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Part 3: Radio Resource Management (RRM) conformance testing
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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

The present document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain requirements for support of RRM (Radio Resource Management) as part of the 3G Long Term Evolution (3G LTE).

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the "*test applicability*" part of the test.

For example only Release 8 and later UE declared to support LTE shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

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 TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 36.101: "E-UTRA UE radio transmission and reception".

[3] ITU-R Recommendation SM.329-10, "Unwanted emissions in the spurious domain".

[4] 3GPP TS 36.133: "E-UTRA requirements for support of radio resource management".

[5] 3GPP TS 36.331: "E-UTRA Radio Resource Control (RRC): protocol specification".

[6] 3GPP TS 36.304: "E-UTRA UE procedures in idle mode".

[7] 3GPP TS 36.508: "Common test environments for User Equipment (UE)".

[8] 3GPP TS 36.213: "E-UTRA Physical layer procedures".

[9] 3GPP TS 36.211: "E-UTRA Physical Channels and Modulation".

[10] 3GPP TS 36.521-1: "User Equipment (UE) conformance specification Radio transmission and reception. Part 1: Conformance Testing".

[11] 3GPP TS 36.321: "E-UTRA Medium Access Control (MAC): protocol specification".

[12] 3GPP TS 36.214: "E-UTRA Physical layer - Measurements".

[13] 3GPP TS 45.010: "Radio subsystem synchronization".

[14] 3GPP TS 36.306: "E-UTRA UE radio access capabilities".

[15] 3GPP TS 45.008: "Radio subsystem link control".

[16] 3GPP TS 45.005: "Radio transmission and reception"

[17] 3GPP2 C.S0033-B: "Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal".

[18] 3GPP2 C.S0024-B: "cdma2000 High Rate Packet Data Air Interface Specification".

[19] 3GPP2 C.S0011-C: "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations"..

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] 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 [1].

Channel edge: The lowest and highest frequency of the carrier, separated by the channel bandwidth.

Channel bandwidth: The RF bandwidth supporting a single E-UTRA RF carrier with the transmission bandwidth configured in the uplink or downlink of a cell. The channel bandwidth is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

Maximum throughput: The maximum achievable throughput for a reference measurement channel.

Maximum Output Power: The mean power level per carrier of UE measured at the antenna connector in a specified reference condition.

Mean power: When applied to E-UTRA transmission this is the power measured in the operating system bandwidth of the carrier. The period of measurement shall be at least one subframe (1ms) unless otherwise stated.

Occupied bandwidth: The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage β/2 of the total mean power of a given emission.

Output power: The mean power of one carrier of the UE, delivered to a load with resistance equal to the nominal load impedance of the transmitter.

Throughput: The number of payload bits successfully received per second for a reference measurement channel in a specified reference condition.

Transmission bandwidth: Bandwidth of an instantaneous transmission from a UE or BS, measured in Resource Block units.

Transmission bandwidth configuration: The highest transmission bandwidth allowed for uplink or downlink in a given channel bandwidth, measured in Resource Block units.

3.2 Symbols

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

$BW_{Channel}$	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_{PRB} Physical Resource Block number as defined in subclause 3.1 in 3GPP TS 36.211.

P_{CMAX} Configured UE transmitted power as defined in subclause 6.2.5 in 3GPP TS 36.101.

S 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

$S_{\text{ServingCcell}}$ Defined in TS 36.304

Sintersearch Defined in TS 25.304, subclause 5.2.6.1.5

Sintrasearch Defined in TS 25.304, subclause 5.2.6.1.5 for UTRAN and in TS 36.304, subclause 5.2.4.7 for E-UTRAN

Snonintrasearch Defined in TS 36.304, subclause 5.2.4.7

SsearchRAT Defined in TS 25.304, subclause 5.2.6.1.5

$\text{Thresh}_{\text{x, high}}$ Defined in TS 36.304, subclause 5.2.4.7

$\text{Thresh}_{\text{x, low}}$ Defined in TS 36.304, subclause 5.2.4.7

$\text{Thresh}_{\text{serving, low}}$ Defined in TS 36.304, subclause 5.2.4.7

$T_{\text{RE-ESTABLISH-REQ}}$ The RRC Re-establishment delay requirement, the time between the moment when erroneous CRCs are applied, to when the UE starts to send preambles on the PRACH.

Treselection Defined in TS 25.304, subclause 5.2.6.1.5

$\text{Treselection}_{\text{RAT}}$ Defined in TS 36.304, subclause 5.2.4.7

$\text{Treselection}_{\text{EUTRAN}}$ Defined in TS 36.304, subclause 5.2.4.7

$\text{Treselection}_{\text{UTRAN}}$ Defined in TS 36.304, subclause 5.2.4.7

$\text{Treselection}_{\text{GERAN}}$ Defined in TS 36.304, subclause 5.2.4.7

T_S Basic time unit, defined in TS 36.211, clause 4

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] 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 [1].

1x RTT CDMA2000 1x Radio Transmission Technology
ARQ Automatic Repeat Request
AWGN Additive White Gaussian Noise
BCCH Broadcast Control Channel
BCH Broadcast Channel
BS Base Station
BSIC Base transceiver Station Identity Code
CCCH SDU Common Control Channel SDU
CCTrCH Coded Composite Transport Channel
CFN Connection Frame Number
CPICH Common Pilot Channel
CPICH Ec/No CPICH received energy per chip divided by the power density in the band
C-RNTI Cell RNTI
CQI Channel Quality Indicator
DL Downlink
DCCH Dedicated Control Channel
DPCH Dedicated Physical Channel
DPCCH Dedicated Physical Control Channel
DRX Discontinuous Reception
DTX Discontinuous Transmission
EARFCN E-UTRA Absolute Radio Frequency Channel Number
EPRE Energy Per Resource Element

E-UTRA	Evolved UMTS Terrestrial Radio Access
E-UTRAN	Evolved UMTS Terrestrial Radio Access Network
FDD	Frequency Division Duplex
FRC	Fixed Reference Channel
GSM	Global System for Mobile communication
HARQ	Hybrid Automatic Repeat Request
HO	Handover
HRPD	High Rate Packet Data
MAC	Medium Access Control
OCNG	OFDMA Channel Noise Generator
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
PBCH	Physical Broadcast Channel
PCCH	Paging Control Channel
P-CCPCH	Primary Common Control Physical Channel
PCFICH	Physical Control Format Indicator Channel
PDCCH	Physical Downlink Control Channel
PDSCH	Physical Downlink Shared Channel
PHICH	Physical Hybrid ARQ Indictor Channel
PLMN	Public Land Mobile Network
PMI	Precoding Matrix Indicator
PRACH	Physical Random Access Channel
PUCCH	Physical Uplink Control Channel
PUSCH	Physical Uplink Shared Channel
RACH	Random Access Channel
RAT	Radio Access Channel
REFSENS	Reference Sensitivity power level
r.m.s	Root Mean Square
RNC	Radio Network Controller
RNTI	Radio Network Temporary Identifier
RRC	Radio Resource Control
RRM	Radio Resource Management
RSRP	Reference Signal Received Power
RSRQ	Reference Signal Received Quality
RSSI	Received Signal Strength Indicator
SCH	Synchronization Channel
SDU	Service Data Unit
SFN	System Frame Number
SNR	Signal-to-Noise Ratio
SON	Self Organizing Network
SRS	Sounding Reference Signal
TDD	Time Division Duplex
TTI	Transmission Time Interval
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunications System
UTRA	UMTS Terrestrial Radio Access
UTRAN	UMTS Terrestrial Radio Access Network

3A Requirements for support of RRM

3A.1 General

Radio Resource Management (RRM) ensures the efficient use of the available radio resources and also provides mechanisms that enable E-UTRAN to meet radio resource related requirements. The requirements that are tested include:

- Idle mode, the cell re-selection algorithms that are controlled by the setting of parameters (thresholds and hysteresis values) that define the best cell and/or determine when the UE should select a new cell

- The configuration of the UE measurement and reporting procedures that are transmitted via dedicated signalling in connected mode
- Connected mode, the mobility of radio connections that has to be supported
- Handover decisions that may be based on UE or eNB measurements
- Inter-RAT RRM, the management of radio resources in connection with inter-RAT mobility, e.g. Inter-RAT handover

For test cases in clauses 4, 5, 6, 7, 8, 9 the initial conditions of the downlink physical channels signal levels and downlink physical channels required are specified in Annex C.0.

Unless otherwise mentioned, in those test case where delay is the test criteria, if HARQ or even RLC retransmission happens, the extra delay due to retransmission shall be excluded in the delay calculation before making a pass or fail judgement on the UE in the test.

3A.2 Requirements Classification for Statistical Testing

The test requirements are 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 a parameter is tested. The statistical nature depends on the type of test 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 Device Under Test (DUT) passing the test actually meets the test requirement and determines how many times a test have to be repeated and what the pass and fail criteria is. The statistical significance shall be set according to Annex G.

3A.3 RRM Test Configurations

The cell configuration of cells described in the test cases shall be set according to TS 36.508 [7] section 4.4.7.

3A.3.1 UE with Single Antenna Connector

For testing a UE with a single E-UTRA antenna connector, the connection diagram configurations are described in TS 36.508 [7] Annex A.

3A.3.2 UE with Multiple Antenna Connectors

For testing a UE with more than one E-UTRA antenna connector, the connection diagram configurations are described in TS 36.508 [7] Annex A. For UEs with more than one E-UTRA antenna connector the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated. The levels of the test signal applied to each of the antenna connectors shall be as defined in the respective test cases.

4 E-UTRAN RRC_IDLE State Mobility

After the UE has switched on and a PLMN has been selected, the cell selection process takes place. 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*).

When the UE is in either Camped Normally state or Camped on Any Cell state on a cell, the UE attempts to detect, synchronise, and monitor intra-frequency, inter-frequency and inter-RAT cells indicated by the serving cell, the cell re-selection evaluation process takes place. This process allows the UE to select a more suitable cell and camp on it. In this process the UE measurement activity is controlled by measurement rules defined in TS 36.304 [6] clause 5.2.4.2, allowing the UE to limit its measurement activity.

4.1 E-UTRAN Cell Selection

Editor's note: There are currently no tests defined for E-UTRAN cell selection.

4.2 E-UTRAN Cell Re-Selection

4.2.1 E-UTRAN FDD – FDD cell re-selection intra frequency case

4.2.1.1 Test purpose

To verify that when the current and target cell operates on the same carrier frequency the UE is able to search and measure cells to meet the intra-frequency cell re-selection requirements.

4.2.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

4.2.1.3 Minimum conformance requirements

The cell re-selection delay shall be less than $T_{evaluate\ E\text{-}UTRAN\_Intra} + T_{SI\text{-}EUTRA}$ in RRC_IDLE state.

The UE shall be able to identify new intra-frequency cells and perform RSRP measurement 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 re-selection criteria defined in TS 36.304 [6] within $T_{detect,\ EUTRAN\_Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 when Treselection = 0 provided that the cell is at least 3 dB better ranked.

The UE shall measure RSRP at least every $T_{measure,EUTRAN\_Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP measurement 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 $T_{measure,EUTRAN\_Intra}/2$.

For an intra-frequency cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met the re-selection criterion defined in TS 36.304 [6] within $T_{evaluateFDD,Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 when Treselection = 0 provided that the cell is at least 3 dB better ranked. When evaluating cells for re-selection, the side conditions are RSRP and SCh apply to both serving and non-serving intra-frequency cells.

If Treselection 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 Treselection time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the intra-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds. When a non-zero value of Treselection is used, the UE shall only perform re-selection on an evaluation which occurs simultaneously to, or later than the expiry of the Treselection timer.

At intra-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 cell for paging reception. The interruption time shall not exceed $T_{SI\text{-}EUTRA}$ + 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 as defined in TS 36.331 [5] for a E-UTRAN cell.

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

- Intra-frequency carrier

In RRC_IDLE state, the UE shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any allowed combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 cells).

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.3 and A.4.2.1.

4.2.1.4 Test description

4.2.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. The general test parameter settings are set up according to Table 4.2.1.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are as defined in clause 4.2.1.4.3
5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.2.1.4.1-1: General Test Parameters for E-UTRAN FDD-FDD intra 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 FDD carrier frequency is used.
Channel Bandwidth ($BW_{channel}$)		MHz	10	
Time offset between cells			3 ms	Asynchronous cells 3ms or 92160*Ts
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration			4	As specified in table 5.7.1-2 in 3GPP TS 36.211 [9]
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	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.

4.2.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one E-UTRA FDD carrier. In the test there are 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.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2.
2. Set the parameters according to T1 in Table 4.2.1.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.2.1.5-1.
4. The SS waits for random access requests information from the UE to perform cell re-selection to a newly detectable cell, Cell 2.
5. If the UE responds on the newly detectable cell, Cell 2 during time duration T2 within 34 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.1.5-1.
7. The SS waits for random access requests information from the UE to perform cell re-selection to an already detected cell, Cell 1.
8. If the UE responds on the already detected cell, Cell 1 during time duration T3 within 8 seconds from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
9. When T3 expires, the power of Cell 1 is set according to Annex C.0 and C.1. Cell 2 shall be powered OFF and set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
10. Repeat step 2-9 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.1.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra cell re-selection test case

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.1-1 Table H.2.1-2
Default RRC messages and information elements contents exceptions	Table H.3.2-1

4.2.1.5 Test requirement

Tables 4.2.1.4.1-1 and 4.2.1.5-1 defines the primary level settings including test tolerances for E-UTRAN FDD-FDD intra-frequency cell re-selection test case.

Table 4.2.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD intra frequency cell re-selection 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 D.1.2 (OP.2 FDD)		OP.2 FDD			OP.2 FDD		
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note 1 OCNG_RB Note 1	dB	0			0		
Qrxlevmin	dBm	-140	-140	-140	-140	-140	-140
Pcompensation	dB	0	0	0	0	0	0
$Qhyst_s$	dB	0	0	0	0	0	0
$Qoffset_{s, n}$	dB	0	0	0	0	0	0
Cell_selection_and_reselection_quality_measurement		RSRP			RSRP		
$\hat{E}_s/I_{ot}$	dB	16.00	-3.55	3.24	-infinity	3.24	-3.55
N_{oc} Note 2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	16.00	13.00	16.45	-infinity	16.45	13.00
RSRP Note 3	dBm/15 kHz	-82.0	-85.0	-81.6	-infinity	-81.6	-85.0
Treselection	s	0	0	0	0	0	0
Sintrasearch	dB	Not sent			Not sent		
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell re-selection 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 test requirement in this case is expressed as:

Cell re-selection delay to a newly detectable cell = $T_{detect,E\text{-}UTRAN\_Intra} + T_{SI\text{-}EUTRA}$

$T_{detect,E\text{-}UTRAN\_Intra}$ = 32 s; as specified in TS 36.133 [4] clause 4.2.2.3.

$T_{SI\text{-}EUTRA}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test; as specified in TS 36.133 [4] clause 4.2.2.3

The cell re-selection delay to a newly detectable cell shall be less than a total of 34 seconds in this test case (note: this gives a total of 33.28 seconds but the test allows 34 seconds).

The cell re-selection 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 test requirement in this case is expressed as:

Cell re-selection to an already detected cell delay = $T_{evaluate,E\text{-}UTRAN\_Intra} + T_{SI\text{-}EUTRA}$

$T_{evaluate,E\text{-}UTRAN\_Intra}$ = 6.40 s; as specified in TS 36.133 [4] clause 4.2.2.3.

$T_{SI\text{-}EUTRA}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test; as specified in TS 36.133 [4] clause 4.2.2.3

The cell re-selection delay to an already detected cell shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.2.2 E-UTRAN TDD – TDD cell re-selection intra frequency case

4.2.2.1 Test purpose

To verify that when the current and target cell operates on the same carrier frequency the UE is able to search and measure cells to meet the intra-frequency cell re-selection requirements.

4.2.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

4.2.2.3 Minimum conformance requirements

The cell re-selection delay shall be less than $T_{evaluate,E\text{-}UTRAN\_Intra} + T_{SI\text{-}EUTRA}$ in RRC_IDLE state.

The UE shall be able to identify new intra-frequency cells and perform RSRP measurement 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 re-selection criteria defined in TS 36.304 [6] within $T_{detect,EUTRAN\_Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 when Treselection = 0.

The UE shall measure RSRP at least every $T_{measure,EUTRAN\_Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP measurements of each measured intra-frequency cell using at least 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.

