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TECHNICAL SPECIFICATION

**LTE;**
**Evolved Universal Terrestrial Radio Access (E-UTRA);**
**Requirements for support of radio resource management**
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# Contents

# Foreword

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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 ".

# 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].

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

**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.

**MBSFN ABS:** ABS configured in MBSFN-configurable subframe.

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

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

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

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

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

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

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

**TDD configuration with CA**: the same uplink-downlink and special subframe configurations [16] in the PCell and SCell are assumed in this version of the specification.

**TDD configuration with inter-frequency**: the same uplink-downlink and special subframe configurations [16] in all the cells on the serving and inter-frequency carriers are assumed in this version of the specification.

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. |
| $N_{\mathrm{TA}}$ | Timing offset between uplink and downlink radio frames at the UE, as defined in clause 3.1 in TS 36.211. |
| $N_{\mathrm{TA\ offset}}$ | Fixed timing advance offset, as defined in clause 3.1 in TS 36.211. |
| $P_{\mathrm{CMAX}}$ | Configured UE transmitted power as defined in clause 6.2.5 in TS 36.101. |
| $P_{\mathrm{CMAX},c}$ | 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 |
| $\mathrm{Thresh}_{\mathrm{x,\ high}}$ | Defined in TS 36.304 , subclause 5.2.4.7 |
| $\mathrm{Thresh}_{\mathrm{x,\ low}}$ | Defined in TS 36.304 , subclause 5.2.4.7 |
| $\mathrm{Thresh}_{\mathrm{serving,\ low}}$ | Defined in TS 36.304 , subclause 5.2.4.7 |
| $T_{\mathrm{PRS}}$ | Cell-specific positioning subframe configuration period as defined in clause 6.10.4.3 in TS 36.211 |
| $\mathrm{T}_{\mathrm{RE\text{-}ESTABLISH\text{-}REQ}}$ | 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 |
| $\mathrm{Treselection}_{\mathrm{RAT}}$ | Defined in TS 36.304 , subclause 5.2.4.7 |
| $\mathrm{Treselection}_{\mathrm{EUTRA}}$ | Defined in TS 36.304 , subclause 5.2.4.7 |
| $\mathrm{Treselection}_{\mathrm{UTRA}}$ | Defined in TS 36.304 , subclause 5.2.4.7 |
| $\mathrm{Treselection}_{\mathrm{GERA}}$ | Defined in TS 36.304 , subclause 5.2.4.7 |
| $\mathrm{T}_{\mathrm{S}}$ | 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 |
| AWGN | Additive White Gaussian Noise |
| BCCH | Broadcast Control Channel |
| BCH | Broadcast Channel |
| CA | Carrier Aggregation |
| CC | Component Carrier |
| CCCH SDU | Common Control Channel SDU |
| 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 |
| DCCH | Dedicated Control Channel |
| DL | Downlink |
| DRX | Discontinuous Reception |
| DTCH | Dedicated Traffic Channel |
| DUT | Device Under Test |
| E-CID | Enhanced Cell-ID (positioning method) |
| ECGI | Evolved CGI |
| 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 |
| HO | Handover |
| HRPD | High Rate Packet Data |
| IDC | In-Device Coexistence |
| LPP | LTE Positioning Protocol |
| MAC | Medium Access Control |
| MBSFN | Multimedia Broadcast multicast service Single Frequency Network |
| MBSFN ABS | MBSFN Almost Blank Subframe |
| MDT | Minimization of Drive Tests |
| 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 |
| PRS | Positioning Reference Signal |
| PSS | Primary Synchronization Signal |
| pTAG | Primary Timing Advance Group |
| PUCCH | Physical Uplink Control CHannel |
| PUSCH | Physical Uplink Shared Channel |
| RSCP | 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 |
| SCH | Synchronization Channel |
| SCell | Secondary Cell |
| SDU | Service Data Unit |
| SFN | System Frame Number |

| | |
|---|---|
| SI | System Information |
| SIB | System Information Block |
| SON | Self Optimized Network |
| SRS | Sounding Reference Signal |
| SSS | Secondary Synchronization Signal |
| sTAG | Secondary Timing Advance Group |
| TAG | Timing Advance Group |
| TDD | Time Division Duplex |
| 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 |
| 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 | |
|---|---|---|---|---|
| | **Band group notation** | **Operating bands** | **Band group notation** | **Operating bands** |
| A | FDD_A | 1, 4, 6, 10, 11, 18, 19, 21, 23, 24 | TDD_A | 33, 34, 35, 36, 37, 38, 39, 40 |
| B | FDD_B | - | TDD_B | - |
| C | FDD_C | 9 | TDD_C | 42, 43 |
| D | FDD_D | 28 | TDD_D | - |
| E | FDD_E | 2, 5, 7, 27 | TDD_E | 41, 44 |
| F | FDD_F | 26 [Note 3] | TDD_F | - |
| G | FDD_G | 3, 8, 12, 13, 14, 17, 20, 22, 29 [Note 2] | TDD_G | - |
| H | FDD_H | 25 | TDD_H | - |

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 as SCC 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.

# 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.

### 4.2.2 Requirements

The UE shall search every layer of higher priority at least every $T_{higher\_priority\_search} = (60 * N_{layers})$ seconds, 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.

#### 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 has evaluated 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 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 10 s, the UE shall initiate cell selection procedures for the selected PLMN as defined in [1].

**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 |

### 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 $T_{measure,EUTRAN\_Intra}$ (see table 4.2.2.3-1) 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 $T_{measure,EUTRAN\_Intra}/2$

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 $T_{evaluate,E\text{-}UTRAN\_intra}$ when $T_{reselection} = 0$ as specified in table 4.2.2.3-1 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 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 4.2.2.3-1 : $T_{detect,EUTRAN\_Intra}$, $T_{measure,EUTRAN\_Intra}$ and $T_{evaluate,\ E\text{-}UTRAN\_intra}$**

| DRX cycle length [s] | $T_{detect,EUTRAN\_Intra}$ [s] (number of DRX cycles) | $T_{measure,EUTRAN\_Intra}$ [s] (number of DRX cycles) | $T_{evaluate,E\text{-}UTRAN\_intra}$ [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) |

### 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.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the reselection criteria defined in TS36.304 within $K_{carrier} * T_{detect,EUTRAN\_Inter}$ 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.

The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell. 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.

The UE shall measure RSRP or RSRQ at least every $K_{carrier}$ * $T_{measure,EUTRAN\_Inter}$ (see table 4.2.2.4-1) for identified lower or equal priority inter-frequency cells. 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.

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 has met reselection criterion defined TS 36.304 within $K_{carrier}$ * $T_{evaluate,E-UTRAN\_Inter}$ when $T_{reselection} = 0$ as specified in table 4.2.2.4-1 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.

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

| DRX cycle length [s] | $T_{detect,EUTRAN\_Inter}$ [s] (number of DRX cycles) | $T_{measure,EUTRAN\_Inter}$ [s] (number of DRX cycles) | $T_{evaluate,E-UTRAN\_Inter}$ [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) |

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

### 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.

#### 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 parameter $N_{UTRA\_carrier}$ is the number of carriers in the neighbour frequency list. 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.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the reselection criteria in TS 36.304 within time $(N_{UTRA\_carrier}) * T_{detectUTRA\_FDD}$ 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.

Cells which have been detected shall be measured at least every $(N_{UTRA\_carrier}) * T_{measureUTRA\_FDD}$ 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.

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 $(N_{UTRA\_carrier}) * T_{evaluateUTRA\_FDD}$ when $T_{reselection} = 0$ as speficied in table 4.2.2.5.1-1 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.

**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) |

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 parameter $N_{UTRA\_carrier\_TDD}$ is the number of carriers used in the neighbour frequency list. 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. 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.

The UE shall evaluate whether newly detectable UTRA TDD cells have met the reselection criteria in TS 36.304 within time $(N_{UTRA\_carrier\_TDD}) * T_{detectUTRA\_TDD}$ when Srxlev $\leq S_{nonIntraSearchP}$ or Squal $\leq S_{nonIntraSearchQ}$ when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least 6dB.

Cells which have been detected shall be measured at least every $(N_{UTRA\_carrier\_TDD}) * T_{measureUTRA\_TDD}$ Srxlev $\leq S_{nonIntraSearchP}$ or Squal $\leq S_{nonIntraSearchQ}$.

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.

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 $N_{UTRA\_carrier\_TDD}$ *$T_{evaluateUTRA\_TDD}$ when $T_{reselection}$ = 0 as specified in table 4.2.2.5.2-1 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.

**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) |

For higher priority cells, a UE may optionally use a shorter value for $\mathbf{T_{measureUTRA\_TDD}}$,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 $T_{measure,GSM}$ (see table 4.2.2.5.3-1).

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.

**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) |

#### 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 $T_{evaluateHRPD}$.

Table 4.2.2.5.4-1 gives values of $T_{measureHRPD}$ and $T_{evaluateHRPD}$.

**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) |

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 $T_{evaluateCDMA2000\_1X}$.

Table 4.2.2.5.5-1 gives values of $T_{measureCDMA2000\_1X}$ and $T_{evaluateCDMA2000\_1X}$.

**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) |

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.

### 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.

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.

### 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.

### 4.2.2.10 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<br><br>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**

<table>
<tr><th>Parameter</th><th>Unit</th><th>Cell 1</th><th>Cell 2</th></tr>
<tr><td>EARFCN [Note1]</td><td></td><td>Channel 1</td><td>N/A</td></tr>
<tr><td>UARFCN [Note1]</td><td></td><td>N/A</td><td>Channel 2</td></tr>
<tr><td>CSG indicator</td><td></td><td>False</td><td>True</td></tr>
<tr><td>Physical cell identity [Note1]</td><td></td><td>1</td><td>N/A</td></tr>
<tr><td>Primary scrambling code [Note1]</td><td></td><td>N/A</td><td>Scrambling code 2</td></tr>
<tr><td>CSG identity</td><td></td><td>Not sent</td><td>Sent (Already stored in UE whitelist from previous visit)</td></tr>
<tr><td>Propagation conditions</td><td></td><td colspan="2">Static, non multipath</td></tr>
<tr><td>CSG cell previously visited by UE</td><td></td><td colspan="2">Yes</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td rowspan="13">0</td><td rowspan="16">N/A</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>Qrxlevmin</td><td>dBm</td><td>-140</td></tr>
<tr><td>$N_{oc}$</td><td>dBm/15 kHz</td><td>Off</td></tr>
<tr><td>RSRP [Note2]</td><td>dBm/15 KHz</td><td>-110</td></tr>
<tr><td>CPICH_RSCP [Note2]</td><td>dBm</td><td rowspan="8">N/A</td><td>-100</td></tr>
<tr><td>CPICH_Ec/Ior</td><td>dB</td><td>-10</td></tr>
<tr><td>PCCPCH_Ec/Ior</td><td>dB</td><td>-12</td></tr>
<tr><td>SCCPCH_Ec/Ior</td><td>dB</td><td>-12</td></tr>
<tr><td>AICH_Ec/Ior</td><td>dB</td><td>-15</td></tr>
<tr><td>SCH_Ec/Ior</td><td>dB</td><td>-15</td></tr>
<tr><td>PICH_Ec/Ior</td><td>dB</td><td>-15</td></tr>
<tr><td>$I_{oc}$</td><td>dBm/3.84 MHz</td><td>Off</td></tr>
<tr><td colspan="4">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<br>Note 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE</td></tr>
</table>

# 4.3 Minimization of Drive Tests (MDT)

UE supporting minimisation of drive tests 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 and E-UTRA RSRQ) 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 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.

# 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 parameters are not configured; or
- DRX parameters are configured and
    - o *drx-InactivityTimer* is running; or
    - o *drx-RetransmissionTimer* is running; or
    - o *mac-ContentionResolutionTimer* is running; or
    - o a Scheduling Request sent on PUCCH is pending; or
    - o an uplink grant for a pending HARQ retransmission can occur and there is data in the corresponding HARQ buffer; or
    - o 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).

## 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.

## 5.3 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 $SW_K = \left\lceil \frac{\text{srch\_win\_k}}{60} \right\rceil$ 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 $SW_O = \left\lceil \frac{\text{srch\_win\_o}}{60} \right\rceil$ 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 $SW_K = \left\lceil \frac{\text{srch\_win\_k}}{300} \right\rceil$ 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 $SW_O = \left\lceil \frac{\text{srch\_win\_o}}{300} \right\rceil$ 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 ($T_{UE\_re\text{-}establish\_delay}$) is specified in clause 6.1.2.1.

#### 6.1.2.1 UE Re-establishment delay requirement

The UE re-establishment delay ($T_{UE\_re\text{-}establish\_delay}$) 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 ($T_{UE\_re\text{-}establish\_delay}$) 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, while non-contention based random access procedures can be carried out on both PCell and an activated SCell.

### 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 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.

## 6.3 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 one SCell, if configured. The UE capable of supporting multiple timing advance [2] [31] may also be configured with one sTAG, in which case the pTAG shall contain one PCell and the sTAG shall contain one SCell with configured uplink. 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] [31] is configured with an sTAG, the UE shall use the activated SCell from the sTAG for deriving the UE transmit timing for cell 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 pTAG for all E-UTRA UE and also to sTAG for UE capable of supporting multiple timing advance [2] [31].

### 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 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 cycle or there is no DRX 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. When the transmission timing error between the UE and the reference timing exceeds $\pm T_e$ the UE is required to adjust its timing to within ±$T_e$. The reference timing shall be $(N_{\text{TA\_Ref}} + N_{\text{TA offset}}) \times T_s$ before the downlink timing of the reference cell. All adjustments made to the UE uplink timing 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 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.

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<br>3; 3 MHz ≤ Bandwidth ≤ 10 MHz<br>4; Bandwidth = 1.4 MHz |
| Aggregation level (CCE) | 4; Bandwidth = 1.4 MHz<br>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.<br>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.<br>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].<br>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<br>3; 3 MHz ≤ Bandwidth ≤ 10 MHz<br>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.<br>-3 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.<br>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].<br>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 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 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 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 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 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 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 ($T_{Evaluate\_}Q_{in\_DRX}$) is 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 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 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 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 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 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 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(10 ms, 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 7.6.2.2-1: $Q_{out}$ and $Q_{in}$ Evaluation Period in DRX**

| 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 7.6.2.1 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 7.6.2.2-2: $Q_{out}$ and $Q_{in}$ Evaluation Period in DRX when higher-layer signalling restricted measurement resource**

| DRX cycle length (s) | $T_{Evaluate\_Q_{out\_DRX}}$ and $T_{Evaluate\_Q_{in\_DRX}}$ (s) (DRX cycles) |
|---|---|
| ≤ 0.01 | Non-DRX requirements in clause 7.6.2.1 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 | |

### 7.6.2.3 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(10 ms, 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.

### 7.6.2.4 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 the downlink SCell. The requirements shall apply for both E-UTRA FDD and TDD.

## 7.7.2 SCell Activation Delay Requirement for Deactivated SCell

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 8.3.3 shall not occur before subframe n+5 and not occur after subframe *n+9* for E-UTRA FDD.

The PCell interruption specified in section 8.3.3 shall not occur before subframe n+5 and not occur after subframe *n+11* for 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

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 PCcell interruption specified in section 8.3.3 shall not occur before subframe n+5 and not occur after subframe *n*+9 for E-UTRA FDD.

The PCell interruption specified in section 8.3.3 shall not occur before subframe n+5 and not occur after subframe *n+11* for E-UTRA TDD.

## 7.8 Interruptions with Carrier Aggregation

### 7.8.1 Introduction

This section contains the requirements related to the interruptions on PCell that are allowed for a E-UTRA CA capable UE when its SCell is configured, deconfigured, activated or deactivated.

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 [2] 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 [2] 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.

# 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 an SCell, 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 SCell.

In the uplink subframe occurring immediately after the measurement gap,

- the E-UTRAN FDD UE shall not transmit any data
- the E-UTRAN TDD UE shall not transmit any data if the subframe occurring immediately before the measurement gap is a downlink subframe.

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.

**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.

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 an SCC is performing measurements on cells on PCC, inter-frequency measurements, or inter-RAT measurements, and an interruption occurs on PCell due to measurements performed on cells on the 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.

#### 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 and SCell 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.

#### 8.1.2.2 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.

##### 8.1.2.2.1 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

$$T_{\text{identify intra}} = T_{\text{basic\_identify\_E-UTRA\_FDD, intra}} \cdot \frac{T_{\text{Measurement\_Period, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{\text{basic\_identify\_E-UTRA\_FDD, intra}}$ 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 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.

$T_{\text{Intra}}$ : 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 $T_{\text{Measurement\_Period Intra}}$. 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 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 200 ms. When measurement gaps are activated the UE shall be capable of performing measurements for at least $Y_{\text{measurement intra}}$ cells , where $Y_{\text{measurement intra}}$ is defined in the following equation. If the UE has identified more than $Y_{\text{measurement intra}}$ 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.

$$\mathrm{Y}_{\text{measurement intra}} = Floor\left\{ X_{\text{basic measurement FDD}} \cdot \frac{\mathrm{T}_{\text{Intra}}}{\mathrm{T}_{\text{Measurement\_Period, Intra}}} \right\} \text{cells}$$

where

$X_{\text{basic measurement FDD}}$ = 8 (cells)

$T_{\text{Measurement\_Period, Intra}}$ = 200 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 9.1.2.1 and 9.1.2.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1.

###### 8.1.2.2.1.1.1 Measurement Reporting Requirements

###### 8.1.2.2.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

###### 8.1.2.2.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, 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 Event Triggered Reporting.

###### 8.1.2.2.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, 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 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 $\leq$ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period, Intra}}$ 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.

#### 8.1.2.2.1.2 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 $T_{identify\_intra}$ as shown in table 8.1.2.2.1.2-1

**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<br>Note2: Time depends upon the DRX cycle in use | |

A cell shall be considered detectable when

- RSRP related side conditions given in Sections 9.1.2.1 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

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. 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 $T_{measure\_intra}$.

**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<br>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 9.1.2.1 and 9.1.2.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1.

##### 8.1.2.2.1.2.1 Measurement Reporting Requirements

###### 8.1.2.2.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

###### 8.1.2.2.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, 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 Event Triggered Reporting.

###### 8.1.2.2.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, 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 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, 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

$$\mathrm{T_{identify\ \ intra}} = \mathrm{T_{basic\ identify\ \mathit{E-UTRA}\_\ TDD,\ intra}} \cdot \frac{\mathrm{T_{Measurement\ Period,\ Intra}}}{\mathrm{T_{Intra}}} \quad ms$$

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 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

$T_{Intra}$ : 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 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 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 and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

$$\mathrm{Y_{measurement\ \ intra}} = Floor\left\{ X_{\mathrm{basic\ measurement\ TDD}} \cdot \frac{\mathrm{T_{Intra}}}{\mathrm{T_{Measurement\_Period,\ Intra}}} \right\} \mathrm{cells}$$

where

$X_{basic\ measurement\ TDD}$ = 8 (cells)

$T_{Measurement\_Period\ Intra}$ = 200 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 9.1.2.1 and 9.1.2.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1.

###### 8.1.2.2.2.1.1 Measurement Reporting Requirements

###### 8.1.2.2.2.1.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

###### 8.1.2.2.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, 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 Event Triggered Reporting.

###### 8.1.2.2.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, 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 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, 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

**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<br>Note2: Time depends upon the DRX cycle in use | |

A cell shall be considered detectable when

- RSRP related side conditions given in Clause 9.1.2.1 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

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. 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 $T_{measure\_intra}$.

**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.<br>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 9.1.2.1 and 9.1.2.2, and the RSRQ measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.5.1.

#### 8.1.2.2.2.2.1 Measurement Reporting Requirements

##### 8.1.2.2.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, respectively.

##### 8.1.2.2.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, 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 Event Triggered Reporting.

##### 8.1.2.2.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.2.1, 9.1.2.2, and 9.1.5.1, 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 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, 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 is used or not, or whether SCell is 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 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 all the DRX cycles specified in TS 36.331 [2] are 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 transmit at least 60 ACK/NACKs on PCell or activated SCell, 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 activated SCell.

##### 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. 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 is used or not, or whether SCell is 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 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 all the DRX cycles specified in TS 36.331 [2] are used.

Within the time, $T_{identify\_CGI,\,intra}\ ms$ , 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 activated SCell, 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 activated SCell.

**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 | 18 |
| 1 | 35 |
| 2 | 43 |
| 3 | 36 |
| 4 | 39 |
| 5 | 42 |
| 6 | 30 |

#### 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. 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 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.

#### 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 $T_{Identify\_Inter}$ according to the following expression:

$$T_{Identify\_Inter} = T_{Basic\_Identify\_Inter} \cdot \frac{480}{T_{Inter1}} \cdot N_{freq} \quad ms$$

Where:

$T_{Basic\_Identify\_Inter}$ = 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 FDD 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 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 and RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled,
- $SCH\_RP|_{dBm}$ 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 and RSRQ measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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: $T_{Measurement\_Period\ \_Inter\_FDD}$ [ms] | Measurement bandwidth [RB] |
|---|---|---|
| 0 | 480 x $N_{freq}$ | 6 |
| 1 (Note) | 240 x $N_{freq}$ | 50 |
| Note: This configuration is optional | | |

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 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 8.1.2.3.1.1-1.

###### 8.1.2.3.1.1.1 Measurement Reporting Requirements

###### 8.1.2.3.1.1.1.1 Periodic Reporting

Reported RSRP and RSRQ 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, and 9.1.6.2, respectively.

###### 8.1.2.3.1.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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 Event Triggered Reporting.

###### 8.1.2.3.1.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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 $T_{identify\text{-}inter}$ defined in clause 8.1.2.3.1.1. 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 $T_{identify\_inter}$ 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, 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 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 $T_{identify\_inter}$ as shown in table 8.1.2.3.1.2-1

**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) | |
|---|---|---|
| | 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 |
| 0.256 | 5.12*$N_{freq}$ (20*$N_{freq}$) | 7.68*$N_{freq}$ (30*$N_{freq}$) |
| 0.32 | 6.4*$N_{freq}$ (20*$N_{freq}$) | 7.68*$N_{freq}$ (24*$N_{freq}$) |
| 0.32< DRX-cycle≤2.56 | Note (20*$N_{freq}$) | Note (20*$N_{freq}$) |
| Note: Time depends upon the DRX cycle in use | | |

A cell shall be considered detectable provided following conditions are fulfilled:

- RSRP$|_{dBm}$ 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 and RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled,
- SCH_RP$|_{dBm}$ SCH Ês/Iot according to Annex B.2.3 for a corresponding Band,

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per FDD inter-frequency and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements to higher layers with the measurement period defined in table 8.1.2.3.1.2-2 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

**Table 8.1.2.3.1.2-2: Requirement to measure FDD interfrequency cells**

| DRX cycle length (s) | $T_{measure\_inter}$ (s) (DRX cycles) |
|---|---|
| ≤0.08 | Non DRX Requirements in clause 8.1.2.3.1.1 are applicable |
| 0.08<DRX-cycle≤2.56 | Note (5*$N_{freq}$) |
| Note: Time depends upon the DRX cycle in use | |

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.3.1 and 9.1.3.2, and 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.

###### 8.1.2.3.1.2.1 Measurement Reporting Requirements

###### 8.1.2.3.1.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

###### 8.1.2.3.1.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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 Event Triggered Reporting.

###### 8.1.2.3.1.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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 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, 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:

$$\mathrm{T}_{\mathrm{Identify\_Inter}} = \mathrm{T}_{\mathrm{Basic\_Identify\_Inter}} \cdot \frac{480}{\mathrm{T}_{\mathrm{Inter1}}} \cdot N_{freq} \quad ms$$

Where:

$T_{Basic\_Identify\_Inter}$ = 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 and RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled,

- 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 and RSRQ measurements to higher layers with measurement accuracy as specified in sub-clauses 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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] |
|---|---|---|---|---|---|---|
| | | DL | UL | Normal CP | Extended CP | |
| 0 | 6 | 2 | 2 | $19760 \cdot T_s$ | $20480 \cdot T_s$ | 480 x $N_{freq}$ |
| 1 (Note 1) | 50 | 2 | 2 | $19760 \cdot T_s$ | $20480 \cdot T_s$ | 240 x $N_{freq}$ |
| Note 1: This configuration is optional<br>Note 2: $T_s$ is defined in TS 36.211 [16] | | | | | | |

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 inter-frequency cells per TDD inter-frequency and the UE physical layer shall be capable of reporting RSRP and RSRQ 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 and RSRQ 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, and 9.1.6.2, respectively.

##### 8.1.2.3.2.1.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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 Event Triggered Reporting.

##### 8.1.2.3.2.1.1.3 Event Triggered Reporting

Reported RSRP and RSRQ measurements contained in event triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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 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, 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 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 $T_{identify\_inter}$ as shown in table 8.1.2.3.2.2-1

**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) | |
|---|---|---|
| | **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 |
| 0.256 | 5.12*Nfreq (20*Nfreq) | 7.68*Nfreq (30*Nfreq) |
| 0.32 | 6.4*Nfreq (20*Nfreq) | 7.68*Nfreq (24*Nfreq) |
| 0.32<DRX-cycle≤2.56 | Note (20*Nfreq) | Note (20*Nfreq) |
| Note: Time depends upon the DRX 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
- RSRP related side conditions given in Clause 9.1.3.1 and 9.1.3.2 and RSRQ related side conditions given in Sections 9.1.6.1 and 9.1.6.2 are fulfilled,
- $SCH\_RP|_{dBm}$ and SCH Ês/Iot according to Annex B.2.3 for a corresponding Band,

The UE shall be capable of performing RSRP and RSRQ 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 and RSRQ measurements to higher layers with the measurement period defined in Table 8.1.2.3.2.2-2 when DRX is in use, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

**Table 8.1.2.3.2.2-2: Requirement to measure TDD interfrequency cells**

| DRX cycle length (s) | $T_{measure\_inter}$ (s) (DRX cycles) |
|---|---|
| ≤0.08 | Non DRX Requirements in clause 8.1.2.3.2.1 are applicable |
| 0.08<DRX-cycle≤2.56 | Note ($5*N_{freq}$) |
| Note: Time depends upon the DRX cycle in use | |

The RSRP measurement accuracy for all measured cells shall be as specified in the sub-clauses 9.1.3.1 and 9.1.3.2, and 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.

##### 8.1.2.3.2.2.1 Measurement Reporting Requirements

###### 8.1.2.3.2.2.1.1 Periodic Reporting

Reported RSRP and RSRQ measurements contained in periodically triggered measurement reports shall meet the requirements in sections 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, respectively.

###### 8.1.2.3.2.2.1.2 Event-triggered Periodic Reporting

Reported RSRP and RSRQ measurements contained in event triggered periodic measurement reports shall meet the requirements in clause 9.1.3.1, 9.1.3.2, 9.1.6.1, and 9.1.6.2, 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 Event Triggered Reporting.

