for 5MHz +5MHz : absolute and relative RSRQ accuracies in CA for FDD and TDD The CR was not implemented as it contained the wrong content.	12.4.0
06-2014	RP-64	RP-140743	2366	1		SCell activation and deactivation delay test case for known SCell	12.4.0
06-2014	RP-64	RP-140910	2312			Clarification on UE Transmit Timing Accuracy test cases in DRX mode R12	12.4.0
06-2014	RP-64	RP-140910	2267			RRM: Clean-up of time offset between cells in RSTD tests (Rel-12)	12.4.0
06-2014	RP-64	RP-140910	2354			RSTD inter-frequency requirements applicability	12.4.0
06-2014	RP-64	RP-140911	2382			RRM: Remove square brackets from eICIC RLM test requirement (Rel-12)	12.4.0
06-2014	RP-64	RP-140911	2379			Correction to periodicity of ABS pattern in eICIC RRM test cases	12.4.0
06-2014	RP-64	RP-140911	2315			Correction for OCNG pattern number in RRM tests R12	12.4.0
06-2014	RP-64	RP-140911	2302			Introduce the CGI reading requirements in CA R12	12.4.0
06-2014	RP-64	RP-140911	2360	1		Test case corrections for eICIC	12.4.0
06-2014	RP-64	RP-140911	2278			Removing DPCH for handover from E-UTRAN to UTRA TDD for Rel-12	12.4.0
06-2014	RP-64	RP-140911	2422			Clean up the correction on PDSCH allocation in PRS subframe R12	12.4.0

06-2014	RP-64	RP-140911	2319			Clarification on E-UTRAN TDD - UE Timing Advance Adjustment Accuracy Test R12	12.4.0
06-2014	RP-64	RP-140914	2416			Correction to PCI configuration conditions in FeICIC tests R12	12.4.0
06-2014	RP-64	RP-140914	2338			CQI feedback periodicity correction for RLM in eICIC/FeICIC test setup	12.4.0
06-2014	RP-64	RP-140916	2307			E-UTRAN TDD - UE Timing Advance Adjustment Accuracy Test for Scell in sTAG	12.4.0
06-2014	RP-64	RP-140916	2340	1		Test case for RACH on SCell	12.4.0
06-2014	RP-64	RP-140916	2306			E-UTRAN FDD - UE Timing Advance Adjustment Accuracy Test for Scell in sTAG	12.4.0
06-2014	RP-64	RP-140918	2357			Editorial corrections RRM	12.4.0
06-2014	RP-64	RP-140918	2364			Clean up for Band 29	12.4.0
06-2014	RP-64	RP-140918	2445			Removing square brackets in FeICIC test cases	12.4.0
06-2014	RP-64	RP-140923	2387			E-UTRAN FDD RSTD measurement reporting in carrier aggregation for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140923	2388			E-UTRAN TDD RSTD measurement reporting in carrier aggregation for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140923	2389			E-UTRAN FDD RSTD measurement accuracy in CA for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140923	2390			E-UTRAN TDD RSTD measurement accuracy in CA for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140923	2290			E-UTRAN FDD absolute and relative RSRP accuracies in CA for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140923	2291			E-UTRAN TDD absolute and relative RSRP accuracies in CA for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140926	2339			Introduction of Band 32/XXXII	12.4.0
06-2014	RP-64	RP-140928	2394	1		Introduce RRM measurement requirements for eIMTA	12.4.0
06-2014	RP-64	RP-140928	2396	1		Inter frequency measurements using autonomous gaps	12.4.0
06-2014	RP-64	RP-140930	2374	1		RRM requirements for TDD-FDD CA	12.4.0
06-2014	RP-64	RP-140937	2412	1		Introduction of test cases for 5MHz +5MHz : RSTD Measurement Accuracy in Carrier Aggregation for 5 + 5MHz bandwidth	12.4.0
06-2014	RP-64	RP-140937	2330	1		Introduction of test cases for 5MHz +5MHz : absolute and relative RSRP accuracies in CA for FDD and TDD	12.4.0
06-2014	RP-64	RP-140937	2410	1		Introduction of test cases for 5MHz +5MHz : RSTD Measurement Reporting Test Case	12.4.0
06-2014	RP-64	RP-140937	2332	2		Introduction of test cases for 5MHz +5MHz : Event triggered reporting on deactivating Scells in non-DRX FDD and TDD	12.4.0
06-2014	RP-64	RP-140937	2415	1		Introduction of test cases for 5MHz +5MHz : E-UTRA event triggered reporting on deactivated SCell with PCell interruption in non-DRX	12.4.0
06-2014	RP-64	RP-140939	2294			E-UTRAN TDD absolute and relative RSRQ accuracies in CA for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140939	2385			E-UTRAN FDD Event triggered reporting on deactivating Scells and interruption probability (0.5%) without DRX for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140939	2386			E-UTRAN TDD Event triggered reporting on deactivating Scells and interruption probability (0.5%) without DRX for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140939	2292			E-UTRAN FDD absolute and relative RSRQ accuracies in CA for 5MHz+10MHz	12.4.0