For an intra-frequency cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met the re-selection criterion defined in TS 36.304 [6] within $T_{evaluate,E\text{-}UTRAN\_Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 when Treselection = 0 provided that the cell is at least 3 dB 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 Treselection 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 Treselection time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the intra-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds.

At intra-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 cell for paging reception. The interruption time shall not exceed $T_{SI-EUTRA}$ + 50 ms. $T_{SI-EUTRA}$ 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 as defined in TS 36.331 [5] for a E-UTRAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.3 and A.4.2.2.

4.2.2.4 Test description

4.2.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. The general test parameter settings are set up according to Table 4.2.2.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 4.2.2.4.3.

5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Table clause C.0 and C.1 for this test.

Table 4.2.2.4.1-1: General Test Parameters for E-UTRAN TDD-TDD intra 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 3μs or 92*Ts
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.21
PRACH configuration index			53	As specified in table 5.7.1-3 in 3GPP TS 36.211
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	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.

4.2.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one E-UTRA TDD carrier. In the test there are 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.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2

2. Set the parameters according to T1 in Table 4.2.2.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts During time duration T1, Cell 2 shall be powered OFF and the physical cell identity shall be changed to ensure Cell 2 is not detected by the UE..

3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.2.2.5-1.

4. The SS waits for random access requests information from the UE to perform cell re-selectionto a newly detectable cell, Cell 2.

5. If the UE responds on the newly detectable cell, Cell 2, during time duration T2 within 34 seconds from the beginning of time period T2, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.2.5-1.

7. The SS waits for random access requests information from the UE to perform cell re-selection to an already detected cell, Cell 1.

8. If the UE responds on the already detected cell, Cell 1, during time duration T3 within 8 seconds from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

9. Repeat step 1-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.2.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra cell re-selection test case

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.1-1 Table H.2.1-2
Default RRC messages and information elements contents exceptions	Table H.3.2-2

4.2.2.5 Test requirement

Tables 4.2.2.4.1-1, and 4.2.2.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD-TDD intra frequency cell re-selection test case.

Table 4.2.2.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD-TDD intra frequency cell re-selection 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 Pattern defined in D.2.2 (OP.2 TDD)		OP.2 TDD			OP.2 TDD		
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note 1] 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	16.00	-3.11 / -3.55	2.79 / 3.24	-infinity	2.79/ 3.24	-3.11/ -3.55
N_{oc}	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	16.00	13.00	16.00 / 16.45	-infinity	16.00 / 16.45	13.00
RSRP	dBm/15 kHz	-82.00	-85.00	-81.60 / -82.00	-infinity	-81.60 / -82.00	-85.00
Treselection	s	0	0	0	0	0	0
Sintrasearch	dB	Not sent			Not sent		
Propagation Condition		AWGN					
Note: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.							

The cell re-selection 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 test requirement in this case is expressed as:

Cell re-selection delay to a newly detectable cell = $T_{detect,EUTRAN\_Intra} + T_{SI\text{-}EUTRA}$

$T_{detect,EUTRAN\_Intra}$ = 32 s; as specified in TS 36.133 [4] clause 4.2.2.3.

$T_{SI\text{-}EUTRA}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test; as specified in TS 36.133 [4] clause 4.2.2.7

The cell re-selection delay to a newly detectable cell shall be less than a total of 34 seconds in this test case (note: this gives a total of 33.28 seconds but the test allows 34 seconds).

The cell re-selection 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 test requirement in this case is expressed as:

Cell re-selection to an already detected cell delay = $T_{evaluate,E\text{-}UTRAN\_Intra} + T_{SI\text{-}EUTRA}$

$T_{evaluate,E\text{-}UTRAN\_Intra}$ = 6.40 s; as specified in TS 36.133 [4] clause 4.2.2.3

$T_{SI\text{-}EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.7

The cell re-selection delay to an already detected cell shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.2.3 E-UTRAN FDD – FDD cell re-selection inter frequency case

4.2.3.1 Test purpose

To verify that when the neighbour cell operates on a different carrier frequency, compared to the current cell the UE is able to search and measure cells to meet the inter-frequency cell re-selection requirements.

4.2.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

4.2.3.3 Minimum conformance requirements

The cell re-selection delay shall be less than $T_{evaluate,E\text{-}UTRAN\_Inter} + T_{SI\text{-}EUTRA}$ in RRC_IDLE state.

The UE shall be able to identify new inter-frequency cells and perform RSRP 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 the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ 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 TS 36.133 [4] clause 4.2.2 as $T_{higher\_priority\_search}$ = (60 * N_{layers}) seconds, where the parameter N_{layers} is the total number of configured higher priority E-UTRA carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible re-selection. 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 for lower or equal priority inter-frequency layers.

The UE shall be able to evaluate whether a newly detectable lower or equal priority inter-frequency cell meets the re-selection criteria defined in TS 36.304 [6] within $K_{carrier}$ * $T_{detect,EUTRAN\_Inter}$ (as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4) if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $Treselection_{EUTRAN}$ = 0 provides that the re-selection criteria is met by a margin of at least 5 dB for re-selection based on ranking or 6 dB for re-selection based on absolute priorities. The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,EUTRAN\_Inter}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateFDD, Inter}$ + $Treselection_{EUTRAN}$) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection. If the UE detects on an 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 at least every $K_{carrier}$ * $T_{measure,EUTRAN\_Inter}$ DRX cycle as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 for identified lower or equal priority inter-frequency cells. If the UE detects on an 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 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 an E-UTRA neighbour cell in cell re-selection, 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 re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met re-selection criterion defined in TS 36.304 [6] within $K_{carrier}$ * $T_{evaluate,E-UTRAN\_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 when $Treselection_{EUTRAN}$ = 0 provides that the re-selection criteria is met by a margin of at least 5 dB for re-selection based on ranking or 6 dB for re-selection based on absolute priorities. When evaluating cells for re-selection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If $Treselection_{EUTRAN}$ 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 $Treselection_{EUTRAN}$ time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the inter-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds. When a non-zero value of $Treselection_{EUTRAN}$ is used, the UE shall only perform re-selection on an evaluation which occurs simultaneously to, or later than the expiry of the $Treselection_{EUTRAN}$ timer.

At 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 inter-frequency cell for paging reception. The interruption time shall not exceed $T_{SI-EUTRA}$ + 50 ms. $T_{SI-EUTRA}$ 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 as defined in TS 36.331 [5] for a E-UTRAN cell.

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

- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers

In RRC_IDLE state, the UE shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any allowed combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 cells).

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.4 and A.4.2.3.

4.2.3.4 Test description

4.2.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. The general test parameter settings are set up according to Table 4.2.3.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are as defined in clause 4.2.3.4.3.
5. There are two E-UTRA FDD carriers and two cells specified in the test. Cell 2 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.2.3.4.1-1: General Test Parameters for E-UTRAN 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		ms	3	Asynchronous cells 3ms or 92160*Ts
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211 [9]
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	5	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.

4.2.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one of the E-UTRA FDD carriers. In the test there are 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 1.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2.
2. Set the parameters according to duration T1 in Table 4.2.3.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. The SS waits for random access requests information from the UE to perform cell re-selection on the lower priority cell, Cell 1.
4. If the UE responds on lower priority cell, Cell 1 during time duration T1 within 8 seconds from the beginning of time period T1 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.2.3.5-1. During time duration T2, Cell 2 shall be powered OFF and the physical cell identity shall be changed to ensure Cell 2 is not detected by the UE.
6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.3.5-1.
7. The SS waits for random access requests information from the UE to perform cell re-selection on the higher priority cell, Cell 2.
8. If the UE responds on higher priority cell, Cell 2 during time duration T3 within 68 seconds from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
9. When T3 expires, the power of Cell 2 is set according to Annex C.0 and C.1. Cell 1 shall be powered OFF and set Cell 1 physical cell identity = ((current cell 1 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.2.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.3.4.3-1: Common Exception messages for E-UTRAN FDD-FDD inter frequency cell re-selection test case

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.2-1 Table H.2.2-2
Default RRC messages and information elements contents exceptions	Table H.3.2-1

4.2.3.5 Test requirement

Tables 4.2.3.4.1-1 and 4.2.3.5-1 defines the primary level settings including test tolerances for E-UTRAN FDD-FDD inter-frequency cell re-selection test case.

Table 4.2.3.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD inter frequency cell re-selection 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 D.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	-99,1					
RSRP Note 3	dBm/15 KHz	-83.2	-83.2	-83.2	-102.8	-infinity	-85.2
$\hat{E}_s/I_{ot}$	dB	15.90	15.90	15.90	-3.70	-infinity	13.90
$\hat{E}_s/N_{oc}$	dB	15.90	15.90	15.90	-3.70	-infinity	13.90
$\text{Treselection}_{EUTRAN}$	S	0			0		
Snonintrasearch	dB	50			Not sent		
$\text{Thresh}_{x,\ high}$	dB	48			48		
$\text{Thresh}_{serving,\ low}$	dB	44			44		
$\text{Thresh}_{x,\ low}$	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.							

The cell re-selection 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 test requirement in this case is expressed as:

Cell re-selection delay to lower priority = $T_{evaluate,E\text{-}UTRAN\_Inter} + T_{SI\text{-}EUTRA}$

$T_{evaluate,E\text{-}UTRAN\_Inter}$ = 6.40 s; as specified in TS 36.133 [4] clause 4.2.2.4

$T_{SI\text{-}EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to lower priority shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

The cell re-selection 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 to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority test requirement in this case is expressed as:

Cell re-selection delay to higher priority = $T_{higher\_priority\_search} + T_{evaluate,E\text{-}UTRAN\_Inter} + T_{SI\text{-}EUTRA}$

$T_{higher\_priority\_search}$ = 60 s; as specified in TS 36.133 [4] clause 4.2.2

$T_{evaluate,E\text{-}UTRAN\_Inter}$ = 6.40 s; as specified in TS 36.133 [4] clause 4.2.2.4

$T_{SI\text{-}EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to higher priority shall be less than a total of 68 seconds in this test case (note: this gives a total of 67.68 seconds but the test allows 68 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.2.4 E-UTRAN FDD – TDD cell re-selection inter frequency case

4.2.5 E-UTRAN TDD – FDD cell re-selection inter frequency case

4.2.6 E-UTRAN TDD – TDD cell re-selection inter frequency case

4.2.6.1 Test purpose

To verify that when the neighbour cell operates on a different carrier frequency, compared to the current cell the UE is able to search and measure cells to meet the inter-frequency cell re-selection requirements.

4.2.6.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

4.2.6.3 Minimum conformance requirements

The cell re-selection delay shall be less than $T_{evaluate,E-UTRAN\_Inter}$ + $T_{SI-EUTRA}$ in RRC_IDLE state.

The UE shall be able to identify new inter-frequency cells and perform RSRP 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 the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ 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 section 4.2.2 of TS 36.133 [4].

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible re-selection. 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 for a lower or equal priority inter-frequency layers.

The UE shall be able to evaluate whether a newly detectable lower or equal priority inter-frequency cell meets the re-selection criteria defined in TS 36.304 [6] within $K_{carrier}$ * $T_{detect,EUTRAN\_Inter}$ (as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4) if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $Treselection_{EUTRAN}$ = 0 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for reselections based on absolute priorities, after it is found in a higher priority search. The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,EUTRAN\_Inter}$. If, after it is found 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 re-selection. However, the minimum measurement filtering requirements specified later in this section 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 at least every $K_{carrier}$ * $T_{measure,EUTRAN\_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 for identified lower or equal priority inter-frequency cells. If the UE detects on an 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 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 an E-UTRA neighbour cell in cell re-selection, 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 re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met re-selection criterion defined in TS

36.304 [6] within $K_{carrier}$ * $T_{evaluate,E-UTRAN\_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 when $Treselection_{EUTRAN}$ = 0 provides that the re-selection criteria is met by a margin of at least 5dB for re-selection based on ranking or 6dB for re-selection based on absolute priorities.

If $Treselection_{EUTRAN}$ 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 $Treselection_{EUTRAN}$ time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the inter-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds.

At 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 inter-frequency cell for paging reception. The interruption time shall not exceed $T_{SI-EUTRA}$ + 50 ms. $T_{SI-EUTRA}$ 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 as defined in TS 36.331 [5] for a E-UTRAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.4 and A.4.2.3.

4.2.6.4 Test description

4.2.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (eNodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. The general test parameter settings are set up according to Table 4.2.6.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 4.2.6.4.3.

5. There are two E-UTRA TDD carriers and two cells specified in the test. Cell 2 is the cell used for registration with the power level set according to clause C.0 and C.1for this test.

Table 4.2.6.4.1-1: General Test Parameters for E-UTRAN TDD-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 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		μs	3	Synchronous cells 3μs or 92*Ts
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in 3GPP 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	5	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.

4.2.6.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one E-UTRA TDD carrier. In the test there are hree 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. At T1 the UE is camped on to Cell 1. 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.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2.
2. Set the parameters according to duration T1 in Table 4.2.6.5-1. Propagation conditions are set accordingto Annex B clause B.1.1. T1 starts.
3. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the lower priority cell, Cell 1.
4. If the UE responds on the lower priority cell, Cell 1, during time duration T1 within 8 seconds from the beginning of time period T1 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.2.6.5-1. During time duration T2, Cell 2 shall be powered OFF and the physical cell identity shall be changed to ensure Cell 2 is not detected by the UE.
6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.6.5-1.
7. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the higher priority cell, Cell 2.
8. If the UE responds on higher priority cell, Cell 2, during time duration T2 within 68 seconds from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
9. Repeat step 1-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2.3 is achieved.

4.2.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause4.4.3.3 and 4.6.3 with the following exceptions:

Table 4.2.6.4.3-1: *SystemInformationBlockType3*: Additional E-UTRAN TDD-TDD inter frequency cell re-selection test point 1 requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	**Value/remark**	**Comment**	**Condition**
cellReselectionServingFreqInfo SEQUENCE {			
threshServingLow	44 dB		

Table 4.2.6.4.3-2: *SystemInformationBlockType3*: Additional E-UTRAN TDD-TDD inter frequency cell re-selection test point 2 requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	**Value/remark**	**Comment**	**Condition**
intraFreqCellReselectionInfo SEQUENCE {			
q-Rxlevmin	-70 (-140 dBm)		

Table 4.2.6.4.3-3: *SystemInformationBlockType5*: Additional E-UTRAN TDD-TDD inter frequency cell re-selection test requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-4 SystemInformationBlockType5			
Information Element	**Value/remark**	**Comment**	**Condition**
intraFreqCarrierFreqList SEQUENCE (SIZE (1..maxFreq)) OF SEQUENCE {			
threshX-High	24 (48 dB)		
threshX-Low	25 (50 dB)		

Table 4.2.6.4.3-4: *PRACH-ConfigCommonDEFAULT*: Additional E-UTRAN TDD-TDD inter frequency cell re-selection test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-7 PRACH-ConfCommonDEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
Prach-ConfigInfo SEQUENCE {			
Prach-ConfigurationIndex	53		

4.2.6.5 Test requirement

Tables 4.2.6.4.1-1 and 4.2.6.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD-TDD inter frequency cell re-selection test case.

Table 4.2.6.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD-TDD inter frequency cell re-selection 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 Pattern defined in TS 36.133 [4] A.3.2.2.1 (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}	dBm/15 kHz	-99,1					
RSRP	dBm/15 KHz	-83.2	-83.2	-83.2	-102.8	-infinity	-85.2
$\hat{E}_s/I_{ot}$	dB	15.90	15.90	15.90	-3.70	-infinity	13.90
$\hat{E}_s/N_{oc}$	dB	15.90	15.90	15.90	-3.70	-infinity	13.90
$Treselection_{EUTRAN}$	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.							

The cell re-selection 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 to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority test requirement in this case is expressed as:

Cell re-selection delay to higher priority = $T_{higher\_priority\_search} + T_{evaluate,E-UTRAN\_Inter} + T_{SI-EUTRA}$

$T_{higher\_priority\_search}$ = 60 s; as specified in TS 36.133 [4] clause 4.2.2

$T_{evaluate,E-UTRAN\_Inter}$ = 6.40 s; as specified in TS 36.133 [4] clause 4.2.2.4

$T_{SI-EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.7

The cell re-selection delay to higher priority shall be less than a total of 68 seconds in this test case (note: this gives a total of 67.68 seconds but the test allows 68 seconds).