###### 8.1.2.3.2.2.1.3 Event Triggered Reporting

Reported RSRP and RSRQ 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, and 9.1.6.2, 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 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, 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.

The requirements in clause 8.1.2.3.1.2 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.

The requirements in clause 8.1.2.3.2.2 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 is used or not, or whether SCell is 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.2.3 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 all the DRX cycles specified in TS 36.331 [2] are 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 activated SCell, 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 activated SCell.

#### 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. 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 is used or not, or whether SCell is 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 all the DRX cycles specified in TS 36.331 [2] are used.

Given that continuous DL data allocation and no DRX is used, no measurement gaps are configured, and TDD configuration as in Table 8.1.2.3.2.1-1 is used, the UE shall have more than 30 ACK/NACK transmitted during the identification of a new CGI of E-UTRA cell.Within the time, $T_{identify\_CGI,\,inter}$ $ms$, over which the UE identifies the new CGI of E-UTRA cell, given that TDD configuration as in Table 8.1.2.3.2.1-1 is used, the UE shall have more than 30 ACK/NACK transmitted on PCell or activated SCell, 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 activated SCell.

#### 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. 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 is used or not, or whether SCell is 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 all the DRX cycles specified in TS 36.331 [2] are used.

Given that continuous DL data allocation and no DRX is used, no measurement gaps are configured, and TDD configuration as in Table 8.1.2.3.2.1-1 is used, the UE shall have more than 30 ACK/NACKs transmitted during the identif ication of a new CGI of E-UTRA cell.Within the time, $T_{identify\_CGI,inter}$ $ms$, over which the UE identifies the new CGI of E-UTRA cell, given that TDD configuration as in Table 8.1.2.3.2.1-1 is used, the UE shall have more than 30 ACK/NACKs transmitted on PCell or activated SCell, 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 activated SCell

##### 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. 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 is used or not, or whether SCell is 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 all the DRX cycles specified in TS 36.331 [2] are 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 activated SCell, 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 activated SCell.

##### 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. 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

$$T_{identify,\ UTRA\_FDD} = T_{basic\_identify\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} \cdot N_{Freq} \quad ms$$

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 $\leq$ 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 $T_{identify,\ enhanced\_UTRA\_FDD}$:

$$T_{identify,\ enhanced\_UTRA\_FDD} = (T_{basic\_identify\_enhanced\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} + 480)\ N_{Freq} \quad ms$$

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

$$T_{measurement\_UTRA\_FDD} = Max\left\{T_{Measurement\_Period\ UTRA\_FDD}, T_{basic\_measurement\_UTRA\_FDD} \cdot \frac{480}{T_{inter1}} \cdot N_{Freq}\right\} ms$$

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.

$N_{freq}$ is 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 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, 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 Event Triggered Reporting.

#### 8.1.2.4.1.2 E-UTRAN FDD – UTRAN FDD measurements when DRX is used

When explicit neighbour list is provided and 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 neighbour cell list within $T_{identify,UTRA\_FDD}$ as shown in table 8.1.2.4.1.2-1

**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) | |
|---|---|---|
| | **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 |
| 0.064 | 2.56* Nfreq (40* Nfreq) | 4.8* Nfreq (75* Nfreq) |
| 0.08 | 3.2* Nfreq (40* Nfreq) | 4.8* Nfreq (60* Nfreq) |
| 0.128 | 3.2* Nfreq (25* Nfreq) | 4.8* Nfreq (37.5* Nfreq) |
| 0.16 | 3.2* Nfreq (20* Nfreq) | 4.8* Nfreq (30* Nfreq) |
| 0.16<DRX-cycle≤2.56 | Note (20* Nfreq) | Note (20* Nfreq) |
| Note: Time depends upon the DRX 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.

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 with the measurement period defined in table 8.1.2.3.1.2-2 when DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

**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) | |
|---|---|---|
| | **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 |
| 0.064 | 0.48* $N_{freq}$ (7.5* $N_{freq}$) | 0.8* $N_{freq}$ (12.5* $N_{freq}$) |
| 0.08 | 0.48* $N_{freq}$ (6* $N_{freq}$) | 0. 8* $N_{freq}$ (10* $N_{freq}$) |
| 0.128 | 0.64* $N_{freq}$ (5* $N_{freq}$) | 0. 8* $N_{freq}$ (6.25* $N_{freq}$) |
| 0.128<DRX-cycle≤2.56 | Note (5* $N_{freq}$) | Note (5* $N_{freq}$) |
| Note: 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.

##### 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 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, 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 Event Triggered Reporting.

### 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

$$T_{\text{identify, UTRA\_TDD}} = Max\left\{5000, T_{\text{basic identify UTRA\_TDD}} \cdot \frac{480}{T_{\text{inter1}}} \cdot N_{Freq}\right\} ms$$

A cell shall be considered detectable when

- P-CCPCH Ec/Io $\geq$ -8 dB,
- DwPCH_Ec/Io $\geq$ -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 $T_{identify,\ enhanced\_UTRA\_TDD}$:

$$\mathrm{T}_{\text{identify, enhanced\_UTRA\_TDD}} = (\mathrm{T}_{\text{basic\_identify\_enhanced\_UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} + 480) \cdot N_{Freq} \quad ms$$

A cell shall be considered detectable when:

- P-CCPCH_Ec/Io $\geq$ -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

$$\mathrm{T}_{\text{measurement UTRA\_TDD}} = Max\left\{\mathrm{T}_{\text{Measurement\_Period UTRA\_TDD}}, \mathrm{T}_{\text{basic measurement UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} \cdot N_{Freq}\right\} ms$$

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.

$N_{\text{freq}}$ is defined in clause 8.1.2.1.1 and $T_{\text{inter1}}$ 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 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, 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 Event Triggered Reporting.

### 8.1.2.4.3.2 E-UTRAN TDD – UTRAN TDD measurements when DRX is used

When explicit neighbour list is provided and 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 neighbour cell list within $T_{identify,UTRA\_TDD}$ as shown in table 8.1.2.4.3.2-1

**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) | |
|---|---|---|
| | 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 |
| 0.32<DRX-cycle≤0.512 | Note (20* Nfreq) | Note (25* Nfreq) |
| 0.512<DRX-cycle≤2.56 | Note (20* Nfreq) | Note (20* Nfreq) |
| Note: Time depends upon the DRX 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 $\geq$ -8 dB,
- DwPCH_Ec/Io $\geq$ -5 dB.

When L3 filtering is used an additional delay can be expected.

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 defined in table 8.1.2.4.3.2-2 when DRX is used, either measurement gaps are scheduled or the UE supports capability of conducting such measurements without gaps.

**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) | |
|---|---|---|
| | 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 |
| 0.064 | $0.48*N_{freq}$ ($7.5*N_{freq}$) | $0.8*N_{freq}$ ($12.5*N_{freq}$) |
| 0.08 | $0.48*N_{freq}$ ($6*N_{freq}$) | 0. $8*N_{freq}$ ($10*N_{freq}$) |
| 0.128 | $0.64*N_{freq}$ ($5*N_{freq}$) | 0. $8*N_{freq}$ ($6.25*N_{freq}$) |
| 0. 128<DRX-cycle≤2.56 | Note ($5*N_{freq}$) | Note ($5*N_{freq}$) |
| Note: 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.

###### 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 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, 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 Event Triggered Reporting.

##### 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 $N_{freq}$*480 ms. The parameter $N_{freq}$ is 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**

| Number of carriers other than 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 $T_{re\text{-}confirm,GSM}$ 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 $T_{re\text{-}confirm,GSM}$ 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**

| Number of carriers other than 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 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 Event Triggered Reporting.

#### 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 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 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 cycle. 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. The parameter $N_{freq}$ is 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*$N_{freq}$) |
| 0.08<DRX-cycle≤ 2.56 | Note (5*$N_{freq}$) |
| Note: Time depends upon the DRX 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, the UE shall make at least one attempt every $N_{freq}$*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 $N_{freq}$*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 parameter $N_{freq}$ is 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, at least every $N_{freq}$*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 $N_{freq}$*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 parameter $N_{freq}$ is 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 $T_{Measurement\ Period,\ GSM}$ (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 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 Event Triggered Reporting.

#### 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:

$$T_{\text{identify, UTRA\_FDD}} = T_{\text{basic\_identify\_UTRA\_FDD}} \cdot \frac{480}{\text{Tinter1}} \cdot N_{Freq} \quad ms$$

$T_{\text{basic\_identify\_UTRA\_FDD}}$ = 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*$T_{\text{identify, UTRA\_FDD}}$ ms, the UE may stop searching UTRA cells for SON.

###### 8.1.2.4.7.1.2 Requirements when DRX is used

When DRX 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 $T_{\text{identify, UTRA\_FDD}}$ as defined in table 8.1.2.4.7.1.2-1.

**Table 8.1.2.4.7.1.2-1: Requirement to identify a new UTRA FDD cell for SON**

| DRX cycle length (s) | $T_{\text{identify, UTRA\_FDD}}$ (s) (DRX cycles) | |
|---|---|---|
| | **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 |
| 0.04<DRX cycle≤0.08 | Note (45* $N_{freq}$) | Note (95* $N_{freq}$) |
| 0.128 | 3.84* $N_{freq}$ (30* $N_{freq}$) | 8.0* $N_{freq}$ (62.5* $N_{freq}$) |
| 0.16 | 4.0* $N_{freq}$ (25* $N_{freq}$) | 8.0* $N_{freq}$ (50* $N_{freq}$) |
| 0.256 | 6.4* $N_{freq}$ (25* $N_{freq}$) | 8.96* $N_{freq}$ (35* $N_{freq}$) |
| 0.32 | 8* $N_{freq}$ (25* $N_{freq}$) | 8.96* $N_{freq}$ (28* $N_{freq}$) |
| 0.32<DRX cycle≤2.56 | Note (25* $N_{freq}$) | Note (25* $N_{freq}$) |
| Note: Time depends upon the DRX 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; $T_{identify,\ UTRA\_FDD}$ is defined in table 8.1.2.4.7.1.2-1.

##### 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 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

$$\mathrm{T_{measurement\_CDMA2000\_1x}} = \mathrm{T_{basic\_measurement\_CDMA2000\_1x}} \cdot N_{Freq} \cdot S_{gap}$$

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 8.1.2.4.9.1-1. 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:

$$\mathrm{T}_{\text{identify, UTRA\_TDD}} = \mathrm{T}_{\text{basic\_identify\_UTRA\_TDD}} \cdot \frac{480}{\mathrm{T}_{\text{inter1}}} \cdot N_{Freq} \quad ms$$

$T_{basic\_identify\_UTRA\_TDD}$ = 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*$T_{identify, UTRA\_TDD}$ 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 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 $T_{identify, UTRA\_TDD}$ as defined in table 8.1.2.4.13.1.2-1.

**Table 8.1.2.4.13.1.2-1: Requirement to identify a new UTRA TDD cell for SON**

| DRX cycle length (s) | $T_{identify, UTRA\_TDD}$ (s) (DRX cycles) | |
|---|---|---|
| | 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 |
| 0.16<DRX cycle≤0.256 | Note (25* $N_{freq}$) | Note (50* $N_{freq}$) |
| 0.256<DRX cycle≤0.32 | Note (25* $N_{freq}$) | Note (45* $N_{freq}$) |
| 0.32<DRX cycle≤2.56 | Note (25* $N_{freq}$) | Note (25* $N_{freq}$) |
| Note: Time depends upon the DRX 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; $T_{identify,\ UTRA\_TDD}$ is defined in table 8.1.2.4.13.1.2-1.

##### 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 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

$$T_{measurement\_CDMA2000\_1x} = T_{basic\_measurement\_CDMA2000\_1x} \cdot N_{Freq} \cdot S_{gap}$$

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 is used or not, the UE shall be able to identify a new CGI of UTRA FDD cell within:

$$T_{identify\_CGI,\ UTRAN\ FDD} = 630 + 40*SIB3\_REP \text{ ms}$$

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 $T_{identify\_CGI,\ UTRAN\ FDD}$ is applicable when no DRX is used as well as when all the DRX cycles specified in TS 36.331 [2] are 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. 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.

### 8.1.2.5 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 all the DRX 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):

$$\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}} = T_{\text{PRS}} \cdot (M - 1) + \Delta \qquad ms \qquad ,$$

where

$\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}}$ is the total time for detecting and measuring at least *n* cells,

$T_{\text{PRS}}$ 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 $T_{\text{PRS}}$** | **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.<br>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:

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{ref} \ge$-6 dB for all Frequency Bands for the reference cell,

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{i} \ge$-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{ref}$ and $\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \mathrm{Iot}\right)_{i}$ conditions apply for all subframes of at least $L = \frac{M}{2}$ PRS positioning occasions, PRP $1,2|_{dBm}$ according to Annex B.2.5 for a corresponding Band

$\mathrm{PRS}\,\hat{\mathrm{E}}_s / \mathrm{Iot}$ 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 $\mathrm{T}_{\mathrm{RSTD\ IntraFreqFDD,\ E\text{-}UTRAN}}$ 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 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 ($\mathrm{T}_{\mathrm{RSTD\ IntraFreqFDD,\ E\text{-}UTRAN,\ HO}}$) shall be according to the following expression:

$$\mathrm{T}_{\mathrm{RSTD\ IntraFreqFDD,\ E\text{-}UTRAN,\ HO}} = \mathrm{T}_{\mathrm{RSTD\ IntraFreqFDD,\ E\text{-}UTRAN}} + K \times T_{\mathrm{PRS}} + T_{\mathrm{HO}} \qquad ms\ ,$$

where:

$K$ is the number of times the intra-frequency handover occurs during $\mathrm{T}_{\mathrm{RSTD\ IntraFreqFDD,\ E\text{-}UTRAN,\ HO}}$.

$T_{\mathrm{HO}}$ 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.

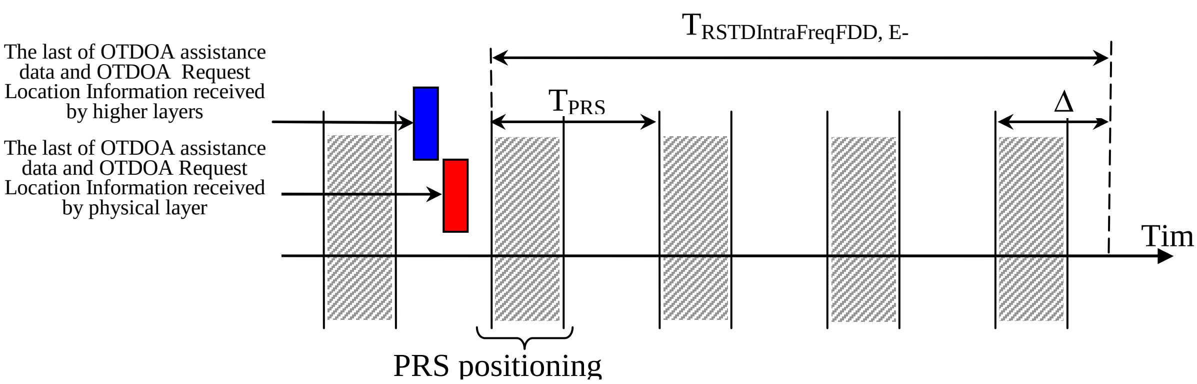


**Figure 8.1.2.5.1-1. Illustration of the RSTD reporting time requirement in an FDD system.**

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,

$T_{\text{PRS}}$ 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 $T_{\text{PRS}}$ | 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.<br>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:

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}\right)_{ref}$ ≥-6 dB for all Frequency Bands for the reference cell,

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}\right)_{i}$ ≥-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}\right)_{ref}$ and $\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}\right)_{i}$ conditions apply for all subframes of at least $L = \frac{M}{2}$ PRS positioning occasions,

PRP $1,2|_{\text{dBm}}$ according to Annex B.2.5 for a corresponding Band

$\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}$ 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 $\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN, HO}}$,

$T_{\text{HO}}$ 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 $\mathrm{TTI}_{\mathrm{DCCH}}$. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

### 8.1.2.6 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 all the DRX 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 $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$ ms as given below:

$$\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}} = T_{\text{PRS}} \cdot (M - 1) + \Delta \qquad ms \qquad ,$$

where

$\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$ is the total time for detecting and measuring at least $n$ cells,

$T_{\text{PRS}}$ 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 $T_{\text{PRS}}$ | 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.<br>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:

$\left(\text{PRS}\ \hat{\text{E}}_{\text{s}} / \text{Iot}\right)_{ref}$ ≥-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 $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$ 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 $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN, HO}}$,

$T_{\text{HO}}$ 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 $\text{TTI}_{\text{DCCH}}$. 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:

$$\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN}} = T_{\text{PRS}} \cdot (M - 1) + \Delta \quad ms ,$$

where

$\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN}}$ is the total time for detecting and measuring at least *n* cells,

$T_{\text{PRS}}$ 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 $T_{\text{PRS}}$ | 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.<br>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 $\mathrm{T}_{\text{RSTD InterFreqTDDFDD, E-UTRAN, HO}}$,

$T_{\text{HO}}$ 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 $TTI_{DCCH}$. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

### 8.1.2.6.3 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:

$$\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN}} = T_{\text{PRS}} \cdot (M - 1) + \Delta \qquad ms \qquad ,$$

where

$\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN}}$ is the total time for detecting and measuring at least *n* cells,

$T_{\text{PRS}}$ 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 $\mathrm{T}_{\text{RSTD InterFreqTDD, E-UTRAN}}$**

| Positioning subframe configuration period $T_{\text{PRS}}$ | 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.<br>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].<br>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 $\mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN}}$ 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 $L = \frac{M}{2}$ 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 $\mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN}}$ 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 ($\mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN,\ HO}}$) shall be according to the following expression:

$$\mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN,\ HO}} = \mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN}} + K \times T_{\mathrm{PRS}} + T_{\mathrm{HO}} \qquad ms,$$

where:

$K$ is the number of times the inter-frequency handover occurs during $\mathrm{T}_{\mathrm{RSTD\ InterFreqTDD,\ E\text{-}UTRAN,\ HO}}$,

$T_{\mathrm{HO}}$ 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,

$T_{\text{PRS}}$ 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 $\mathrm{T}_{\text{RSTD InterFeqFDDTDD,E-UTRAN}}$**

| Positioning subframe configuration period $T_{\text{PRS}}$ | 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.<br>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 $\mathrm{T}_{\text{RSTD InterFeqFDDTDD,E-UTRAN}}$, provided:

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}\right)_{ref}$ ≥-6 dB for all Frequency Bands for the reference cell,

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}\right)_{i}$ ≥-13 dB for all Frequency Bands for neighbour cell *i*,

$\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}\right)_{ref}$ and $\left(\text{PRS } \hat{\mathrm{E}}_{\mathrm{s}} / \text{Iot}\right)_{i}$ 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

$\mathrm{PRS}\,\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{Iot}$ is as defined in Clause 8.1.2.5.1.

The time $\mathrm{T}_{\mathrm{RSTD\ InterFeqFDDTDD,E\text{-}UTRAN}}$ 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 ($\mathrm{T}_{\mathrm{RSTD\ InterFreqFDDTDD,\ E\text{-}UTRAN,\ HO}}$) shall be according to the following expression:

$$\mathrm{T}_{\mathrm{RSTD\ InterFreqFDDTDD,\ E\text{-}UTRAN,\ HO}} = \mathrm{T}_{\mathrm{RSTD\ InterFreqFDDTDD,\ E\text{-}UTRAN}} + K \times T_{\mathrm{PRS}} + T_{\mathrm{HO}} \qquad ms,$$

where:

$K$ is the number of times the inter-frequency handover occurs during $\mathrm{T}_{\mathrm{RSTD\ InterFreqFDDTDD,\ E\text{-}UTRAN,\ HO}}$,

$T_{\mathrm{HO}}$ 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].<br>Note 2: 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 $\mathrm{TTI}_{\mathrm{DCCH}}$. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report.

### 8.1.2.7 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 ($\mathrm{T}_{\mathrm{measure\_FDD\_UE\_Rx\_Tx1}}$) of the UE Rx-Tx time difference measurement shall be as specified in table 8.1.2.7.1-1.

**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<br>Note2: Time depends upon the DRX 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 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 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 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.

**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<br>Note2: Time depends upon the DRX 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 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 is used as well as when no DRX is used shall be as specified in the sub-clause 9.1.9.

##### 8.1.2.7.2.1 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

$T_{\text{basic\_identify\_E-UTRA\_FDD\_eICIC, intra}}$ is 1000 ms.

$T_{\text{Intra}}$ 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 $T_{\text{Measurement\_Period\_eICIC, Intra}}$. 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 $Y_{\text{measurement\_intra\_eICIC}}$ cells , where $Y_{\text{measurement\_intra\_eICIC}}$ is defined in the following equation. If the UE has identified more than $Y_{\text{measurement\_intra\_eICIC}}$ 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.

$$Y_{\text{measurement\_intra\_eICIC}} = Floor\left\{ X_{\text{basic\_measurement\_FDD\_eICIC}} \cdot \frac{T_{\text{Intra}}}{T_{\text{Measurement\_Period\_eICIC,Intra}}} \right\} \text{ cells}$$

where

$X_{\text{basic\_measurement\_FDD\_eICIC}}$ = 8 (cells)

$T_{\text{Measurement\_Period\_eICIC, Intra}}$ = 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 Event Triggered Reporting.

###### 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<br>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<br>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 Event Triggered Reporting.

###### 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

$$T_{identify\_intra\_eICIC} = T_{basic\_identify\_E\text{-}UTRA\_TDD\_eICIC,intra} \cdot \frac{T_{Measurement\_Period\_eICIC,Intra}}{T_{Intra}} \quad ms$$

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 9.1.2.3 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.

$$Y_{measurement\_intra\_eICIC} = Floor\left\{ X_{basic\_measurement\_TDD\_eICIC} \cdot \frac{T_{Intra}}{T_{Measurement\_Period\_eICIC, Intra}} \right\} \text{ cells}$$

where

$X_{basic\_measurement\_TDD\_eICIC}$ = 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.

###### 8.1.2.8.2.1.1 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 Event Triggered Reporting.

###### 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<br>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.<br>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 Event Triggered Reporting.

###### 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:

$$T_{identify\_intra\_FeICIC} = T_{basic\_identify\_E\text{-}UTRA\_FDD\_FeICIC,\ intra} \cdot \frac{T_{Measurement\_Period\_FeICIC,\ Intra}}{T_{Intra}} \quad ms$$

where

$T_{basic\_identify\_E\text{-}UTRA\_FDD\_FeICIC,\ intra}$ 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 Event Triggered Reporting.

###### 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 $T_{identify\_intra\_FeICIC}$ 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 $T_{identify\_intra\_FeICIC}$ defined in clause 8.1.2.8.3.1 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 $T_{Measurement\_Period\_FeICIC,\ Intra}$ 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 $T_{identify\_intra\_FeICIC}$ 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.<br>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.<br>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 Event Triggered Reporting.

###### 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

$$T_{\text{identify\_ intra\_FeICIC}} = T_{\text{basic\_identify\_E-UTRA\_TDD\_FeICIC, intra}} \cdot \frac{T_{\text{Measurement\_Period\_FeICIC, Intra}}}{T_{\text{Intra}}} \quad ms$$

where

$T_{\text{basic\_identify\_E-UTRA\_TDD\_eICIC, intra}}$ is 1000 ms.

$T_{\text{Intra}}$ 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 $T_{\text{Measurement\_Period\_FeICIC, Intra}}$. 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.

$$Y_{\text{measurement\_intra\_FeICIC}} = Floor\left\{ X_{\text{basic\_measurement\_TDD\_FeICIC}} \cdot \frac{T_{\text{Intra}}}{T_{\text{Measurement\_Period\_FeICIC, Intra}}} \right\} \text{ cells}$$

where

$X_{\text{basic\_measurement\_TDD\_FeICIC}}$ = 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 Event Triggered Reporting.

###### 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.<br>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.<br>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 Event Triggered Reporting.

###### 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 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 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 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 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. If the UE is not configured with SCell carrier frequency, 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 26 reporting criteria in total. If the UE is configured with SCell carrier frequency, 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 35 reporting criteria in total.

**Table 8.2.2-1: Requirements for reporting criteria per measurement category**

| Measurement category | $E_{cat}$ | Note |
|---|---|---|
| Intra-frequency Note 1 | 9 | 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 | 7 | E-UTRA inter-frequency cells |
| 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 (UTRAN FDD, UTRAN TDD, 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. |
| Note 1: When the UE is configured with SCell carrier frequency, $E_{cat}$ for Intra-frequency is applied per serving frequency.<br>Note 2: When the UE is configured with 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. This requirement applies when there is a single on-going LPP OTDOA location session. | | |

# 8.3 Measurements for E-UTRA carrier aggregation

## 8.3.1 Introduction

This clause contains 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 at least one downlink SCell, but:

- up to two downlink CCs and up to two uplink CCs for intra-band contiguous carrier aggregation, or
- up to two downlink CCs and one uplink CC for inter-band carrier aggregation, or
- up to two downlink CCs and one uplink CC for intra-band non-contiguous 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). Requirements in this clause are applicable to both FDD and TDD carrier aggregation.

## 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 the secondary component carrier

The 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 the 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 the 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 the secondary component carrier with deactivated SCell

This clause defines the measurement requirements of the 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 the 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 the 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 an SCC with deactivated SCell. This may cause interruptions on PCell 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 Event Triggered Reporting.

###### 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 ≤ 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.

#### 8.3.3.2.2 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 the 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<br>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 the 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<br>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 an SCC with deactivated SCell. This may cause interruptions (packet drops) to a

PCell 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 Event Triggered Reporting.

###### 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 $\leq$ 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.

# 8.4 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 downlink SCell. 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 both FDD and TDD.

## 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 the currently configured secondary component carrier. 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 $\mathrm{T}_{\mathrm{RSTD,\ E\text{-}UTRAN,\ PCell\_change}}$,

$T_{\mathrm{PRS}}$ 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 the secondary component carrier

The RSTD measurements when all cells are on the 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 may cause interruption on the PCell due to the RSTD measurements of up to 0.5% of missed ACK/NACK, provided that the PRS periodicity, $T_{\mathrm{PRS}}$, is greater than or equal to 640 ms. When the PCell and the SCell belong to the same frequency band, each interruption shall not exceed 5 subframes. When the PCell and the SCell belong to different frequency bands, each interruption shall not exceed 1 subframe. No interruption is allowed when the PRS periodicity is below 640 ms.

- if the UE is configured for RSTD measurements on cells belonging to SCC with deactivated SCell 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 PCell 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.

No interruptions while the On Duration timer is running shall be allowed when common DRX is used.

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.