06-2014	RP-64	RP-140939	2289			E-UTRAN TDD Event triggered reporting under deactivated Scell in non-DRX for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140939	2288			E-UTRAN FDD Event triggered reporting under deactivated Scell in non-DRX for 10MHz+5MHz	12.4.0
06-2014	RP-64	RP-140945	2384			Correct Correlation Matrix and Antenna Configuration for RRM test cases A.8	12.4.0
06-2014	RP-64	RP-140945	2346	1		E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG	12.4.0
06-2014	RP-64	RP-140945	2383			Correct Correlation Matrix and Antenna Configuration for RRM test cases A.4, A.7	12.4.0
06-2014	RP-64	RP-140945	2336	2		New Test Case for UE Transmit Timing Accuracy requirements in DRX	12.4.0
06-2014	RP-64	RP-140945	2268	1		UE Behaviour after Measurement Gap	12.4.0
06-2014	RP-64	RP-140945	2345	1		E-UTRAN FDD - UE Transmit Timing Accuracy Tests for SCell in sTAG	12.4.0
06-2014	RP-64	RP-140945	2419			Editorial correction for band 31 in 36.133	12.4.0
06-2014	RP-64	RP-140959	2395	2		Introduce RSRP/RSRQ measurement accuracy requirements for 3DL CA	12.4.0
06-2014	RP-64	RP-140959	2376	3		Introduce the support of 3DL CA to TS 36.133 Section 7.8 "Interruptions with Carrier Aggregation"	12.4.0
06-2014	RP-64	RP-140959	2375	2		Introduce the support of 3DL CA to TS 36.133 Section	12.4.0

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06-2014	RP-64	RP-140959	2373	2		SCell activation and deactivation delay requirements for 3 DL CA	12.4.0
09-2014	RP-65	RP-141526	2527			Tolerance levels for measurements on UTRAN	12.5.0
09-2014	RP-65	RP-141530	2474			Correction to periodicity of ABS pattern in feICIC RRM test cases	12.5.0
09-2014	RP-65	RP-141531	2515	1		Maximum transmission timing difference	12.5.0
09-2014	RP-65	RP-141536	2502			Introduction of test cases for 5MHz +5MHz : absolute and relative RSRQ accuracies in CA for FDD and TDD	12.5.0
09-2014	RP-65	RP-141539	2481			Modification on E-UTRAN event triggered reporting under deactivated SCell for 20 MHz bandwidth	12.5.0
09-2014	RP-65	RP-141545	2523	2		Introduction of BeaconRSSI measurements for WLAN/3GPP Radio Interworking	12.5.0
09-2014	RP-65	RP-141554	2492			Interruptions on Activated Serving Cells for 3DL CA	12.5.0
09-2014	RP-65	RP-141554	2495			Requirements for UE Measurements Procedures in RRC_CONNECTED State for 3DL CA	12.5.0
09-2014	RP-65	RP-141562	2454	1		Correction of values in RSTD tests	12.5.0
09-2014	RP-65	RP-141562	2457			Clarification to RSTD CA Reporting Delay tests	12.5.0
09-2014	RP-65	RP-141562	2480	1		Clarification on UE bahavior considering max transmit timing difference between TAGs R12	12.5.0
09-2014	RP-65	RP-141562	2496	1		Applicability of requirements	12.5.0
09-2014	RP-65	RP-141562	2510			Note to clarify that certain requirements do not apply to band 32	12.5.0
09-2014	RP-65	RP-141700	2471	3		Clarification for ACK/NACK feedback of CGI measurement	12.5.0
12-2014	RP-66	RP-142176	2484	2		Introducing measurement accuracy requirements for UE category 0 in TS36.133 Clause 9	12.6.0
12-2014	RP-66	RP-142176	2506	3		Measurements requirements for UE category 0 with 1 Rx	12.6.0
12-2014	RP-66	RP-142143	2534	-		Correction of PRS Signal Levels in RSTD Reporting Tests	12.6.0
12-2014	RP-66	RP-142144	2538	-		Correction of Es/Noc values in inter-frequency RSTD tests	12.6.0
12-2014	RP-66	RP-142174	2547	1		Introduction of PDSCH FRC for TDD UL-DL configuration 0	12.6.0
12-2014	RP-66	RP-142144	2553	1		Clarification on time to identify the target UTRA TDD cell for blind redirection from E-UTRA to UTRA TDD	12.6.0
12-2014	RP-66	RP-142174	2555	1		CR on inter frequency RSRP test case for eIMTA	12.6.0
12-2014	RP-66	RP-142174	2556	1		CR on inter frequency RSRQ test case for eIMTA	12.6.0
12-2014	RP-66	RP-142147	2566	-		Correction to ABS pattern and CRS Es/Iot in feICIC RRM test cases	12.6.0
12-2014	RP-66	RP-142144	2569	-		SCell activation and deactivation delay test case for unknown SCell R12	12.6.0
12-2014	RP-66	RP-142157	2573	2		Clarification on cell identification for TDD config 0	12.6.0
12-2014	RP-66	RP-142177	2585	1		RSRQ accuracy test case in TDD-FDD CA when Pcell is FDD R12	12.6.0
12-2014	RP-66	RP-142177	2586	1		RSRQ accuracy test case in TDD-FDD CA when Pcell is TDD R12	12.6.0