The cell re-selection 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 test requirement in this case is expressed as:

Cell re-selection delay to lower priority = $T_{evaluate,E-UTRAN\_Inter} + T_{SI-EUTRA}$

$T_{evaluate,E-UTRAN\_Inter}$ = 6.40 s; as specified in TS 36.133 [4] clause 4.2.2.4

$T_{SI-EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.7

The cell re-selection delay to lower priority shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3 E-UTRAN to UTRAN Cell Re-Selection

4.3.1 E-UTRAN FDD – UTRAN FDD cell re-selection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined.*
- *Statistical testing of cell re-selection delay performance requirements are undefined*

4.3.1.1 E-UTRA FDD-UTRAN FDD cell reselection: UTRA FDD is of higher priority

4.3.1.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA FDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of higher priority.

4.3.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD UE.

4.3.1.1.3 Minimum conformance requirements

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 cell list at the minimum measurement rate. The parameter $N_{UTRA\_carrier}$ is the number of carriers used for all UTRA FDD cells in the neighbour cell 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.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ 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 TS 36.133 [4] clause 4.2.2 as $T_{higher\_priority\_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher or lower priority in preparation for possible re-selection. 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.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA\_carrier} * T_{detectUTRA\_FDD}$ (as defined in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1) when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$ when $Treselection_{RAT} = 0$ provided that the re-selection criteria is met by a margin of at least 6 dB.

Cells which have been detected shall be measured at least every $N_{UTRA\_carrier} * T_{measureUTRA\_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA\_FDD}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateUTRA\_FDD}$ + $Treselection_{RAT}$) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA\_carrier}$ * $T_{evaluateUTRA\_FDD}$ as defined in table 4.2.2.5-1 of TS 36.133 [4] clause 4.2.2.5 when $Treselection_{RAT}$ = 0.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.1 and A.4.3.1.

4.3.1.1.4 Test description

4.3.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.
2. The general test parameter settings are set up according to Table 4.3.1.1.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are as defined in clause 4.3.1.1.4.3.
5. There is one E-UTRA FDD cell and one UTRA FDD cell specified in the test. Cell 2 (UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.3.1.1.4.1-1: 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		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	
T3 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
	Neighbour cell		Cell 1	
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211 [9]
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	25	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	5	During T2, 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 T3
T3		s	85	T3 need to be defined so that cell re-selection reaction time is taken into account.

4.3.1.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. Both E-UTRA cell 1 and UTRA 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. During T2, cell 2 shall be powered off, and during the off time the scrambling code shall be changed. At starting T3 cell 2 becomes stronger than $Thresh_{x\_high}$, the UE is expected to detect cell 2, send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2.

2. Set the parameters according to duration T1 in Table 4.3.1.1.5-1 and 4.3.1.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the lower priority cell, Cell 1.

4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.3.1.1.5-1 and 4.3.1.1.5-2. During T2, Cell 2 shall be powered off, and during the off time the scrambling code shall be changed

5. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.3.1.1.5-2 and 4.3.1.1.5-2.

6. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the higher priority cell, Cell 2.

7. If the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell2 within 81s from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

8. Repeat step 1-7 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

4.3.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.3.1.1.4.3-1: Common Exception messages

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.3-1 Table H.2.3-2
Default RRC messages and information elements contents exceptions	Table H.3.2-1

The UTRA system information for inter-RAT frequency and priority information to be used during the the initialisation phase is not defined in the message contents exceptions.

4.3.1.1.5 Test requirement

Tables 4.3.1.1.4-1, 4.3.1.1.5-1 and 4.3.1.1.5-2 define the primary level settings including test tolerances for cell re-selection E-UTRA FDD to UTRA FDD test case (UTRA is of higher priority).

Table 4.3.1.1.5-1: Cell specific Test Parameters for Cell 1(E-UTRA FDD)

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.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 + TT	-84 + TT	-84 + TT
$\hat{E}_s/I_{ot}$	dB	14 + TT	14 + TT	14 + TT
$\hat{E}_s/N_{oc}$	dB	14 + TT	14 + TT	14 + TT
$Treselection_{EUTRAN}$	s	0		
Snonintrasearch	dB	50		
$Thresh_{x,\ high}$ (Note 2)	dB	40		
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2 : This refers to the value of $Thresh_{x,\ high}$ which is included in E-UTRA system information, and is a threshold for the UTRA target cell				

Table 4.3.1.1.5-2: Cell specific test parameters for Cell 2 (higher priority UTRA FDD)

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	-5+TT	-∞	11+TT
I_{oc}	dBm/3,84 MHz	-70		
CPICH_Ec/Io	dB	-16.19 +TT	-∞	-10.33 +TT
CPICH_RSCP	dBm	-85+TT	-∞	-69+TT
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 : 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.				

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 on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher\_priority\_search} + T_{evaluateUTRA\_FDD} + T_{SI-UTRA}$

Where:

$T_{higher\_priority\_search}$ See section 4.4.2; 60s is assumed in this test case

$T_{evaluateUTRA-FDD}$ 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 80.48 s for higher priority cell search, allow 81 s for higher priority cell reselection in the test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.1.2 E-UTRAN FDD – UTRAN FDD cell re-selection: UTRA FDD is of lower priority

4.3.1.2.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA FDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority.

4.3.1.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD UE.

4.3.1.2.3 Minimum conformance requirements

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA FDD cells in the neighbour cell list at the minimum measurement rate. The parameter $N_{UTRA\_carrier\_FDD}$ is the number of carriers used for all UTRA FDD cells in the neighbour cell list. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$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 TS 36.133 [4] clause 4.2.2 as $T_{higher\_priority\_search}$ = (60 * N_{layers}) seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure such layers is not reduced and shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA\_carrier\_FDD}$ * $T_{detectUTRA\_FDD}$ (as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2) when the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is greater than $S_{nonintrasearch}$ when $Treselection_{RAT}$ = 0 provided that the re-selection criteria is met by a margin of at least [6 dB].

Cells which have been detected shall be measured at least every $N_{UTRA\_carrier}$ * $T_{measureUTRA\_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells o the same frequency layer) is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA\_FDD}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateUTRA\_FDD}$ + $Treselection_{RAT}$) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA\_carrier}$ * $T_{evaluateUTRA\_FDD}$ as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2 when $Treselection_{RAT}$ = 0.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.1.

4.3.1.2.4 Test description

4.3.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The general test parameter settings are set up according to Table 4.3.1.2.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 4.3.1.2.4.3.

5. There is one E-UTRA FDD cell and one UTRA FDD cell specified in the test. Cell 2 (UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.3.1.2.4.1-1: 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		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	
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 [9]
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.

4.3.1.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA FDD carrier. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Both Cell 1 and 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 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2
2. Set the parameters according to T1 in Table 4.3.1.2.5-1 and 4.3.1.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.3.1.2.5-1 and 4.3.1.2.5-2.
4. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
6. Repeat step 1-5 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

4.3.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.3.1.2.4.3-1: Common Exception messages

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.3-5 Table H.2.3-6
Default RRC messages and information elements contents exceptions	Table H.3.2-1

The UTRA system information for inter-RAT frequency and priority information to be used during the the initialisation phase is not defined in the message contents exceptions.

4.3.1.2.5 Test requirement

Tables 4.3.1.2.4.1-1, 4.3.1.2.5-1 and 4.3.1.2.5-2 define the primary level settings including test tolerances for E-UTRAN FDD- UTRAN FDD intra frequency cell re-selection test case which UTRA is of lower priority.

Table 4.3.1.2.5-1

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (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 + TT	-102 + TT
$\hat{E}_s/I_{ot}$	dB	12 + TT	-4 + TT
$\hat{E}_s/N_{oc}$	dB	12 + TT	-4 + TT
$Treselection_{EUTRAN}$	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 4.3.1.2.5-2: Cell specific test parameters for Cell 2(Lower priority UTRA FDD)

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+TT	13+TT
I_{oc}	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21 + TT	-10.21 + TT
CPICH_RSCP	dBm	-67+TT	-67+TT
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 : 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.			

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 test requirement in this case is expressed as:

Cell re-selection delay to lower priority = $T_{evaluateUTRA\_FDD}$ + $T_{SI-EUTRA}$

$T_{evaluateUTRA\_FDD}$ = 19.2 s; as specified in TS 36.133 [4] clause 4.2.2.5

$T_{SI-EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to lower priority shall be less than a total of 21 seconds in this test case (note: this gives a total of 20.48 seconds but the test allows 21 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.1.3 E-UTRAN FDD – UTRAN FDD cell re-selection in fading propagation conditions: UTRA FDD is of lower priority

4.3.1.3.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA FDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

4.3.1.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD UE.

4.3.1.3.3 Minimum conformance requirements

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA FDD cells in the neighbour cell list at the minimum measurement rate. The parameter $N_{UTRA\_carrier\_FDD}$ is the number of carriers used for all UTRA FDD cells in the neighbour cell list. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shal search for iner-RAT layers of higher priority at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher\_priority\_search}$ = (60 * N_{layers}) seconds, where the parameters N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher or lower priority in preparation for possible re-selection. 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.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA\_carrier\_FDD}$ * $T_{detectUTRA\_FDD}$ (as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2) when the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ when $Treselection_{RAT}$ = 0 provided that the re-selection criteria is met by a margin of at least 6 dB.

Cells which have been detected shall be measured at least every $N_{UTRA\_carrier}$ * $T_{measureUTRA\_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA\_FDD}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateUTRA\_FDD}$ + $Treselection_{RAT}$) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA\_carrier}$ * $T_{evaluateUTRA\_FDD}$ as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2 when $Treselection_{RAT}$ = 0.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.1.3.

4.3.1.3.4 Test description

4.3.1.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 4.3.1.3.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 4.3.1.3.4.3.

5. There is one E-UTRA FDD cell and one UTRA FDD cell specified in the test. Cell 2 (UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.3.1.3.4.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case in fading conditions

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	
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 [9]
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

4.3.1.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA FDD carrier. In the test there are four successive time periods, with time duration of T1, T2, T3 and T4 respectively. Both Cell 1 and 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 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2. Time duration T2 and T4 are not used for cell re-selection in the test.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2
2. Set the parameters according to T1 in Table 4.3.1.3.5-1 and 4.3.1.3.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. When T1 expires, the SS shall switch the power setting from T1 to T3 as specified in Table 4.3.1.3.5-1 and 4.3.1.3.5-2.
4. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
5. If the UE responds on Cell 2 during time duration T3 within 21 seconds from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
6. Repeat step 1-5 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

4.3.1.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.3.1.3.4.3-1: Common Exception messages

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.3-5 Table H.2.3-6
Default RRC messages and information elements contents exceptions	Table H.3.2-1

The UTRA system information for inter-RAT frequency and priority information to be used during the the initialisation phase is not defined in the message contents exceptions.

4.3.1.3.5 Test requirement

Tables 4.3.1.3.4.1-1, 4.3.1.3.5-1 and 4.3.1.3.5-2 define the primary level settings including test tolerances for E-UTRAN FDD- UTRAN FDD intra frequency cell re-selection test case which UTRA is of lower priority.

Table 4.3.1.3.5-1

Parameter	Unit	Cell 1			
		T1	T2	T3	T4
E-UTRA RF Channel number		1			
$BW_{channel}$	MHz	10			
OCNG Patterns defined in A.3.2.1.1 (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 + TT	-82 + TT	-107 + TT	-107 + TT
$\hat{E}_s/I_{ot}$	dB	22 + TT	22 + TT	-3 + TT	-3 + TT
$\hat{E}_s/N_{oc}$	dB	22 + TT	22 + TT	-3 + TT	-3 + TT
$Treselection_{EUTRAN}$	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 t 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 inform threshold for the UTRA target cell.					

Table 4.3.1.3.5-2: Cell specific test parameters for Cell 2(Lower priority UTRA FDD)

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 + TT	13 + TT	13 + TT	13 + TT
I_{oc}	dBm/3,84 MHz	-70			
CPICH_Ec/Io	dB	-10.21 + TT	-10.21 + TT	-10.21 + TT	-102.1 + TT
CPICH_RSCP	dBm	-67 + TT	-67 + TT	-67 + TT	-67 + TT
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					

The probability of re-selection from Cell 1 to Cell 2 during T2 observed during testing shall be less than 10%.

The probability of re-selection 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 REQUST message on Cell 2. In order to evaluate re-selection delay, the SS 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 test requirement in this case is expressed as:

Cell re-selection delay to lower priority = $T_{evaluateUTRA\_FDD} + T_{SI\text{-}EUTRA}$

$T_{evaluateUTRA\_FDD}$ = 19.2 s; as specified in TS 36.133 [4] clause 4.2.2.5

$T_{SI\text{-}EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to lower priority shall be less than a total of 21 seconds in this test case (note: this gives a total of 20.48 seconds but the test allows 21 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.2 E-UTRAN FDD – UTRAN TDD cell re-selection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test tolerances applicable to this test are undefined*
- *The Test system uncertainties applicable to this test are undefined*

4.3.2.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRAN TDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA cell is of lower priority.

4.3.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRAN TDD UE.

4.3.2.3 Minimum conformance requirements

4.3.2.3.1 3.84Mcps TDD option

4.3.2.3.2 1.28Mcps TDD option

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 cell list at the minimum measurement rate specified in this section. The parameter $N_{UTRA\_carrier\_TDD}$ is the number of carriers used for all UTRA TDD cells in the neighbour cell 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 TS 36.133 [4] table 4.2.2.5.2-1.

If the $S_{ServingCell}$of the E-UTRA serving cell is greater than $S_{nonintrasearch}$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 section 36.133[4] clauses 4.2.2.

If the $S_{ServingCell}$of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$then the UE shall search for and measure inter-RAT 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 inter-RAT layers shall be the same as that defined below for lower priority RATs.

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 the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is less than $S_{nonintrasearch}$ 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 ($N_{UTRA\_carrier\_TDD}$) * $T_{measureUTRA\_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

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 section 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 TS 36.304[6] within $N_{UTRA\_carrier\_TDD}$ *$T_{evaluateUTRA\_TDD}$ when $T_{reselection}$ = 0 provided that the reselection criteria is met by a margin of at least 6 dB.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.2.

4.3.2.3.3 7.68Mcps TDD option

4.3.2.4 Test description

4.3.2.4.1 3.84Mcps TDD option

4.3.2.4.2 1.28Mcps TDD option

4.3.2.4.2.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. The general test parameter settings are set up according to Table 4.3.2.4.2.1-1.

3. Propagation conditions are set according to Annex B clause B. 0.

4. Message contents are as defined in clause 4.3.2.4.2.3.

5. There is one E-UTRA FDD cell and one UTRA TDD cell specified in the test. Cell 2 (UTRA TDD cell) is the cell used for registration with the power level set according to T2 in table 4.3.2.5.2-2.

Table 4.3.2.4.2.1-1: 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		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	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 3ms or 92160*Ts
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	

4.3.2.4.2.2 Test procedure

The test consists of one active cell and one neighbour cell. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the test. Cell 1 and Cell 2 belong to different tracking areas. The UTRA TDD layer is configured at a lower priority than the E-UTRA FDD layer.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS36.304.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2.

2. Set the parameters according to T1 in Table 4.3.2.5.2-1 and 4.3.2.5.2-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. The SS waits for random access requests information from the UE to perform cell re-selection on the higher priority cell, Cell 1.

4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.3.2.5.2-1 and 4.3.2.5.2-2.

5. The SS waits for random access requests information from the UE to perform cell re-selection on the lower priority cell, Cell 2.

6. If the UE responds on lower priority cell, Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

7. Repeat step 1-6 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved

4.3.2.4.2.3 Message contents

Message contents are according TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.3.2.4.2.3-1: Common Exception messages

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.3-5
Default RRC messages and information elements contents exceptions	Table H.3.2-1

Table 4.3.2.4.2.3-2: *SystemInformationBlockType3*: Inter-RAT E-UTRAN FDD – UTRA TDD cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	**Value/remark**	**Comment**	**Condition**
cellReselectionServingFreqInfo SEQUENCE {			
threshServingLow	23 (46 dB)	46 is actual value in dB (23 * 2 dB)	

Table 4.3.2.4.2.3-3: *PRACH-ConfigCommonDEFAULT*: Additional E-UTRAN FDD to UTRA TDD cell re-selection test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-7 PRACH-ConfCommonDEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
Prach-ConfigInfo SEQUENCE {			
Prach-ConfigurationIndex	4		

4.3.2.4.3 7.68 Mcps TDD option

4.3.2.5 Test requirement

4.3.2.5.1 3.84Mcps TDD option

4.3.2.5.2 1.28Mcps TDD option

Tables 4.3.2.4.2-1, 4.3.2.5.2-1 and 4.3.2.5.2-2 defines the primary level settings including test tolerances for E-UTRAN FDD to GSM cell re-selection test case.