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 the currently configured secondary component carrier. 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 $\mathrm{T}_{\mathrm{RSTD,\ E\text{-}UTRAN,\ PCell\_change}}$,

$T_{\mathrm{PRS}}$ 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 secondary component carrier

The RSTD measurements of cells on both primary component carrier and configured secondary component carrier shall meet all applicable requirements (FDD or TDD) 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 $T_{\mathrm{PRS}}$ | 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 may cause interruption on the PCell due to the RSTD measurements of up to 0.5% of missed ACK/NACK, provided that the PRS periodicity, $T_{\mathrm{PRS}}$, is greater than or equal to 640 ms. When the PCell and the SCell belong to the same frequency band, each interruption shall not exceed 5 subframes. When the PCell and the SCell belong to different frequency bands, each interruption shall not exceed 1 subframe. No interruption is allowed when the PRS periodicity is below 640 ms.

- if the UE is configured for RSTD measurements on cells belonging to at least SCC with deactivated SCell 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 PCell 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.

No interruptions while the On Duration timer is running shall be allowed when common DRX is used.

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.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 the currently configured secondary component carrier. 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 ($\mathrm{T_{RSTD,\,E\text{-}UTRAN,\,PCell\_change}}$) shall be according to the following expression:

$$\mathrm{T_{RSTD,\,E\text{-}UTRAN,\,PCell\_change}} = \mathrm{T_{RSTD,\,E\text{-}UTRAN}} + K \times T_{\mathrm{PRS}} + T_{\mathrm{PCell\_change}} \qquad ms,$$

where:

$K$ is the number of times the PCell is changed during $\mathrm{T_{RSTD,\,E\text{-}UTRAN,\,PCell\_change}}$,

$T_{\mathrm{PRS}}$ 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,

$\mathrm{T_{RSTD,\,E\text{-}UTRAN}}$ 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.

# 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].

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 an SCell, 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 | $dBm/BW_{Channel}$ | $dBm/BW_{Channel}$ |
| ±6 | ±9 | ≥-6 dB | FDD_A, TDD_A | -121 | 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 |
| ±8 | ±11 | ≥-6 dB | FDD_A, FDD_C, FDD_D, FDD_E, FDD_F, FDD_G, FDD_H, TDD_A, TDD_C, TDD_E | 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_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 |
| ±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/$BW_{Channel}$ |
| ±6 | ±9 | ≥-4 dB | FDD_A, TDD_A | -121 | 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 |
| ±8 | ±11 | ≥-4 dB | FDD_A, FDD_C, FDD_D, FDD_E, FDD_F, FDD_G, FDD_H, TDD_A, TDD_C, TDD_E | 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$|_{dBm}$ 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 | | | |
|---|---|---|---|---|---|
| Normal condition | Extreme condition | Ês/Iot Note 2 | Io Note 3 range | | |
| | | | E-UTRA operating band groups Note 6 | Minimum Io | Maximum Io |
| dB | dB | dB | | dBm/15kHz Note 1, 5 | dBm/$BW_{Channel}$ |
| ±2 | ±3 | ≥-2 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 |
| ±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,

$RSRP|_{dBm}$ 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/$BW_{Channel}$ |
| ±6 | ±9 | ≥-9.46 | FDD_A, TDD_A | -121 | 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 |
| ±8 | ±11 | ≥-9.46 | FDD_A, FDD_C, FDD_D, FDD_E, FDD_F, FDD_G, FDD_H, TDD_A, TDD_C, TDD_E | N/A | -70 | -50 |
| NOTE 1: This Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.<br>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.<br>NOTE 3: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.<br>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 | | | |
|---|---|---|---|---|---|
| | | | Io Note 3 range | | |
| Normal condition | Extreme condition | Ês/Iot Note 2, 6 | 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_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 |
| ±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.

## 9.1.3 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 | | | | |
|---|---|---|---|---|---|---|
| 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 | ±9 | ≥-6 dB | FDD_A, TDD_A | -121 | 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 |
| ±8 | ±11 | ≥-6 dB | FDD_A, FDD_C, FDD_D, FDD_E, FDD_F, FDD_G, FDD_H, TDD_A, TDD_C, TDD_E | 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

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \le 27 dB$$

| 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 |
| ±6 | ±6 | ≥-6 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 |

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_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 |
| ±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_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 |
| ±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_C, TDD_C | -120 | -50 |
| | | | FDD_D | -119.5 | -50 |
| | | | FDD_E, TDD_E | -119 | -50 |
| | | | FDD_F | -118.5 Note 3 | -50 |
| | | | FDD_G | -118 | -50 |
| | | | FDD_H | -117.5 | -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_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 |
| ±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 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 | | | |
|---|---|---|---|---|---|
| | | | Io Note 1 range | | |
| Normal condition | Extreme condition | Ês/Iot | 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_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 |
| ±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 | | | |
|---|---|---|---|---|---|
| | | Ês/Iot Note 2 | Io Note 1 range | | |
| Normal condition | Extreme condition | | 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_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 |
| ±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 | | | | |
|---|---|---|---|---|---|---|
| | | | | 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_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 |
| ±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 | | | | |
|---|---|---|---|---|---|---|
| | | | | 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 | $dBm/BW_{Channel}$ |
| ±3 | ±4 | ≥-3 dB | 0 ≤Io1-Io2 | 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 Note 4 | -50 |
| | | | | FDD_G | -118 | -50 |
| | | | | FDD_H | -117.5 | -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.

## 9.1.7 RSRQ Measurement Report Mapping

The reporting range of RSRQ is defined from -19.5 dB to -3 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_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 |

## 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 | ≤ 3 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 |
| ±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.<br>NOTE 2: Ts is the basic timing unit defined in TS 36.211.<br>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.<br>NOTE 4: Except Band 29<br>NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.<br>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 20472$T_s$ with 2$T_s$ resolution for UE Rx - Tx time difference less than 4096$T_s$ and 8Ts for UE Rx - Tx time difference equal to or greater than 4096$T_s$.

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$|_{dBm}$ 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 Note 7 | Maximum Io |
| Ts Note 2 | dB | MHz | | dBm/15kHz | dBm/$BW_{Channel}$ |
| ±20 | ≥-3 dB | ≤ 3 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 |
| ±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.
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 | dBm/BW$_{Channel}$ |
| +20 | ≥-7.76 | ≤ 3 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 |
| +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
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 shall apply without DRX as well as for all the DRX cycles specified in TS 36.331 [2].

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$|_{dBm}$ 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 9 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 | $(PRS\ \hat{E}s/Iot)_{ref}$ ≥-6dB and $(PRS\ \hat{E}s/Iot)_i$ ≥-13dB | ≥ 6 | 6 | 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 |
| ±6 | $(PRS\ \hat{E}s/Iot)_{ref}$ ≥-6dB and $(PRS\ \hat{E}s/Iot)_i$ ≥-13dB | ≥ 25 | ≥ 2 | Note 4 | Note 4 | Note 4 |
| ±5 | $(PRS\ \hat{E}s/Iot)_{ref}$ ≥-6dB and $(PRS\ \hat{E}s/Iot)_i$ ≥-13dB | ≥ 50 | ≥ 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 shall apply without DRX as well as for all the DRX cycles specified in TS 36.331 [2].

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**

<table>
<tr><th rowspan="3">Accuracy</th><th colspan="6">Conditions</th></tr>
<tr><th rowspan="2">PRS Ês/Iot</th><th rowspan="2">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</th><th rowspan="2">Minimum number of available measurement subframes among the reference cell and the measured neighbour cell i</th><th colspan="3">Io Note 6 range</th></tr>
<tr><th>E-UTRA operating band groups Note 8</th><th>Minimum Io Note 1</th><th>Maximum Io</th></tr>
<tr><td>Ts Note 2</td><td>dB</td><td>RB</td><td></td><td></td><td>dBm/15kHz Note 5</td><td>dBm/BW<sub>Channel</sub></td></tr>
<tr><td rowspan="7">±21</td><td rowspan="7">(PRS Ês/Iot)<sub>ref</sub> ≥-6dB and (PRS Ês/Iot)<sub>i</sub> ≥-13dB</td><td rowspan="7">≥ 6</td><td rowspan="7">4</td><td>FDD_A, TDD_A</td><td>-121</td><td>-50</td></tr>
<tr><td>FDD_C, TDD_C</td><td>-120</td><td>-50</td></tr>
<tr><td>FDD_D</td><td>-119.5</td><td>-50</td></tr>
<tr><td>FDD_E, TDD_E</td><td>-119</td><td>-50</td></tr>
<tr><td>FDD_F</td><td>-118.5</td><td>-50</td></tr>
<tr><td>FDD_G</td><td>-118</td><td>-50</td></tr>
<tr><td>FDD_H</td><td>-117.5</td><td>-50</td></tr>
<tr><td>±10</td><td>(PRS Ês/Iot)<sub>ref</sub> ≥-6dB and (PRS Ês/Iot)<sub>i</sub> ≥-13dB</td><td>≥ 25</td><td>≥ 2</td><td>Note 4</td><td>Note 4</td><td>Note 4</td></tr>
<tr><td>±9</td><td>(PRS Ês/Iot)<sub>ref</sub> ≥-6dB and (PRS Ês/Iot)<sub>i</sub> ≥-13dB</td><td>≥ 50</td><td>≥ 1</td><td>Note 4</td><td>Note 4</td><td>Note 4</td></tr>
<tr><td colspan="7">NOTE 1: This minimum Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.<br>NOTE 2: Ts is the basic timing unit defined in TS 36.211 [16].<br>NOTE 3: PRS bandwidth is as indicated in prs-Bandwidth in the OTDOA assistance data defined in [24].<br>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.<br>NOTE 5: The condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.<br>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.<br>NOTE 7: If a CA capable UE is configured with SCell, the serving cell channel bandwidth is the minimum of the serving cell channel bandwidths in the component carriers involved in the RSTD measurement. If one 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.<br>NOTE 8: E-UTRA operating band groups are as defined in Section 3.5.</td></tr>
</table>

## 9.1.10.3 RSTD Measurement Report Mapping

The reporting range of RSTD is defined from -15391$T_s$ to 15391$T_s$ with 1$T_s$ resolution for absolute value of RSTD less or equal to 4096$T_s$ and 5Ts for absolute value of RSTD greater than 4096$T_s$.

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 carrier aggregation. Requirements in this clause are applicable to all carrier aggregation capable UEs which have been configured with a downlink Scell. Note : This clause covers measurement accuracy requirements for frequencies corresponding to those used for the PCell and SCell; 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 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 the secondary 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 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 the 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 RSTD measurement accuracy requirements for a UE configured with a downlink secondary cell. The UE may operate in either E-UTRA inter-band or intra-band carrier aggregation. 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 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.

## 9.2 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.<br>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.

# 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<br>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 49232$T_s$ with 2$T_s$ resolution for timing advance less or equal to 4096$T_s$ and 8$T_s$ for timing advance greater than 4096$T_s$.

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 | $49232 \le T_{ADV}$ | $T_s$ |

# 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.0 FDD | R.1 FDD | R.3 FDD | R.4 FDD | R.6 FDD |
| Channel bandwidth | MHz | 1.4 | 3 | 5 | 10 | 10 | 10 | 20 | 20 |
| Number of transmitter antennas | | 1 | | | 1 | 2 | 1 | 1 | 1 |
| Allocated resource blocks (Note 4) | | 2 | | | 24 | 24 | 24 | 24 | 24 |
| Allocated subframes per Radio Frame | | 10 | | | 10 | 10 | 10 | 10 | 10 |
| Modulation | | QPSK | | | QPSK | QPSK | QPSK | QPSK | QPSK |
| Target Coding Rate | | 1/3 | | | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Information Bit Payload | | | | | | | | | |
| For Sub-Frames 4, 9 | Bits | 120 | | | 2088 | 2088 | 2088 | 2088 | 2088 |
| For Sub-Frame 5 | Bits | 104 | | | 2088 | 1736 | 2088 | 2088 | 2088 |
| For Sub-Frame 0 | Bits | 32 | | | 1736 | 1736 | 1736 | 1736 | 1736 |
| For Sub-Frame 1, 2, 3, 6, 7, 8 | Bits | 0 | | | 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 |
| For Sub-Frame 5 | | 1 | | | 1 | 1 | 1 | 1 | 1 |
| For Sub-Frame 0 | | 1 | | | 1 | 1 | 1 | 1 | 1 |
| For Sub-Frame 1, 2, 3, 6, 7, 8 | | 0 | | | 0 | 0 | 1 | 0 | 1 |
| Binary Channel Bits Per Sub-Frame | | | | | | | | | |
| For Sub-Frames 4, 9 | Bits | 456 | | | 6624 | 6336 | 6624 | 6624 | 6624 |
| For Sub-Frame 5 | Bits | 360 | | | 6336 | 6048 | 6336 | 6336 | 6336 |
| For Sub-Frame 0 | Bits | 176 | | | 5784 | 5520 | 5784 | 5784 | 5784 |
| For Sub-Frame 1, 2, 3, 6, 7, 8 | Bits | 0 | | | 0 | 0 | 6624 | 0 | 6624 |
| Max. Throughput averaged over 1 frame | kbps | 37.6 | | | 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.
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**

| Parameter | Unit | Value | | | | | |
|---|---|---|---|---|---|---|---|
| Reference channel | | R.2 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 | 2 | 1 |
| Allocated resource blocks (Note 4) | | 2 | | | 24 | 24 | 24 |
| Uplink-Downlink Configuration (Note 5) | | 1 | | | 1 | 1 | 1 |
| Special Subframe Configuration (Note 6) | | 6 | | | 6 | 6 | 6 |
| Allocated subframes per Radio Frame | | 6 | | | 6 | 6 | 6 |
| Modulation | | QPSK | | | QPSK | QPSK | QPSK |
| Target Coding Rate | | 1/3 | | | 1/3 | 1/3 | 1/3 |
| Information Bit Payload | | | | | | | |
| For Sub-Frames 4,9 | Bits | 120 | | | 2088 | 2088 | 2088 |
| For Sub-Frame 5 | Bits | 104 | | | 2088 | 2088 | 2088 |
| For Sub-Frame 0 | Bits | 56 | | | 2088 | 1736 | 2088 |
| For Sub-Frame 1, 6 (DwPTS) | Bits | 56 | | | 1032 | 1032 | 1032 |
| Number of Code Blocks per Sub-Frame (Note 7) | | 1 | | | 1 | 1 | 1 |
| For Sub-Frames 4,9 | | 1 | | | 1 | 1 | 1 |
| For Sub-Frame 5 | | 1 | | | 1 | 1 | 1 |
| For Sub-Frame 0 | | 1 | | | 1 | 1 | 1 |
| For Sub-Frame 1, 6 (DwPTS) | | 1 | | | 1 | 1 | 1 |
| Binary Channel Bits Per Sub-Frame | | | | | | | |
| For Sub-Frames 4,9 | Bits | 456 | | | 6624 | 6336 | 6624 |
| For Sub-Frame 5 | Bits | 408 | | | 6480 | 6192 | 6480 |
| For Sub-Frame 0 | Bits | 224 | | | 5928 | 5664 | 5928 |
| For Sub-Frame 1, 6 (DwPTS) | Bits | 272 | | | 3696 | 3504 | 3696 |
| Max. Throughput averaged over 1 frame | Mbps | 0.0512 | | | 1.0416 | 1.0064 | 1.0416 |

Note 1: 2 symbols allocated to PDCCH for 10 MHz 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.10 FDD | R.6 FDD | R.7 FDD | R.9 FDD |
| Channel bandwidth | MHz | 1.4 | 20 | 10 | 10 | 10 |
| Number of transmitter antennas | | 1 | 1 | 1 | 2 | 2 |
| Control region OFDM symbols[Note1] | symbols | 4 | 2 | 2 | 2 | 3 |
| Aggregation level | CCE | 2<br>(Note 6) | 8 | 8 | 8 | 8 |
| DCI Format | | Note 3 | Note 3 | Note 3 | Note 3 | Note 3 |
| Cell ID | | 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 1: The control region consists of PCFICH, PHICH and PDCCH.<br>Note 2: DCI formats are defined in TS 36.212.<br>Note 3: DCI format shall depend upon the test configuration.<br>Note 4: Cell ID shall depend upon the test configuration.<br>Note 5: Payload size shall depend upon the test configuration.<br>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.10 TDD | R.6 TDD | R.7 TDD | R.9 TDD |
| Channel bandwidth | MHz | 1.4 | 20 | 10 | 10 | 10 |
| Number of transmitter antennas | | 1 | 1 | 1 | 2 | 2 |
| Control region OFDM symbols[Note1] | symbols | 4<br>(Note 6) | 2 | 2 | 2 | 3 |
| Aggregation level | CCE | 2<br>(Note 7) | 8 | 8 | 8 | 8 |
| DCI Format | | Note 3 | Note 3 | Note 3 | Note 3 | Note 3 |
| Cell ID | | 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 1: The control region consists of PCFICH, PHICH and PDCCH.<br>Note 2: DCI formats are defined in TS 36.212.<br>Note 3: DCI format shall depend upon the test configuration.<br>Note 4: Cell ID shall depend upon the test configuration.<br>Note 5: Payload size shall depend upon the test configuration.<br>Note 6: Only 2 OFDM symbols for special subframes 1 and 6.<br>Note 7: For PDCCH using SI/RA/P-RNTI, Aggregation level 4 is used. | | | | | | |

## 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 ( $\gamma$ ) 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 $\gamma_i$ 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 $\gamma$ 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 $\gamma_{PRB}$ [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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ [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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ [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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 Void

#### A.3.2.1.16 Void

#### 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 $\gamma_{PRB}$ [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.<br>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 $\gamma_{PRB}$ is used to scale the power of PDSCH.<br>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 $\gamma_{PRB}$ 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.<br>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 ( $\gamma$ ) 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 $\gamma_i$ 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 $\gamma$ 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 $\gamma_{PRB}$ [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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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**

<table>
<tr><th rowspan="4">Allocation $n_{PRB}$</th><th colspan="18">Relative power level $\gamma_{PRB}$ [dB]</th></tr>
<tr><th colspan="18">Special subframe configuration</th></tr>
<tr><td colspan="2">0</td><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td><td colspan="2">5</td><td colspan="2">6</td><td colspan="2">7</td><td colspan="2">8</td></tr>
<tr><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td></tr>
<tr><td rowspan="2">0 – 12</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td rowspan="2">37 – 49</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="19">Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].</td></tr>
</table>

### 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 $\gamma_{PRB}$ [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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ [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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ [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.<br>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 $\gamma_{PRB}$ is used to scale the power of PDSCH.<br>Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in TS 36.211 [16].<br>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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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.<br>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 $\gamma_{PRB}$ is used to scale the power of PDSCH.<br>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.<br>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 $\gamma_{PRB}$ 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**

<table>
<tr><th rowspan="5">Allocation<br>$n_{PRB}$</th><th colspan="18">Relative power level $\gamma_{PRB}$ [dB]</th></tr>
<tr><th colspan="18">Special subframe configuration</th></tr>
<tr><td colspan="2">0</td><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td><td colspan="2">5</td><td colspan="2">6</td><td colspan="2">7</td><td colspan="2">8</td></tr>
<tr><th colspan="18">Control region OFDM symbols</th></tr>
<tr><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td></tr>
<tr><td rowspan="2">0 – 12</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td rowspan="2">37 – 49</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2" rowspan="2">0</td><td colspan="2">0</td><td colspan="2">0</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="19">Note 1: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [16].</td></tr>
</table>

## 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**

<table>
<tr><th rowspan="3">Allocation<br>$n_{PRB}$</th><th colspan="4">Relative power level $\gamma_{PRB}$ [dB]</th><th rowspan="3">PDSCH Data</th></tr>
<tr><th colspan="4">Subframe (Note 1)</th></tr>
<tr><td>0</td><td>5</td><td>3 , 4, 8, 9 and 6 (as normal subframe)Note 3</td><td>1 and 6 (as special subframe) Note 3</td></tr>
<tr><td>0 – 49</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Note 2</td></tr>
<tr><td colspan="6">Note 1: PDSCH allocation does not apply to subframes configured as PRS subframes.<br>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 $\gamma_{PRB}$ is used to scale the power of PDSCH.<br>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.<br>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 $\gamma_{PRB}$ 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.</td></tr>
</table>

### 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** $\gamma_{PRB}$ **[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 $\gamma_{PRB}$ 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 $\gamma_{PRB}$ 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** $\gamma_{PRB}$ **[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**

| **Allocation** $n_{PRB}$ | **Relative power level** $\gamma_{PRB}$ **[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 – 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.<br>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 $\gamma_{PRB}$ is used to scale the power of PDSCH.<br>Note 3: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in 3GPP TS 36.211 [16].<br>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 $\gamma_{PRB}$ 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<br>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.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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note 1<br>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.<br>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.<br>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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note 1<br>OCNG_RB Note 1 | dB | 0 | | | 0 | | |
| 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.<br>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.<br>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 | 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.<br>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.<br>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

$T_{evaluate,E\text{-}UTRAN\_inter}$ See Table 4.2.2.4-1 in clause 4.2.2.4

$T_{SI\text{-}EUTRA}$ 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.<br>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.<br>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.4.3 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.<br>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.<br>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 | |
| $Thresh_{x, high}$ (Note 1) | dB | 48 | |
| 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.4.3.1.2.2 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: $T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$

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.4.3.1.3 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 | | | |
| 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.4.3.2 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 | | |
| 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 | |
| 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.<br>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.<br>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.4.3.3 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**

| 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 | | | 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. |
| T2 | | s | 25 | T2 need to be defined so that cell re-selection reaction time is taken into account. |

**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 | |
| Thresh$_{x,\ high}$ (Note 1) | dB | 48 | |
| 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.4.3.3.2 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: $T_{evaluateUTRA\_FDD} + T_{SI\text{-}UTRA}$

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.4.3.4 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 |
| $Thresh_{x, high}$ (Note2) | dB | 24(-79dBm) | | |
| $S_{nonintrasearch}$ | dB | 46 | | |
| 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.<br>Note2: 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 (Note1) | | 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) | | | | | |
| $Thresh_{x, low}$ (Note2) | dB | 46 (-94dBm) | | | | | |
| Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.<br>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 | | | | | | | |

##### 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.<br>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.4.3.4.2.1.3 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 | | | |
| 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 | | | | | | | |
| $Qrxlevmin_{EUTRA}$ | dBm | -140 | | | | | | | |
| UE_TXPWR_MAX_RACH | dBm | 21 | | | | | | | |
| Treselection | s | 0 | | | | | | | |
| $Thresh_{x, high}$ (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 $Thresh_{x, high}$ 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: $T_{evaluateUTRA\_TDD} + T_{SI\text{-}UTRA}$

Where:

| | |
|---|---|
| $T_{evaluateUTRA\_TDD}$ | 19.2s, See Table 4.2.2.5.2-1 |
| $T_{SI\text{-}UTRA}$ | 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.4.4 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.<br>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.<br>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: $T_{evaluateHRPD} + T_{SI\text{-}HRPD}$

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.4.5.2 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 | |
| $S_{ServingCell}$ | 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.<br>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.<br>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 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.5.1.3.1-1: 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 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 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.<br>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.<br>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 | 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 | -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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 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.

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.<br>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.<br>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.<br>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.<br>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.5.2 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.<br>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<br>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.<br>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<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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<br>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.<br>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.<br>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.<br>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.<br>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.<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$<br>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.5.3 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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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 | | | | | | |
| 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 | 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.<br>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.<br>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.6.2 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.<br>Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.<br>Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.<br>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.<br>Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.<br>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 ( $P_{\text{CMAX}}$ ) | 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.<br>Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.<br>Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.<br>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 ( $P_{\text{CMAX}}$ ) | 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.<br>Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.<br>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.6.3 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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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:

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

$T_{RRC\_procedure\_delay}$ = 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.

## 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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 accuracyy, 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 |
| E-UTRA RF Channel Number | | 1 | 1 | 1 |
| Channel Bandwidth ($BW_{channel}$) | MHz | 10 | 10 | 1.4 |
| DRX cycle | ms | OFF | 80[Note5] | OFF |
| PDCCH/PCFICH/PHICH Reference measurement channel[Note1] | | R.6 FDD | R.6 FDD | R.8 FDD |
| OCNG Pattern[Note2] | | OP.2 FDD | OP.2 FDD | OP.4 FDD |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA[Note3]<br>OCNG_RB[Note3] | dB | 0 | 0 | 0 |
| $N_{oc}$ | dBm/15 kHz | -98 | -98 | -98 |
| $\hat{E}_s/I_{ot}$ | dB | 3 | 3 | 3 |
| $\hat{E}_s/N_{oc}$ | dB | 3 | 3 | 3 |
| Io[Note4] | dBm/9 MHz | -65.5 | -65.5 | N/A |
| | dBm/1.08 MHz | N/A | N/A | -74.7 |
| Propagation condition | - | 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 | Test 1 | Test 2 | Test 3 | Comment |
|---|---|---|---|---|
| | Value | | | |
| srsBandwidthConfiguration | bw5 | bw5 | bw7 | |
| srsSubframeConfiguration | sc1 | sc3 | sc1 | |
| ackNackSrsSimultaneousTransmission | FALSE | FALSE | FALSE | |
| srsMaxUpPTS | N/A | N/A | N/A | Not applicable for FDD |
| srsBandwidth | 0 | 0 | 0 | No hopping |
| srsHoppingBandwidth | hbw0 | hbw0 | hbw0 | |
| frequencyDomainPosition | 0 | 0 | 0 | |
| duration | TRUE | TRUE | TRUE | Indefinite duration |
| Srs-ConfigurationIndex | 0 | 77 | 0 | SRS periodicity of 2ms and 80 ms for Test 1 and 2, respectively. |
| transmissionComb | 0 | 0 | 0 | |
| cyclicShift | 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 for E-UTRAN FDD**

| Field | Test2 | Comment |
|---|---|---|
| | Value | |
| onDurationTimer | psf1 | |
| drx-InactivityTimer | psf1 | |
| drx-RetransmissionTimer | psf1 | |
| longDRX-CycleStartOffset | sf80 | |
| shortDRX | 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 bandwith, the test sequence shall be carried out in RRC_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms (Tests 1 and 2, 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 $+64\times T_S$ (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 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.