12-2014	RP-66	RP-142147	2597	-		Correction on Io value in CA 20MHz RSRQ test case R12	12.6.0
12-2014	RP-66	RP-142163	2598	-		Correction on Io value in CA 10MHz+5MHz RSRQ test case R12	12.6.0
12-2014	RP-66	RP-142188	2599	-		Range increase for RSRQ	12.6.0
12-2014	RP-66	RP-142188	2606	1		Clarification of parallel reporting criteria (E-UTRA)	12.6.0
12-2014	RP-66	RP-142164	2611	1		Interruptions with RSTD Measurements for 3DL CA	12.6.0
12-2014	RP-66	RP-142164	2614	-		RRM requirements for RSTD in 3 DL CA	12.6.0
12-2014	RP-66	RP-142177	2619	1		RSRP accuracy test cases for TDD-FDD CA	12.6.0
12-2014	RP-66	RP-142176	2630	-		SI reading requirements for UE category 0 with 1 Rx in FDD, TDD and HD-FDD	12.6.0
12-2014	RP-66	RP-142144	2639	-		Changes to RSTD CA Reporting Delay tests	12.6.0
12-2014	RP-66	RP-142188	2640	-		Revision of RSRP absolute accuracy requirements in Rel-12	12.6.0
12-2014	RP-66	RP-142144	2644	-		Clarifications to RSTD values	12.6.0
12-2014	RP-66	RP-142144	2656	-		Correction to RSTD Intra Frequency Delay Test Case	12.6.0
12-2014	RP-66	RP-142144	2665	-		Correction on autonomous time adjustment in MTAG case	12.6.0
12-2014	RP-66	RP-142176	2666	-		Introduce RLM requirements for LC-MTC in TS36.133	12.6.0
12-2014	RP-66	RP-142174	2669	1		Introducing test case for TDD-TDD Inter-frequency event triggered reporting for TDD UL/DL configuration 0	12.6.0
12-2014	RP-66	RP-142179	2670	1		Introducing requirements for small cell enhancement in TS36.133	12.6.0
12-2014	RP-66	RP-142180	2671	2		Introducing interruption requirements for dual connectivity into TS36.133	12.6.0

12-2014	RP-66	RP-142162	2674	-		E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX for 20MHz+10MHz	12.6.0
12-2014	RP-66	RP-142162	2675	-		E-UTRAN TDD event triggered reporting on deactivating SCell with PCell interruption in non-DRX for 20MHz+10MHz	12.6.0
12-2014	RP-66	RP-142162	2676	-		E-UTRAN TDD RSTD Measurement Reporting Test Case for 20MHz+10MHz	12.6.0
12-2014	RP-66	RP-142162	2677	-		TDD RSRP for E-UTRAN Carrier Aggregation for 20MHz+10MHz	12.6.0
12-2014	RP-66	RP-142162	2678	1		TDD RSRP for E-UTRAN Carrier Aggregation for 20MHz+10MHz	12.6.0
12-2014	RP-66	RP-142162	2679	-		E-UTRAN TDD RSTD Measurement Accuracy in Carrier Aggregation for 20MHz+10MHz	12.6.0
12-2014	RP-66	RP-142143	2682	1		Introducing positioning enhancement requirement for UE Rx-Tx accuracy	12.6.0
12-2014	RP-66	RP-142144	2686	-		Correction on CA test cases in R12	12.6.0
12-2014	RP-66	RP-142188	2687	-		Correction on E-UTRAN TDD – Non-Contention Based Random Access Test For Scell	12.6.0
12-2014	RP-66	RP-142179	2688	1		Introduction of RSRP measurement accuracy requirement for DRS based measurement	12.6.0
12-2014	RP-66	RP-142188	2690	1		Ecat clarification for iRAT	12.6.0
12-2014	RP-66	RP-142180	2694	-		CR for TS36.133 on Cell phase accuracy for Dual Connectivity	12.6.0
12-2014	RP-66	RP-142180	2695	1		Introduction of RRM requirements for Dual Connectivity	12.6.0
12-2014	RP-66	RP-142180	2696	1		Introduction of measurement requirements for Dual Connectivity	12.6.0
12-2014	RP-66	RP-142178	2697	1		Measurement and reporting of BLER in section 9	12.6.0
12-2014	RP-66	RP-142177	2698	1		Introduction of TDD-FDD CA test cases	12.6.0
12-2014	RP-66	RP-142178	2699	1		CR on measurement for MBSFN MDT	12.6.0
12-2014	RP-66	RP-142188	2707	1		PCell Interruption in Rel-12 CA	12.6.0
12-2014	RP-66	RP-142158	2708	1		UE Behaviour after Measurement Gap in CA	12.6.0
12-2014	RP-66	RP-142177	2709	1		CA RRM Testing for Multiple Duplex Modes	12.6.0
12-2014	RP-66	RP-142177	2710	1		CA RRM Testing for Fall back CA Configuration	12.6.0
12-2014	RP-66	RP-142188	2712	1		Introduction of High Doppler measurement accuracy requierments	12.6.0
12-2014	RP-66	RP-142172	2714	1		Requirements for increased carrier monitoring for idle mode 36.133	12.6.0
12-2014	RP-66	RP-142172	2715	1		Requirements for increased carrier monitoring in RRC connected state 36.133	12.6.0
12-2014	RP-66	RP-142161	2716	1		Different TDD configurations in CA	12.6.0
12-2014	RP-66	RP-142178	2722	1		MBMS requirements in section 9	12.6.0
12-2014	RP-66	RP-142179	2725	1		Intra-frequency and inter-frequency measurement accuracy requirements with DMTC	12.6.0
12-2014	RP-66	RP-142188	2727	-		RSTD accuracy requirements for smaller and larger bandwidths	12.6.0