Table 4.3.2.5.2-1: 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_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
Qrxlevmin	dBm/15kHz	-140	-140
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-87+TT	-101+TT
$\hat{E}_s/I_{ot}$	dB	11+TT	-3+TT
$S_{nonintrasearch}$	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. Note 2: 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 4.3.2.5.2-2: 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+TT	-3+TT		
DwPCH_Ec/Ior	dB			0+TT	0+TT
OCNS_Ec/Ior	dB	-3+TT	-3+TT		
$\hat{I}_{or}/I_{oc}$	dB	11+TT	11+TT	11+TT	11+TT
I_{oc}	dBm/1.28 MHz	-80 +TT			
PCCPCH RSCP	dBm	-72+TT	-72+TT	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. Note 2: This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell.					

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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

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, as specified in TS 36.133 [4] 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, allow 21 s for lower priority cell reselection in the test case.

4.3.2.5.3 7.68 Mcps TDD option

4.3.3 E-UTRAN TDD – UTRAN FDD cell re-selection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined.*
- Statistical testing of cell re-selection delay performance requirements are undefined

4.3.3.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA FDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority.

4.3.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA FDD UE.

4.3.3.3 Minimum conformance requirements

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA FDD cells in the neighbour cell list at the minimum measurement rate. The parameter $N_{UTRA\_carrier\_FDD}$ is the number of carriers used for all UTRA FDD cells in the neighbour cell list. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$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 TS 36.133 [4] clause 4.2.2 as $T_{higher\_priority\_search}$ = (60 * N_{layers}) seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher or lower priority in preparation for possible re-selection. 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.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA\_carrier\_FDD}$ * $T_{detectUTRA\_FDD}$ (as defined in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1) when the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ when $Treselection_{RAT}$ = 0 provided that the re-selection criteria is met by a margin of at least 6 dB.

Cells which have been detected shall be measured at least every $N_{UTRA\_carrier}$ * $T_{measureUTRA\_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA\_FDD}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateUTRA\_FDD}$ + $Treselection_{RAT}$) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA\_carrier}$ * $T_{evaluateUTRA\_FDD}$ as defined in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1 when $Treselection_{RAT}$ = 0.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.1 and A.4.3.3.

4.3.3.4 Test description

4.3.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The general test parameter settings are set up according to Table 4.3.3.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 4.3.3.4.3.

5. There is one E-UTRA TDD cell and one UTRA FDD cell specified in the test. Cell 2 (UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.3.3.4.1-1: 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		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	
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 5.7.1-2 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.

4.3.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA FDD carrier. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than Cell 1.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2A.
2. Set the parameters according to T1 in Table 4.3.3.5-1 and 4.3.3.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.3.3.5-1 and 4.3.3.5-2.
4. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
6. Repeat step 1-5 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

4.3.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.3.3.4.3-1: Common Exception messages

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.3-5 Table H.2.3-6
Default RRC messages and information elements contents exceptions	Table H.3.2-2

The UTRA system information for inter-RAT frequency and priority information to be used during the the initialisation phase is not defined in the message contents exceptions.

4.3.3.5 Test requirement

Tables 4.3.3.4.1-1, 4.3.3.5-1 and 4.3.3.5-2 define the primary level settings including test tolerances for E-UTRAN TDD- UTRAN FDD intra frequency cell re-selection test case which UTRA is of lower priority.

Table 4.3.3.5-1: Cell specific test parameters for Cell 1(E-UTRA TDD)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.2.1 (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 + TT	-102 + TT
$\hat{E}_s/I_{ot}$	dB	12 + TT	-4 + TT
$\hat{E}_s/N_{oc}$	dB	12 + TT	-4 + TT
$Treselection_{EUTRAN}$	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 4.3.3.5-2: Cell specific test parameters for Cell 2(Lower priority UTRA FDD)

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+TT	13+TT
I_{oc}	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21 + TT	-10.21 + TT
CPICH_RSCP	dBm	-67+TT	-67+TT
Propagation Condition		AWGN	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
QrxlevminEUTRA	dBm	-140	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	S	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
$\text{Thresh}_{x,\ high}$ (Note 1)	dB	48	
Note : This refers to the value of $\text{Thresh}_{\mathbf{x,\ high}}$ which is included in UTRA system information, and is a threshold for the E-UTRA target cell.			

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 test requirement in this case is expressed as:

Cell re-selection delay to lower priority = $T_{evaluateUTRA\_FDD} + T_{SI\text{-}EUTRA}$

$T_{evaluateUTRA\_FDD}$ = 19.2 s; as specified in TS 36.133 [4] clause 4.2.2.5

$T_{SI\text{-}EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to lower priority shall be less than a total of 21 seconds in this test case (note: this gives a total of 20.48 seconds but the test allows 21 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.4 E-UTRAN TDD – UTRAN TDD cell re-selection

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *Statistical testing of UE measurement performance requirements are undefined*
- *Message contents are undefined*

4.3.4.1 E-UTRA TDD-UTRAN TDD cell re-selection : UTRA is of higher priority

4.3.4.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA TDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of higher priority.

4.3.4.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA TDD UE.

4.3.4.1.3 Minimum conformance requirements

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 cell list at the minimum measurement rate. The parameter $N_{UTRA\_carrier\_TDD}$ is the number of carriers used for all UTRA TDD cells in the neighbour cell 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.

If the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is greater than $S_{nonintrasearch}$then:

- The UE may not search for, or measure inter-RAT layers of equal or lower priority.
- 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 TS 36.133 [4] clause 4.2.2 as $T_{higher\_priority\_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher, equal or lower priority in preparation for possible re-selection. 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.

The UE shall evaluate whether newly detectable UTRA TDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA\_carrier\_TDD} * T_{detectUTRA\_TDD}$ (as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2) except when UTRA TDD is of higher priority than the currently selected E-UTRA frequency layer and the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ when $Treselection_{RAT} = 0$.

Cells which have been detected shall be measured at least every $N_{UTRA\_carrier\_TDD} * T_{measureUTRA\_TDD}$ except when UTRA TDD is of higher priority than the currently selected E-UTRA frequency layer and the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is greater than $S_{nonintrasearch}$.

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA\_TDD}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateUTRA\_TDD} + Treselection_{RAT}$) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met re-selection criterion defined in TS 36.304 6] within $N_{UTRA\_carrier\_TDD} * T_{evaluateUTRA\_TDD}$ as defined in table 4.2.2.5.2-1 of TS 36.133 [4 clause 4.2.2.5.2 when $Treselection_{RAT} = 0$.as specified in table 4.2.2.5.2-1 provided that the reselection criteria is met by a margin of at least [6]dB.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.4.

4.3.4.1.4 Test description

4.3.4.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: [Lowest, 5MHz, and Highest channel bandwidth as defined in TS 36.508 [7] clause 4.3.1.2.]

1. Connect the SS (node B/eNodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. The general test parameter settings are set up according to Table 4.3.4.1.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 4.3.41..4.3.

5. There is one E-UTRA TDD cell and one UTRA TDD cell specified in the test. Cell 2 is the cell used for registration.

Table 4.3.4.1.4.1-1: 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 2	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	1.28 Mcps TDD OPTION cell
T3 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
	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 3ms or 92160*Ts
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	25	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	5	During T2, cell 2 shall be powered off, and during the off time the 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 T3
T3		s	85	T3 need to be defined so that cell re-selection reaction time is taken into account.

4.3.4.1.4.2 Test procedure

The test consists of one active cell and one neighbor cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. Both E-UTRA cell 1 and UTRA 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. During T2, cell 2 shall be powered off, and during the off time the scrambling code shall be changed. At starting T3 cell 2 becomes stronger than Thresh_{x_high}, the UE is expected to detect cell 2, send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2.

2. Set the parameters according to duration T1 in Table 4.3.4.1.5-1and 4.3.4.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the lower priority cell, Cell 1.

4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.3.4.1.5-1 and 4.3.4.1.5-2. During T2, cell 2 shall be powered off, and during the off time the scrambling code shall be changed

5. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.3.4.1.5-1 and 4.3.4.1.5-2.

6. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the higher priority cell, Cell 2.

7. If the UE camps on cell2 , and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell2 within 81s from the beginning of time period T3. then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

8. Repeat step 1-7 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.3.4.1.4.3 Message contents

Message contents are according to [clause FFS in reference FFS].

4.3.4.1.5 Test requirement

Tables 4.3.4.1.4-1, 4.3.4.1.5-1 and 4.3.4.1.5-2 define the primary level settings including test tolerances for cell re-selection E-UTRA TDD to UTRA TDD test case (UTRA is of higher priority).

Table 4.3.4.1.5-1: Cell specific test requirement 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_RB	dB			
SSS_RB	dB			
PCFICH_PA	dB			
PHICH_PA	dB			
PHICH_PB	dB			
PDCCH_PA	dB			
PDCCH_PB	dB			
PDSCH_PA	dB			
PDSCH_PB	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+TT	-87+TT	-87+TT
$\hat{E}_s/I_{ot}$	dB	11+TT	11+TT	11+TT
$Thresh_{x, high}$ (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. 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 4.3.4.1.5-2: Cell specific test requirement 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	-3+TT	-inf	11+TT	-3+TT	-inf	11+TT
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP	dBm	-86 +TT	-inf	-72+TT	n.a.		
Propagation Condition		AWGN					
$Q_{rxlevmin}$	dBm	-103					
$Qoffset_{s,n}$	dB	C1, C2: 0					
$Qhyst_s$	dB	0					
$S_{nonintrasearch}$	dB	Not sent					
$Thresh_{serving, low}$	dB	24 (-79dBm)					
$Thresh_{x, low}$ (Note2)	dB	46 (-94dBm)					
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: This refers to the value of Threshx, low which is included in UTRA system information, and is a threshold for the E-UTRA target cell.							

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 s TS 36.133 [4]ection 4.2.2.5

$T_{evaluateUTRA\_TDD}$ 19.2s, See TS 36.133 [4] Table 4.2.2.5.2-1

T_{SI_UTRA} Maximum repetition period of relevant system info blocks that need 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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.4.2 E-UTRAN TDD – UTRAN TDD cell re-selection: UTRA is of lower priority

4.3.4.2.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA TDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority.

4.3.4.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA TDD UE.

4.3.4.2.3 Minimum conformance requirements

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 cell list at the minimum measurement rate. The parameter $N_{UTRA\_carrier\_TDD}$ is the number of carriers used for all UTRA TDD cells in the neighbour cell 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.

If the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is greater than $S_{nonintrasearch}$then:

- The UE may not search for, or measure inter-RAT layers of equal or lower priority.
- 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 TS 36.133 [4] clause 4.2.2 as $T_{higher\_priority\_search}$ = (60 * N_{layers}) seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher, equal or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure such layers is not reduced and shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA TDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA\_carrier\_TDD}$ * $T_{detectUTRA\_TDD}$ (as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2) except when UTRA TDD is of higher priority than the currently selected E-UTRA frequency layer and the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is greater than $S_{nonintrasearch}$ when $Treselection_{RAT}$ = 0.

Cells which have been detected shall be measured at least every $N_{UTRA\_carrier\_TDD}$ * $T_{measureUTRA\_TDD}$ except when UTRA TDD is of higher priority than the currently selected E-UTRA frequency layer and the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is greater than $S_{nonintrasearch}$.

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA\_TDD}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateUTRA\_TDD}$ + $Treselection_{RAT}$) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA\_carrier\_TDD}$ * $T_{evaluateUTRA\_TDD}$ as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2 when $Treselection_{RAT}$ = 0.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.4.

4.3.4.2.4 Test description

4.3.4.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: [Lowest, 5MHz, and Highest channel bandwidth as defined in TS 36.508 [7] clause 4.3.1.2.]

1. Connect the SS (node B/eNodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. The general test parameter settings are set up according to Table 4.3.4.2.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are as defined in clause 4.3.4.2.4.3.
5. There is one E-UTRA TDD cell and one UTRA TDD cell specified in the test. Cell 1 is the cell used for registration.

Table 4.3.4.2.4.1-1: 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 2	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	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 3ms or 92160*Ts
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	

4.3.4.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA TDD carrier. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Both Cell 1 and 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 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2
2. Set the parameters according to T1 in Table4.3.4.2.5-1 and 4.3.4.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table4.3.4.2.5-1 and 4.3.4.2.5-2.
4. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
6. Repeat step 1-5 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.3.4.2.4.3 Message contents

Message contents are according to [clause FFS in reference FFS].

4.3.4.2.5 Test requirement

Tables 4.3.4.2.4.1-1, 4.3.4.2.5-1 and 4.3.4.2.5-2 define the primary level settings including test tolerances for E-UTRAN TDD- UTRAN TDD intra frequency cell re-selection test case which UTRA is of lower priority.

Table 4.3.4.2.5-1: Cell specific test requirement 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	
BWchannel	MHz	10	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RA(Note1)	dB		
OCNG_RB(Note1)	dB		
Qrxlevmin	dBm/15kHz	-140	-140
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-87+TT	-101+TT
$\hat{E}_s/I_{ot}$	dB	11+TT	-3+TT
Snonintrasearch	dB	Not sent	
Threshserving, low	dB	46 (-94dBm)	
Threshx, 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. Note 2: This refers to the value of Threshx, low which is included in E-UTRA system information, and is a threshold for the UTRA target cell			

Table 4.3.4.2.5-2: Cell specific test requirement 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+TT	11+TT	11+TT	11+TT
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-72+TT	-72+TT	n.a.	n.a.
Propagation Condition		AWGN			
$Q_{rxlevmin}$	dBm	-103			
$Qoffset_{s,n}$	dB	C1, C2: 0			
$Qhyst_s$	dB	0			
$Thresh_{x, high}$ (Note2)	dB	46 (-94dBm)			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: This refers to the value of $Thresh_{x, high}$ which is included in UTRA system information and is a threshold for the E-UTRA target cell.					

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 SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay test requirement in this case is expressed as:

Cell re-selection delay = $T_{evaluateUTRA\_TDD} + T_{SI\_UTRA}$,

$T_{evaluateUTRA\_TDD}$ =19.2s; as specified in TS 36.133 [4] clause 4.2.2.5.2

$T_{SI-UTRA}$ = 1280 ms; 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.

The cell re-selection delay shall be less than a total of 21 seconds in this test case (note: this gives a total of 20.48 seconds but the test allows 21 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.4 E-UTRAN to GSM Cell Re-Selection

4.4.1 E-UTRAN FDD – GSM cell re-selection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test tolerances applicable to this test are undefined*
- *The Test system uncertainties applicable to this test are undefined*

4.4.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring GSM cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements.

4.4.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support GSM UE.

4.4.1.3 Minimum conformance requirements

The cell re-selection delay shall be less than 4 * $T_{measure, GSM} + T_{BCCH}$ in RRC_IDLE state.

When the measurement rules defined in in TS 36.304 [6] indicates 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 equal or lower priority than the serving cell shall be measured at least every $T_{measure,GSM}$ as defined in table 4.2.2.5.3-1 of TS 36.133 [4] clause 4.2.2.5.3.

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 re-selection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of re-selection, or to continuously verify the BSIC of the GSM BCCH carrier every 30s.

However, the minimum measurement filtering requirements specified 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 TS 36.304 [6], 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 re-selection, if the UE cannot demodulate the BSIC of that GSM BCCH carrier. Additionally, the UE shall not consider a GSM neighbour cell in cell re-selection, if it is indicated as not allowed in the measurement control system information of the serving cell.

The UE shall evaluate the inter-RAT cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds. When a non-zero value of $Treselection_{EUTRAN}$ is used, the UE shall only perform re-selection on an evaluation which occurs simultaneously to, or later than the expiry of the $Treselection_{EUTRAN}$ timer.

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-frequency cell. For E-UTRAN to GSM cell re-selection the interruption time must not exceed T_{BCCH} + 50 ms. T_{BCCH} is the maximum time allowed to read BCCH data from a GSM cell as defined in TS 45.008 [15] clause 6.2.

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

- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 32 GSM carriers

In RRC_IDLE state, the UE shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any allowed combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 cells).

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.3 and A.4.4.1.