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 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 bandwith, the test sequence shall be carried out in RRC_CONNECTED for non-DRX (Tests 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** |
| E-UTRA RF Channel Number | | 1 | 1 | 1 |
| Channel Bandwidth ($BW_{channel}$) | MHz | 10 | 10 | 1.4 |
| Special subframe configuration[Note1] | | 6 | 6 | 6 |
| Uplink-downlink configuration[Note2] | | 1 | 1 | 1 |
| DRX cycle | ms | OFF | 80[Note7] | OFF |
| PDCCH/PCFICH/PHICH Reference measurement channel[Note3] | | R.6 TDD | R.6 TDD | R.8 TDD |
| OCNG Pattern[Note4] | | OP.2 TDD | OP.2 TDD | OP.4 TDD |
| PBCH_RA | dB | 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 |
| $\hat{E}_s/I_{ot}$ | dB | 3 | 3 | 3 |
| $\hat{E}_s/N_{oc}$ | dB | 3 | 3 | 3 |
| Io[Note6] | dBm/9 MHz | -65.5 | -65.5 | N/A |
| | dBm/1.08 MHz | N/A | N/A | -74.7 |
| Propagation condition | - | 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 | Test 1 | Test 2 | Tset3 | Comment |
|---|---|---|---|---|
| | Value | | | |
| srsBandwidthConfiguration | bw5 | bw5 | bw7 | |
| srsSubframeConfiguration | sc3 | sc3 | sc3 | Once every 5 subframes |
| ackNackSrsSimultaneousTransmission | FALSE | FALSE | FALSE | |
| srsMaxUpPTS | FALSE | FALSE | FALSE | |
| srsBandwidth | 0 | 0 | 0 | No hopping |
| srsHoppingBandwidth | hbw0 | hbw0 | hbw0 | |
| frequencyDomainPosition | 0 | 0 | 0 | |
| duration | TRUE | TRUE | TRUE | Indefinite duration |
| Srs-ConfigurationIndex | 15 | 85 | 15 | SRS periodicity of 10 and 80 ms for Test 1 and 2, respectively. |
| transmissionComb | 0 | 0 | 0 | |
| cyclicShift | 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 for E-UTRAN TDD**

| Field | Test2 | Comment |
|---|---|---|
| | Value | |
| onDurationTimer | psf1 | |
| drx-InactivityTimer | psf1 | |
| drx-RetransmissionTimer | psf1 | |
| longDRX-CycleStartOffset | sf80 | |
| shortDRX | 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 bandwith, the test sequence shall be carried out in RRC_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms (Tests 1 and 2, 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 $+64\times T_S$ (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 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.

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 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 bandwith, the test sequence shall be carried out in RRC_CONNECTED for non-DRX (Tests 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 1 | Test 2 |
| E-UTRA RF Channel Number | | 1 | 1 | 2 | 2 |
| Channel Bandwidth ($BW_{channel}$) | MHz | 20 | 20 | 20 | 20 |
| Active PCell | | Cell 1 | Cell 1 | | |
| Active SCell | | | | Cell 2 | Cell 2 |
| TAG configuration | | pTAG | pTAG | pTAG | pTAG |
| DRX cycle | ms | OFF | 80[Note5] | OFF | 80[Note5] |
| PDCCH/PCFICH/PHICH Reference measurement channel[Note1] | | 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 |
| 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/18 MHz | -62.5 | -62.5 | -62.5 | -62.5 |
| 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.7.1.3.1-3.

**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 1 | Test 2 | |
| srsBandwidthConfiguration | bw5 | bw5 | bw5 | 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 | 77 | SRS periodicity of 2ms 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.7.1.3.1-3: drx-Configuration to be used in UE Transmit Timing Accuracy Test 2 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.7.1.3.2 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.

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 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 $+64\times T_S$ (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 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.

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 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. The Cell 1 is PCelln 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 1 | Test 2 |
| E-UTRA RF Channel Number | | 1 | 1 | 2 | 2 |
| Channel Bandwidth ($BW_{channel}$) | MHz | 20 | 20 | 20 | 20 |
| 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 | pTAG | pTAG |
| 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.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 |
| 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/18 MHz | -62.5 | -62.5 | -62.5 | -62.5 |
| Propagation condition | - | AWGN | AWGN | AWGN | AWGN |
| Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.<br>Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.<br>Note 3: For the reference measurement channels, see clause A.3.1.<br>Note 4: For the OCNG pattern, see clause A.3.2.<br>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.<br>Note 6: Io level has been derived from other parameters for information purpose. It is not a settable parameter.<br>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 1 | Test 2 | Tset3 |
| 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.7.1.4.1-3: DRX Configuration to be used in UE Transmit Timing Accuracy Test 2 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.7.1.4.2 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.

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 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 $+64\times T_S$ (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 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.

d) The test system shall verify that the UE transmit timing offsets of both PCell and SCell stay s 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 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

# 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.<br>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.<br>Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.<br>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.<br>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.7.3 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 Low | 2x2 Low | 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 | |
| | $\rho_A$, $\rho_B$ | | 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**

| 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 | | 1x2 Low | | | 2x2 Low | | |
| OCNG Pattern defined in A.3.2.1 (FDD) | | OP.2 FDD | | | OP.2 FDD | | |
| $\rho_A$, $\rho_B$ | | 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 | -4.7 | -9.5 | -13.5 | -4.7 | -9.5 | -13.5 |
| $N_{oc}$ | dBm/15 kHz | -98 | | | -98 | | |
| Propagation condition | | AWGN | | | 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.7.3.1.1-1.

**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 | | |
| $\rho_A$, $\rho_B$ | | 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.

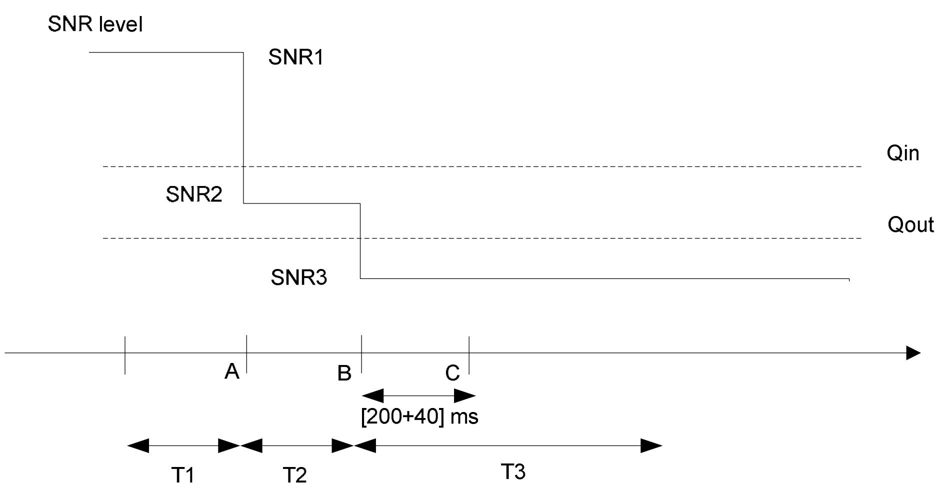


**Figure A.7.3.1.1-1 SNR variation for out-of-sync testing**

#### 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 | |
| | $\rho_A$, $\rho_B$ | | 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 | |
| | $\rho_A$, $\rho_B$ | | 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 | | | | |
| $\rho_A$, $\rho_B$ | | 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.

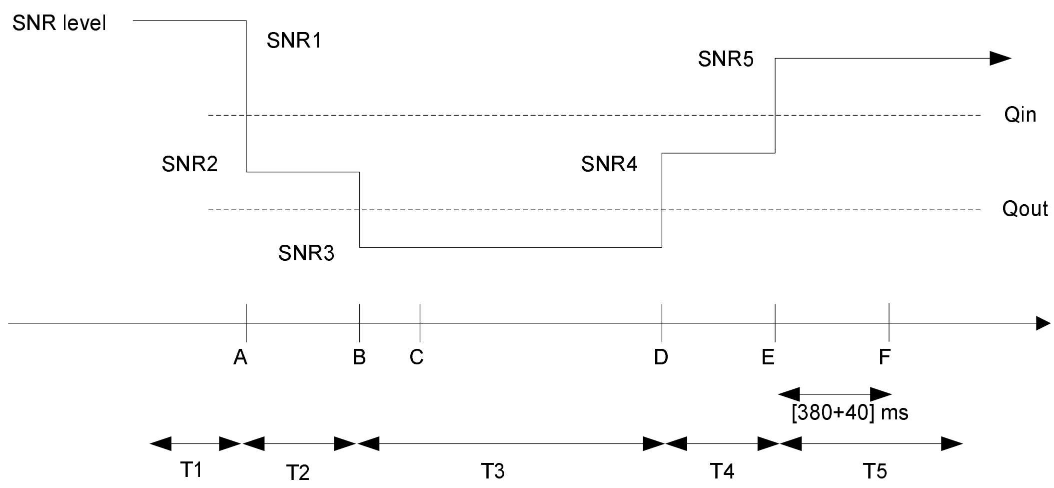


**Figure A.7.3.2.1-1 SNR variation for in-sync testing**

#### 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 Low | 2x2 Low | 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 | |
| | $\rho_A$, $\rho_B$ | | 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**

<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>Correlation Matrix and Antenna Configuration</td><td></td><td colspan="3">1x2 Low</td><td colspan="3">2x2 Low</td></tr>
<tr><td>Special subframe configuration[Note1]</td><td></td><td colspan="3">6</td><td colspan="3">6</td></tr>
<tr><td>Uplink-downlink configuration[Note2]</td><td></td><td colspan="3">1</td><td colspan="3">1</td></tr>
<tr><td>OCNG Pattern defined in A.3.2.2 (TDD)</td><td></td><td colspan="3">OP.2 TDD</td><td colspan="3">OP.2 TDD</td></tr>
<tr><td>$\rho_A$, $\rho_B$</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 3]</td><td>dB</td></tr>
<tr><td>OCNG_RB[Note 3]</td><td>dB</td></tr>
<tr><td>SNR [Note 8]</td><td>dB</td><td>-5.1</td><td>-9.1</td><td>-13.1</td><td>-5.2</td><td>-9.2</td><td>-13.2</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: For the special subframe configuration see table 4.2-1 in TS 36.211.<br>Note 2: For the uplink-downlink configuration see table 4.2-2 in TS 36.211.<br>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.<br>Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.<br>Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.<br>Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.<br>Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.<br>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.</td></tr>
</table>

**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 | | |
| $\rho_A$, $\rho_B$ | | 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.

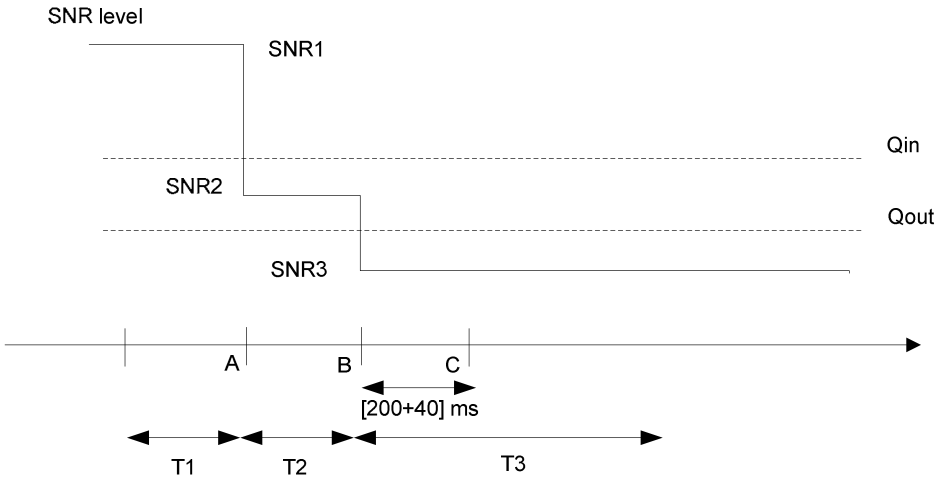


**Figure A.7.3.3.1-1. SNR variation for out-of-sync testing**

#### 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 | |
| | $\rho_A$, $\rho_B$ | | 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 | |
| | $\rho_A$, $\rho_B$ | | 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 | | | | |
| $\rho_A$, $\rho_B$ | | 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 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.

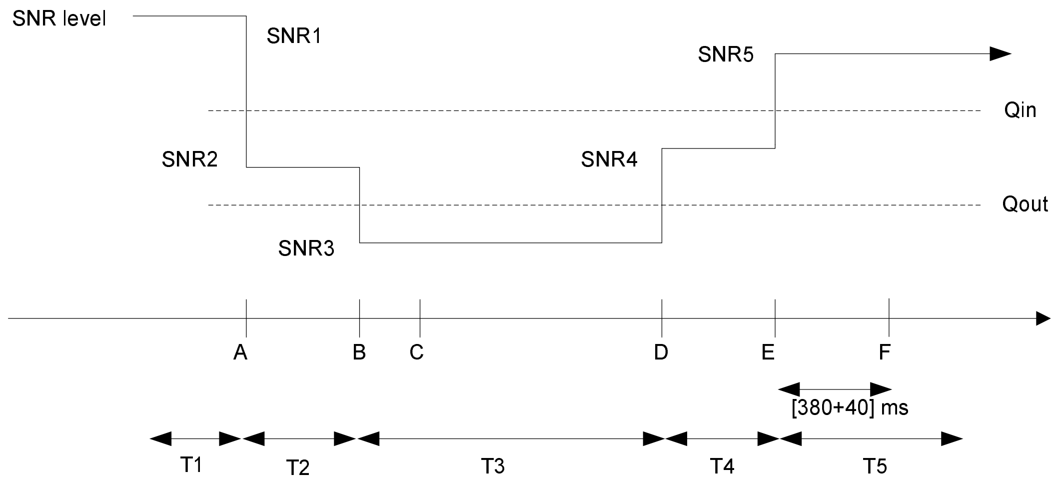


**Figure A.7.3.4.1-1. SNR variation for in-sync testing**

### 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**

| Parameter | | Unit | Value Test 1 | Value Test 2 | Comment |
|---|---|---|---|---|---|
| PCFICH/PDCCH/PHICH parameters | | | R.7 FDD | 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 | 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 (BWchannel) | | MHz | 10 | 10 | |
| Correlation Matrix and Antenna Configuration | | | 2x2 Low | 1x2 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 | 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.7.3.5.1-3 |
| 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 | 2 | 2 | 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.7.3.5.1-2: 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 Low | | |
| OCNG Pattern defined in A.3.2.1 (FDD) | | OP.2 FDD | | | OP.2 FDD | | |
| $\rho_A$, $\rho_B$ | | -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 | Test2 | Comment |
|---|---|---|---|
| | Value | Value | |
| 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 | Test2 | Comment |
|---|---|---|---|
| | Value | Value | |
| 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. |

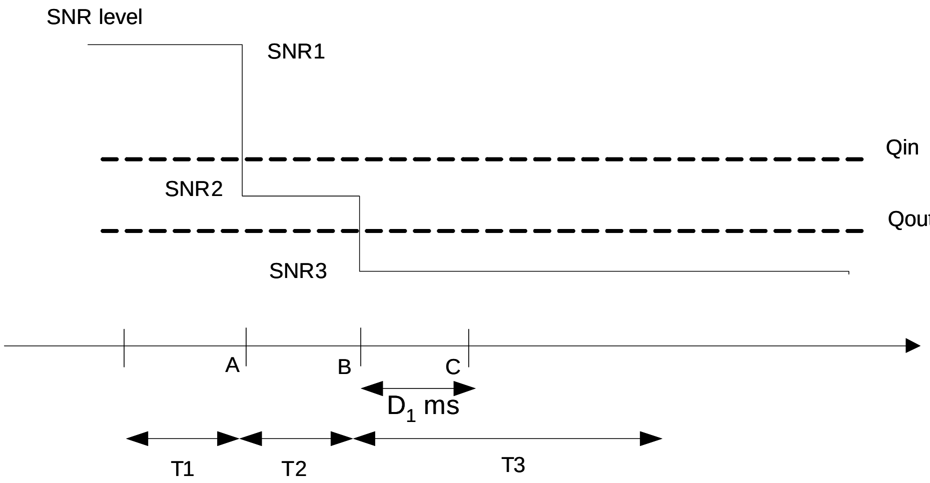


**Figure A.7.3.5.1-1 SNR variation for out-of-sync testing in DRX**

### 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 | |
| Correlation Matrix and Antenna Configuration | | | 1x2 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 | | 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 | |
| | $\rho_A$, $\rho_B$ | | 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 | |
| | $\rho_A$, $\rho_B$ | | 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 | | | | |
| Correlation Matrix and Antenna Configuration | | 1x2 Low | | | | |
| OCNG Pattern defined in A.3.2.1 (FDD) | | OP.2 FDD | | | | |
| $\rho_A$, $\rho_B$ | | 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. |

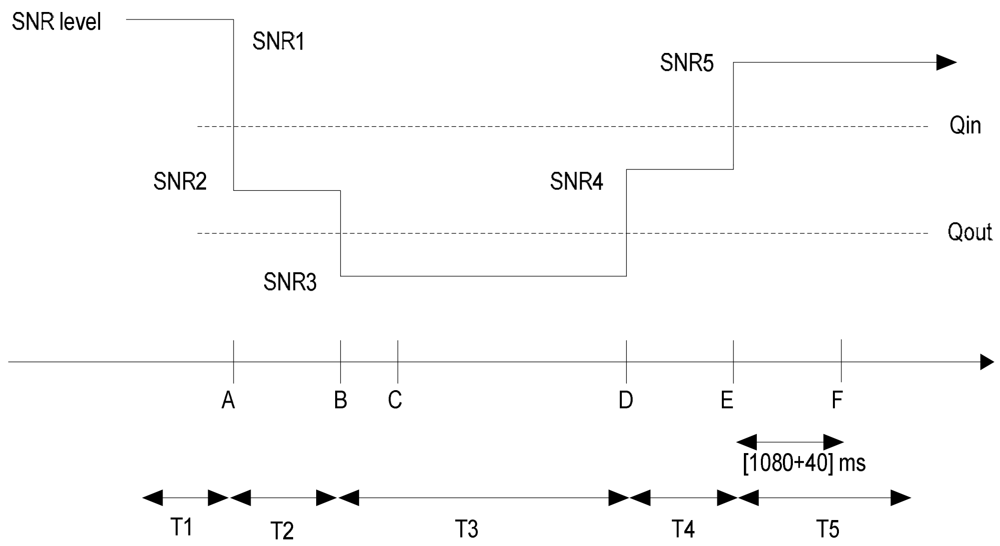


**Figure A.7.3.6.1-1 SNR variation for in-sync testing in DRX**

#### 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 Test 1 | Value Test 2 | Comment |
|---|---|---|---|---|---|
| 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 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 | 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 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 | | |
| $\rho_A$, $\rho_B$ | | -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 | Test2 | Comment |
|---|---|---|---|
| | Value | Value | |
| 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. |

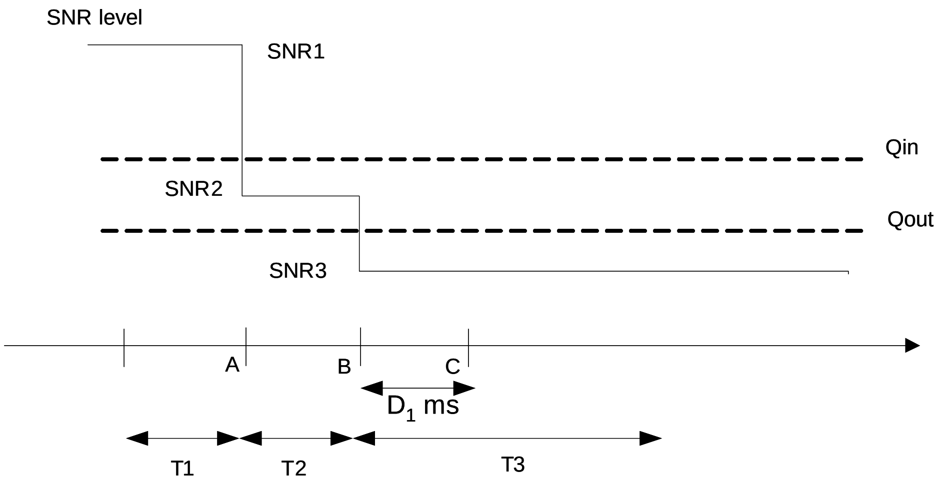


**Figure A.7.3.7.1-1 SNR variation for out-of-sync testing in DRX**

### 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 | |
| Correlation Matrix and Antenna Configuration | | | 1x2 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 | | 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 | |
| | $\rho_A$, $\rho_B$ | | 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 | |
| | $\rho_A$, $\rho_B$ | | 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 | | | | |
| Correlation Matrix and Antenna Configuration | | 1x2 Low | | | | |
| Special subframe configuration[Note1] | | 6 | | | | |
| Uplink-downlink configuration[Note2] | | 1 | | | | |
| OCNG Pattern defined in A.3.2.2 (TDD) | | OP.2 TDD | | | | |
| $\rho_A$, $\rho_B$ | | 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. |

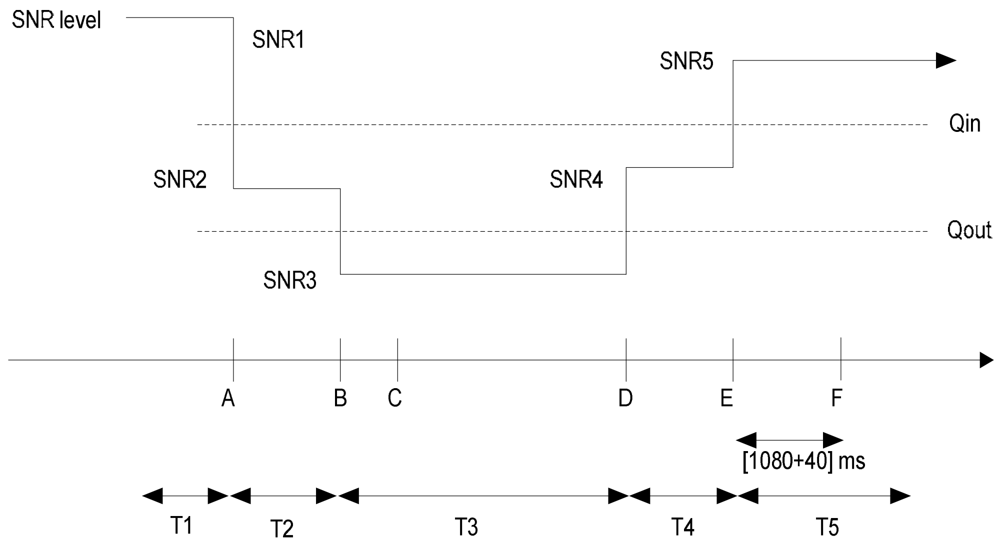


**Figure A.7.3.8.1-1 SNR variation for in-sync testing in DRX**

### 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.<br>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>$\rho_A$, $\rho_B$</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, clause 9.2.54 [28]. 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 | | |
| $\rho_A$, $\rho_B$ | | -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.

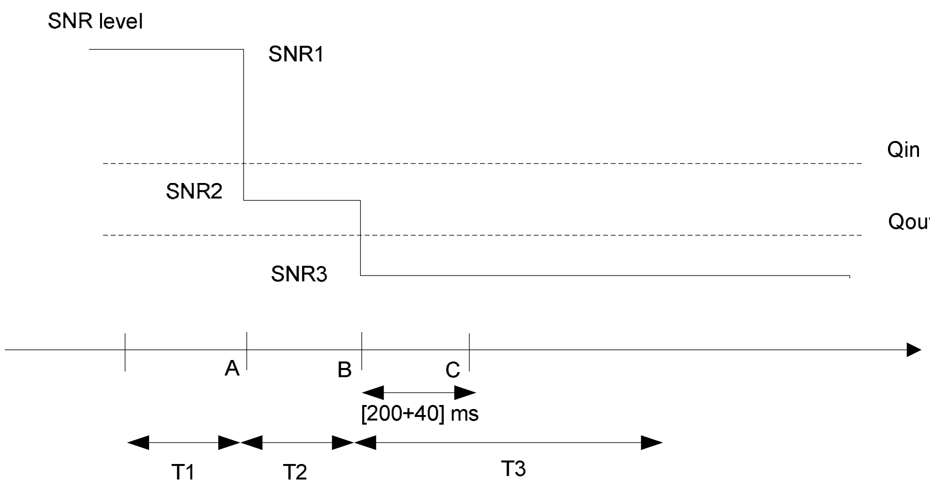


**Figure A.7.3.9.1-1 SNR variation for out-of-sync testing**

### 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.<br>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>$\rho_A$, $\rho_B$</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].<br>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.<br>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:<br>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 | | |
| $\rho_A$, $\rho_B$ | | -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.

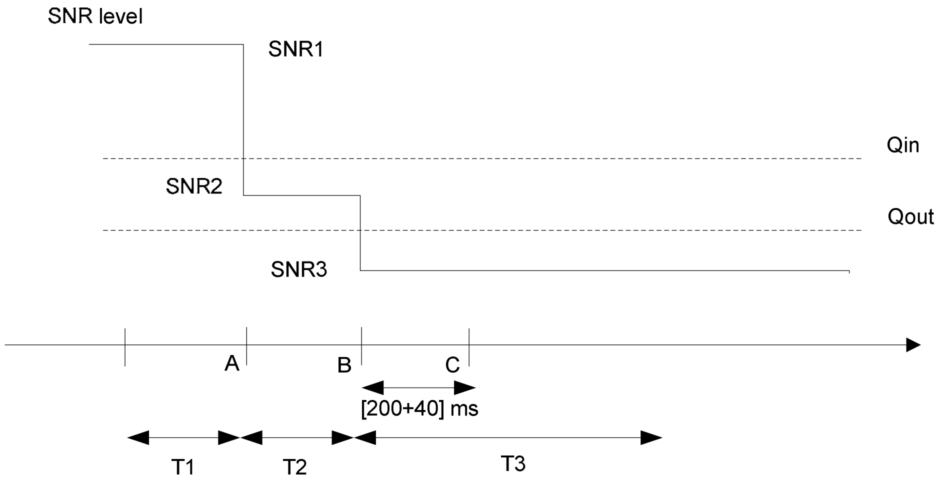


**Figure A.7.3.10.1-1 SNR variation in active cell for out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS**

#### 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 | | $(PCI_{cell1}-PCI_{cell2})mod3 != 0$ | Cell IDs are chosen such that CRS from cells 1 and 2 do not overalp in frequency |
| ABS pattern | | '10000000 100000001 000000010 000000100 00000' | FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2.<br>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.<br>No MBSFN subframes are cofigured in the ABS subframes. |
| Time domain measurement resource restriction pattern | | '10000000 100000001 000000010 000000100 00000' | 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 | | | | |
| $\rho_A$, $\rho_B$ | | -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.