12-2014	RP-66	RP-142149	2736	-		Corrections to E-UTRAN TDD RLM In-sync under Time Domain Measurement Resource Restriction with CRS assistance information	12.6.0
12-2014	RP-66	RP-142149	2738	-		Corrections to E-UTRAN TDD RLM Out-of-sync under Time Domain Measurement Resource Restriction with CRS Assistance Information	12.6.0
12-2014	RP-66	RP-142149	2740	-		Test case for inter-RAT HO to multicarrier UTRA	12.6.0
12-2014	RP-66	RP-142178	2741	-		CR on parallel reporting criteria for eMBMS	12.6.0
12-2014	RP-66	RP-142186	2742	-		Introduction of 2UL non-contiguous intra-band CA	12.6.0
12-2014	RP-66	RP-142021	2743	-		Introduction of 2UL inter-band CA	12.6.0
12-2014	RP-66	RP-142150	2745	-		Requirements for multicarrier handover from EUTRA to UTRA	12.6.0
03-2015	RP-77	RP-150387	2747	-		CR to Correct Implementation Error in FDD RSTD Measurement Reporting Delay Test Case and to Update Io Levels for Certain RSTD Test Cases	12.7.0
03-2015	RP-77	RP-150382	2750	-		Remove incorrect note from CA RSTD Accuracy tests	12.7.0
03-2015	RP-77	RP-150387	2751	-		Change Nprs value for 5MHz CA RSTD Accuracy tests	12.7.0
03-2015	RP-77	RP-150066	2754	1		Maximum allowed layers for multiple monitoring for CA	12.7.0
03-2015	RP-77	RP-150387	2756	-		DRX correction for interruption with dual connectivity	12.7.0
03-2015	RP-77	RP-150388	2757	-		Correction of Interruptions with RSTD Measurements for 3DL CA	12.7.0
03-2015	RP-77	RP-150387	2761	1		RRM requirements for ProSe	12.7.0
03-2015	RP-77	RP-150396	2763	1		Updating the requirements applicability for TDD config 0	12.7.0
03-2015	RP-77	RP-150394	2764	1		Cleanup for RSRQ measurement requirement for SCE	12.7.0
03-2015	RP-77	RP-150394	2774	1		Clean up the correction on discovery signal measurements	12.7.0
03-2015	RP-77	RP-150387	2775	1		Correction on MBSFN measurements	12.7.0
03-2015	RP-77	RP-150394	2776	-		Introduce CA measurement accuracy requirements for	12.7.0

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03-2015	RP-77	RP-150382	2777	-		Correction on Io in carrier aggregation test cases	12.7.0
03-2015	RP-77	RP-150387	2783	-		Introducing accuracy requirement for new RSRQ	12.7.0
03-2015	RP-77	RP-150384	2785	-		Time-domain measurement resource restriction pattern for serving cell in feICIC RSRP and RSRQ test cases	12.7.0
03-2015	RP-77	RP-150384	2791	-		CR on typo of referencing section name in CA measurements	12.7.0
03-2015	RP-77	RP-150393	2797	1		Clarification including PSCell in Note 1 for Ecat	12.7.0
03-2015	RP-77	RP-150386	2798	1		Clarification of IncMon requirements for E-UTRA idle state	12.7.0
03-2015	RP-77	RP-150386	2799	1		Clarification of IncMon requirements for E-UTRA connected state	12.7.0
03-2015	RP-77	RP-150386	2800	1		Clarification concerning IncMon scaling for non-gap-assisted measurements	12.7.0
03-2015	RP-77	RP-150382	2803	-		Correction of RMC and OCNG pattern in event triggered tests without measurement gap	12.7.0
03-2015	RP-77	RP-150394	2804	-		CR on RSRQ requirements for CRS based discovery signal	12.7.0
03-2015	RP-77	RP-150387	2808	-		Correction to RRM test cases	12.7.0
03-2015	RP-77	RP-150388	2809	-		Correction to CA Testing with Different CA Configurations	12.7.0
03-2015	RP-77	RP-150393	2811	-		Principle to test synchronous and asynchronous DC requirements	12.7.0
03-2015	RP-77	RP-150387	2814	-		Further revision of RSRP requirement for 36.133 release 12	12.7.0
03-2015	RP-77	RP-150387	2815	-		Additional bandwidths for EUTRAN activation and deactivation of known and unknown SCell in non-DRX	12.7.0
03-2015	RP-77	RP-150387	2816	1		High Doppler measurement accuracy requirements	12.7.0
03-2015	RP-77	RP-150384	2817	1		36.133 CR to change CPICH Ec/No to CPICH Ec/Io in EUTRA FDD to UTRA FDD HO test cases	12.7.0
03-2015	RP-77	RP-150388	2822	-		Maximum Transmission Timing Difference in 3DL CA	12.7.0
03-2015	RP-77	RP-150053	2824	-		Correction to the implementation of CR 2471r3 (Clarification for ACK/NACK feedback of CGI measurement)	12.7.0
06-2015	RP-68	RP-150972	2825			3 DL CA Phase I tests # 1-2: Event triggered reporting tests with deactivated SCells in non-DRX for TDD-FDD CA	12.8.0
06-2015	RP-68	RP-150961	2828			RMC for 10 MHz for UE category 0 RRM tests	12.8.0
06-2015	RP-68	RP-150957	2829			Correction to measurement scaling factor for incmon	12.8.0
06-2015	RP-68	RP-150957	2832			RSRP requierment for SCE	12.8.0