4.4.1.4 Test description

4.4.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. The general test parameter settings are set up according to Table 4.4.1.4.1-1.
3. Propagation conditions are set according to Annex B clause B. 0.
4. Message contents are as defined in clause 4.4.1.4.3.
5. There is one E-UTRA FDD cell and one GSM cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.4.1.4.1-1: General Test Parameters for E-UTRAN 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	
Monitored GSM cell list size			12 GSM neighbours including ARFCN 1	
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211 [9]
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	

4.4.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cells on one E-UTRA FDD carrier and twelve GSM cells. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Cell 1 (E-UTRA FDD cell) and Cell 2 (GSM cell) shall belong to different Location Areas. 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 re-selection criterion during T1. At the start of T2, the signal levels change such that Cell 2 meets the re-selection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA FDD layer.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2.
2. Set the parameters according to T1 in Table's 4.4.1.5-1 and 4.4.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 4.4.1.5-1 and 4.4.1.5-2.
4. The SS waits for location update information from the UE to perform cell re-selection on Cell 2.
5. If the UE responds on Cell 2 during time duration T2 within 27.9 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
6. Repeat step 1-5 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.4.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.4.1.4.3-1: Common Exception messages for E-UTRAN FDD – GSM cell re-selection test case

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.3-9 Table H.2.3-10
Default RRC messages and information elements contents exceptions	Table H.3.2-1

All GSM cell messages indicated shall use the same content as described in the default message content in TS 45.008 [15] clause 9 for Rel-4 and later releases, with the exceptions above and as specified in Table 4.4.1.5-2.

4.4.1.5 Test requirement

Tables 4.4.1.4.1-1, 4.4.1.5-1 and 4.4.1.5-2 defines the primary level settings including test tolerances for E-UTRAN FDD to GSM cell re-selection test case.

Table 4.4.1.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.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 + TT	-102 + TT
$\hat{E}_s/I_{ot}$	dB	9 + TT	-4 + TT
$Treselection_{EUTRAN}$	s	0	
Snonintrasearch	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ Note 2	dB	24	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: This refers to $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for GSM target cell.			

Table 4.4.1.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-90 + TT	-75 + TT
RXLEV_ACCESS_MIN	dBm	-104	
MS_TXPWR_MAX_CCH	dBm	33	

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 test requirement in this case is expressed as:

Cell re-selection delay = $4 * T_{measureGSM} + T_{BCCH}$

$T_{measureGSM}$ = 6.40 s; as specified in TS 36.133 [4] clause 4.2.2.3

T_{BCCH} = 1.9 s; maximum time allowed to read the BCCH data from GSM cell, when being synchronized to a BCCH carrier; as specified in TS 45.008 [15] clause 6.2

The cell re-selection delay shall be less than a total of 27.9 seconds in this test case (note: this gives a total of 26 seconds for the $T_{measureGSM}$ calculation plus 1.9 s for T_{BCCH} but the test allows 27.9 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.4.2 E-UTRAN TDD – GSM cell re-selection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test tolerances applicable to this test are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *Statistical testing of cell re-selection delay performance requirements are undefined*

4.4.2.1 Test purpose

To verify that the UE is able to search and measure neighbouring GSM cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements.

4.4.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support GSM UE.

4.4.2.3 Minimum conformance requirements

If the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is greater than $S_{nonintrasearch}$ then:

- The UE may not search for, or measure GSM cells if the priority of GSM is equal to, or lower than the serving cell.
- The UE shall search for and measure GSM cells if the priority of GSM is higher than the serving cell. The minimum rate at which the UE is required to search for and measure such layers may be reduced in this scenario to maintain UE battery life.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall measure, according to the measurement rules defined in TS36.304 [6] at least every $T_{measure,GSM}$ as defined in table 4.2.2.5.3-1 of TS 36.133 [4] clause 4.2.2.5.3:

- If a detailed neighbour cell list is provided, the signal level of the GSM BCCH carrier of each GSM neighbour cell indicated in the measurement control system information of the serving cell; or
- If only BCCH carriers are provided, the signal level of the GSM BCCH carriers indicated in the measurement control system information of the serving cell

If the RSRP of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for GSM BCCH carrier at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher\_priority\_search}$ = (60 * N_{layers}) seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies. 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 re-selection to any higher priority cell is not triggered within (4 * $T_{measure\_GSM}$ + $Treselection_{RAT}$) after it has been found in a higher priority search, the UE is not required to continue make measurements of the BCCH carrier to evaluate the ongoing possibility of re-selection, or to continuously verify the BSIC of the GSM BCCH carrier every 30s.

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 TS 36.304 [6], 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 re-selection, if the UE cannot demodulate the BSIC of that GSM BCCH carrier. Additionally, the UE shall not consider a GSM neighbour cell in cell re-selection, if it is indicated as not allowed in the measurement control system information of the serving cell.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.3 and A.4.4.2.

4.4.2.4 Test description

4.4.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. The general test parameter settings are set up according to Table 4.4.2.4.1-1 [clause FFS in reference FFS].
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are as defined in clause 4.4.2.4.3.
5. There is one E-UTRA TDD cell and one GSM cell specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.4.2.4.1-1: 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	
Monitored GSM cell list size			12 GSM neighbours including ARFCN 1	
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			4	As specified in table 5.7.1-2 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.
Propagation channel			AWGN	
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.

4.4.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one E-UTRA TDD carrier and twelve GSM cells. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Cell 1 and Cell 2 belong to different tracking areas. 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 re-selection criterion. At the start of T2, the signal levels change such that Cell 2 meets the re-selection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA FDD layer.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2.
2. Set the parameters according to T1 in Table's 4.4.2.5-1 and 4.4.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 4.4.2.5-1 and 4.4.2.5-2.
4. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
5. If the UE responds on Cell 2 during time duration T2 within [28 seconds] from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
6. Repeat step 1-5 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

4.4.2.4.3 Message contents

Message contents are according to TS 36.508 [4] clause 4.6 with the following exceptions: [FFS]

4.4.2.5 Test requirement

Tables 4.4.2.4.1-1, 4.4.2.5-1 and 4.4.2.5-2 defines the primary level settings including test tolerances for E-UTRAN FDD to GSM cell re-selection test case.

Table 4.4.2.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.2		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		
$Q_{rxlevmin}$	dBm	-140	
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-89+TT	-100+TT
$\hat{E}_s/I_{ot}$	dB	9+TT	-2+TT
$T_{reselectionEUTRAN}$	s	0	
$S_{nonintrasearch}$	dB	Not sent	
$Thresh_{serving, low}$	dB	44	
$Thresh_{x, low}$ (Note 2)	dB	24	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: This refers to $Thresh_{x, low}$ which is included in E-UTRA system information, and is a threshold for GSM target cell.

Table 4.4.1.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-90+TT	-75+TT
RXLEV_ACCESS_MIN	dBm	-104	
MS_TXPWR_MAX_CCH	dBm	33	

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.

The cell re-selection delay test requirement in this case is expressed as:

Cell re-selection delay = 4 * TmeasureGSM + TBCCH

TmeasureGSM = 6.4 s; as specified in TS 36.133 [4] clause 4.2.2.5

TBCCH = 1.9 s; as specified in TS 45.008 [15] clause 6.2

The cell re-selection delay shall be less than a total of [28 seconds] in this test case (note: this gives a total of 27.5 seconds but the test allows 28 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.5 E-UTRAN to HRPD Cell Re-Selection

4.5.1 E-UTRAN FDD – HRPD Cell re-selection

4.5.1.1 E-UTRAN FDD – HRPD Cell Reselection: HRPD is of Lower Priority

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The intra-frequency cell reselection criteria related to scaling of measurement rules parameters need to be specified when parameters are finalized*
- *The intra-frequency cell reselection criteria related to exact scaling parameters for different mobility states are undefined*
- *Measurement bandwidth (current assumption is 6RB) is undefined*
- *The "out of service" criteria is undefined*
- *The transmission scheme (1Tx or 2Tx) undefined*
- *The Message contents are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *Test tolerances have not yet been applied to the wanted and interfering signal levels*

4.5.1.1.1 Test purpose

To verify that the UE is able to search and measure neighboring HRPD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements.

4.5.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support HRPD

4.5.1.1.3 Minimum conformance requirements

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 RSRP of the E-UTRA serving cell (or other cells on the same frequency layer) is lower than 'HRPD Start Measuring E-UTRAN Rx Power Strength Threshold' and HRPD is of lower priority than the currently selected E-UTRAN frequency layer, the UE shall measure CDMA2000 HRPD Pilot Strength of the HRPD cells at least every (Number of HRPD Neighbor Frequency)*$T_{measureHRPD}$. In case HRPD is of higher priority than the currently selected E-UTRAN frequency layer the UE shall measure HRPD cells at least every (Number of HRPD Neighbor Frequency)* $T_{higher\_proirty\_search}T_{higher\_priority\_measure}$. The parameter $T_{higher\_proirty\_search}$ $T_{higher\_priority\_measure}$ is defined in section 4.2.2 of TS 36.133 [4].

The UE shall be capable of evaluating that the HRPD cell has met cell reselection criterion defined in TS 36.304 [6] within $T_{evaluateHRPD}$.

Table 4.2.2.5.4-1 of TS 36.133 [4] clause 4.2.2.5.4 gives values of $T_{measureHRPD}$ and $T_{evaluateHRPD}$

4.5.1.1.4 Test description

4.5.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] Clause 4.3.1.1.

1. Connect the SS (nodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508[7] Annex A Figure A.14

2. The general test parameter settings are set up according to Table 4.5.1.1.4.1-1..

3. Propagation conditions are set according to Annex B clause B.0. 4. Message contents are as defined in clause 4.5.1.1.4.3

5. There is one E-UTRA FDD cell and one HRPD cell specified in the test. Cell 1(E-UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table A.4.5.1.1.4.1-1: 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	

4.5.1.1.4.2 Test procedure

The test consists of one active cell and one neighbor cell. The UE is requested to monitor the neighbouring cell on one HRPD cell. In the test there are 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. Cell2 is of lower priority than cell 1. Cell 1 and Cell 2 belong to different tracking areas.

1. Ensure the UE is in State 2 according to TS 36.508 [7] clause 4.5.2.

2. Set the parameters according to T1 in Table’s 4.5.1.1.5-1 and 4.5.1.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table’s 4.5.1.1.5-1 and 4.5.1.1.5-2.

4. The SS waits for location update information from the UE to perform cell re-selection on Cell 2.

5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

6. Repeat step 1-5 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

4.5.1.1.4.3 Message contents

Message contents are according to [clause FFS in reference FFS].

4.5.1.1.5 Test requirement

Tables 4.5.1.1.5-1 and 4.5.1.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – HRPD cell re-selection test (HRPD cell is of lower priority).

Table A.4.5.1.1.5-1: 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 D.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 + TT	-100+ TT
$\hat{E}_s/I_{ot}$	dB	9+ TT	-2+ TT
$Treselection_{EUTRAN}$	S	0	
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
$S_{ServingCell}$	dB	51	40
$Thresh_{serving, low}$	dB	43	
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 + TT	0 + TT
I_{oc}	dBm/ 1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-3 + TT	-3 + TT
Propagation Condition		AWGN	
$S_{nonServingCell,x}$		-6	
Treselection	s	0	
hrpd-CellReselectionPriority	-	0	
$Thresh_{x, low}$		-14	

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 cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateHRPD} + T_{SI\text{-}HRPD}$

Where:

$T_{evaluatHRPD}$ 19.2 s for 1.28 s DRX cycle as specified in TS 36.133 [4] Clause 4.2.2.5 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; 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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.6 E-UTRAN to cdma2000 1xRTT Cell Re-Selection

4.6.1 E-UTRAN FDD – cdma2000 1xRTT Cell re-selection

4.6.1.1 E-UTRAN FDD – cdma2000 1x Cell Reselection: cdma2000 1X is of Lower Priority

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The intra-frequency cell reselection criteria related to scaling of measurement rules parameters need to be specified when parameters are finalized*
- *The intra-frequency cell reselection criteria related to exact scaling parameters for different mobility states are undefined*
- *Measurement bandwidth (current assumption is 6RB) is undefined*
- *The "out of service" criteria is undefined*
- *The transmission scheme (1Tx or 2Tx) undefined*
- *The Message contents are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *Test tolerances have not yet been applied to the wanted and interfering signal levels*

4.6.1.1.1 Test purpose

To verify that the UE is able to search and measure neighboring cdma2000 1xRTT cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the cdma2000 1x is of lower priority.

4.6.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support cdma2000 1xRTT.

4.6.1.1.3 Minimum conformance requirements

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 RSRP of the E-UTRA serving cell (or other cells on the same frequency layer) is lower than 'CDMA2000 1X Start Measuring E-UTRAN Rx Power Strength Threshold' and cdma2000 1X is of lower priority than the currently selected E-UTRAN frequency layer, the UE shall measure Pilot Ec/Io of the CDMA2000 1X cells at least every (Number of CDMA2000 1X Neighbor Frequency)*$T_{measureCDMA2000\ 1X}$. In case cdma2000 1X is of higher priority than the currently selected E-UTRAN frequency layer, the UE shall measure cdma2000 1X cells at least every (Number of CDMA2000 1X Neighbor Frequency)* $T_{higher\_proirty\_search}T_{higher\_priority\_measure}$. The parameter $T_{higher\_proirty\_search}$ $T_{higher\_priority\_measure}$ is defined in section 4.2.2 of TS 36.133 [4].

The UE shall be capable of evaluating that the cdma2000 1X cell has met cell reselection criterion defined in TS 36.304 [6] within $T_{evaluateCDMA2000\ 1X}$.

Table 4.2.2.5.5-1 of TS 36.133 [4] clause 4.2.2.5.5 gives values of $T_{measureCDMA2000\ 1X}$ and $T_{evaluateCDMA2000\ 1X}$.

4.6.1.1.4 Test description

4.6.1.1.4.1 Initial conditions

Test Environment: Normal as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] Clause 4.3.1.1.

1. Connect the SS (nodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14
2. The general test parameter settings are set up according to Table 4.6.1.1.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0..
4. Message contents are as defined in clause 4.6.1.1.4.3
5. There is one E-UTRA FDD cell and one CDMA2000 1xRTT cell specified in the test. Cell 1(E-UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.6.1.1.4.1-1: 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	

4.6.1.1.4.2 Test procedure

The test consists of one active cell and one neighbor cell. The UE is requested to monitor the neighbouring cell on one CDMA200 1xRTT cell. In the test there are two successive time periods, with time duration of T1 and T2 respectively.

Both E-UTRAN FDD cell 1 and CDMA2000 1xRTT 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. Cell2 is of lower priority than cell 1. Cell 1 and Cell 2 belong to different tracking areas.

1. Ensure the UE is in State 2 according to TS 36.508 [7] clause 4.5.2.
2. Set the parameters according to T1 in Table's 4.6.1.1.5-1 and 4.6.1.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 4.6.1.1.5-1 and 4.6.1.1.5-2.
4. The SS waits for location update information from the UE to perform cell re-selection on Cell 2.
5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
6. Repeat step 1-5 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

4.6.1.1.4.3 Message contents

Message contents are according to [clause FFS in reference FFS].

4.6.1.1.5 Test requirements

Tables 4.6.1.1.5-1 and 4.6.1.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – cdma2000 1xRTT cell re-selection test (cdma2000 1x cell is of lower priority).

Table 4.6.1.1.5-1: 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 D.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+ TT	-100+ TT
$\hat{E}_s/I_{ot}$	dB	9+ TT	-2+ TT
$\hat{E}_s/N_{oc}$	dB	9	-2
$Treselection_{EUTRAN}$	S	0	
Snonintrasearch	dB	Not sent	
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
$S_{ServingCell}$	dB	51	40
$\textbf{Thresh}_{\textbf{serving, low}}$	dB	43	
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 4.6.1.1.5-2: 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] + TT	[0] + TT
I_{oc}	dBm/ 1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	[-10] + TT	[-10] + TT
Propagation Condition		AWGN	
$S_{nonServingCell,x}$		[-20]	
Treselection	S	0	
oneXRTT-CellReselectionPriority	-	0	
$Thresh_{x,\ low}$		[-28]	

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 cell re-selection delay to lower priority cell can be expressed as: $T_{evaluatecdma2000\ 1X} + T_{SI-cdma2000\ 1X}$

Where:

$T_{evaluatcdma2000\ 1X}$ = 19.2 s for 1.28 s DRX cycle as specified in TS 36.133 [4] Clause 4.2.2.5 Table 4.2.2.5.5-1

$T_{SI-cdma2000\ 1X}$ 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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5 E-UTRAN RRC_CONNECTED State Mobility

When the UE is in RRC_CONNECTED state on a cell, network-controlled UE-assisted handovers are performed. The UE makes measurements of attributes of the serving and neighbour cells to enable the handover process. This process allows the UE to transfer a connection between the UE and current cell to target cell.