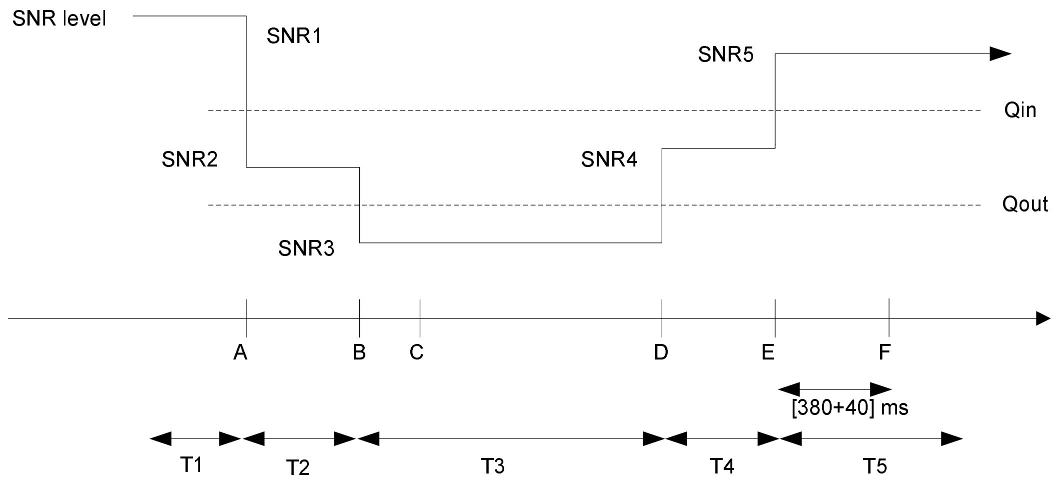


**Figure A.7.3.11.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction**

### 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 | | $(PCI_{cell1}-PCI_{cell2})mod3 != 0$ | 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 | | | | |
| $\rho_A$, $\rho_B$ | | -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.

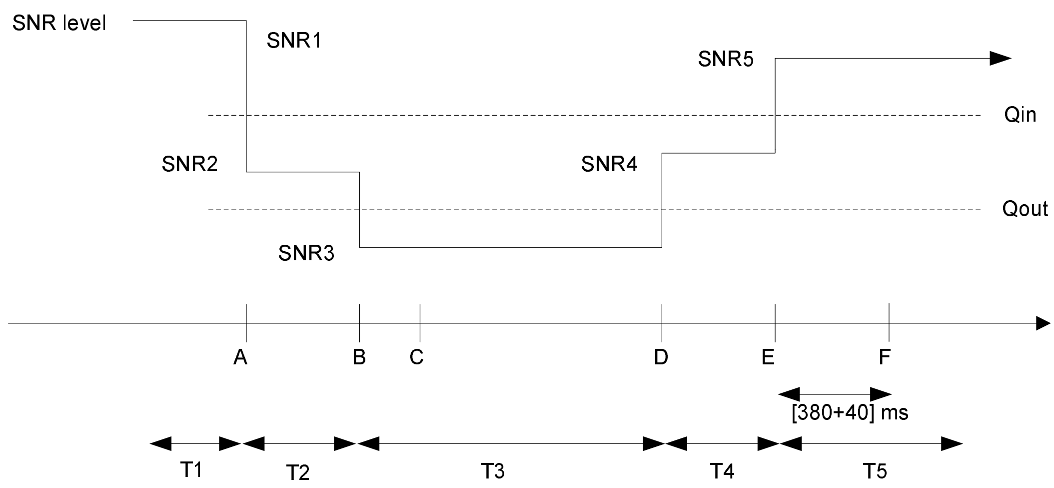


**Figure A.7.3.12.1-1 SNR variation in active cell for in-sync testing under time domain measurement resource restriction**

### 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.<br>None of the PDCCH are intended for the UE under test |
| OCNG parameters | | | OP.6 FDD for the serving cell (Cell 1)<br>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 | |
| | $\rho_A$, $\rho_B$ | | -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.<br>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 | | |
| $\rho_A$, $\rho_B$ | | -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.

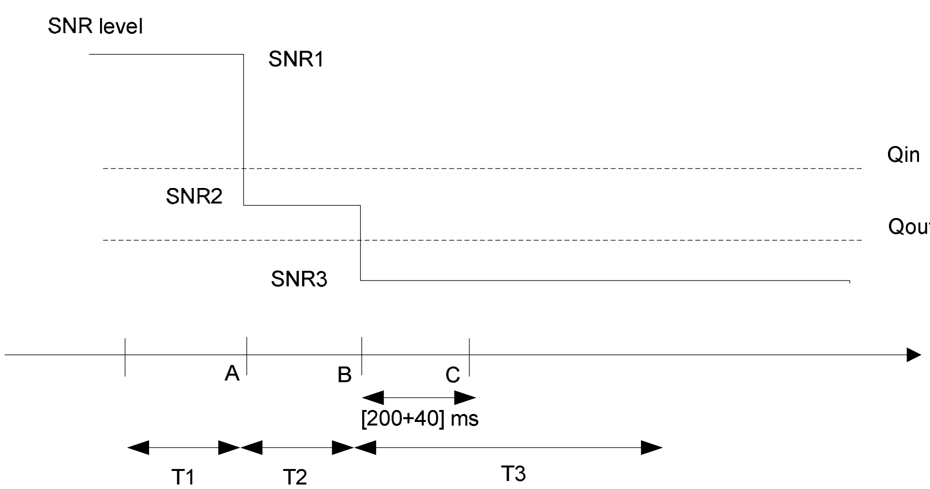


**Figure A.7.3.13.1-1 SNR variation for out-of-sync testing**

### 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 | |
| | $\rho_A$, $\rho_B$ | | -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 | | |
| $\rho_A$, $\rho_B$ | | -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.

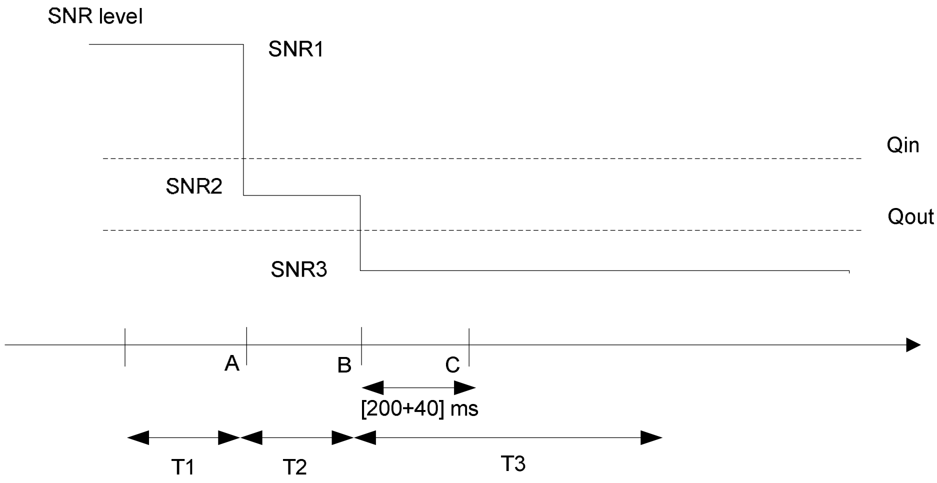


**Figure A.7.3.14.1-1 SNR variation for out-of-sync testing**

#### 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 | | | 0100000001000000010000 0000010000001000000 | 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 | | | 0100000001000000010000 | 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 | | | | |
| $\rho_A$, $\rho_B$ | | -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.

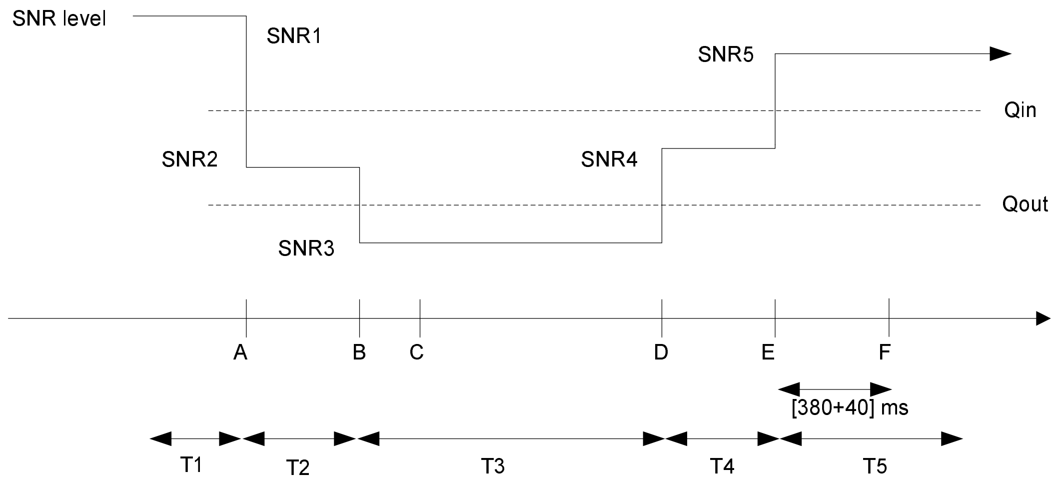


**Figure A.7.3.15.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction with MBSFN ABS**

### 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:<br>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 | | | | |
| $\rho_A$, $\rho_B$ | | -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.

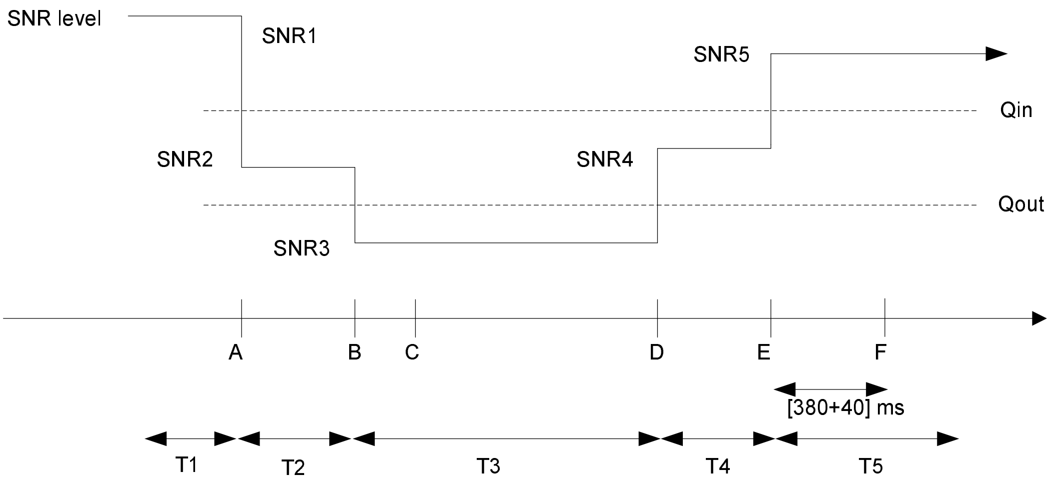


**Figure A.7.3.16.1-1 SNR variation in the active cell for in-sync testing under time domain measurement resource restriction with MBSFN ABS**

### 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.<br>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 | |
| | $\rho_A$, $\rho_B$ | | -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<br>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<br>Cell 3 frequency shift with respect to Cell 1: -100 | |
| T1 | | s | 1 | |
| T2 | | s | 0.4 | |
| T3 | | s | 0.5 | |
| Physical cell IDs | | | $(PCI_{cell1}-PCI_{cell2})mod3 = 0$<br>$(PCI_{cell1}-PCI_{cell3})mod3 != 0$<br>$PCI_{cell1}$ 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.<br>Configured in both Cell 2 and Cell 3 prior to the start of T1. |

| | | | | |
|---|---|---|---|---|
| Time domain measurement resource restriction pattern | | | '10000000100000001000000010000000100000000' | 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 |
| $\rho_A$, $\rho_B$ | | -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.<br>Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.<br>Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.<br>Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.<br>Note 5: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.<br>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. | | | | | | |

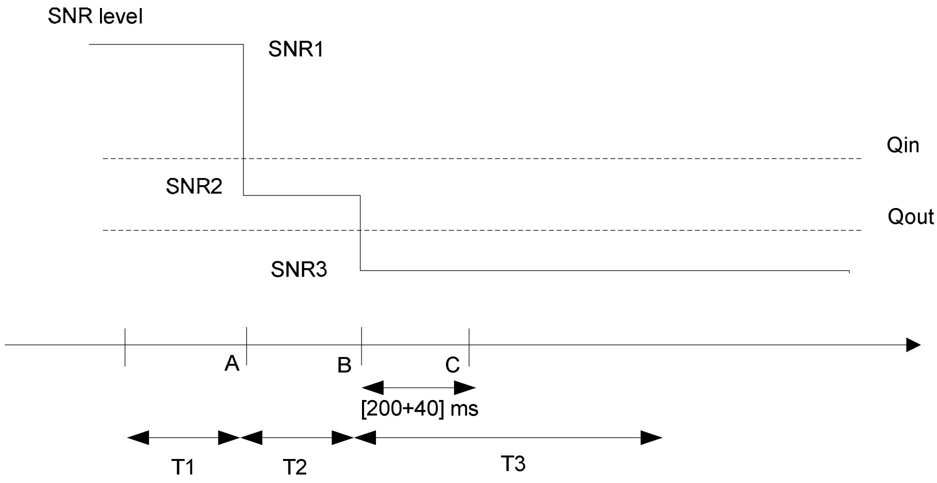


**Figure A.7.3.17.1-1 SNR variation for out-of-sync testing**

#### 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**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| PCFICH/PDCCH/PHICH parameters | | | 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 | As specified in clause A.3.2.2.2 |
| 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 TDDcarrier 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 | |
| | $\rho_A$, $\rho_B$ | | -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 | | µs | Cell 2 time offset with respect to Cell 1: 3<br>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<br>Cell 3 frequency shift with respect to Cell 1: -100 | |
| T1 | | s | 1 | |
| T2 | | s | 0.4 | |
| T3 | | s | 0.5 | |
| Physical cell IDs | | | $(PCI_{cell1}-PCI_{cell2})mod3 = 0$<br>$(PCI_{cell1}-PCI_{cell3})mod3 != 0$<br>$PCI_{cell1}$ not equal to $PCI_{cell2}$ | Cell PCIs are selected so that all conditions are met |
| ABS pattern | | | '00001000000000100000' | 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.<br>Configured in both Cell 2 and Cell 3 prior to the start of T1. |

<table>
<tr><td colspan="2">Time domain measurement resource restriction pattern</td><td></td><td>'00001000000000100000'</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 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 only in CRS-AssistanceInfo. It includes a single MBSFN-SubframeConfig element with subframe allocation oneFrame='000000'</td></tr>
<tr><td>antennaPortsCount</td><td></td><td>an2</td></tr>
<tr><td>mbsfn-SubframeConfigList</td><td></td><td>oneFrame = '000000'</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.7.3.18.1-2: 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**

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Cell 1</th><th>Cell 2</th><th>Cell 3</th></tr>
<tr><th>T1</th><th>T2</th><th>T3</th><th>T1-T3</th><th>T1-T3</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td colspan="3">1</td><td>1</td><td>1</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="3">10</td><td>10</td><td>10</td></tr>
<tr><td>Special subframe configuration<sup>Note1</sup></td><td></td><td colspan="3">6</td><td>6</td><td>6</td></tr>
<tr><td>Uplink-downlink configuration<sup>Note2</sup></td><td></td><td colspan="3">1</td><td>1</td><td>1</td></tr>
<tr><td>Correlation Matrix and Antenna Configuration</td><td></td><td colspan="3">2x2 Low</td><td>2x2 Low</td><td>2x2 Low</td></tr>
<tr><td>OCNG Pattern defined in A.3.2.2.2 (TDD)</td><td></td><td colspan="3">OP.2 TDD</td><td>OP.2 TDD</td><td>OP.2 TDD</td></tr>
<tr><td>$\rho_A$, $\rho_B$</td><td></td><td colspan="3">-3</td><td>-3</td><td>-3</td></tr>
<tr><td>PCFICH_RB</td><td>dB</td><td colspan="3">1</td><td rowspan="14">Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-1.</td><td rowspan="14">Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.2-1.</td></tr>
<tr><td>PDCCH_RA</td><td>dB</td><td colspan="3">1</td></tr>
<tr><td>PDCCH_RB</td><td>dB</td><td colspan="3">1</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td colspan="3" rowspan="11">-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<sup>Note1</sup></td><td>dB</td></tr>
<tr><td>OCNG_RB<sup>Note1</sup></td><td>dB</td></tr>
<tr><td>SNR <sup>Note 6</sup></td><td>dB</td><td>-1.5</td><td>-5.2</td><td>-13.7</td><td>4</td><td>2</td></tr>
<tr><td>$N_{oc}$</td><td>dBm/15 kHz</td><td colspan="3">-98</td><td>-98</td><td>-98</td></tr>
<tr><td>Propagation condition</td><td></td><td colspan="3">ETU 30 Hz</td><td>ETU 30 Hz</td><td>ETU 30 Hz</td></tr>
<tr><td colspan="7">Note 1: For the special subframe configuration see table 4.2-1 in TS 36.211.<br>Note 2: For the uplink-downlink subframe configuration see table 4.2-2 in TS 36.211.<br>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.<br>Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.<br>Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.<br>Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.<br>Note 7: SNR levels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the CRS REs.<br>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.</td></tr>
</table>

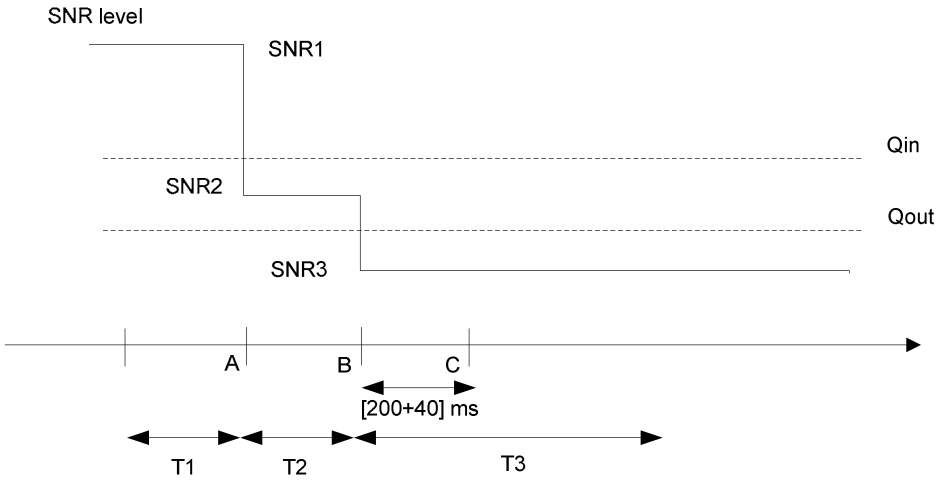


**Figure A.7.3.18.1-1 SNR variation for out-of-sync testing**

### 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 | '1000000010000000100000001000000010000000' | '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 | | | '1000000010000000100000001000000010000000' | 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' |
| | antennaPortsCount | | | 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 | ($PCI_{cell1}$-$PCI_{cell3}$) mod3! = 0 | Cell PCIs are selected so that all conditions are met |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 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. |
| | $\rho_A$, $\rho_B$ | | -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. |
| | $\rho_A$, $\rho_B$ | | -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 |
| $\rho_A$, $\rho_B$ | | -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.

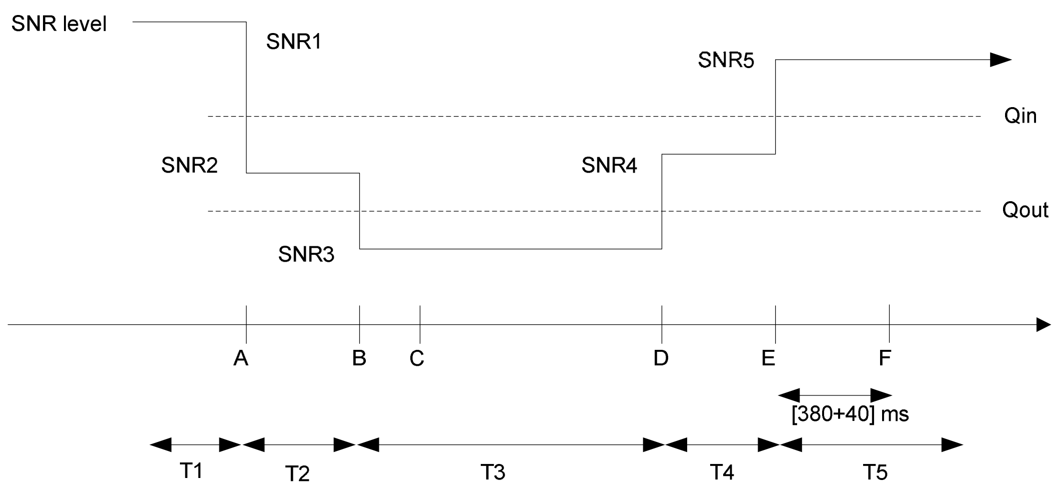


**Figure A.7.3.19.1-1 SNR variation for in-sync testing**

### 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**

<table>
<tr><th colspan="2" rowspan="3">Parameter</th><th rowspan="3">Unit</th><th colspan="3">Value</th><th rowspan="3">Comment</th></tr>
<tr><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">PCFICH/PDCCH/PHICH parameters</td><td></td><td>R.9 TDD</td><td>R.9 TDD</td><td>R.9 TDD</td><td>As specified in section A.3.1.2.2.<br>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>OP.2 TDD</td><td>OP.2 TDD</td><td>As specified in section A.3.2.2.2.</td></tr>
<tr><td colspan="2">Active cell</td><td></td><td>PCell</td><td>Neighbor Cell</td><td>Neighbor Cell</td><td>Cell 1, Cell 2 and Cell 3 are 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>Normal</td><td></td></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>1</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>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>2x2 Low</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 colspan="2">Neighbor Cell ABS configuration</td><td></td><td>N/A</td><td colspan="2">Non-MBSFN ABS</td><td>As defined in Table A.3.4.1.2-1</td></tr>
<tr><td colspan="2">ABS Pattern</td><td></td><td>N/A</td><td>‘000010000 0000010000 0’</td><td>‘000010000 0000010000 0’</td><td>TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2 and Cell 3.<br>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.</td></tr>
<tr><td colspan="2">Time domain measurement resource restriction pattern</td><td></td><td>‘000010000 0000010000 0’</td><td>N/A</td><td>N/A</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 rowspan="3">CRS assistant information</td><td>physCellId</td><td></td><td rowspan="3">N/A</td><td>see PCI conditions below</td><td>see PCI conditions below</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 oneFrame=’000000’</td></tr>
<tr><td>antennaPorts Count</td><td></td><td>an2</td><td>an2</td></tr>
<tr><td>mbsfn-SubframeConfigList</td><td></td><td>oneFrame = ‘000000’</td><td>oneFrame = ‘000000’</td></tr>
<tr><td colspan="2">Time offset from Cell 1</td><td>us</td><td>0</td><td>3</td><td>2</td><td></td></tr>
<tr><td colspan="2">Frequency offset</td><td>Hz</td><td>0</td><td>300</td><td>-100</td><td></td></tr>
<tr><td colspan="2">Physical Cell ID</td><td></td><td>$PCI_{cell1}$</td><td>($PCI_{cell1}$-$PCI_{cell2}$) mod3 = 0, $PCI_{cell1}$ not equal to $PCI_{cell2}$</td><td>($PCI_{cell1}$-$PCI_{cell3}$) mod3 != 0</td><td>Cell PCIs are selected so that all conditions are met</td></tr>
</table>

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | |
| | $\rho_A$, $\rho_B$ | | -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 | |
| | $\rho_A$, $\rho_B$ | | -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 |
| $\rho_A$, $\rho_B$ | | -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.

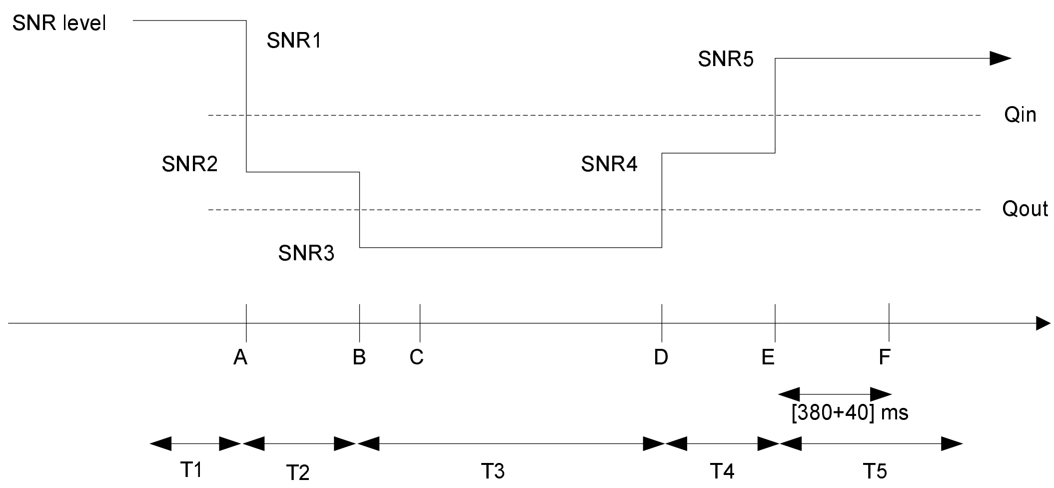


**Figure A.7.3.20.1-1 SNR variation for in-sync testing**

### 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**

<table>
<tr><th colspan="2" rowspan="3">Parameter</th><th rowspan="3">Unit</th><th colspan="3">Value</th><th rowspan="3">Comment</th></tr>
<tr><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">PCFICH/PDCCH/PHICH parameters</td><td></td><td>R.9 FDD</td><td>R.9 FDD</td><td>R.9 FDD</td><td>As specified in section A.3.1.2.1.<br>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>OP.9 FDD</td><td>OP.9 FDD</td><td>As specified in section A.3.2.1.</td></tr>
<tr><td colspan="2">Active cell</td><td></td><td>PCell</td><td>Neighbor Cell</td><td>Neighbor Cell</td><td>Cell 1, Cell 2 and Cell 3 are 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>Normal</td><td></td></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</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 ($BW_{channel}$)</td><td>MHz</td><td>10</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>2x2 Low</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 colspan="2">Neighbor Cell ABS configuration</td><td></td><td>N/A</td><td colspan="2">MBSFN ABS</td><td>As defined in Table A.3.4.2.2-2</td></tr>
<tr><td colspan="2">ABS Pattern</td><td></td><td>N/A</td><td>'010000001 0000000100 0000000100 0000100000 0'</td><td>'010000001 0000000100 0000000100 0000100000 0'</td><td>FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.<br>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 configured in the ABS subframes configured in Cell 2 and Cell 3 prior to the start of T1.</td></tr>
<tr><td colspan="2">Time domain measurement resource restriction pattern</td><td></td><td>‘010000001 0000000100 0000000100 0000100000 0’</td><td>N/A</td><td>N/A</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 rowspan="3">CRS assistance information</td><td>physCellId</td><td></td><td rowspan="3">N/A</td><td>see PCI conditions below</td><td>see PCI conditions below</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 fourFrames = ‘100001000100000100001000’</td></tr>
<tr><td>antennaPorts Count</td><td></td><td>an2</td><td>an2</td></tr>
<tr><td>mbsfn-SubframeConfigList</td><td></td><td>fourFrames = ‘100001000 1000001000 01000’</td><td>fourFrames = ‘100001000 1000001000 01000’</td></tr>
<tr><td colspan="2">Time offset between cells (With respect to Cell 1)</td><td>us</td><td>0</td><td>3</td><td>2</td><td></td></tr>
<tr><td colspan="2">Frequency shift between cells (With respect to Cell 1)</td><td>Hz</td><td>0</td><td>300</td><td>-100</td><td></td></tr>
<tr><td colspan="2">Physical Cell ID</td><td></td><td>$PCI_{cell1}$</td><td>($PCI_{cell1}$-$PCI_{cell2}$) mod3 = 0,</td><td>($PCI_{cell1}$-$PCI_{cell3}$) mod3 != 0</td><td>Cell PCIs are selected so that all conditions are met</td></tr>
</table>

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | $PCI_{cell1}$ 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. |
| | $\rho_A$, $\rho_B$ | | -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. |
| | $\rho_A$, $\rho_B$ | | -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 |
| $\rho_A$, $\rho_B$ | | -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.