06-2015	RP-68	RP-150962	2833r 1	1		CR on FDD-FDD inter-frequency absolute and relative CRS RSRP accuracy test case	12.8.0
06-2015	RP-68	RP-150962	2834r 1	1		CR on TDD-TDD inter-frequency absolute and relative CRS RSRP accuracy test case	12.8.0
06-2015	RP-68	RP-150962	2835r 1	1		CR on FDD absolute and relative CSI-RSRP accuracy test case for E-UTRAN Carrier Aggregation	12.8.0
06-2015	RP-68	RP-150962	2836r 1	1		CR on TDD absolute and relative CSI-RSRP accuracy test case for E-UTRAN Carrier Aggregation	12.8.0
06-2015	RP-68	RP-150962	2837r 1	1		CR on FDD-FDD inter-frequency absolute and relative CSI-RSRP accuracy test case	12.8.0
06-2015	RP-68	RP-150962	2838r 1	1		CR on TDD-TDD inter-frequency absolute and relative CSI-RSRP accuracy test case	12.8.0
06-2015	RP-68	RP-150962	2839r 1	1		CR on FDD intra frequency absolute and relative CSI-RSRP accuracy test case	12.8.0
06-2015	RP-68	RP-150962	2840r 1	1		CR on TDD intra frequency absolute and relative CSI-RSRP accuracy test case	12.8.0
06-2015	RP-68	RP-150962	2842r 1	1		Intra-frequency absolute and relative RSRP accuracies in CRS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2843r 1	1		Absolute and relative RSRP accuracies for E-UTRAN Carrier Aggregation in CRS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2845r 1	1		SCE FDD intra-frequency absolute RSRQ accuracy	12.8.0
06-2015	RP-68	RP-150962	2846r 1	1		SCE TDD intra-frequency absolute RSRQ accuracy	12.8.0
06-2015	RP-68	RP-150962	2847			SCE FDD absolute RSRQ accuracy for CA	12.8.0
06-2015	RP-68	RP-150962	2848			SCE TDD absolute RSRQ accuracy for CA	12.8.0
06-2015	RP-68	RP-150961	2849r 1	1		Test for CGI acqusition requirements for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2850r 1	1		Test for cell identification for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2851			Test for handover requirements for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2852			Test for RRC re-establishment requirements for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2853r	1		HD-FDD handover requirements for UE category 0	12.8.0

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06-2015	RP-68	RP-150957	2855r 1	1		Correction of requirements for ProSe in DRX	12.8.0
06-2015	RP-68	RP-150962	2857r 1	1		E-UTRAN FDD intra frequency CRS based discovery signal measurements when DRX is used	12.8.0
06-2015	RP-68	RP-150962	2858r 1	1		E-UTRAN TDD intra frequency CRS based discovery signal measurements when DRX is used	12.8.0
06-2015	RP-68	RP-150962	2859r 1	1		E-UTRAN FDD-FDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2860r 1	1		E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in DRX based on CRS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2861r 1	1		E-UTRAN FDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2862r 1	1		E-UTRAN TDD event triggered reporting under deactivated SCell in non-DRX based on CRS based discovery signal	12.8.0
06-2015	RP-68	RP-150961	2866r 1	1		RSRP accuracy FD-FDD Intra frequency case for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2867r 1	1		RSRP accuracy HD-FDD Intra frequency case for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2868r 1	1		RSRP accuracy TDD Intra frequency case for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2869r 1	1		RSRQ accuracy FD-FDD Intra frequency case for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2870r 1	1		RSRQ accuracy HD-FDD Intra frequency case for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2871r 1	1		RSRQ accuracy TDD Intra frequency case for UE category 0	12.8.0
06-2015	RP-68	RP-150972	2872r 1	1		Test case for 3DL CA: PCell in FDD: Event triggered reporting on deactivated SCells and interruption probability (0.5%) without DRX (TDD-FDD CA)	12.8.0
06-2015	RP-68	RP-150972	2873r 1	1		Test case for 3DL CA: PCell in TDD: Event triggered reporting on deactivated SCells and interruption probability (0.5%) without DRX (TDD-FDD CA)	12.8.0
06-2015	RP-68	RP-150958	2874r 1	1		Test case for 3DL CA: Event triggered reporting on deactivated SCells and interruption probability (0.5%) without DRX (FDD CA)	12.8.0
06-2015	RP-68	RP-150968	2875r 1	1		Test case for 3DL CA: Event triggered reporting on deactivated SCells and interruption probability (0.5%) without DRX (TDD 3 DL CA)	12.8.0