5.1 E-UTRAN Handover

5.1.1 E-UTRAN FDD-FDD Handover intra frequency case

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.1.1.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an intra-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

5.1.1.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receive 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 defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.1.2.1.2.

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

When intra-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

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

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 bsed on non-DRX target cell search times.

T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in 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 know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identificaiton requirements are described in TS 36.133 [4] clause 8.1.2.2.1 for intra-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.1.2.1 and A.5.1.2

5.1.1.4 Test description

5.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. The general test parameter settings are set up according to Table 5.1.1.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are defined in clause 5.1.1.4.3.

5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.1.4.1-1: 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.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.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		ms	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[9]
Time offset between cells		ms	3	Asynchronous cells 3ms or 92160*Ts
T1		s	5	
T2		s	≤5	
T3		s	1	

5.1.1.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may 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. T3 is defined as the end of the last TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 5.1.1.5-1. The SS sends downlink MAC padding bits according to Annex A.1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. The SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.1.5-1.

6. UE shall transmit a MeasurementReport message triggered by Event A3.

7. SS shall transmit an RRCConnectionReconfiguration message implying handover to Cell 2.

8. The start of T3 is the instant when the last TTI containing the RRC Connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power setting from T2 to T3 as specified in Table 5.1.1.1.5-1.

9. The UE shall transmit RRCConnectionReconfigurationComplete message.

10. If the UE transmits the uplink PRACH channel to Cell 2 less than 50 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

11. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

13. Repeat step 1-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.1.1.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra frequency handover test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 Table H.3.2-1 Table H.3.2-3

Table 5.1.1.4.3-2: *ReportConfigEUTRA-A3*: Additional E-UTRAN FDD-FDD intra frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 5.1.1.4.3-3: MeasuredResults: Additional E-UTRAN FDD-FDD intra frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 5.1.1.4.3-4: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD intra frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId		
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

5.1.1.5 Test requirement

Tables 5.1.1.4.1-1 and 5.1.1.5-1 define the primary level settings including test tolerances for E-UTRAN FDD-FDD intra frequency handover test case.

Table 5.1.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD 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 D.1.1 (OP.1 FDD) and in D.1.2 (OP.2 FDD)</td><td></td><td>OP.1 FDD</td><td>OP.1 FDD</td><td>OP.2 FDD</td><td>OP.2 FDD</td><td>OP.2 FDD</td><td>OP.1 FDD</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 + TT</td><td>-3.3 + TT</td><td>-3.3 + TT</td><td>-Infinity</td><td>2.36 + TT</td><td>2.36 + TT</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 + TT</td><td>8 + TT</td><td>8 + TT</td><td>- Infinity</td><td>11 + TT</td><td>11 + TT</td></tr>
<tr><td>RSRP Note 3</td><td>dBm/15 KHz</td><td>-90 + TT</td><td>-90 + TT</td><td>-90 + TT</td><td>- Infinity</td><td>-87 + TT</td><td>-87 + TT</td></tr>
<tr><td>Propagation Condition</td><td></td><td colspan="6">AWGN</td></tr>
<tr><td colspan="8">Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</td></tr>
</table>

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

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

T_{search} = 0, since Cell 2 is known prior to the test

T_{IU} = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

Maximum RRC procedure delay = 15 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 50 ms in this test case (note: this gives a total of 15 ms for maximum RRC procedure delay plus 35 ms for $T_{interrupt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.2 E-UTRAN TDD-TDD Handover intra frequency case

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The RRC procedure delay requirement is not confirmed*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.1.2.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an intra-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

5.1.2.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

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 defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.2.2.4.2.

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

When intra-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

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

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 bsed on non-DRX target cell search times.

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

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 know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identificaiton requirements are described in TS 36.133 [4] clause 8.1.2.2.2 for intra-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.2.2.4 and A.5.1.2.

5.1.2.4 Test description

5.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. The general test parameter settings are set up according to Table 5.1.2.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are defined in clause 5.1.2.4.3.

5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.2.4.1-1: General Test Parameters for E-UTRAN TDD/TDD Intra Frequency Handover case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in Annex A
PCFICH/PDCCHPHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in Annex A
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		ms	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		µs	3	Synchronous cells 3µs or 92*Ts
T1		s	5	
T2		s	≤5	
T3		s	1	

Table 5.1.2.4.1-2: Cell Specific Test Parameters for E-UTRAN TDD/TDD Intra Frequency Handover 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 TS 36.133 [4] A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note]	dB						
OCNG_RB[Note]	dB						
$\hat{E}_s/I_{ot}$	dB	8 + TT	-3.3 + TT	-3.3 + TT	-Infinity	2.36 + TT	2.36 + TT
N_{oc}	dBm/15 KHz	-98					
RSRP	dBm/15 KHz	-90 + TT	-90 + TT	-90 + TT	- Infinity	-87 + TT	-87 + TT
Propagation Condition		AWGN					
Note: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.							

5.1.2.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may 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. The start of T3 is defined as the end of the last TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.
2. Set the parameters according to T1 in Table 5.1.2.5-1. The SS sends downlink MAC padding bits according to Annex A.1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.2.5-1.
6. UE shall transmit a MeasurementReport message triggered by Event A3.
7. SS shall transmit an RRCConnectionReconfiguration message implying handover to Cell 2.
8. The start of T3 is the instant when the last TTI containing the RRC Connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.1.2.1.5-1.
9. The UE shall transmit RRCConnectionReconfigurationComplete message.

10. If the UE transmits the uplink PRACH channel to Cell 2 less than [45 ms] from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

11. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

13. Repeat step 1-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions: [FFS].

5.1.2.5 Test requirement

Tables 5.1.2.4.1-1 and 5.1.2.5-1 define the primary level settings including test tolerances for E-UTRAN TDD/TDD Intra Frequency Handover test.

Table 5.1.2.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD/TDD Intra Frequency Handover 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 TS 36.133 [4] A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note]	dB						
OCNG_RB[Note]	dB						
$\hat{E}_s/I_{ot}$	dB	8 + TT	-3.3 + TT	-3.3 + TT	-Infinity	2.36 + TT	2.36 + TT
N_{oc}	dBm/15 KHz	-98					
RSRP	dBm/15 KHz	-90 + TT	-90 + TT	-90 + TT	- Infinity	-87 + TT	-87 + TT
Propagation Condition		AWGN					
Note: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.							

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The maximum RRC procedure delay test requirement in this case is [10ms; as specified in TS 36.331 [5] clause 11.2].

The $T_{interrupt}$ test requirement in this case is 35 ms expressed as:

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

T_{search} = 0, since cell 2 is known prior to the test

T_{IU} = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

The handover delay $D_{handover}$ shall be less than a total of [45 ms] in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.3 E-UTRAN FDD-FDD Handover inter frequency case

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.1.3.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an inter-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

5.1.3.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receive 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 defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.1.2.1.2.

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 inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

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

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 serach 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 know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identificaiton requirements are described in TS 36.133 [4] clause 8.1.2.3.1 for inter-frequency handover.

Inter-frequency measurement requirements rely on the UE being configured with one measurement gap pattern. UEs shall only support those measurement gap patterns listed in TS 36.133 [4] Table 8.1.2.1-1 that are relevant to its measurement capabilities.

The normative reference for this requirement is TS 36.133 [4] clause 5.1.2.1 and A.5.2.1.

5.1.3.4 Test description

5.1.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. The general test parameter settings are set up according to Table 5.1.3.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are defined in clause 5.1.3.4.3.
5. There are two E-UTRA FDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.3.4.1-1: 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.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in clause A.2.1
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbour 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	
Gap Pattern Id			1	As specified in 3GPP TS 36.133[4] section 8.1.2.1.
A3-Offset		dB	-6	
Hysteresis		dB	0	
TimeToTrigger		Ms	0	
Filter coefficient			0	L3 filtering is not used
DRX			DRX_L	As specified in Table 5.1.3.5-2
PRACH configuration			4	As specified in table 5.7.1-2 in 3GPP TS 36.211 [9]
Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between cells		3	ms	Asynchronous cells 3ms or 92160*Ts
Gap pattern configuration Id			0	As specified in Table 8.1.2.1-1 in 3GPP TS 36.133 [4] started before T2 starts
T1		s	5	
T2		s	≤5	
T3		s	1	

5.1.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. T3 is defined as the end of the last TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 5.1.3.5-1. The SS sends downlink MAC padding bits according to Annex A.1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.3.5-1.
6. UE shall transmit a MeasurementReport message triggered by Event A3.
7. SS shall transmit an RRCConnectionReconfiguration message implying handover to Cell 2.
8. The start of T3 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.1.3.5-1.
9. The UE shall transmit RRCConnectionReconfigurationComplete message.
10. If the UE transmits the uplink PRACH channel to Cell 2 less than 50 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
11. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
13. Repeat step 1-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.3.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 5.1.3.4.3-1: Common Exception messages for E-UTRAN FDD-FDD inter-frequency handover test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-3 Table H.3.2-1 Table H.3.2-3 Table H.3.6-2

Table 5.1.3.4.3-2: *ReportConfigEUTRA-A3*: Additional E-UTRAN FDD-FDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-8 (-4 dB)	-4 is actual value in dB (-8 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 5.1.3.4.3-3: *MeasuredResults*: Additional E-UTRAN FDD-FDD inter frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 5.1.3.4.3-4: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD inter frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId		
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

5.1.3.5 Test requirement

Tables 5.1.3.4.1-1, 5.1.3.5-1, and 5.1.3.5-2 define the primary level settings including test tolerances for E-UTRAN FDD-FDD inter frequency handover test case.

Table 5.1.3.5-1: Cell Specific Test requirement 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 D.1.1 (OP.1 FDD) and in D.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 + TT	4 + TT	4 + TT	-Infinity	7 + TT	7 + TT
N_{oc} Note 2	dBm/15 kHz	-98					
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT	4 + TT	-Infinity	7 + TT	7 + TT
RSRP Note 3	dBm/15 KHz	-94 + TT	-94 + TT	-94 + TT	-Infinity	-91 + TT	-91 + TT
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 5.1.3.5-2: Reference DRX-Configuration to be used in E-UTRAN FDD-FDD inter frequency handover test case

Parameter	Value	Comments
Reference configuration	DRX_L	As defined in 4.8.2.1.5 in TS 36.508 [7.]
onDurationTimer	psf6	
drx-InactivityTimer	psf1920	
drx-RetransmissionTimer	sf16	
longDRX-CycleStartOffset	sf1280, 0	
shortDRX	disabled	
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].		

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

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

T_{search} = 0, since Cell 2 is known prior to the test

T_{IU} = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

Maximum RRC procedure delay = 15 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 50 ms in this test case (note: this gives a total of 15 ms for maximum RRC procedure delay plus 35 ms for $T_{interrupt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.4 E-UTRAN TDD-TDD Handover inter frequency case

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The RRC procedure delay requirement is not confirmed*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.1.4.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an inter-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

5.1.4.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

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 defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.2.2.4.2.

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 inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

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

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 bsed on non-DRX target cell search times.
>
> T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in new cell. T_{IU} can be up to 30ms.

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 know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identificaiton requirements are described in TS 36.133 [4] clause 8.1.2.3.4 for inter-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.2.2.4 and A.5.1.4

5.1.4.4 Test description

5.1.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. The general test parameter settings are set up according to Table 5.1.4.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are defined in clause 5.1.4.4.3.

5. There are two E-UTRA TDD carrier and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.4.4.1-1: General Test Parameters for E-UTRAN TDD/TDD Inter Frequency Handover case

Parameter		Unit	Value	Comment
m			DL Reference Measurement Channel R.0 TDD	As specified in Annex A
PCFICH/PDCCHPHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in Annex A
Gap Pattern Id			1	As specified in 3GPP TS 36.133 section 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channel Number			1, 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	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		µs	3	Synchronous cells 3µs or 92*Ts
T1		s	5	
T2		s	≤5	
T3		s	1	

Table 5.1.4.4.1-2: Cell Specific Test Parameters for E-UTRAN TDD/TDD Inter Frequency Handover 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 TS 36.133 [4] A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note]	dB						
OCNG_RB[Note]	dB						

$\hat{E}_s/I_{ot}$	dB	4 + TT	4 + TT	4 + TT	-Infinity	7 + TT	7 + TT
N_{oc}	dBm/15 KHz	-98					
RSRP	dBm/15 KHz	-94 + TT	-94 + TT	-94 + TT	- Infinity	-91 + TT	-91 + TT
Propagation Condition		AWGN					
Note: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.							

5.1.4.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may 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. The start of T3 is defined as the end of the last TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.
2. Set the parameters according to T1 in Table 5.1.4.5-1. The SS sends downlink MAC padding bits according to Annex A.1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.4.5-1.
6. UE shall transmit a MeasurementReport message triggered by Event A3.
7. SS shall transmit an RRCConnectionReconfiguration message implying handover to Cell 2.
8. The start of T3 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.1.3.5-1.
9. The UE shall transmit RRCConnectionReconfigurationComplete message.
10. If the UE transmits the uplink PRACH channel to Cell 2 less than [45 ms] from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
11. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
13. Repeat step 1-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions: [FFS].

5.1.4.5 Test requirement

Tables 5.1.4.4.1-1 and 5.1.4.5-1 define the primary level settings including test tolerances for E-UTRAN TDD/TDD Inter Frequency Handover test.

Table 5.1.4.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD/TDD Inter Frequency Handover 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 TS 36.133 [4] A.3.2.1.1 (OP.1 TDD) and in A.3.2.1.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note]	dB						
OCNG_RB[Note]	dB						
$\hat{E}_s/I_{ot}$	dB	4 + TT	4 + TT	4 + TT	-Infinity	7 + TT	7 + TT
N_{oc}	dBm/15 KHz	-98					
RSRP	dBm/15 KHz	-94 + TT	-94 + TT	-94 + TT	- Infinity	-91 + TT	-91 + TT
Propagation Condition		AWGN					
Note: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.							

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The maximum RRC procedure delay test requirement in this case is [10ms; as specified in TS 36.331 [5] clause 11.2].

The $T_{interrupt}$ test requirement in this case is 35 ms expressed as:

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

$T_{search} = 0$, since cell 2 is known prior to the test

$T_{IU} = 15$ ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

The handover delay $D_{handover}$ shall be less than a total of [45 ms] in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.5 E-UTRAN FDD-FDD inter frequency Handover: unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The parameter for T_{search} for the unknown target cell used in the handover delay requirements is undefined in the core requirememst*
- *The Statistical testing for this test is undefined in Annex G*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.1.5.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an inter-frequency handover: unknown target cell is commanded by meeting the handover to an unknown target cell delay requirements.

5.1.5.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

5.1.5.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receive 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 defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.1.2.1.2.

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 inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

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

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. 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 know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identificaiton requirements are described in TS 36.133 [4] clause 8.1.2.3.1 for inter-frequency handover.

Inter-frequency measurement requirements rely on the UE being configured with one measurement gap pattern. UEs shall only support those measurement gap patterns listed in TS 36.133 [4] Table 8.1.2.1-1 that are relevant to its measurement capabilities.

The normative reference for this requirement is TS 36.133 [4] clause 5.1.2.1 and A.5.1.5.

5.1.5.4 Test description

5.1.5.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. The general test parameter settings are set up according to Table 5.1.5.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are defined in clause 5.1.5.4.3.

5. There are two E-UTRA FDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.5.4.1-1: General Test Parameters for E-UTRAN FDD-FDD inter frequency handover: unknown target cell test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.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 3GPP TS 36.211 [9]
Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between cells			3 ms	Asynchronous cells 3ms or 92160*Ts
T1		s	≤5	
T2		s	1	

5.1.5.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1and T2 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. A RRC message implying handover shall be sent to the UE during perod T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. Starting T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 5.1.5.5-1. The SS sends downlink MAC padding bits according to Annex A.1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. SS shall transmit an RRCConnectionReconfigurationmessage implying handover to Cell 2.