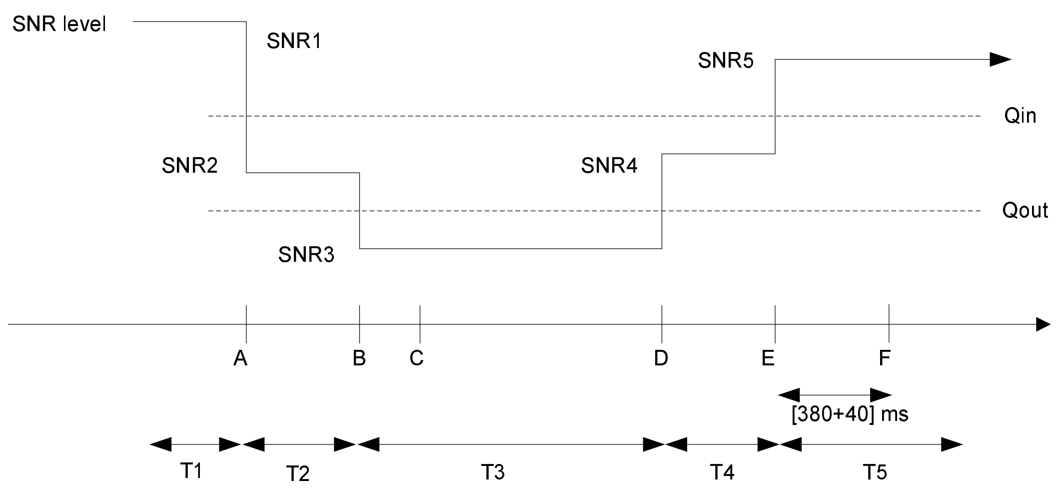


**Figure A.7.3.21.1-1 SNR variation for in-sync testing**

### 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 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. 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' |
| | antennaPortsCount | | | 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 | |
| | $\rho_A$, $\rho_B$ | | -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 | |
| | $\rho_A$, $\rho_B$ | | -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 |
| $\rho_A$, $\rho_B$ | | -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.

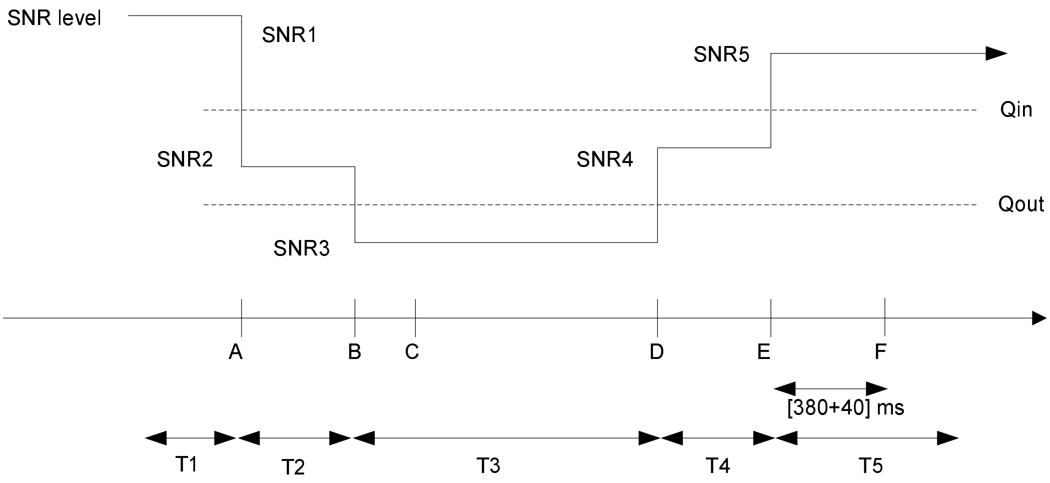


**Figure A.7.3.22.1-1 SNR variation for in-sync testing**

#### 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.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 | |
| 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 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.8.1.2.1-1: 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 | |
| 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 | |
| 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.<br>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.<br>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 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.8.1.5.1-1: 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 should 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.<br>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.<br>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 | |
| 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>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.<br>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<br>Cell 3 offset with respect to Cell 1: -2.5 | Three synchronous cells |
| T1 | | S | 5 | |
| T2 | | S | 5 | |
| Physical cell IDs | | | $(PCI_{cell1} - PCI_{cell3})mod6 = 0$<br>$(PCI_{cell2} - PCI_{cell3})mod6 != 0$<br>$PCI_{cell1}$ 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.<br>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.<br>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.<br>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 | |
| 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.8.2 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 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.8.2.1.1-1: 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 | |
| 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 | |
| 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.<br>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.<br>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 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.8.2.3.1-1: 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 should 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.<br>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 | |
| 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.<br>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<br>Cell 3 offset with respect to Cell 1: -2.5 | Three synchronous cells |
| T1 | | s | 5 | |
| T2 | | s | 5 | |
| Physical cell IDs | | | $(PCI_{cell1} - PCI_{cell3})mod6 = 0$<br>$(PCI_{cell2} - PCI_{cell3})mod6 != 0$<br>$PCI_{cell1}$ 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.<br>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.<br>Provided to 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.<br>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 MBSFN-SubframeConfig |
| | antennaPortsCount | | 1 | |

| | | | | |
|---|---|---|---|---|
| | mbsfn-SubframeConfigList | | *oneFrame* = '000000' | 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 | |
| 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.8.3 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 | |
| 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 | |
| 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.<br>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.<br>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 | 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.8.3.2.1-4: *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 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. 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.<br>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.<br>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 should 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.<br>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.<br>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.<br>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.<br>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.8.4 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 | |
| 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 | |
| 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 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. 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.<br>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.<br>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 should 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**

| 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.<br>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.<br>Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | |

**Table A.8.4.5.1-3: 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.8.5 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 | |
| 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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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 2x$TTI_{DCCH}$ 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 | |
| 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.<br>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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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.<br>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.<br>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.8.6 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 | |
| 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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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 2x$TTI_{DCCH}$ 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.8.7 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 | |
| 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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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 2x$TTI_{DCCH}$ 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 | |
| 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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior.<br>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.8.8 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.<br>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*$T_{Measurement\ Period,\ GSM}$ = 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 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.8.8.2.1-4: *TimeAlignmentTimer* and *sr-ConfigIndex* -Configuration to be used in E-UTRAN FDD-GSM event triggered reporting when DRX is used in AWGN**

| Field | Test1 Value | Test2 Value | Comment |
|---|---|---|---|
| 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**

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Cell 1</th></tr>
<tr><th>T1</th><th>T2</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td colspan="2">1</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="2">10</td></tr>
<tr><td>OCNG Pattern defined in A.3.2.1.1 (OP.1 FDD)</td><td></td><td colspan="2">OP.1 FDD</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td colspan="2" 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></tr>
<tr><td>$\hat{E}_s/N_{oc}$</td><td>dB</td><td>4</td><td>4</td></tr>
<tr><td>$N_{oc}$</td><td>dBm/15 kHz</td><td colspan="2">-98</td></tr>
<tr><td>RSRP</td><td>dBm/15 kHz</td><td>-94</td><td>-94</td></tr>
<tr><td>SCH_RP</td><td>dBm/15 kHz</td><td>-94</td><td>-94</td></tr>
<tr><td>Propagation Condition</td><td></td><td colspan="2">AWGN</td></tr>
<tr><td colspan="4">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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.</td></tr>
</table>

**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 2x$TTI_{DCCH}$ 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 | |
| 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.<br>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 2x$TTI_{DCCH}$ 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 = $2*T_{\text{Measurement Period, GSM}}$ = 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 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 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 | |
| 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 2x$TTI_{DCCH}$ 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 | |
| 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.<br>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 | |
| 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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$.<br>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 | |
| 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.<br>Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.<br>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.<br>Note2: In the case of multi-frequency network, the UTRA RF Channel Number can be set for the primary frequency in this test.<br>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 | |
| 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.<br>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 | us | 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 | |
| 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 = $2*T_{\text{Measurement Period, GSM}}$ = $2*N_{freq}$*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 ΔT = 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 $I_{\text{PRS}}$ | | 171 | 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 $N_{\text{PRS}}$ | | 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<br>Cell 3 to Cell 1: -1 | PRS are transmitted from synchronous cells |
| Expected RSTD | µs | Cell 2: 3<br>Cell 3: 3<br>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'<br>Cell 2: '00001111'<br>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 |
| 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 | |
| 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 | dB | 0 | | 0 | | 0 | N/A |
| 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. There is no PDSCH allocated 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 $I_{\text{PRS}}$ | | 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 $N_{\text{PRS}}$ | | 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<br>Cell 3 to Cell 1: -1 | PRS are transmitted from synchronous cells |
| Expected RSTD | µs | Cell 2: 3<br>Cell 3: 3<br>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'<br>Cell 2: '00001111'<br>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 |
| 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 | | |
| 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 | |
| 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 $I_{\mathrm{PRS}}$ | | Cell 1: 181,<br>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 $N_{\mathrm{PRS}}$ | | 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<br>and<br>(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<br>Cell 3 to Cell 1: -1 | PRS are transmitted from synchronous cells |
| Expected RSTD | µs | Cell 2: -2<br>Cell 3: 2<br>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'<br>Cell 2: '0000000011111111'<br>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 |
| OCNG patterns defined in A.3.2.1 | | OP.5 FDD | N/A | N/A |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note 1<br>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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 |
| OCNG patterns defined in A.3.2.1 | | OP.5 FDD | | OP.6 FDD | | OP.6 FDD | 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 | -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 $I_{\text{PRS}}$ | | Cell 1: 184,<br>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 $N_{\text{PRS}}$ | | 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<br>and<br>(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 receive time offset between the cells at the UE antenna connector | µs | Cell 2 to Cell 1: 1<br>Cell 3 to Cell 1: -1 | PRS are transmitted from synchronous cells |
| Expected RSTD | µs | Cell 2: -2<br>Cell 3: 2<br>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'<br>Cell 2: '0000000011111111'<br>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 |
| OCNG patterns defined in A.3.2.2 | | OP.1 TDD | N/A | N/A |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note 1<br>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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 |
| OCNG patterns defined in A.3.2.2 | | OP.1 TDD | | OP.2 TDD | | OP.2 TDD | N/A |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note 1<br>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 | |
| 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 | |
| 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.<br>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.<br>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 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. 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 | |
| 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.<br>Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.<br>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.<br>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 | |
| 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 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. 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 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 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 | | |
| | | | | | | | | | | |
| 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 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 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 | | |
| | | | | | | | | | | |
| 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 should 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 should 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.<br>Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.<br>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.<br>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 |
| Note 1: See Table A.8.16.1.1-1 for other general test parameters.<br>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 | | |
| 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 |
| Note 1: See Table A.8.16.2.1-1 for other general test parameters.<br>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 | | |
| 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.<br>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 | |
| 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.<br>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 | |
| 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 Void

# A.8.16.10 Void

# A.8.16.11 Void

# A.8.16.12 Void

# A.8.16.13 Void

# A.8.16.14 Void

# A.8.16.15 Void

# A.8.16.16 Void

# 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 defines the start of time period T2. Since the activation command follows upon reporting the cell, the UE shall be able to report valid CSI for the activated SCell at latest 24ms into T2. The UE shall start reporting CSI already 9ms into T2 but may 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 time span 5 to 9ms into T2.

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE, 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 time span 5 to 9ms into T3.

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 | 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 | ≤12 | During this time the PCell shall be known and the SCell configured, detected and reported. |
| 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

The UE shall send the first CSI report for SCell at latest 9ms into T2.

The UE shall start sending CSI reports for SCell with non-zero CQI index at latest 24ms into T2.

The UE shall stop sending CSI reports for SCell in at latest 8ms into T3.

Interruption of PCell during SCell activation shall not happen outside the time span 5 to 9ms into T2.

Interruption of PCell during SCell deactivation shall not happen outside the time span 5 to 9ms into T3.

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: If there are no uplink resources for reporting the valid CSI 24ms into T2 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

# 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 defines the start of time period T2. Since the activation command follows upon reporting the cell, the UE shall be able to report valid CSI for the activated SCell at latest 24ms into T2. The UE shall start reporting CSI already 11ms into T2 but may 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 time span 5 to 11ms into T2.

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE, 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 time span 5 to 11ms into T3.

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 | ≤12 | During this time the PCell shall be known and the SCell configured, detected and reported. UE should report Event A1 for SCell within 6.4s (20×scellMeasCycle). |
| 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.<br>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.<br>Note 3: Es/Iot, RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>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

The UE shall send the first CSI report for SCell at latest 11ms into T2.

The UE shall start sending CSI reports for SCell with non-zero CQI index at latest 24ms into T2.

The UE shall stop sending CSI reports for SCell at latest 8ms into T3.

Interruption of PCell during SCell activation shall not happen outside the time span 5 to 11ms into T2.

Interruption of PCell during SCell deactivation shall not happen outside the time span 5 to 11ms into T3.

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: If there are no uplink resources for reporting the valid CSI 24ms into T2 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.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 |

**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.3.2.2.8 (OP.8 TDD) | | OP.7 TDD | | | OP.8.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.8.16.19 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 a 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, 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.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 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 | |
| $BW_{\mathbf{channel}}$ | 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 | -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.<br>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.<br>Note 3: Es/Iot, RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>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 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 SCell with non-zero CQI index at latest in a subframe (m+34).

During T3 the UE shall stop sending CSI reports for SCell1 in 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.8.16.20 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 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 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+34).

During T3 the UE shall stop sending CSI reports for SCell1 in 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.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 |

**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.3.2.2.8 (OP.8 TDD) | | OP.7 TDD | | | OP.8.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.8.17 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 $\Delta$T 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 $I_{\text{PRS}}$ | | 171 for all cells on PCC<br>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 $N_{\text{PRS}}$ | | 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 receivetime offset between the cells at the UE antenna connector | µs | Cell 1 to Cell 2: 1<br>Cell 3 to Cell 2: -1 | Cell 1 to Cell 2: 1<br>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<br>Other neighbour cells: randomly between -3 and 3 | Cell 1: -2<br>Cell 3: 2<br>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<br>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<br>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'<br>Cell 2: '00001111'<br>Cell 3: '11110000' | Cell 1: '1111111100000000'<br>Cell 2: '0000000011111111'<br>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 |
| 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 | |
| OCNG patterns defined in A.3.2.1 | | OP.5 FDD | | OP.6 FDD | | OP.6 FDD | N/A |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note 1<br>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 ΔT = 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 | | 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 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 $I_{\mathrm{PRS}}$ | | 174 for all cells on PCC<br>184 for all cells on SCC | | 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 $N_{\mathrm{PRS}}$ | | 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<br>Cell 3 to Cell 2: -1 | Cell 1 to Cell 2: 1<br>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<br>Other neighbour cells: randomly between -3 and 3 | Cell 1: -2<br>Cell 3: 2<br>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].<br>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<br>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<br>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'<br>Cell 2: '00001111'<br>Cell 3: '11110000' | Cell 1: '1111111100000000'<br>Cell 2: '0000000011111111'<br>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 |
| 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 | |
| OCNG patterns defined in A.3.2.2 | | OP.1 TDD | | OP.2 TDD | | OP.2 TDD | N/A |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note 1<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.8.18 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 | |
| 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.<br>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.<br>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 | |
| 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.<br>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 | |
| 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 | |
| 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.<br>Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2.<br>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.<br>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.<br>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.8.20.3 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 | |
| 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.<br>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.<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$<br>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.8.20.1.1.1-2: 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 | |
| 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.<br>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.<br>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.8.21 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.<br>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.<br>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.<br>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.<br>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.<br>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”.<br>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.<br>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.<br>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.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**

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Test 1</th><th colspan="2">Test 2</th><th colspan="2">Test 3</th></tr>
<tr><th>Cell 1</th><th>Cell 2</th><th>Cell 1</th><th>Cell 2</th><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><td colspan="2">1</td><td colspan="2">1</td></tr>
<tr><td colspan="2">$BW_{channel}$</td><td>MHz</td><td colspan="2">10</td><td colspan="2">10</td><td colspan="2">10</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>$n_{PRB}$</td><td colspan="2">22—27</td><td colspan="2">22—27</td><td colspan="2">22—27</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>-</td><td>R.0 FDD</td><td>-</td><td>R.0 FDD</td><td>-</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>$n_{PRB}$</td><td>13—36</td><td>-</td><td>13—36</td><td>-</td><td>13—36</td><td>-</td></tr>
<tr><td colspan="2">PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1</td><td></td><td colspan="2">R.6 FDD</td><td colspan="2">R.6 FDD</td><td colspan="2">R.6 FDD</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)</td><td></td><td>OP.1 FDD</td><td>OP.2 FDD</td><td>OP.1 FDD</td><td>OP.2 FDD</td><td>OP.1 FDD</td><td>OP.2 FDD</td></tr>
<tr><td colspan="2">PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>OCNG_RB Note1</td><td>dB</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="6">$N_{oc}$ Note2</td><td>Bands FDD_A</td><td rowspan="6">dBm/15 kHz</td><td rowspan="6">-106</td><td rowspan="6">-106</td><td rowspan="6">-88</td><td rowspan="6">-88</td><td colspan="2">-116</td></tr>
<tr><td>Bands FDD_C</td><td colspan="2">-115</td></tr>
<tr><td>Bands FDD_D</td><td colspan="2">-114.5</td></tr>
<tr><td>Bands FDD_E, FDD_F Note 5</td><td colspan="2">-114</td></tr>
<tr><td>Bands FDD_G Note 7</td><td colspan="2">-113</td></tr>
<tr><td>Bands FDD_H</td><td colspan="2">-112.5</td></tr>
<tr><td colspan="2">$\hat{E}_s/I_{ot}$</td><td>dB</td><td>2.5</td><td>-6</td><td>2.5</td><td>-6</td><td>0.46</td><td>-5.76</td></tr>
<tr><td rowspan="6">RSRP Note3</td><td>Bands FDD_A</td><td rowspan="6">dBm/15 kHz</td><td rowspan="6">-100</td><td rowspan="6">-105</td><td rowspan="6">-82</td><td rowspan="6">-87</td><td>-113</td><td>-117</td></tr>
<tr><td>Bands FDD_C</td><td>-112</td><td>-116</td></tr>
<tr><td>Bands FDD_D</td><td>-111.5</td><td>-115.5</td></tr>
<tr><td>Bands FDD_E, FDD_F Note 5</td><td>-111</td><td>-115</td></tr>
<tr><td>Bands FDD_G Note 7</td><td>-110</td><td>-114</td></tr>
<tr><td>Bands FDD_H</td><td>-109.5</td><td>-113.5</td></tr>
<tr><td rowspan="6">Io Note3</td><td>Bands FDD_A</td><td rowspan="6">dBm/9 MHz</td><td rowspan="6">-70.27</td><td rowspan="6">-70.27</td><td rowspan="6">-52.27</td><td rowspan="6">-52.27</td><td colspan="2">-82.43</td></tr>
<tr><td>Bands FDD_C</td><td colspan="2">-81.43</td></tr>
<tr><td>Bands FDD_D</td><td colspan="2">-80.93</td></tr>
<tr><td>Bands FDD_E, FDD_F Note 5</td><td colspan="2">-80.43</td></tr>
<tr><td>Bands FDD_G Note 7</td><td colspan="2">-79.43</td></tr>
<tr><td>Bands FDD_H</td><td colspan="2">-78.93</td></tr>
<tr><td colspan="2">$\hat{E}_s/N_{oc}$</td><td>dB</td><td>6</td><td>1</td><td>6</td><td>1</td><td>3</td><td>-1</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td colspan="2">AWGN</td><td colspan="2">AWGN</td><td colspan="2">AWGN</td></tr>
</table>

| | |
|---|---|
| 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. |

#### 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note2<br>OCNG_RB Note2 | | dB | 0 | 0 | 0 | 0 | 0 | 0 |
| $N_{oc}$ 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 | | 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_RANote1 | | | | | | |
| OCNG_RBNote | | | | | | |
| $N_{oc}$ Note2 | Bands FDD_A | dBm/15 kHz | -88.65 | -88.65 | ($N_{oc}$ for Channel 2 +8dB) | -117 |
| | 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 |
| RSRP Note3 | Bands FDD_A | dBm/15 kHz | -78.65 | -78.65 | (RSRP for Cell 2 +25dB) | -121 |
| | 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 | -50.45 | -50.45 | (Io for Channel 2 +19.75dB) | -87.76 |
| | 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. |

#### 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. 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**

| 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA[Note2]<br>OCNG_RB[Note2] | | dB | 0 | 0 | 0 | 0 |
| $N_{oc}$ [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)**

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Test 1</th><th colspan="2">Test 2</th></tr>
<tr><th colspan="2">Cell 1</th><th colspan="2">Cell 1</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td colspan="2">1</td><td colspan="2">1</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="2">10</td><td colspan="2">10</td></tr>
<tr><td>Gap Pattern Id</td><td></td><td colspan="2">0</td><td colspan="2">0</td></tr>
<tr><td>Measurement bandwidth</td><td>$n_{PRB}$</td><td colspan="2">22—27</td><td colspan="2">22—27</td></tr>
<tr><td>PDSCH Reference measurement channel defined in A.3.1.1.1</td><td></td><td colspan="2">R.0 FDD</td><td colspan="2">R.0 FDD</td></tr>
<tr><td>PDSCH allocation</td><td>$n_{PRB}$</td><td colspan="2">13—36</td><td colspan="2">13—36</td></tr>
<tr><td>PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1</td><td></td><td colspan="2">R.6 FDD</td><td colspan="2">R.6 FDD</td></tr>
<tr><td>OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and A.3.2.1.2 (OP.2 FDD)</td><td></td><td colspan="2">OP.1 FDD</td><td colspan="2">OP.1 FDD</td></tr>
<tr><td>PBCH_RA</td><td rowspan="13">dB</td><td rowspan="13">0</td><td rowspan="13">0</td><td rowspan="13">0</td><td rowspan="13">0</td></tr>
<tr><td>PBCH_RB</td></tr>
<tr><td>PSS_RA</td></tr>
<tr><td>SSS_RA</td></tr>
<tr><td>PCFICH_RB</td></tr>
<tr><td>PHICH_RA</td></tr>
<tr><td>PHICH_RB</td></tr>
<tr><td>PDCCH_RA</td></tr>
<tr><td>PDCCH_RB</td></tr>
<tr><td>PDSCH_RA</td></tr>
<tr><td>PDSCH_RB</td></tr>
<tr><td>OCNG_RANote1</td></tr>
<tr><td>OCNG_RBNote</td></tr>
<tr><td>$N_{oc}$ Note2</td><td>dBm/15 kHz</td><td colspan="2">-88.65</td><td colspan="2">-104</td></tr>
<tr><td>$\hat{E}_s / I_{ot}$</td><td>dB</td><td colspan="2">10</td><td colspan="2">13</td></tr>
<tr><td>RSRP Note3</td><td>dBm/15 kHz</td><td colspan="2">-78.65</td><td colspan="2">-91</td></tr>
<tr><td>Io Note3</td><td>dBm/9 MHz</td><td colspan="2">-50.45</td><td colspan="2">-63.01</td></tr>
<tr><td>$\hat{E}_s / N_{oc}$</td><td>dB</td><td colspan="2">10</td><td colspan="2">13</td></tr>
<tr><td>Propagation condition</td><td>-</td><td colspan="2">AWGN</td><td colspan="2">AWGN</td></tr>
<tr><td colspan="6">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.<br>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.<br>Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</td></tr>
</table>

**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 | 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] | 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_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 |
| RSRPNote3 | Bands FDD_A | dBm/15 kHz | -121 | (RSRP for Cell 1 +8dB) | (RSRP for Cell 1 +4dB) |
| | 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 | | |
| IoNote3 | Bands FDD_A | dBm/9 MHz | -87.76 | (Io for Channel 1 +5.33dB) | |
| | 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**

<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">E-UTRA RF Channel Number</td><td></td><td>1</td><td colspan="2">2</td></tr>
<tr><td colspan="2">$BW_{channel}$</td><td>MHz</td><td colspan="3">10</td></tr>
<tr><td colspan="2">Special subframe configuration[Note1]</td><td></td><td colspan="3">6</td></tr>
<tr><td colspan="2">Uplink/downlink configuration[Note1]</td><td></td><td colspan="3">1</td></tr>
<tr><td colspan="2">Timing offset to Cell 1</td><td>μs</td><td>-</td><td>0</td><td>3</td></tr>
<tr><td colspan="2">Time alignment error between cell 2 and cell 1</td><td></td><td>-</td><td>≤ Time alignment error as specified in 3GPP TS 36.104 [30] clause 6.5.3.1</td><td>-</td></tr>
<tr><td colspan="2">Measurement bandwidth</td><td>$n_{PRB}$</td><td colspan="3">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>R.0 TDD</td><td>-</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>$n_{PRB}$</td><td>13—36</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="3">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.1 TDD</td><td>OP.2 TDD</td></tr>
<tr><td colspan="2">PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA[Note2]<br>OCNG_RB[Note2]</td><td>dB</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="3">$N_{oc}$ [Note3]</td><td>Bands TDD_A</td><td rowspan="3">dBm/15 kHz</td><td>-117</td><td colspan="2" rowspan="3">( $N_{oc}$ for Channel 1 +1dB)</td></tr>
<tr><td>Bands TDD_C</td><td>-116</td></tr>
<tr><td>Bands TDD_E</td><td>-115</td></tr>
<tr><td colspan="2">$\hat{E}_s/I_{ot}$</td><td>dB</td><td>-4</td><td>0.5</td><td>-5.76</td></tr>
<tr><td rowspan="3">RSRP[Note4]</td><td>Bands TDD_A</td><td rowspan="3">dBm/15 kHz</td><td>-121</td><td rowspan="3">(RSRP for Cell 1 +8dB)</td><td rowspan="3">(RSRP for Cell 1 +4dB)</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>-87.76</td><td colspan="2" rowspan="3">(Io for Channel 1 +5.33dB)</td></tr>
<tr><td>Bands TDD_C</td><td>-86.76</td></tr>
<tr><td>Bands TDD_E</td><td>-85.76</td></tr>
<tr><td colspan="2">$\hat{E}_s/N_{oc}$</td><td>dB</td><td>-4</td><td>3</td><td>-1</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td colspan="3">AWGN</td></tr>
<tr><td colspan="6">Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.<br>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.<br>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.<br>Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.<br>Note 6: The selection of the bands for testing depends on the configuration of the carrier</td></tr>
</table>

| | |
|---|---|
| | 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.<br>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<br>PBCH_RB<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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_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_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 |
| $(\mathrm{Io})_{meas}$ Note 3 | Bands FDD_A | dBm/9 MHz | -71.41 | -74.88 | -53.63 | -57.37 | -81.63 | -85.37 |
| | 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. |

### 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<br>PBCH_RB<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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 |
| $(\mathrm{Io})_{meas}$ 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 | | '0100000010000000100000000001000000100000' | MBSFN ABS pattern. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1.<br>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 | | '0100000010000000100000000001000000100000' | 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 | | '0001000000010000000100000000100000010000' | 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 | | dB | Note 6 | 0 | Note 6 | 0 | Note 6 | 0 |
| PBCH_RB | | | | | | | | |
| PCFICH_RB | | | | | | | | |
| PHICH_RA | | | | | | | | |
| PHICH_RB | | | | | | | | |
| PDCCH_RA | | | | | | | | |
| PDCCH_RB | | | | | | | | |
| PDSCH_RA | | | | | | | | |
| PDSCH_RB | | | | | | | | |
| OCNG_RA Note1 | | | | | | | | |
| OCNG_RB Note1 | | | | | | | | |
| 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_C | | | | | | -115 | |
| | Bands FDD_D | | | | | | -114.5 | |
| | Bands FDD_E , FDD_F Note 8 | | | | | | -114 | |
| | Bands FDD_G | | | | | | -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, 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 FDD_A | dBm/15 kHz | -101 | -108 | -83 | -92 | -111 | -120 |
| | 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_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 | Bands FDD_A | dBm/9 MHz | -71.41 | -76.09 | -53.63 | -58.76 | -81.63 | -86.76 |
| | Bands FDD_C | | | | | | -80.63 | -85.76 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| in OFDM symbols other than the 1st one | 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.