06-2015	RP-68	RP-150965	2880			OTDOA RSTD Measurements on different secondary component carriers	12.8.0
06-2015	RP-68	RP-150955	2884			E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +20 MHz bandwidth R12	12.8.0
06-2015	RP-68	RP-150958	2885			E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +10 MHz bandwidth R12	12.8.0
06-2015	RP-68	RP-150955	2886			E-UTRAN TDD with 20 MHz +20 MHz bandwidth to UTRAN TDD cell search under fading propagation conditions R12	12.8.0
06-2015	RP-68	RP-150958	2887			E-UTRAN TDD with 20 MHz +10 MHz bandwidth to UTRAN TDD cell search under fading propagation conditions R12	12.8.0
06-2015	RP-68	RP-150957	2897			Further clarification of MBMSBLER reporting in section 9	12.8.0
06-2015	RP-68	RP-150962	2903r 1	1		Test case of FDD-FDD inter-frequency RSRQ measurement accuracy in discovery signal occasions	12.8.0
06-2015	RP-68	RP-150962	2904			CR on side conditions for inter-frequency measurement for SCE	12.8.0
06-2015	RP-68	RP-150962	2905			CR on test case for RSRQ TDD-TDD inter frequency measurement accuracy requirement for SCE	12.8.0
06-2015	RP-68	RP-150955	2906r 1	1		Maximum Rx difference between Pcell and Scell in section 7.9	12.8.0
06-2015	RP-68	RP-150962	2908r 1	1		FDD-FDD intra frequency event triggered reporting in DRX based on CSI-RS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2909r 1	1		TDD-TDD intra frequency event triggered reporting in DRX based on CSI-RS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2910r 1	1		FDD-FDD inter frequency event triggered reporting in DRX based on CSI-RS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2911r 1	1		TDD-TDD inter frequency event triggered reporting in DRX based on CSI-RS based discovery signal	12.8.0

06-2015	RP-68	RP-150962	2912r 1	1		FDD event triggered reporting under deactivated SCell in non-DRX based on CSI-RS based discovery signal	12.8.0
06-2015	RP-68	RP-150962	2913r 1	1		TDD event triggered reporting under deactivated SCell in non-DRX based on CSI-RS based discovery signal	12.8.0
06-2015	RP-68	RP-150957	2915r 2	2		CR of DC interruption requirements	12.8.0
06-2015	RP-68	RP-150965	2916r 1	1		Event triggered reporting on deactivated SCells in non-DRX (FDD CA)	12.8.0
06-2015	RP-68	RP-150965	2917r 1	1		Event triggered reporting on deactivated SCells in non-DRX (TDD CA)	12.8.0
06-2015	RP-68	RP-150972	2919r 1	1		Introduction of RRM test case for E-UTRAN TDD-FDD 3 DL CA activation and deactivation of known SCell in non-DRX with PCell in FDD	12.8.0
06-2015	RP-68	RP-150972	2920r 1	1		Introduction of RRM test case for E-UTRAN TDD-FDD 3 DL CA activation and deactivation of known SCell in non-DRX with PCell in TDD	12.8.0
06-2015	RP-68	RP-150972	2921			3DL CA Phase I tests #11_3DL FDD CA SCell activation and deactivation for known SCells without DRX	12.8.0
06-2015	RP-68	RP-150965	2921a			Correction of implementation of CR 2644 in Table A.9.8.1.1-1	12.8.0
06-2015	RP-68	RP-150972	2922			3DL CA Phase I tests #12_3DL TDD CA SCell activation and deactivation for known SCells without DRX	12.8.0
06-2015	RP-68	RP-150959	2922a r2	2		Incmon CR for FDD-FDD Interfrequency correct reporting of measurement events without reduced performance group configured, non DRX	12.8.0
06-2015	RP-68	RP-150959	2923r 2	2		Incmon CR for TDD-TDD Interfrequency correct reporting of measurement events without reduced performance group configured, non DRX	12.8.0
06-2015	RP-68	RP-150963	2928r 1	1		FDD RLM Test Case for Out-of-sync in DRX for PSCell in asynchronous DC	12.8.0
06-2015	RP-68	RP-150963	2929r 1	1		FDD RLM Test Case for In-sync in DRX for PSCell in asynchronous DC	12.8.0
06-2015	RP-68	RP-150954	2932			Correction of Cell Time offset in RSTD CA Test cases (Rel-12)	12.8.0
06-2015	RP-68	RP-150963	2933r 1	1		Introduction of DC intra-frequency event triggered reporting with DRX in synchronous FDD DC	12.8.0
06-2015	RP-68	RP-150963	2934r 1	1		Introduction of DC intra-frequency event triggered reporting with DRX in synchronous TDD DC	12.8.0
06-2015	RP-68	RP-150963	2935r 1	1		Introduction of DC intra-frequency event triggered reporting with DRX in asynchronous FDD DC	12.8.0
06-2015	RP-68	RP-150963	2936r 1	1		Introduction of DC inter-frequency event triggered reporting with DRX in synchronous FDD DC	12.8.0
06-2015	RP-68	RP-150963	2937r 1	1		Introduction of DC inter-frequency event triggered reporting with DRX in synchronous TDD DC	12.8.0