4. The start of T2 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.1.5.5-1.

5. The UE shall transmit RRCConnectionReconfigurationComplete message.

6. If the UE transmits the uplink PRACH channel to Cell 2 less than [FFS] ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

7. When T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.5.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 5.1.5.4.3-1: Common Exception messages for E-UTRAN FDD-FDD inter-frequency handover: unknown target cell test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.2-1 Table H.3.2-3

Table 5.1.5.4.3-2: *MeasuredResults*: Additional E-UTRAN FDD-FDD inter frequency handover: unknown target cell test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 5.1.5.4.3-3: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD inter frequency handover: unknown target cell test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId		
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

5.1.5.5 Test requirement

Tables 5.1.5.4.1-1 and 5.1.5.5-1define the primary level settings including test tolerances for E-UTRAN FDD-FDD inter frequency handover: unknown target cell test.

Table 5.1.5.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD inter frequency handover: unknown target cell test case

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 D.1.1 (OP.1 FDD) and in D.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 + TT	4 + TT	-Infinity	7 + TT
N_{oc} Note 2	dBm/15 kHz	-98			
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT	-Infinity	7 + TT
RSRP Note 3	dBm/15 KHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
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.

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the PRACH to Cell 2.

The handover to an unknown target cell delay = Cell search delay T_{search} + handover delay $D_{handover}$

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

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

T_{search} = 0, since Cell 2 is known prior to the test

T_{IU} = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

Maximum RRC procedure delay = 15 ms as defined in TS 36.331 [5] clause 11.2

The Cell search delay T_{Search} test requirement in this case is expressed as:

Cell search delay T_{Search} = [FFS]

The handover to an unknown target cell delay shall be less than a total of [T_{search} for the unknown cell] + 50 ms in this test case (note: this gives a total of [FFS] plus 50 ms for handover delay $D_{handover}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.6 E-UTRAN TDD-TDD inter frequency handover: unknown target cell

- *Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:*
  - *The RRC procedure delay requirement is not confirmed*
  - *The Test system uncertainties applicable to this test are undefined*
  - *The Test tolerances applicable to this test are undefined*

5.1.6.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when the target cell is unknown and an inter-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.6.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

5.1.6.3 Minimum conformance requirements

Procedure delays for all procedures that can command a handover are specified in 3GPP TS 36.331 [2].

When the UE receive 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 defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.2.2.4.2.

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 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 new cell. T_{IU} can be up to 30ms.

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 identificaiton requirements are described in TS 36.133 [4] clause 8.1.2.3.4 for inter-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.2.2.4 and A.5.1.4

5.1.6.4 Test description

5.1.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. The general test parameter settings are set up according to Table 5.1.6.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are defined in clause 5.1.6.4.3.
5. There are two E-UTRA TDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.6.4.1-1: General test parameters for 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 section A.2.1
PCFICH/PDCCHPHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 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 index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells		µs	3	Synchronous cells 3µs or 92*Ts
Gap pattern configuration			-	No gap pattern configured
T1		s	≤5	
T2		s	1	

5.1.6.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.
2. Set the parameters according to T1 in Table 5.1.6.5-1. The SS sends downlink MAC padding bits according to Annex A.1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message implying handover to Cell 2.

4. The start of T2 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.1.6.5-1.
5. The UE shall transmit RRCConnectionReconfigurationComplete message.
6. If the UE transmits the uplink PRACH channel to Cell 2 less than 130 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
7. When T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.1.6.4.3-1: Common Exception messages for E-UTRAN TDD-TDD inter frequency handover unknown target cell test requirements

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-2 Table H.3.2-3

5.1.6.5 Test requirement

Tables 5.1.6.4.1-1 and 5.1.6.5-1 define the primary level settings including test tolerances for E-UTRAN TDD-TDD inter frequency handover test case when the target cell is unknown.

Table 5.1.6.5-1: Cell specific test parameters for 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 TS 36.133[4] 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_RANote 1	dB				
OCNG_RBNote 1	dB				
N_{oc} Note 3	dBm/15 kHz	-98			
RSRP Note 4	dBm/15 kHz	-94 + TT	-94 + TT	-Infinity	-93 + TT
$\hat{E}_s/I_{ot}$	dB	4 + TT	4 + TT	-Infinity	5 + TT
SCH_RP Note 4	dBm/15 kHz	-94 + TT	-94 + TT	-Infinity	-93 + TT
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT	-Infinity	5 + TT
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The handover delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the PRACH to Cell 2.

The maximum RRC procedure delay test requirement in this case is [15ms; as specified in TS 36.331 [5] clause 11.2].

The $T_{interrupt}$ test requirement in this case is expressed as:

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

$T_{search} = 80$ ms, since cell 2 is unknown prior to the test

$T_{IU} = 15$ ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

The handover delay $D_{handover}$ shall be less than a total of [T_{search} for the unkown target cell] + 50ms, allow [T_{search} for the unkown target cell] = 80 ms in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2 Handover from E-UTRAN to other RATs

5.2.1 E-UTRAN FDD – UTRAN FDD handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.2.1.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to UTRAN in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.2.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD UE.

5.2.1.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to UTRAN with the activation time "now" or earlier than RRC procedure delay seconds from the end of the last E-UTRAN TTI containing the RRC command, 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.

If the access is delayed to an indicated activation time later than E-UTRAN RRC procedure delay seconds from the end of the last TTI containing the E-UTRAN RRC command, the UE shall be ready to start the transmission of the new uplink DPCCH at the designated activation time + interruption time.

Where:

$D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in TS 36.133 [4] clause 5.3.1.1.2.

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 $T_{interrupt1}$. The $T_{interrupt1}$ equation is defined as:

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

If the target cell is unknown the interruption time shall be less than $T_{interrupt2}$. The $T_{interrupt2}$ equation is defined as:

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

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. 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.

T_{sync} is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 [12] 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.

The phase reference is the UTRA primary CPICH.

The requirements assume that N312 has the smallest possible value i.e. only one "in_sync" is required.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.1 and A.5.2.1.

5.2.1.4 Test description

5.2.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.2.1.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are defined in clause 5.2.1.4.3.
5. There is one E-UTRA FDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.1.4.1-1: General Test Parameters for E-UTRAN FDD – UTRAN FDD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.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 TS 36.133 [4] 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	-91	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-UTRA		dB	-18	Absolute UTRAN CPICH Ec/N0 threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		dB	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	

5.2.1.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect ans send a measurmeent report. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table's 5.2.1.5-1 and 5.2.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. The SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.1.5-1 and 5.2.1.5-2.
6. UE shall transmit a MeasurementReport message triggered by Event B2.
7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.2.1.5-1 and 5.2.1.5-2.

9. If the UE transmits the UL DPCCH to Cell 2 less than 190 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

10. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

11. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code – 50) mod 200 + 100) for next iteration of the test procedure loop.

12. Repeat step 1-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.1.4.3-1: Common Exception messages for E-UTRAN FDD – UTRAN FDD handover

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-5 Table H.3.3-1 Table H.3.3-3

Table 5.2.1.4.3-2: *ReportConfigInterRAT-B2-UTRA*: Additional E-UTRAN FDD – UTRAN FDD handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-8 ReportConfigInterRAT-B2(EUTRA-Thres, UTRA-Thres)			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B2-UTRA(EUTRA-Thres, UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
threshold-RSRP	39 (-101 dBm)	-101 dBm EUTRA-Thres is actual threshold value in dBm (39 – 140 dBm)	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2-UTRA CHOICE {			
thresholdUTRA-EcN0	13 (-18 dB)	-18 dB is actual UTRA-Thres is actual Ec/NOEcNO value in dB ((13 – 49)/2 dB)	
}			
}			
}			
}			
timeToTrigger	ms0		
}			
}			
maxReportCells	6		
reportInterval	ms1024		
reportAmount	Infinity		
}			

Table 5.2.1.4.3-3: *MeasuredResults*: Additional E-UTRAN FDD – UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultsServing			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
neighbouringMeasResults CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 5.2.1.4.3-4: *MeasResultListUTRA*: Additional E-UTRAN FDD – UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
fdd	PhysCellIdUTRA-FDD		
}			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdUTRA		
lcoatonAreaCode	Not present		
routingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSCP		Set according to specific test	
utra-EcN0		Set according to specific test	
…			
}			
}			

Table 5.2.1.4.3-5: *PhysCellIdentityUTRA-FDD*: Additional E-UTRAN FDD – UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysCellIdUTRA-FDD ::= SEQUENCE {	250	This is the typical value range used in UTRAN FDD tests.	

5.2.1.5 Test requirement

Tables 5.2.1.4.1-1, 5.2.1.5-1 and 5.2.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – UTRAN FDD handover test.

Table 5.2.1.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.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	dB			
OCNG_RB^Note	dB			
$\hat{E}_s/I_{ot}$	dB	0 + TT	0 + TT	0 + TT
$\hat{E}_s/N_{oc}$		0 + TT	0 + TT	0 + TT
N_{oc}	dBm/15 kHz	-98		
RSRP	dBm/15 KHz	-98 + TT	-98 + TT	-98 + TT
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 5.2.1.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN FDD cell

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 + TT	-1.8 + TT
I_{oc}	dBm/3,84 MHz	-70	-70	-70
CPICH_Ec/Io	dB	-infinity	-14 + TT	-14 + TT
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}.				

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the UL DPCCH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt1}$ (note: the target cell is known)

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

T_{IU} = 10 ms; T_{IU} can be up to one UTRA frame (10 ms).

F_{max} = 4 radio frames; The maximum radio frames within the transmission time intervals to fit into DCCH with 40 ms TTI

T_{sync} = 40 ms; In case higher layers indicate the usage of a post-verification period T_{sync} = 0 ms. Otherwise T_{sync} = 40 ms

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 190 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 140 ms for $T_{interrupt1}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.2 E-UTRAN TDD – UTRAN FDD handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *It has not been decided how to handle the scenario that any timing information of Cell 2 should be deleted in the UE in the test procedure*

5.2.2.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to UTRAN in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.2.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA FDD UE.

5.2.2.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to UTRAN with the activation time "now" or earlier than RRC procedure delay seconds from the end of the last E-UTRAN TTI containing the RRC command, 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.

If the access is delayed to an indicated activation time later than E-UTRAN RRC procedure delay seconds from the end of the last TTI containing the E-UTRAN RRC command, the UE shall be ready to start the transmission of the new uplink DPCCH at the designated activation time + interruption time.

Where:

$D_{handover}$ equals the RRC procedure delay, which is 50ms plus the interruption time stated in TS 36.133 [4] clause 5.3.1.1.2.

The interruption time, i.e. the time between the last TTI containing a transport block on the E-UTRAN PDSCH and the time the UE starts transmission of the new uplink DPCCH depends on whether the target cell is known for 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 $T_{interrupt1}$. The $T_{interrupt1}$ equation is defined as:

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

If the target cell is known the interruption time shall be less than $T_{interrupt2}$. The $T_{interrupt2}$ equation is defined as:

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

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. 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.

T_{sync} is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 [12] 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.

The phase reference is the UTRA primary CPICH.

The requirements assume that N312 has the smallest possible value i.e. only one “in_sync” is required.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.1 and A.5.2.2.

5.2.2.4 Test description

5.2.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.

2. The general test parameter settings are set up according to Table 5.2.2.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are defined in clause 5.2.2.4.3.

5. There is one E-UTRA TDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for call setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.2.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)			DL Reference Measurement Channel R.6 TDD	As specified in section A.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 3GPP TS 36.211. Applicable to cell 1.
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP 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	-101	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	

5.2.2.4.2 Test procedure

The test consists of one E-UTRAN TDD cell and one neighbour UTRAN FDD 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. A neighbouring cell list, including the UTRA cell (Cell 2) is sent to the UE before T2 starts. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurmeent report. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.

2. Set the parameters according to T1 in Table 5.2.2.5-1 and 5.2.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.2.5-1 and 5.2.2.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event B2.

7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.2.2.5-1 and 5.2.2.5-2.

9. If the UE transmits the Uplink DPCCH channel to Cell 2 less than [190 ms] from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

10. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

11. Repeat step 1-10 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

5.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.2.4.3-1: Common Exception messages for E-UTRAN TDD – UTRAN FDD handover

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.3-1 Table H.3.3-3

Table 5.2.2.4.3-2: *MeasurementConfiguration-DEFAULT*: Additional E-UTRAN TDD – UTRAN FDD handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigInterRAT-B2-UTRA		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 5.2.2.4.3-3: *ReportConfigInterRAT-B2-UTRA*: Additional E-UTRAN TDD – UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B2-UTRA(EUTRA-Thres, UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
Threshold-RSRP	39 (-101dBm)	The actual value is (IE value - 140) dB	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2-UTRA CHOICE {			
thresholdUTRA-EcN0	13 (-18dB)	The actual value is (IE value – 49)/2 dB	
}			
}			
}			
}			
timeToTrigger	ms0		
}			
}			
maxReportCells	6		
reportInterval	ms1024		
reportAmount	infinity		
}			

Table 5.2.2.4.3-4: *MeasuredResults*: Additional E-UTRAN TDD – UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1		
measResultsServing			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
neighbouringMeasResults CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 5.2.2.4.3-5: *MeasResultListUTRA*: Additional E-UTRAN TDD – UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultsListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicallCellIdentity CHOICE {			
cellIdentityFDD	UTRA-FDD-CellIdentity		
cellIdentityTDD	Not present		
}			
globalCellIdentity SEQUENCE {			
globalcellID-UTRA	GlobalCellId-UTRA		
lac-Id	Not present		
rac-Id	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
mode CHOICE {			
fdd SEQUENCE {			
cpich-RSCP		Set according to specific test	
cpich-EcN0		Set according to specific test	
…			
}			
}			
}			
}			

Table 5.2.2.4.3-6: *UTRA-FDD-CellIdentity*: Additional E-UTRAN TDD – UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
UTRA-FDD-CellIdentity ::= SEQUENCE {			
primaryScramblingCode	250	Value range INTEGER (0..511)	
}			

5.2.2.5 Test requirement

Tables 5.2.2.4.1-1, 5.2.2.5-1 and 5.2.2.5-2 define the primary level settings including test tolerances for E-UTRAN TDD – UTRAN FDD handover test.

Table 5.2.2.5-1: 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 D.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]				
OCNG_RB[Note]				
RSRP	dBm/15 kHz	-98	-98	-98
$\hat{E}_s/I_{oc}$	dB	0	0	0
N_{oc}	dBm/15 kHz	-98		
Propagation Condition		AWGN		
Note: 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.				

Table 5.2.2.5-2: Cell specific test parameters for UTRAN FDD (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

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		
DPCH_Ec/Ior	dB	N/A	N/A	Note 1
OCNS	dB	-0.941	-0.941	Note 2
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-1.8	-1.8
I_{oc}	dBm/3.84 MHz	-70		
CPICH_Ec/Io	dB	-infinity	-14	-14
Propagation Condition		AWGN		
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.				

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the UL DPCCH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

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

T_{IU} = 10 ms; T_{IU} can be up to one UTRA frame (10 ms).

F_{max} = 4 radio frames; The maximum radio frames within the transmission time intervals to fit into DCCH with 40 ms TTI

T_{sync} = 40 ms; In case higher layers indicate the usage of a post-verification period T_{sync} = 0 ms. Otherwise T_{sync} = 40 ms

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 190 ms in this test case (note: this gives a total of 50ms for maximum RRC procedure delay plus 140 ms for Tinterrupt).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.3 E-UTRAN FDD – GSM handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *It has not been decided how to handle the scenario that any timing information of Cell 2 should be deleted in the UE in the test procedure*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.2.3.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to GSM in RRC_CONNECTED state by meeting the UE handover delay and interruption time requirements.

5.2.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support GSM UE.

5.2.3.3 Minimum conformance requirements

The handover delay $T_{Handover\ delay}$ shall be less than handover delay + T_{offset} + T_{UL} in RRC_CONNECTED state.

The handover delay given in table 5.2.3.3-1 and interruption time given in table 5.2.3.3-2 requirements 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 [5].

When the UE receives a RRC MOBILITY FROM E-UTRA command with the activation time "now" or earlier than RRC procedure delay (see below) from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT within the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.3.3-1 from the end of the last TTI containing the RRC command.

If the access is delayed to an indicated activation time later than RRC procedure delay from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT at the designated activation time + interruption time.

The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay. If the activation time is used, it corresponds to the CFN of the E-UTRAN channel.

Table 5.2.3.3-1: 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 RRC the MOBILITY FROM E-UTRA COMMAND is received	190

The interruption time is the time between the end of the 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 defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.3.3-2.Table 5.2.3.3-2: 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

The normative reference for this requirement is TS 36.133 [4] clause 5.3.3 and A.5.2.3.

5.2.3.4 Test description

5.2.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.

2. The general test parameter settings are set up according to Table 5.2.3.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 5.2.3.4.3.