### 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 | | dB | Note 6 | 0 | Note 6 | 0 | Note 6 | 0 |
| PBCH_RB | | | | | | | | |
| PCFICH_RB | | | | | | | | |
| PHICH_RA | | | | | | | | |
| PHICH_RB | | | | | | | | |
| PDCCH_RA | | | | | | | | |
| PDCCH_RB | | | | | | | | |
| PDSCH_RA | | | | | | | | |
| PDSCH_RB | | | | | | | | |
| OCNG_RA Note1 | | | | | | | | |
| OCNG_RB Note1 | | | | | | | | |
| 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 $\left(\hat{E}_s/Iot\right)_{meas}$ note 5, note 7 in the 1st OFDM symbol | | dB | 2.88 | -8.19 | 3.54 | -10.19 | 3.54 | -10.19 |
| CRS $\left(\hat{E}_s/Iot\right)_{meas}$ note 5 in OFDM symbols 4,7,11 | | dB | 2.88 | -2 | 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_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.<br>Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>Note 3: See Table A.9.1.6.2-1 for the other parameters.<br>Note 4: E-UTRA operating band groups are as defined in Section 3.5.<br>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**

| Parameter | | Unit | Test 1 | | |
|---|---|---|---|---|---|
| | | | Cell 1 | Cell 2 | Cell 3 |
| $BW_{channel}$ Note 1 | | MHz | 20 | | |
| Measurement bandwidth | | $n_{PRB}$ | 47—52 | | |
| PDSCH Reference measurement channel defined in A.3.1.1.2 | | | R.3 TDD | R.3 TDD | N/A |
| PDSCH allocation | | $n_{PRB}$ | 38—61 | 38—61 | N/A |
| PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2 | | | R.10 TDD | | |
| OCNG Patterns defined in A.3.2.2.7 (OP.7 TDD) and A.3.2.2.8 (OP.8 TDD) | | | OP.7 TDD | OP.7 TDD | OP.8 TDD |
| Io Note2 | Bands TDD_A Note 5 | dBm/18 MHz | -84.75 | (Io for Channel 1 +5.33dB) | |
| | Bands TDD_C Note 5 | | -83.75 | | |
| | Bands TDD_E Note 5 | | -82.75 | | |
| 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.<br>Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>Note 3: See Table A.9.1.7.2-1 for the other parameters.<br>Note 4: E-UTRA operating band groups are as defined in Section 3.5.<br>Note 5: The test applies for E-UTRA operating bands in this band group which are supporting 20 MHz channel bandwidth. | | | | | |

### 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: $(PCI_{cell1} – PCI_{cell3}) mod 6=0$,<br>$PCI_{cell1}$ not equal to $PCI_{cell3}$<br>Non-colliding CRS: $(PCI_{cell2} – PCI_{cell3}) mod 6$ !=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>'10000000100000001000 00001000000010000000'</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 and Cell 2.<br>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 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>'10000000100000001000 00001000000010000000'</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.<br>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>'01000000010000000100 00000100000001000000'</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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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_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_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 |
| | Band 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_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. |

### 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**

<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">Special subframe configuration</td><td></td><td>6</td><td>As specified in table 4.2-1 in TS 36.211. The same configuration in both cells</td></tr>
<tr><td colspan="2">Uplink-downlink configuration</td><td></td><td>1</td><td>As specified in table 4.2-2 in TS 36.211. The same configuration in both cells</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 $PCI_{cell3}$<br>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>‘00000000010000000001’</td><td>TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.<br>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.<br>Provided to the UE for Cell 1 and Cell 2 before the measurements start.</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.<br>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>‘10000000001000000000’</td><td>Configured for Cell 1 measurements.</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.9.1.15.2-2: 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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.9.2 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_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_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_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_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.<br>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.<br>Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.<br>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.<br>Note 6: E-UTRA operating band groups are as defined in Section 3.5.<br>Note 7: Except Band 29. | | | | |

#### 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA[Note2]<br>OCNG_RB[Note2] | | dB | 0 | 0 | 0 | 0 | 0 | 0 |
| $N_{oc}$ [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_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_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_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_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.<br>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.<br>Note 3: RSRQ, RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.<br>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.<br>Note 6: E-UTRA operating band groups are as defined in Section 3.5.<br>Note 7: Except Band 29. | | | | | | | |

#### 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. 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

| 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note2<br>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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note2<br>OCNG_RB Note2 | dB | 0 | 0 | 0 |
| $N_{oc}$ 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 | | Test 1 | | | |
|---|---|---|---|---|---|
| | | Units | Cell 1 | Cell 2 | 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>OCNG_RB Note1 | | dB | 0 | 0 | 0 |
| $N_{oc}$ Note2 | Bands FDD_A | dBm/15 kHz | -119.5 | -116 | -116 |
| | 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 Note 7 | | -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_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_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_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 | | ‘10000000100000001000 00001000000010000000’ | Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 1.<br>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 | | ‘10000000100000001000 00001000000010000000’ | 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 | | ‘01000000010000000100 00000100000001000000’ | 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 | | dB | Note 6 | 0 | Note 6 | 0 | Note 6 | 0 |
| PBCH_RB | | | | | | | | |
| PCFICH_RB | | | | | | | | |
| PHICH_RA | | | | | | | | |
| PHICH_RB | | | | | | | | |
| PDCCH_RA | | | | | | | | |
| PDCCH_RB | | | | | | | | |
| PDSCH_RA | | | | | | | | |
| PDSCH_RB | | | | | | | | |
| OCNG_RA Note1 | | | | | | | | |
| OCNG_RB Note1 | | | | | | | | |
| 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_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_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_C, FDD_D, 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_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.<br>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.<br>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.<br>Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.<br>Note 5: Applies to restricted measurement subframes of the respective cell.<br>Note 6: Non-ABS and ABS subframe channel powers defined in Table A.3.4.1.1-1.<br>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.<br>Note 8: E-UTRA operating band groups are as defined in Section 3.5.<br>Note 9: Except Band 29. | | | | |

### 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<br>PBCH_RB<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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 $(\hat{E}_s/I_{ot})_{meas}$ 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<br>PBCH_RB<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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_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 $\left(\hat{E}_s/I_{ot}\right)_{meas}$ Note5, note 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 Note3,4,5 | Bands FDD_A | dBm/15 kHz | -79.76 | -86.76 | -98.85 | -105.85 | -111 | -120 |
| | 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) $_{meas}$ Note3,4,5 | Bands FDD_A | dB | -12.60 | -15.02 | -12.60 | -15.02 | -12.38 | -16.36 |
| | Bands FDD_C | | | | | | | |
| | Bands FDD_D | | | | | | | |
| | Bands FDD_E , FDD_F Note 8 | | | | | | | |
| | Bands FDD_G Note 10 | | | | | | | |
| | Bands FDD_H | | | | | | | |
| (Io) $_{meas}$ Note3 1st OFDM symbol | Bands FDD_A | dBm/9 MHz | -50.17 | -53.64 | -69.26 | -72.73 | -81.63 | -85.37 |
| | 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) $_{meas}$ Note3 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_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.

### 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<br>PBCH_RB<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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 $\left(\hat{E}_s/Iot\right)_{meas}$ Note 5, note 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 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 | -15.02 | -12.60 | -15.02 | -12.38 | -16.36 |
| $(\mathrm{Io})_{meas}$ Note3 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 |
| $(\mathrm{Io})_{meas}$ Note3 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_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.<br>Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves<br>Note 3: See Table A.9.2.5.2-1 for the other parameters<br>Note 4: E-UTRA operating band groups are as defined in Section 3.5.<br>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.<br>Note 2: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves<br>Note 3: See Table A.9.2.6.2-1 for the other parameters<br>Note 4: E-UTRA operating band groups are as defined in Section 3.5.<br>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**

**Table A.9.2.13.2-2: 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**

**Table A.9.2.14.2-2: 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**

<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">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<br>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>$(PCI_{cell1} - PCI_{cell3})mod6 = 0$<br>$(PCI_{cell2} - PCI_{cell3})mod6 != 0$<br>$PCI_{cell1}$ 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>‘1000000010000000100000 001000000010000000’</td><td>FDD ABS Pattern Info IE, as defined in TS 36.423[28], clause 9.2.54.<br>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.<br>Configured in 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>‘1000000010000000100000 001000000010000000’</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.<br>Configured 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>‘0100000001000000010000 000100000001000000’</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">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’.</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.9.2.15.2-2: 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.6 FDD | OP.6 FDD |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RA Note1<br>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 | -84.76 | | | -103.85 | | | -116 | | |
| | 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 $(\hat{E}_s/I_{ot})_{meas}$ 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 FDD_A | dBm/15 kHz | -80.76 | -82.76 | -86.26 | -99.85 | -101.85 | -105.35 | -112 | -114 | -120 |
| | 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 |
| $(\mathrm{RSRQ})_{meas}$ Note3,4,5 | Bands FDD_A, FDD_C, FDD_D, FDD_E, FDD_F Note 7, FDD_G | dB | -14.43 | -11.59 | -15.09 | -14.43 | -11.59 | -15.09 | -14.19 | -10.81 | -16.81 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Note 9, FDD_H | | | | | | | | | | |
| $(\mathrm{Io})_{meas}$ Note3 | Bands FDD_A | dBm/9 MHz | -49.34 | -53.19 | | -68.43 | -72.28 | | -80.82 | -85.03 | |
| | Bands FDD_C | | | | | | | | -79.82 | -84.03 | |
| | 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.

### 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<br>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>$(PCI_{cell1} - PCI_{cell3})\text{mod}6 = 0$<br>$(PCI_{cell2} - PCI_{cell3})\text{mod}6 \text{ != } 0$<br>$PCI_{cell1}$ 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.<br>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.<br>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.<br>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 | | |
| BWchannel | | 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>PDSCH_RA<br>PDSCH_RB<br>OCNG_RANote1<br>OCNG_RBNote1 | | dB | Note 6 | Note 6 | 0 | Note 6 | Note 6 | 0 | Note 6 | Note 6 | 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 | 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 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 |
| $(\mathrm{RSRQ})_{meas}$ 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 |
| $(\mathrm{Io})_{meas}$ 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 Void

## A.9.2.18 Void

## 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**

<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 colspan="2">Cell 2</th></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td colspan="2">2</td></tr>
<tr><td colspan="2">$BW_{channel}$</td><td>MHz</td><td>10</td><td colspan="2">10</td></tr>
<tr><td colspan="2">Antenna Configuration</td><td></td><td>1x2</td><td colspan="2">1x2</td></tr>
<tr><td colspan="2">Gap Pattern Id</td><td></td><td>0</td><td colspan="2">-</td></tr>
<tr><td colspan="2">PBCH_RA</td><td rowspan="13">dB</td><td rowspan="13">0</td><td colspan="2">0</td></tr>
<tr><td colspan="2">PBCH_RB</td><td colspan="2">0</td></tr>
<tr><td colspan="2">PSS_RA</td><td colspan="2">0</td></tr>
<tr><td colspan="2">SSS_RA</td><td colspan="2">0</td></tr>
<tr><td colspan="2">PCFICH_RB</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">PHICH_RA</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">PHICH_RB</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">PDCCH_RA</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">PDCCH_RB</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">PDSCH_RA</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">PDSCH_RB</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">OCNG_RA Note1</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">OCNG_RB Note1</td><td colspan="2">-∞</td></tr>
<tr><td colspan="2">AllowedMeasBandwidth in TS 36.331 [2]</td><td>RB</td><td>6</td><td colspan="2">50</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 colspan="2">-</td></tr>
<tr><td colspan="2">PDSCH allocation</td><td>$n_{PRB}$</td><td>13-36</td><td colspan="2">-</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">-</td></tr>
<tr><td colspan="2">OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD)</td><td></td><td>OP.1 FDD</td><td colspan="2">-</td></tr>
<tr><td rowspan="2">$I_{ot}$ Note2</td><td>bandwidth</td><td>$n_{PRB}$</td><td>0-49</td><td>0-21<br>28-49</td><td>22-27</td></tr>
<tr><td></td><td>dBm/15 kHz</td><td>-94</td><td>-87</td><td>-110</td></tr>
<tr><td rowspan="2">$\hat{E}_s/I_{ot}$</td><td>bandwidth</td><td>$n_{PRB}$</td><td>0-49</td><td>0-21<br>28-49</td><td>22-27</td></tr>
<tr><td></td><td>dB</td><td>-4</td><td>-3</td><td>20</td></tr>
<tr><td colspan="2">RSRP Note3</td><td>dBm/15 kHz</td><td>-98</td><td colspan="2">-90</td></tr>
<tr><td colspan="2">RSRQ Note3</td><td>dB</td><td>-16.25</td><td colspan="2">-</td></tr>
<tr><td colspan="2">$WB\text{-}RSRQ_0$ Note3 in subframe 0</td><td>dB</td><td>-</td><td colspan="2">-13.68</td></tr>
<tr><td colspan="2">$WB\text{-}RSRQ_1$ Note3 in subframe ≠ 0</td><td>dB</td><td>-</td><td colspan="2">-13.63</td></tr>
<tr><td colspan="2">Io Note3</td><td>dBm/ 9 MHz</td><td>-64.76</td><td colspan="2">-</td></tr>
<tr><td colspan="2">Io Note3 in symbol 0, 4, 11 of subframe 0</td><td>dBm/ 9 MHz</td><td>-</td><td colspan="2">-82.38</td></tr>
<tr><td colspan="2">Io Note3 in symbol 7 of subframe 0</td><td>dBm/ 9 MHz</td><td>-</td><td colspan="2">-82.20</td></tr>
<tr><td colspan="2">Io Note3 in symbol 0, 4, 7, 11 of subframes ≠ 0</td><td>dBm/ 9 MHz</td><td>-</td><td colspan="2">-82.38</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td>AWGN</td><td colspan="2">AWGN</td></tr>
<tr><td colspan="6">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.<br>Note 2: Interference from other cells not specified in the test, assumed to be constant over time and modelled as noise.<br>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.<br>Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.<br>Note 5: This test case is applicable to all FDD frequency bands except band 31.</td></tr>
</table>

### 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 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 | | | | 0 | |
| PBCH_RB | | | | 0 | |
| PSS_RA | | | | 0 | |
| SSS_RA | | | | 0 | |
| PCFICH_RB | | | | -∞ | |
| PHICH_RA | | | | -∞ | |
| PHICH_RB | | dB | 0 | -∞ | |
| 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<br>28-49 | 22-27 |
| | | dBm/15 kHz | -94 | -87 | -110 |
| $\hat{E}_s/I_{ot}$ | bandwidth | $n_{PRB}$ | 0—49 | 0-21<br>28-49 | 22-27 |
| | | dB | -4 | -3 | 20 |
| RSRP Note4 | | dBm/15 kHz | -98 | -90 | |
| RSRQ Note4 | | dB | -16.25 | - | |
| $\text{WB-RSRQ}_0$ Note4 in subframe 0 | | dB | - | -13.68 | |
| $\text{WB-RSRQ}_1$ 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-RSRQ$_{0.}$ or WB-RSRQ$_{1}$.

## 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 | | OP.1 FDD | |

| | | |
|---|---|---|
| A.3.2.1.1 (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**

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th>Test 1</th><th>Test 2</th></tr>
<tr><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></tr>
<tr><td colspan="2">PCCPCH_Ec/Ior</td><td>dB</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></tr>
<tr><td colspan="2">PICH_Ec/Ior</td><td>dB</td><td>-15</td><td>-15</td></tr>
<tr><td colspan="2">DPCH_Ec/Ior</td><td>dB</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></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">-60.00</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>9.54</td><td>-9.54</td></tr>
<tr><td rowspan="5">CPICH RSCP, Note 1</td><td>Band I, IV, VI, X, XI, XIX, XXI</td><td rowspan="5">dBm</td><td rowspan="5">-60.46</td><td>-114.0</td></tr>
<tr><td>Band II, V, VII</td><td>-112.0</td></tr>
<tr><td>Band XXV, XXVI</td><td>-110.5 (Note 3)</td></tr>
<tr><td>Band III, VIII, XII, XIII, XIV, XX, XXII</td><td>-111.0</td></tr>
<tr><td>Band IX (Note 2)</td><td>-113.0</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">-50.00</td><td>-94.0</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>-93.0</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td>AWGN</td><td>AWGN</td></tr>
<tr><td colspan="5">NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.<br>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.<br>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="5">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.</td></tr>
</table>

### 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 | 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.9.3.2.2-3: UTRAN FDD cell specific test parameters for UTRAN FDD CPICH RSCP absolute measurement accuracy test in E-UTRAN TDD**

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th>Test 1</th><th>Test 2</th></tr>
<tr><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></tr>
<tr><td colspan="2">PCCPCH_Ec/Ior</td><td>dB</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></tr>
<tr><td colspan="2">PICH_Ec/Ior</td><td>dB</td><td>-15</td><td>-15</td></tr>
<tr><td colspan="2">DPCH_Ec/Ior</td><td>dB</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></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">-60.00</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>9.54</td><td>-9.54</td></tr>
<tr><td rowspan="5">CPICH RSCP, Note 1</td><td>Band I, IV, VI, X, XI, XIX, XXI</td><td rowspan="5">dBm</td><td rowspan="5">-60.46</td><td>-114.0</td></tr>
<tr><td>Band II, V, VII</td><td>-112.0</td></tr>
<tr><td>Band XXV, XXVI</td><td>-110.5 (Note 3)</td></tr>
<tr><td>Band III, VIII, XII, XIII, XIV, XX, XXII</td><td>-111.0</td></tr>
<tr><td>Band IX (Note 2)</td><td>-113.0</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">-50.00</td><td>-94.0</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>-93.0</td></tr>
<tr><td colspan="2">Propagation condition</td><td>-</td><td>AWGN</td><td>AWGN</td></tr>
<tr><td colspan="5">NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.<br>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.<br>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="5">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.</td></tr>
</table>

#### A.9.3.2.3 Test Requirements

The CPICH RSCP measurement absolute accuracy shall meet the requirements in Clause 9.2.1.

## 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.<br>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.<br>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**

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Accuracy [dB]</th><th>Conditions</th></tr>
<tr><th>Normal condition</th><th>Extreme condition</th><th>Io [dBm/3,84 MHz]</th></tr>
</table>

| | | | | |
|---|---|---|---|---|
| CPICH_Ec/Io | dB | -2.7…1.5 for -14 ≤ CPICH Ec/Io<br>-3.2…2 for -16 ≤ CPICH Ec/Io < -14<br>-4.2…3 for -20 ≤ CPICH Ec/Io < -16 | -4.2…3 | -94...-87(Band I, IV, VI, X, XI, XIX, XXI)<br>-92…-85 (Band II, V, VII)<br>-90.5…-83.5 (Band XXV, XXVI (Note 2))<br>-91…-84 (Band III, VIII, XII, XIII, XIV, XX, XXII)<br>93…-86 (Band IX (Note 1)) |
| | | ± 1.5 for -14 ≤ CPICH Ec/Io<br>± 2 for -16 ≤ CPICH Ec/Io < -14<br>± 3 for -20 ≤ CPICH Ec/Io < -16 | ± 3 | -87...-50(Band I, IV, VI, X, XI, XIX, XXI)<br>-85…-50 (Band II, V, VII)<br>-83.5…-50 (Band XXV, XXVI (Note 2))<br>-84…-50 (Band III, VIII, XII, XIII, XIV, XX, XXII)<br>-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.<br>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**

<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.<br>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.<br>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.9.4.2.3 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<br>-3.2…2 for -16 ≤ CPICH Ec/Io < -14<br>-4.2…3 for -20 ≤ CPICH Ec/Io < -16 | -4.2…3 | -94...-87(Band I, IV, VI, X, XI, XIX, XXI)<br>-92…-85 (Band II, V, VII)<br>-90.5…-83.5 (Band XXV, XXVI (Note 2))<br>-91…-84 (Band III, VIII, XII, XIII, XIV, XX, XXII)<br>93…-86 (Band IX (Note 1)) |
| | | ± 1.5 for -14 ≤ CPICH Ec/Io<br>± 2 for -16 ≤ CPICH Ec/Io < -14<br>± 3 for -20 ≤ CPICH Ec/Io < -16 | ± 3 | -87...-50(Band I, IV, VI, X, XI, XIX, XXI)<br>-85…-50 (Band II, V, VII)<br>-83.5…-50 (Band XXV, XXVI (Note 2))<br>-84…-50 (Band III, VIII, XII, XIII, XIV, XX, XXII)<br>-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.<br>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.9.5 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.<br>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.<br>Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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**

<table>
<tr><th>Parameter</th><th>Unit</th><th>Tests 1</th><th>Tests 2</th></tr>
<tr><td>E-UTRAN RF Channel Number</td><td>-</td><td>1</td><td>1</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td>1.4</td><td>10</td></tr>
<tr><td>Uplink-downlink configuration of cell Note1</td><td></td><td>1</td><td>1</td></tr>
<tr><td>Special subframe configuration of cell Note1</td><td></td><td>6</td><td>6</td></tr>
<tr><td>PDSCH Reference measurement channel defined in A.3.1.1.2</td><td>-</td><td>R.2 TDD</td><td>R.0 TDD</td></tr>
<tr><td>PDSCH allocation</td><td>$n_{PRB}$</td><td>2-3</td><td>13-36</td></tr>
<tr><td>PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2</td><td>-</td><td>R.8 TDD</td><td>R.6 TDD</td></tr>
<tr><td>OCNG Patterns defined in A.3.2.2.3 (OP.3 TDD) and A.3.2.2.1 (OP.1 TDD)</td><td>-</td><td>OP.3 TDD</td><td>OP.1 TDD</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td rowspan="13">0</td><td 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 Note2</td><td>dB</td></tr>
<tr><td>OCNG_RB Note2</td><td>dB</td></tr>
<tr><td>$N_{oc}$ Note 3</td><td>dBm/15 kHz</td><td>-98</td><td>-98</td></tr>
<tr><td>RSRP Note 4</td><td>dBm/15 kHz</td><td>-101</td><td>-101</td></tr>
<tr><td>$\hat{E}_s/N_{oc}$</td><td>dB</td><td>-3</td><td>-3</td></tr>
<tr><td rowspan="2">Io Note 4</td><td>dBm/1.08 MHz</td><td>-77.66</td><td>N/A</td></tr>
<tr><td>dBm/9 MHz</td><td>N/A</td><td>-68.45</td></tr>
<tr><td>$\hat{E}_s/I_{ot}$</td><td>dB</td><td>-3</td><td>-3</td></tr>
<tr><td>Propagation Condition</td><td></td><td colspan="2">AWGN</td></tr>
<tr><td colspan="4">Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in TS 36.211.<br>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.<br>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.<br>Note 4: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</td></tr>
</table>

**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 | | '1000000010000000100000001000000010000000' | Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54. Configured in Cell 2.<br>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 | | '1000000010000000100000001000000010000000' | 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 $(\hat{E}_s/I_{ot})_{meas}$ Note 3 | dB | -3 | -0.76 |
| CRS $(\hat{E}_s/I_{ot})_{nonABS}$ 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: $(\hat{E}_s/I_{ot})_{meas}$ is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $(\hat{E}_s/I_{ot})_{nonABS}$ 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 $(\hat{E}_s/I_{ot})_{meas}$ Note 3 | dB | -3 | -0.76 |
| CRS $(\hat{E}_s/I_{ot})_{nonABS}$ 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.<br>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.<br>Note 3: $(\hat{E}_s/I_{ot})_{meas}$ is calculated in CRS REs in the subframes indicated for PCell measurements by measurement resource restriction pattern, whilst $(\hat{E}_s/I_{ot})_{nonABS}$ is calculated in CRS REs in the subframes not indicated for PCell measurements by measurement resource restriction paattern.<br>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<br>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<br>($PCI_{cell1}$ - $PCI_{cell3}$ )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>‘10000000100000001000 00001000000010000000’</td><td>Non-MBSFN ABS. FDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.<br>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>‘10000000100000001000 00001000000010000000’</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 Note 1 | dB | | | |
| OCNG_RB Note 1 | 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**

<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>Cell to be measured</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 TDD 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">Special subframe configuration</td><td></td><td>6</td><td>For all cells in the test. 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 all cells in the test. For uplink-downlink subframe configurations see Table 4.2-2 in [16].</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<br>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>$(PCI_{cell1} - PCI_{cell2})mod6 = 0$<br>$(PCI_{cell1} - PCI_{cell3})mod6 != 0$</td><td>Cell PCIs are selected so that both conditions are met</td></tr>
<tr><td colspan="2">ABS pattern</td><td></td><td>‘00000000010000000001’</td><td>Non-MBSFN ABS. TDD ABS Pattern Info IE, as defined in TS 36.423 [28], clause 9.2.54.<br>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.</td></tr>
<tr><td colspan="2">Time-domain measurement resource restriction pattern for serving cell measurements</td><td></td><td>‘00000000010000000001’</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 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>1</td></tr>
<tr><td>mbsfn-SubframeConfigList</td><td>oneFrame = ‘000000’</td></tr>
</table>