06-2015	RP-68	RP-150959	2938r 1	1		Testcases for E-UTRA Incmon idle interfrequency reselection	12.8.0
06-2015	RP-68	RP-150962	2940r 2	2		CR on minimum number of subframes for discovery-based measurements	12.8.0
06-2015	RP-68	RP-150961	2941r 1	1		E-UTRAN FD-FDD Radio Link Monitoring Tests for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2942r 1	1		E-UTRAN HD-FDD Radio Link Monitoring Tests for UE category 0	12.8.0
06-2015	RP-68	RP-150961	2943r 1	1		E-UTRAN TDD Radio Link Monitoring Tests for UE category 0	12.8.0
06-2015	RP-68	RP-150958	2944r 1	1		Absolute and relative RSRP accuracies in FDD 3 DL CA	12.8.0
06-2015	RP-68	RP-150968	2945r 1	1		Absolute and relative RSRP accuracies in TDD 3 DL CA	12.8.0
06-2015	RP-68	RP-150972	2946r 1	1		PCell in FDD: absolute and relative RSRQ accuracies in TDD-FDD 3 DL CA	12.8.0
06-2015	RP-68	RP-150972	2947r 1	1		PCell in TDD: absolute and relative RSRQ accuracies in TDD-FDD 3 DL CA	12.8.0
06-2015	RP-68	RP-150959	2950			FDD-FDD Interfrequency correct reporting of measurement events with reduced performance group configured for non DRX IncMon	12.8.0
06-2015	RP-68	RP-150959	2951			TDD-TDD Interfrequency correct reporting of measurement events with reduced performance group configured for non DRX IncMon	12.8.0
06-2015	RP-68	RP-150963	2952r 1	1		E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX for PSCell in synchronous dual connectivity	12.8.0
06-2015	RP-68	RP-150963	2953r 1	1		E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX for PSCell in synchronous dual connectivity	12.8.0

06-2015	RP-68	RP-150961	2954r 1	1		E-UTRAN FDD PCell interruption at transitions between active and non-active when DRX is used in PSCell in asynchronous dual connectivity	12.8.0
06-2015	RP-68	RP-150958	2955			E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell for 20 MHz +10 MHz bandwidth R12	12.8.0
06-2015	RP-68	RP-150955	2956			E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG for 20 MHz +20 MHz bandwidth R12	12.8.0
06-2015	RP-68	RP-150958	2957			E-UTRAN TDD - UE Transmit Timing Accuracy Tests for SCell in sTAG for 20 MHz +10 MHz bandwidth R12	12.8.0
06-2015	RP-68	RP-150955	2958			E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test for Scell in sTAG for 20 MHz +20 MHz bandwidth R12	12.8.0
06-2015	RP-68	RP-150958	2959			E-UTRAN TDD – UE Timing Advance Adjustment Accuracy Test for Scell in sTAG for 20 MHz +10 MHz bandwidth R12	12.8.0
06-2015	RP-68	RP-150965	2962			Addition PDSCH RMC for 5MHz with user data	12.8.0
06-2015	RP-68	RP-150972	2967r 1	1		3 DL CA Phase II tests # 1-2: RSRP measurement accuracies for TDD-FDD CA	12.8.0
06-2015	RP-68	RP-150963	2971r 1	1		PSCell Add and Release Delay Tests for Synchronous DC	12.8.0
06-2015	RP-68	RP-150963	2972r 1	1		PSCell Add and Release Delay Tests for Asynchronous DC	12.8.0
06-2015	RP-68	RP-150959	2975r 1	1		Idle mode FDD to UTRA FDD interRAT reselection	12.8.0
06-2015	RP-68	RP-150959	2976r 1	1		Idle mode TDD to UTRA FDD interRAT reselection	12.8.0
06-2015	RP-68	RP-150959	2977			E-UTRA FDD InterRAT UTRA FDD correct reporting of measurement events with reduced performance group configured, non DRX	12.8.0
06-2015	RP-68	RP-150959	2978			E-UTRA TDD InterRAT UTRA FDD correct reporting of measurement events with reduced performance group configured, non DRX	12.8.0
06-2015	RP-68	RP-150963	2979r 1	1		E-UTRAN FDD PCell interruption at transitions between active and non-active when DRX is used in PSCell in synchronous dual connectivity	12.8.0
06-2015	RP-68	RP-150963	2980r 1	1		E-UTRAN TDD PCell interruption at transitions between active and non-active when DRX is used in PSCell in synchronous dual connectivity	12.8.0
06-2015	RP-68	RP-150963	2981r 1	1		E-UTRAN FDD inter-frequency event triggered reporting in asynchronous dual connectivity	12.8.0
06-2015	RP-68	RP-150958	2984r 1	1		Modification for interruption period for SCell (de-)activation with 3DL	12.8.0
06-2015	RP-68	RP-150959	2987r 1	1		Test cases of Idle mode E-UTRA to UTRA TDD interRAT cell reselection for IncMon	12.8.0
06-2015	RP-68	RP-150959	2988r 1	1		Test cases of Interfrequency correct reporting of measurement events with reduced performance group configured, DRX	12.8.0
06-2015	RP-68	RP-150963	2989r 2	2		E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX for PSCell in synchronous dual connectivity	12.8.0