**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 $\mathrm{T}_{\text{RSTD IntraFreqFDD, E-UTRAN}}$ is provided for the measurement period, and PRS are configured according to $I_{\text{PRS}}$ 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'<br>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<br>Other neighbour cells: randomly between -3 and 3 | Cell 2: -1<br>Other neighbour cells: randomly between -3 and 3 | Cell 2: -1<br>Other neighbour cells: randomly between -3 and 3 | Cell 2: 1<br>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 |
| $T_{RSTD\ IntraFreqFDD,\ E-UTRAN}$ | 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note1<br>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 $I_{\text{PRS}}$ 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 $I_{\text{PRS}}$ | | 9 | | 14 | | As defined in TS 36.211 |
| Number of consecutive positioning downlink subframes $N_{\text{PRS}}$ | | 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 |

| | | | |
|---|---|---|---|
| $T_{\text{RSTD IntraFreqTDD, E-UTRAN}}$ | 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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note1<br>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 $I_{\text{PRS}}$ 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 $N_{\text{PRS}}$ | | 6 | 1 | As defined in TS 36.211 |
| prs-MutingInfo | | Cell1:'11110000'<br>Cell2:'11110000' | | See clause 6.5.1.2 in TS 36.355 for more information |
| expectedRSTD | µs | Cell 2: 1<br>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 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]. |
| $\mathrm{T}_{\text{RSTD InterFreqFDD, E-UTRAN}}$ | 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 $I_{\mathrm{PRS}}$ | | 12 | 19 | 2 | 12 |
| PRS subframe offset | | N/A | 7 | N/A | 10 |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note1<br>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).<br>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.<br>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 $I_{\mathrm{PRS}}$ 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 $N_{\mathrm{PRS}}$ | | 6 | 1 | As defined in TS 36.211 |
| prs-MutingInfo | | Cell1:'11110000'<br>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<br>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 $I_{\text{PRS}}$ | | 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.<br>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 $I_{\mathrm{PRS}}$ 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 sunbframes $N_{\text{PRS}}$ | | 1 | As defined in TS 36.211 |
| prs-MutingInfo | | Cell1:'11110000'<br>Cell2:'11110000'<br>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<br>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<br>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<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note1<br>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).<br>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.<br>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 $\mathrm{T}_{\text{RSTD IntraFreqTDD, E-UTRAN}}$ is provided for the measurement period, and PRS are configured according to $I_{\text{PRS}}$ 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 sunbframes $N_{\mathrm{PRS}}$ | | 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'<br>Cell2:'11110000'<br>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<br>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 difference between the cells at the UE antenna connector | µs | Cell 1 to Cell 2: -1<br>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. |
| $T_{\mathrm{RSTD\ IntraFreqTDD,\ E\text{-}UTRAN}}$ | 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 $I_{\mathrm{PRS}}$ | | 14 | 14 | 14 |
| PBCH_RA<br>PBCH_RB<br>PSS_RA<br>SSS_RA<br>PCFICH_RB<br>PHICH_RA<br>PHICH_RB<br>PDCCH_RA<br>PDCCH_RB<br>OCNG_RA Note1<br>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. | | | |

**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 Note 1 | 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<br>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 (BWchannel) | 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. | | | |

**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<br>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.9.9 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_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_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_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 |
| | | | -91.76 |
| | Bands FDD_C | | |
| | 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.<br>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.<br>Note 3: RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.<br>Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.<br>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.<br>Note 6: E-UTRA operating band groups are as defined in Section 3.5.<br>Note 7: Except Band 29. | | | |

#### 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[Note 1] | | | 6 |
| Uplink/downlink configuration[Note 1] | | | 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[Note 2] | | | |
| OCNG_RB[Note 2] | | | |
| $N_{oc}$ [Note 3] | Bands TDD_A | dBm/15 kHz | -122 |
| | Bands TDD_C | | -121 |
| | Bands TDD_E | | -120 |
| $\hat{E}_s/I_{ot}$ | | dB | -4 |
| RSRP[Note 4] | Bands TDD_A | dBm/15 kHz | -126 |
| | Bands TDD_C | | -125 |
| | Bands TDD_E | | -124 |
| RSRQ[Note 4] | Bands TDD_A | dB | -16.25 |
| | Bands TDD_C | | |
| | Bands TDD_E | | |
| Io[Note 4] | 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.

# 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_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 | | |

NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Section B.4.2.
NOTE 2: For Band 26, the condition is -122 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

## 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.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_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 | |
| NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2.<br>NOTE 2: For Band 26, the condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.<br>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_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 | | |
| NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.<br>NOTE 2: For Band 26, 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_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 | |

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: For Band 26, 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_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 |

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: For Band 26, 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_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 | |
| NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.<br>NOTE 2: For Band 26, the condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.<br>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_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 | |
| NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.<br>NOTE 2: For Band 26, 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_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 | |
| NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.<br>NOTE 2: For Band 26, the condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.<br>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_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 |
| NOTE 1: This condition level is increased by Δ>0, when applicable, as described in Sections B.4.2 and B.4.3.<br>NOTE 2: For Band 26, the condition is -125 dBm/15kHz when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.<br>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_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 |
| 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: For Band 26, 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.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, 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, 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, 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, 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.

# Annex C (informative): Change history:

| 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 |

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| 2008-12 | RP#42 | RP-080933 | 60 | | | Interfrequency and GSM measurement performance requirements in large DRX | 8.4.0 |
| 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 |

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| 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 |

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| 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 Patterns for 1.4MHz Bandwidth | 8.6.0 |
| 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 |

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| 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 | 9.2.0 |

| Change History | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| | | | | | | Cases | |
| 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 |

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| 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 |

| Change History | | | | | | | |
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| 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-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 |

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| 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<br>(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 |

| Change History | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 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 | 10.4.0 |

| Change History | | | | | | | |
|---|---|---|---|---|---|---|---|
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| | | | | | | autonomous gaps | |
| 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 | 10.5.0 |

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| | | | | | | triggered reporting under fading propagation conditions in asynchronous cells test case | |
| 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<br>CR not implemented as it is based on the wrong | 10.6.0 |

| Change History | | | | | | | |
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| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| | | | | | | version of the spec | |
| 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 reporting test cases | 11.1.0 |
| 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 | 11.1.0 |

| Change History | | | | | | | |
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| | | | | | | B41 REFSENS | |
| 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 FDD R11 | 11.1.0 |
| 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 |

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| 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 |

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| 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 measurement reporting delay test cases(Rel-11) | 11.4.0 |
| 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 |

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| 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 |
| 09-2013 | RP-61 | RP-131291 | 1831 | | | Correction on the test cases for UE Transmit Timing Accuracy for SCell (Rel-11) | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1835 | | | Corrections on RSTD CA test parameters (Rel-11) | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1838 | | | FDD: RSTD measurement reporting test cases for CA with 20MHz BW (Rel-11) | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1841 | | | TDD: RSTD measurement reporting test cases for CA with 20MHz BW (Rel-11) | 11.6.0 |
| 09-2013 | RP-61 | RP-131285 | 1843 | | | Timing and RSRP value corrections in Test cases A.9.2.6 and A.9.2.9 | 11.6.0 |
| 09-2013 | RP-61 | RP-131285 | 1845 | | | Corrections to Bands for 20MHz CA Test cases | 11.6.0 |
| 09-2013 | RP-61 | RP-131279 | 1853 | | | Cell time offset in TDD Inter-RAT test cases | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1861 | | | Rel-11 CRs on synchronization requirements for E-UTRA to CDMA 2000 handover | 11.6.0 |
| 09-2013 | RP-61 | RP-131290 | 1865 | 1 | | Correct the SNR values for RLM tests with non-MBSFN ABS in FeICIC R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131290 | 1867 | 1 | | E-UTRAN FDD RSRP Measurement Accuracy Test in FeICIC R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131290 | 1870 | 1 | | E-UTRAN TDD RSRP Measurement Accuracy Test in FeICIC R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131284 | 1872 | | | E-UTRAN FDD UE Rx-Tx Time difference test in FeICIC R11 | 11.6.0 |

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| 09-2013 | RP-61 | RP-131284 | 1874 | | | E-UTRAN TDD UE Rx-Tx Time difference test in FeICIC R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131284 | 1880 | | | Clarification on UE Rx-Tx accuracy requirements in FeICIC R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131284 | 1882 | | | Clarification on UE Rx-Tx measurement requirements in FeICIC R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1885 | | | Clarification on antenna port for timing and eCID test cases R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1888 | 1 | | Addition of TDD serving cell measurement accuracy tests R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131285 | 1902 | | | Clarification of Refesens in WB-RSRQ sections of 36.133 R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131290 | 1904 | | | Remove the brackets of FeICIC side conditions R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1907 | 1 | | Test cases of E-UTRAN FDD RSTD Measurement Accuracy for Carrier Aggregation for 20MHz R1 | 11.6.0 |
| 09-2013 | RP-61 | RP-131290 | 1909 | 1 | | CR on Intra-frequency RSRQ test case for FDD | 11.6.0 |
| 09-2013 | RP-61 | RP-131290 | 1910 | 1 | | CR on Intra-frequency RSRQ test case for TDD | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1912 | 1 | | Test cases of E-UTRAN TDD RSTD Measurement Accuracy for Carrier Aggregation for 20MHz R11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131284 | 1915 | | | Correction to SCH Es/Iot side condition for intra-frequency measurements under time domain measurement resource restriction with CRS assistance information | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1920 | | | Modification on the requirement for PCell interruption for Rel-11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1923 | | | Phase II CA 20 MHz Tests: Event triggered reporting on deactivating SCell and and interruption probability without DRX | 11.6.0 |
| 09-2013 | RP-61 | RP-131293 | 1950 | | | Editorial corrections RRM | 11.6.0 |
| 09-2013 | RP-61 | RP-131293 | 1953 | 1 | | Clarification of CGI reading requirements | 11.6.0 |
| 09-2013 | RP-61 | RP-131285 | 1960 | 1 | | Editorial corrections in capturing RF requirements | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1963 | | | Clarification on tests for multiple bandwidths | 11.6.0 |
| 09-2013 | RP-61 | RP-131282 | 1967 | | | CR on PCell Interruptions | 11.6.0 |
| 09-2013 | RP-61 | RP-131283 | 1968 | 1 | | Time stamp accuracy for RLF and handover failure reporting with eMDT | 11.6.0 |
| 09-2013 | RP-61 | RP-131284 | 1977 | | | Correction of cell identification test case with FeICIC | 11.6.0 |
| 09-2013 | RP-61 | RP-131284 | 1983 | | | RLM requirements correction | 11.6.0 |
| 09-2013 | RP-61 | RP-131284 | 1987 | | | Clarification on antenna ports in the measured and aggressor cells for UE Rx-Tx with FeICIC | 11.6.0 |
| 09-2013 | RP-61 | RP-131290 | 1989 | | | FeICIC FDD Test for In-sync With MBSFN ABS for Rel. 11 | 11.6.0 |
| 09-2013 | RP-61 | RP-131290 | 1991 | | | FeICIC TDD Test for In-sync With MBSFN ABS for Rel. 11 | 11.6.0 |
| 12-2013 | RP-62 | RP-131927 | 1995 | | | Corrections to CA event triggered tests on deactivated SCell with PCell interruption in non-DRX (Rel-11) | 11.7.0 |
| 12-2013 | RP-62 | RP-131928 | 2002 | | | Corrections to CA Interruption Requirements | 11.7.0 |
| 12-2013 | RP-62 | RP-131926 | 2008 | | | CRS Es/Iot for eICIC RSRP, RSRQ with MBSFN ABS Test Cases | 11.7.0 |
| 12-2013 | RP-62 | RP-131928 | 2012 | | | Amendment on SCell Activation Delay Requirements for other activation actions | 11.7.0 |
| 12-2013 | RP-62 | RP-131928 | 2015 | | | Amendment on SCell Activation Delay Requirements in case no RS for measurement | 11.7.0 |
| 12-2013 | RP-62 | RP-131936 | 2018 | 1 | | Correction to the SNR values for RLM tests with MBSFN ABS in FeICIC R11 | 11.7.0 |
| 12-2013 | RP-62 | RP-131936 | 2022 | 2 | | Correction for the RSRP/RSRQ test cases in FeICIC R11 | 11.7.0 |
| 12-2013 | RP-62 | RP-131928 | 2030 | 1 | | CR on PCell Interruptions For Inter-band CA During Measurements | 11.7.0 |
| 12-2013 | RP-62 | RP-131939 | 2037 | 1 | | Introduction of E-UTRAN TDD WB-RSRQ test case R11 | 11.7.0 |
| 12-2013 | RP-62 | RP-131925 | 2043 | | | Correction of Proximity Indication Test Case<br>Not implemented as the CR is not based on the latest version of the spec | 11.7.0 |
| 12-2013 | RP-62 | RP-131939 | 2052 | | | Clarifications for intra-band non-contiguous CA R11 | 11.7.0 |
| 12-2013 | RP-62 | RP-131939 | 2057 | 1 | | Inter-frequency WB-RSRQ FDD test case | 11.7.0 |
| 12-2013 | RP-62 | RP-131928 | 2070 | | | Clarification on Pcell Interruption shall not occur before SF n+5 | 11.7.0 |
| 12-2013 | RP-62 | RP-131925 | 2077 | | | Correction in RSTD requirements | 11.7.0 |
| 12-2013 | RP-62 | RP-131939 | 2079 | | | Editorial corrections RRM | 11.7.0 |
| 12-2013 | RP-62 | RP-131939 | 2083 | 2 | | Band simplification | 11.7.0 |
| 12-2013 | RP-62 | RP-131931 | 2090 | 1 | | Requirements clarification under different BWs in FeICIC | 11.7.0 |
| 12-2013 | RP-62 | RP-131931 | 2094 | | | Correction in cell search FeICIC test cases | 11.7.0 |
| 12-2013 | RP-62 | RP-131936 | 2096 | 1 | | Correct ABS pattern for FeICIC for In-sync with MBSFN ABS for Rel. 11 | 11.7.0 |
| 12-2013 | RP-62 | RP-131926 | 2103 | | | Correction to Test cases A.9.2.9 and A.9.2.10 | 11.7.0 |

| Change History | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 12-2013 | RP-62 | RP-131925 | 2110 | | | Corrections to CGI Reading in Autonomous Gap | 11.7.0 |
| 12-2013 | RP-62 | RP-131936 | 2122 | | | Remove the brackets of SNR values in RLM test cases in FeICIC R11 | 11.7.0 |
| 12-2013 | RP-62 | RP-131928 | 2134 | | | CSI Reporting in SCell Activation Requirements | 11.7.0 |
| 12-2013 | RP-62 | RP-131927 | 2142 | | | Editorial corrections RRM | 11.7.0 |
| 12-2013 | RP-62 | RP-131939 | 2144 | | | Applying band simplification | 11.7.0 |
| 12-2013 | RP-62 | RP-131939 | 2150 | 2 | | Correction to MTA requirements | 11.7.0 |
| 12-2013 | RP-62 | RP-131925 | 2154 | | | Correction in RSTD test cases | 11.7.0 |
| 12-2013 | RP-62 | RP-131931 | 2156 | | | Correction to interference clarification in FeICIC requirements | 11.7.0 |
| 03-2014 | RP-63 | RP-140375 | 2241 | | | TDD UL/DL subframe configurations in requirements | 11.8.0 |
| 03-2014 | RP-63 | RP-140368 | 2233 | | | Missing condition in CGI identification requirements | 11.8.0 |
| 03-2014 | RP-63 | RP-140375 | 2235 | | | Band simplification clean up | 11.8.0 |
| 03-2014 | RP-63 | RP-140368 | 2223 | | | CSI Reporting in SCell Activation Requirements | 11.8.0 |
| 03-2014 | RP-63 | RP-140367 | 2262 | | | Correction of Proximity Indication Test Case | 11.8.0 |
| 03-2014 | RP-63 | RP-140375 | 2252 | | | Editorial corrections RRM from Rel-11 | 11.8.0 |
| 03-2014 | RP-63 | RP-140368 | 2257 | | | Alignment between interruption requirements for RSTD and mobillity measurements for SCell | 11.8.0 |
| 03-2014 | RP-63 | RP-140371 | 2199 | 1 | | Clarification of BW applicability in Rx-Tx Time Difference measurement R11 | 11.8.0 |
| 03-2014 | RP-63 | RP-140368 | 2180 | | | Correction on PDSCH allocation in PRS subframe r11 | 11.8.0 |
| 03-2014 | RP-63 | RP-140367 | 2191 | | | PRS_RA corrections | 11.8.0 |
| 06-2014 | RP-64 | RP-140742 | 2365 | 1 | | SCell activation and deactivation delay test case for known SCell | 11.9.0 |
| 06-2014 | RP-64 | RP-140910 | 2266 | | | RRM: Clean-up of time offset between cells in RSTD tests (Rel-11) | 11.9.0 |
| 06-2014 | RP-64 | RP-140910 | 2311 | 1 | | Clarification on UE Transmit Timing Accuracy test cases in DRX mode R11 | 11.9.0 |
| 06-2014 | RP-64 | RP-140910 | 2352 | | | RSTD inter-frequency requirements applicability | 11.9.0 |
| 06-2014 | RP-64 | RP-140911 | 2381 | | | RRM: Remove square brackets from eICIC RLM test requirement (Rel-11) | 11.9.0 |
| 06-2014 | RP-64 | RP-140911 | 2378 | | | Correction to periodicity of ABS pattern in eICIC RRM test cases | 11.9.0 |
| 06-2014 | RP-64 | RP-140911 | 2359 | | | Test case corrections for eICIC | 11.9.0 |
| 06-2014 | RP-64 | RP-140911 | 2314 | | | Correction for OCNG pattern number in RRM tests R11 | 11.9.0 |
| 06-2014 | RP-64 | RP-140911 | 2421 | | | Clean up the correction on PDSCH allocation in PRS subframe R11 | 11.9.0 |
| 06-2014 | RP-64 | RP-140911 | 2301 | | | Introduce the CGI reading requirements in CA R11 | 11.9.0 |
| 06-2014 | RP-64 | RP-140911 | 2277 | | | Removing DPCH for handover from E-UTRAN to UTRA TDD for Rel-11 | 11.9.0 |
| 06-2014 | RP-64 | RP-140911 | 2318 | | | Clarification on E-UTRAN TDD - UE Timing Advance Adjustment Accuracy Test R11 | 11.9.0 |
| 06-2014 | RP-64 | RP-140914 | 2414 | | | Correction to PCI configuration conditions in FeICIC tests R11 | 11.9.0 |
| 06-2014 | RP-64 | RP-140914 | 2337 | | | CQI feedback periodicity correction for RLM in eICIC/FeICIC test setup | 11.9.0 |
| 06-2014 | RP-64 | RP-140918 | 2363 | | | Clean up for Band 29 | 11.9.0 |
| 06-2014 | RP-64 | RP-140918 | 2356 | 1 | | Editorial corrections RRM | 11.9.0 |
| 06-2014 | RP-64 | RP-140918 | 2444 | | | Removing square brackets in FeICIC test cases | 11.9.0 |
| 09-2014 | RP-65 | RP-141526 | 2526 | | | Tolerance levels for measurements on UTRAN | 11.10.0 |
| 09-2014 | RP-65 | RP-141530 | 2473 | | | Correction to periodicity of ABS pattern in feICIC RRM test cases | 11.10.0 |
| 09-2014 | RP-65 | RP-141532 | 2453 | 1 | | Correction of values in RSTD tests | 11.10.0 |
| 09-2014 | RP-65 | RP-141532 | 2456 | | | Clarification to RSTD CA Reporting Delay tests | 11.10.0 |
| 12-2014 | RP-66 | RP-142143 | 2533 | | | Correction of PRS Signal Levels in RSTD Reporting Tests | 11.11.0 |
| 12-2014 | RP-66 | RP-142144 | 2537 | | | Correction of Es/Noc values in inter-frequency RSTD tests | 11.11.0 |
| 12-2014 | RP-66 | RP-142147 | 2565 | | | Correction to ABS pattern and CRS Es/Iot in feICIC RRM test cases | 11.11.0 |
| 12-2014 | RP-66 | RP-142144 | 2568 | | | SCell activation and deactivation delay test case for unknown SCell R11 | 11.11.0 |
| 12-2014 | RP-66 | RP-142147 | 2596 | | | Correction on Io value in CA 20MHz RSRQ test case R11 | 11.11.0 |
| 12-2014 | RP-66 | RP-142144 | 2552 | 1 | | Clarification on time to identify the target UTRA TDD cell for blind redirection from E-UTRA to UTRA TDD | 11.11.0 |
| 12-2014 | RP-66 | RP-142150 | 2744 | | | Requirements for multicarrier handover from EUTRA to UTRA | 11.10.0 |
| 12-2014 | RP-66 | RP-142144 | 2638 | | | Changes to RSTD CA Reporting Delay tests | 11.11.0 |
| 12-2014 | RP-66 | RP-142144 | 2643 | | | Clarifications to RSTD values | 11.11.0 |
| 12-2014 | RP-66 | RP-142144 | 2655 | | | Correction to RSTD Intra Frequency Delay Test Case | 11.11.0 |
| 12-2014 | RP-66 | RP-142144 | 2685 | | | Correction on CA test cases in R11 | 11.11.0 |
| 12-2014 | RP-66 | RP-142144 | 2702 | | | CR on PRS Signal Levels in RSTD Reporting Tests for | 11.11.0 |

| Change History | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| | | | | | | Carrier Aggregation | |
| 12-2014 | RP-66 | RP-142149 | 2735 | | | Corrections to E-UTRAN TDD RLM In-sync under Time Domain Measurement Resource Restriction with CRS assistance information | 11.11.0 |
| 12-2014 | RP-66 | RP-142149 | 2737 | | | Corrections to E-UTRAN TDD RLM Out-of-sync under Time Domain Measurement Resource Restriction with CRS Assistance Information | 11.11.0 |
| 12-2014 | RP-66 | RP-142149 | 2704 | 1 | | Introduction of UE requirements for PCell interruptions (Rel-11) | 11.11.0 |
| 12-2014 | RP-66 | RP-142149 | 2739 | 1 | | Test case for inter-RAT HO to multicarrier UTRA | 11.11.0 |
| 03-2015 | RP-67 | RP-150384 | 2746 | | | CR to Correct Implementation Errors in Intra-Frequency RSTD Measurement Reporting Delay Test Cases | 11.12.0 |
| 03-2015 | RP-67 | RP-150382 | 2749 | | | Remove incorrect note from CA RSTD Accuracy tests | 11.12.0 |
| 03-2015 | RP-67 | RP-150065 | 2753 | 1 | | Maximum allowed layers for multiple monitoring for CA | 11.12.0 |
| 03-2015 | RP-67 | RP-150384 | 2784 | | | Time-domain measurement resource restriction pattern for serving cell in feICIC RSRP and RSRQ test cases | 11.12.0 |
| 03-2015 | RP-67 | RP-150384 | 2790 | | | CR on typo of referencing section name in CA measurements | 11.12.0 |
| 03-2015 | RP-67 | RP-150382 | 2802 | | | Correction of RMC and OCNG pattern in event triggered tests without measurement gap | 11.12.0 |
| 03-2015 | RP-67 | RP-150384 | 2807 | | | UE Behaviour after Measurement Gap | 11.12.0 |
| 03-2015 | RP-67 | RP-150384 | 2818 | | | 36.133 CR to change CPICH Ec/No to CPICH Ec/Io in EUTRA FDD to UTRA FDD HO test cases | 11.12.0 |
| 06-2015 | RP-68 | RP-150955 | 2888 | | | E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells for 20 MHz +20 MHz bandwidth R11 | 11.13.0 |
| 06-2015 | RP-68 | RP-150955 | 2890 | | | E-UTRAN TDD with 20 MHz +20 MHz bandwidth to UTRAN TDD cell search under fading propagation conditions R11 | 11.13.0 |
| 06-2015 | RP-68 | RP-150954 | 2931 | | | Correction of Cell Time offset in RSTD CA Test cases (Rel-11) | 11.13.0 |
| 06-2015 | RP-68 | RP-150955 | 2960 | | | E-UTRAN TDD activation and deactivation of known SCell in non-DRX for 20 MHz +20 MHz bandwidth R11 | 11.13.0 |
| 06-2015 | RP-68 | RP-150955 | 2961 | | | E-UTRAN TDD activation of unknown SCell in non-DRX for 20 MHz +20 MHz bandwidth R11 | 11.13.0 |
| 06-2015 | RP-68 | RP-150955 | 3000 | | | Correction to feICIC cell configurations in RLM | 11.13.0 |
| 06-2015 | RP-68 | RP-150955 | 3002 | | | Correction to A.8.1.8 | 11.13.0 |
| | | | | | | Corrects history table | 11.13.1 |
| 09-2015 | RP-69 | RP-151475 | 3018 | - | | Correction of Ior/Ioc value in RRM Test case A.4.3.1.1 | 11.14.0 |
| 09-2015 | RP-69 | RP-151483 | 3060 | - | | Corrections to the RMC configurations in 36.133 R11 | 11.14.0 |
| 11-2015 | | | | | | No change except in version number. Caters for error in ETSI transposition of v11.14.0. | 11.14.1 |
| 12-2015 | RP-70 | RP-152131 | 3084 | - | | Correction of RSRQ value in RRM Serving Cell Test cases A.9.9.1, A.9.9.2 | 11.15.0 |
| 12-2015 | RP-70 | RP-152131 | 3119 | 1 | | Correction of definition of antenna connection in some RSTD tests | 11.15.0 |
| 12-2015 | RP-70 | RP-152131 | 3148 | - | | Correction on measurement category for reporting criteria | 11.15.0 |
| 12-2015 | RP-70 | RP-152133 | 3161 | - | | Alignment of dB values for 2DL CA activation and deactivation Test cases | 11.15.0 |
| 12-2015 | RP-70 | RP-152133 | 3180 | - | | Update of 2DL CA activation and deactivation of unknown SCell Test cases A.8.16.19+A.8.16.20 | 11.15.0 |
| 12-2015 | RP-70 | RP-152131 | 3212 | - | | Further Correction of Cell Time offset in RSTD CA test cases (Rel-11) | 11.15.0 |
| 12-2015 | RP-70 | RP-152133 | 3277 | - | | Alignment of time when UE starts CSI reporting for activated SCell | 11.15.0 |
| 2016/03 | RP-71 | RP-160488 | 3319 | | F | Correction to feICIC TDD RSRP accuracy OCNG in TS 36.133 | 11.16.0 |
| 2016/06 | RP-72 | RP-161140 | 3508 | - | F | A clarification on bands | 11.17.0 |

# History

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|---|---|---|
| V11.2.0 | November 2012 | Publication |
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