06-2015	RP-68	RP-150963	2990r 2	2		E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX for PSCell in synchronous dual connectivity	12.8.0
06-2015	RP-68	RP-150957	2992			CR on interruption during D2D discovery for D2D single RF chain	12.8.0
06-2015	RP-68	RP-150965	2993			CR on E-UTRAN TDD-TDD inter frequency measurements when DRX is used	12.8.0
06-2015	RP-68	RP-150965	2998			Test case of FDD-FDD inter-frequency new RSRQ measurement accuracy	12.8.0
06-2015	RP-68	RP-150965	2999			Test case of TDD-TDD inter-frequency new RSRQ measurement accuracy	12.8.0
06-2015	RP-68	RP-150955	3001			Correction to feICIC cell configurations in RLM	12.8.0
06-2015	RP-68	RP-150955	3003			Correction to A.8.1.8	12.8.0
06-2015	RP-68	RP-150972	3004r 1	1		CR on absolute and relative RSRQ accuracies in TDD 3DL CA	12.8.0
06-2015	RP-68	RP-150972	3005r 1	1		CR on absolute and relative RSRQ accuracies in FDD 3DL CA	12.8.0
06-2015	RP-68	RP-150965	3006			CR for test case of new RSRQ measurement accuracy in FDD	12.8.0
06-2015	RP-68	RP-150965	3007			CR for test case of new RSRQ measurement accuracy in TDD	12.8.0
06-2015	RP-68	RP-150972	3008r 1	1		RSTD measurement reporting in FDD 3 DL CA	12.8.0
06-2015	RP-68	RP-150972	3009r	1		RSTD measurement reporting in TDD 3 DL CA	12.8.0

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06-2015	RP-68	RP-150972	3010r 1	1		RSTD measurement accuracy in FDD 3 DL CA	12.8.0
06-2015	RP-68	RP-150972	3011r 1	1		RSTD measurement accuracy in TDD 3 DL CA	12.8.0
06-2015	RP-68	RP-150964	3012r 2	2		Clarification of ProSe requirements in ONC	12.8.0
06-2015	RP-68	RP-150957	3013			Correction to Asynchronous Requirements for DC for only FDD-FDD	12.8.0
06-2015	RP-68	RP-150959	3014			E-UTRA TDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured non DRX IncMon	12.8.0
06-2015	RP-68	RP-150959	3015			E-UTRA FDD InterRAT UTRA TDD correct reporting of measurement events with reduced performance group configured non DRX for IncMon	12.8.0
06-2015	RP-68	RP-150958	3016			Correction to E-UTRA TDD event triggered reporting under deactivated SCell in non-DRX for 20 MHz + 10 MHz	12.8.0
06-2015	RP-68	RP-150969	2893			Carrier aggregation test cases for band 31	13.0.0
06-2015	RP-68	RP-150974	2966			4DL CA RRM requirements for “UE Measurements Procedures in RRC_CONNECTED State”	13.0.0
06-2015	RP-68	RP-150974	2970	1		RRM Requirements in Section 7 for 4 DL CA	13.0.0
09-2015	RP-69	RP-151475	3020	-		Correction of Ior/Ioc value in RRM Test case A.4.3.1.1	13.1.0
09-2015	RP-69	RP-151479	3022	-		Cleanup of 3DL CA RRM Test cases	13.1.0
09-2015	RP-69	RP-151483	3031	-		Time offset between cells	13.1.0
09-2015	RP-69	RP-151497	3032	-		Requirements for DC on ACK/NACK reporting for measurements using autonomous gaps	13.1.0
09-2015	RP-69	RP-151475	3034	-		Interruptions at overlapping addition/release/activation/deactivation of SCells	13.1.0
09-2015	RP-69	RP-151504	3035	-		RRM Requirements for 3 DL/2UL Inter-band CA	13.1.0
09-2015	RP-69	RP-151483	3037	-		CR on editorial corrections in TS36133 in Rel-13	13.1.0
09-2015	RP-69	RP-151478	3039	-		CR on item title of table in clause 8.1.2.4.5.1 in TS36133 in Rel-13	13.1.0
09-2015	RP-69	RP-151500	3041	-		3DL CA Phase II tests #15_ SCell activation and deactivation for unknown SCells without DRX (FDD 3 DL CA) in Rel-13	13.1.0
09-2015	RP-69	RP-151500	3043	-		3DL CA Phase II tests #16_SCell activation and deactivation for unknown SCells without DRX (TDD 3 DL CA) in Rel-13	13.1.0
09-2015	RP-69	RP-151475	3045	-		Modifying test case of E-UTRAN 2DL TDD CA activation of unknown SCell in non-DRX in Rel-13	13.1.0
09-2015	RP-69	RP-151480	3047	-		CR on delete note in table 8.5.2.1.6.1-1 in TS36133 in Rel-13	13.1.0
09-2015	RP-69	RP-151479	3052	-		Correction of inconsistency in 3 DL CA Event Triggered Reporting under Deactivated SCells in Non-DRX	13.1.0
09-2015	RP-69	RP-151479	3054	-		CR on Interruptions at PSCell Addition/release	13.1.0
09-2015	RP-69	RP-151483	3062	-		Corrections to the RMC configurations in 36.133 R13	13.1.0
09-2015	RP-69	RP-151479	3064	-		Remove the Brackets in RLM Tests for UE category 0 R13	13.1.0
09-2015	RP-69	RP-151474	3066	1		Adding SNR values to DC RLM test cases R13	13.1.0
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History

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