5. There is one E-UTRA FDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.3.4.1-1: General Test Parameters for E-UTRAN FDD – GSM handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Gap Pattern Id			1	As specified in TS 36.133 [4] section 8.1.2.1.
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	

5.2.3.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may not have any timing information of Cell 2. The RRC message implying handover to Cell 2 shall be sent to the UE during T2, after the UE has reported Event B1. T3 is defined as the end of the 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 is sent.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.

2. Set the parameters according to T1 in Table's 5.2.3.5-1 and 5.2.3.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.3.5-1 and 5.2.3.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event B1.

7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.2.3.5-2.

9. If the UE sends access bursts on the new DCCH to Cell 2 less than 100 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

10. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

11. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

12. Repeat step 1-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.3.4.3-1: Common Exception messages for E-UTRAN FDD – GSM handover

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.3-2 Table H.3.3-3

Table 5.2.3.4.3-2: *MeasConfig-DEFAULT*: Additional E-UTRAN FDD – GSM handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigInterRAT-B1-GERAN		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 5.2.3.4.3-3: *ReportConfigInterRAT-B1-GERAN*: Additional E-UTRAN FDD – GSM handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7A ReportConfigInterRAT-B1-GERAN(GERAN-Thres)			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-GERAN(GERAN-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventide CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
B1-Threshold-GERAN CHOICE {			
thresholdGERAN	30 (-80 dBm)	-80 is actual value in dBm (30 – 110 dBm)	

Table 5.2.3.4.3-4: *MeasuredResults*: Additional E-UTRAN FDD – GSM handover

Table 5.2.3.4.3-5: *MeasResultListGERAN:* Additional E-UTRAN FDD – GSM handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListGERAN ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
MeasResultGERAN SEQUENCE {			
carrierFreq	CarrierFreqGERAN	Contains the carrier frequency of the target GERAN cell	
physCellId	PhysCellIdGERAN	Contains the Base Station Identity Code (BSIC)	
}			
Cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdGERAN		
routingAreaCode	Not present		
}			
measResult SEQUENCE {			
Rssi		Set according to specific test	
…			
}			
}			

5.2.3.5 Test requirement

Tables 5.2.3.4.1-1, 5.2.3.5-1 and 5.2.3.5-2 defines the primary level settings including test tolerances for E-UTRAN FDD to GSM handover test case.

Table 5.2.3.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	**Unit**	**Cell 1**	
		T1, T2	**T3**
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.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 + TT	
N_{oc} Note 2	dBm/15 kHz	-98 (AWGN)	
$\hat{E}_s/N_{oc}$	dB	4 + TT	

RSRP Note 3	dBm/15kHz	-94 + TT
Propagation Condition		AWGN
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other paramete'rs for information purposes. They are not settable parameters themselves.		

Table 5.2.3.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2, T3
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-85 + TT	-75 + TT

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to send access bursts on the new DCCH to Cell 2.

The handover delay $T_{Handover\ delay}$ test requirement in this case is expressed as:

Handover delay $T_{Handover\ delay}$ = handover delay + T_{offset} + T_{UL}

Handover delay = 90 ms; this is based on handover delay value as defined in Table 5.2.3.3.-1

T_{offset} = 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} = 4.65 ms; the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame

The handover delay $T_{Handover\ delay}$ shall be less than a total of 100 ms in this test case (note: this gives a total of 99.29 ms but the test allows 100 ms).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.4 E-UTRAN TDD – UTRAN TDD handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *RRC procedure delay requirements are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *Statistical testing of Handover delay performance requirements are undefined*
- *It has not been decided how to handle the scenario that any timing information of Cell 2 should be deleted in the UE in the test procedure*
- *Message contents are undefined*

5.2.4.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to UTRAN in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.2.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA TDD UE.

5.2.4.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover with the activation time "now" or earlier than RRC procedure delay seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCH or the SYNC-UL within $D_{handover}$ seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

If the access is delayed to an indicated activation time later than RRC procedure delay seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCH at the designated activation time + interruption time.

Where:

$D_{handover}$ equals the RRC procedure performance value plus the interruption time stated in TS 36.133 [4] section 5.3.2.2.

The interruption time, i.e. the time between the end of the last TTI containing a transport block on the E-UTRAN PDCCH and the time the UE starts transmission of the new uplink DPCH or the SYNC-UL, is dependent on whether the target cell is known for 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 $T_{interrupt1}$

$$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + [20] + 10*F_{max} \text{ ms}$$

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

$$T_{interrupt2} = T_{offset} + T_{UL} + 30*F_{SFN} + [180] + 10*F_{max} \text{ ms}$$

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

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.

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.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.2 and A.x.x.

5.2.4.4 Test description

5.2.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.2.4.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are defined in clause 5.2.4.4.3.

5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.4.4.1-1: 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 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
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 3GPP TS 36.133 section 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 3ms or 92160*Ts
Access Barring Information			Not Sent	No additional delays in random access procedure.
Hysteresis		dB	0	
Time To Trigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Hys		dB	0	
Thresh1		dBm	-94	E-UTRA event B2 threshold
Thresh2		dBm	-79	UTRA event B2 threshold
T1		s	5	
T2		s	≤10	
T3		s	1	

5.2.4.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may not have any timing information of Cell 2. A neighbouring cell list, including the UTRA cell (Cell 2) is sent to the UE before T2 starts. Starting T2, Cell 2 becomes detectable and the UE is expected to detect ans send a measurmeent report. T3 is defined as the end of the last TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.

2. Set the parameters according to T1 in Table’s 5.2.4.5-1 and 5.2.4.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table’s 5.2.4.5-1 and 5.2.4.5-2.

4. UE shall transmit a MeasurementReport message triggered by Event B2.

5. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

6. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.2.4.5-1 and 5.2.4.5-2.

7. If the UE transmits the UL to Cell 2 less than [50 ms] from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

8. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources. Any timing information of Cell 2 is deleted in the UE.

9. Repeat step 1-8 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

5.2.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions: [FFS].

5.2.4.5 Test requirement

Tables 5.2.4.4.1-1, 5.2.4.5-1 and 5.2.4.5-2 define the primary level settings including test tolerances for E-UTRAN TDD – UTRAN TDD handover test.

Table 5.2.4.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN TDD cell

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_RB	dB			
SSS_RB	dB			
PCFICH_PA	dB			
PHICH_PA	dB			
PHICH_PB	dB			
PDCCH_PA	dB			
PDCCH_PB	dB			
PDSCH_PA	dB			
PDSCH_PB	dB			
OCNG_RA Note	dB			
OCNG_RB Note	dB			
$\hat{E}_s / I_{ot}$	dB	11+TT	-3+TT	-3+TT
N_{oc}	dBm/15kHz	-98		
RSRP	dBm/15kHz	-87+TT	-101+TT	-101+TT
SCH_RP	dBm/15 kHz	-87	-101	-101
Propagation Condition		AWGN		
Note: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.				

Table 5.2.4.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN TDD cell

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0			DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number*		Channel 2					
PCCPCH_Ec/Ior	dB	-3					
DwPCH_Ec/Ior	dB				0		
OCNS_Ec/Ior	dB	-3					
$\hat{I}_{or}/I_{oc}$	dB	-3+TT	11+TT	11+TT	-3+TT	11+TT	11+TT
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP	dBm	-86+TT	-72+TT	-72+TT	n.a.		
Propagation Condition		AWGN					
* Note: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.							

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the channel to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

$D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

$T_{interrupt1}$= T_{offset}+T_{UL}+30*F_{SFN}+[20] +10*F_{max} ms

T_{offse}= 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} = 10 ms; The time that can elapse until the appearance of the UL timeslot in the target cell

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

F_{max} = 0; The maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

Maximum RRC procedure delay = [50] ms as defined in TS 36.133

The handover delay $D_{handover}$ shall be less than a total of [90 ms] in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.5 E-UTRAN FDD – UTRAN TDD handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.2.5.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN FDD to UTRAN TDD in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.2.5.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA TDD UE.

5.2.5.3 Minimum conformance requirements

5.2.5.3.1 3.84Mcps TDD option

5.2.5.3.2 1.28Mcps TDD option

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover with the activation time "now" or earlier than RRC procedure delay seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCH or the SYNC-UL within $D_{handover}$ seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

If the access is delayed to an indicated activation time later than E-UTRAN RRC procedure delay seconds from the end of the last TTI containing the E-UTRAN RRC command, the UE shall be ready to start the transmission of the new uplink DPCCH at the designated activation time + interruption time.

Where:

$D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in TS 36.133 [4] clause 5.3.2.2.2.

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 DPCH or 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 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 $T_{interrupt1}$. The $T_{interrupt1}$ equation is defined as:

$$T_{interrupt1}= T_{offset}+T_{UL}+30*F_{SFN}+20 +10*F_{max} \text{ ms}$$

If the target cell is unknown the interruption time shall be less than $T_{interrupt2}$. The $T_{interrupt2}$ equation is defined as:

$$T_{interrupt2}= T_{offset}+T_{UL}+30*F_{SFN}+ 180 +10*F_{max} \text{ ms}$$

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
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.

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.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.1 and A.5.2.5.

5.2.5.3.2 7.68 Mcps TDD option

5.2.5.4 Test description

5.2.5.4.1 3.84Mcps TDD option

5.2.5.4.2 1.28Mcps TDD option

5.2.5.4.2.1Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.2.5.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are defined in clause 5.2.5.4.3.
5. There is one E-UTRA FDD serving cell and one UTRATDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.5.4.2.1-1: General Test Parameters for E-UTRAN FDD – UTRAN TDD handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A. 1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A. 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 3GPP TS 36.133 section 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.
Hysteresis		dB	0	
Time To Trigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Hys		dB	0	
Thresh1		dBm	-94	Absolute E-UTRAN RSRP threshold for event B2
Thresh2		dBm	-79	Absolute UTRAN RSCP threshold for event B2
T1		s	5	
T2		s	≤ 10	
T3		s	1	

5.2.5.4.2.2 Test procedure

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 TS 36.133 [4] 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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table's 5.2.5.5.2-1 and 5.2.5.5.2-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.5.5.2.-1 and 5.2.5.5.2-2.
6. UE shall transmit a MeasurementReport message triggered by Event B2.
7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.2.5.5-1 and 5.2.5.5-2.
9. If the UE transmits the UL DPCH Cell 2 less than [90] ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
10. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
11. SS shall change set cell 2 cell parameter id =(current cell 2 cell parameter id +4) mod 16.
12. Repeat step 1-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.5.4.2.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.5.4.2.3-1: Common Exception messages for E-UTRAN FDD – UTRAN TDD handover

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-5 Table H.3.3-1 Table H.3.3-3

Table 5.2.5.4.2.3-2: *ReportConfigInterRAT-B2-UTRA*: Additional E-UTRAN FDD – UTRAN TDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B2-UTRA(EUTRA-Thres, UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
threshold-RSRP	46 (-94 dBm)	-94 dBm EUTRA-Thres is actual threshold value in dBm (46 – 140 dBm)	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2UTRA CHOICE {			
utra-RSCP	36 (-79 dBm)	-79 dBm is actual UTRA-Thres is actual RSCP value in dBm (36-115dBm)	
}			
}			
}			
}			
Hysteresis	0		
timeToTrigger	ms0		
}			
}			
maxReportCells	6		
reportInterval	ms1024		
reportAmount	1		
}			

Table 5.2.5.4.2.3-3: *MeasuredResults*: Additional E-UTRAN FDD – UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 5.2.5.4.2.3-4: *MeasResultListUTRA*: Additional E-UTRAN FDD – UTRAN TDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
Tdd	UTRA-TDD-CellIdentity		
}			
cgi-Info SEQUENCE {			
cellGlobalId	GlobalCellId-UTRA		
locationAreaCode	Not present		
routingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSCP	Set according to specific test		
}			
}			

5.2.5.4.3 7.68 Mcps TDD option

5.2.5.5 Test requirement

5.2.5.5.1 3.84Mcps TDD option

5.2.5.5.2 1.28Mcps TDD option

Tables 5.2.5.4.2.1-1, 5.2.5.5.2-1 and 5.2.5.5.2-2 define the primary level settings including test tolerances for E-UTRAN FDD – UTRAN TDD handover test.

Table 5.2.5.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.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	11 + TT	-3 + TT	-3+ TT
N_{oc}	dBm/15 kHz	-98		
$\hat{E}_s/I_{ot}$	dB	11 + TT	-3 + TT	-3+ TT
RSRP	dBm/15 KHz	-87 + TT	-101 + TT	-101+ TT
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 5.2.5.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN TDD cell

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0			DwPTS		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number*		Channel 2					
PCCPCH_Ec/Ior	dB	-3					
DwPCH_Ec/Ior	dB				0		
OCNS_Ec/Ior	dB	-3					
$\hat{I}_{or}/I_{oc}$	dB	-3 TT	11 TT	11 TT	-3 TT	11 TT	11 TT
I_{oc}	dBm/1.28 MHz	-80					
PCCPCH RSCP	dBm	-86 TT	-72 TT	-72 TT	n.a.		
Propagation Condition		AWGN					
* Note: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.							

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the UL DPCH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 + 10*F_{max}$ ms

T_{offse}= 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} = 10 ms; The time that can elapse until the appearance of the UL timeslot in the target cell

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

F_{max} = 0; The maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 90 ms in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.5.5.2 7.68 Mcps TDD option

5.2.6 E-UTRA TDD – GSM handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.2.6.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to GSM in RRC_CONNECTED state by meeting the UE handover delay and interruption time requirements.

5.2.6.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support GSM UE.

5.2.6.3 Minimum conformance requirements

The handover delay $T_{Handover}$ delay shall be less than handover delay + T_{offset} + T_{UL} in RRC_CONNECTED state.

The handover delay given in table 5.2.6.3-1 and interruption time given in table 5.2.6.3-2 requirements 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 [5].

When the UE receives a RRC MOBILITY FROM E-UTRA command with the activation time "now" or earlier than RRC procedure delay (see below) from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT within the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.3.3-1 from the end of the last TTI containing the RRC command.

If the access is delayed to an indicated activation time later than RRC procedure delay from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT at the designated activation time + interruption time.

The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay. If the activation time is used, it corresponds to the CFN of the E-UTRAN channel.

Table 5.2.6.3-1: 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 RRC the MOBILITY FROM E-UTRA COMMAND is received	190

The interruption time, i.e. the time between the end of the last TTI containing a transport block on the old channel and the time the UE is ready to transmit on the new channel, shall be less than the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.3.3-2:

Table 5.2.6.3-2: 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

The normative reference for this requirement is TS 36.133 [4] clause 5.3.3 and A.5.2.3.

5.2.6.4 Test description

5.2.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.2.6.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are as defined in clause 5.2.6.4.3.
5. There is one E-UTRA TDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.6.4.1-1: General Test Parameters for E-UTRAN TDD – GSM handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Gap Pattern Id			1	As specified in TS 36.133 [4] section 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 [9]
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211 [9]
CP length of cell 1			Normal	
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
$T_{identify,gsm}$		ms	5040	Based on Table 8.1.2.4.5.1.2.1-1 in TS 36.133 [4]
$T_{reconfirm,gsm}$		ms	4800	Based on Table 8.1.2.4.5.1.2.1-1 in TS 36.133 [4]
T1		s	20	
T2		s	5	
T3		s	1	

5.2.6.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may not have any timing information of Cell 2. The RRC message implying handover to Cell 2 shall be sent to the UE during T2, after the UE has reported Event B1. T3 is defined as the end of the 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 is sent.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table's 5.2.6.5-1 and 5.2.6.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.6.5-1 and 5.2.6.5-2.
6. UE shall transmit a MeasurementReport message triggered by Event B1.
7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.2.6.5-2.
9. If the UE sends access bursts on the new DCCH to Cell 2 less than 100 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

10. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

11. Repeat step 1-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.6.4.3-1: Common Exception messages for E-UTRAN TDD – GSM handover

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.3-2 Table H.3.3-3

Table 5.2.6.4.3-2: MeasurementConfiguration-DEFAULT: Additional E-UTRAN TDD – GSM handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigInterRAT-B1-GERAN		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 5.2.6.4.3-3: ReportConfigInterRAT-B1-GERAN: Additional E-UTRAN TDD – GSM handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-GERAN(GERAN-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
B1-Threshold-GERAN CHOICE {			
thresholdGERAN	30 (-80 dBm)	-80 is actual value in dBm (30 – 110 dBm)	

Table 5.2.6.4.3-4: MeasuredResults: Additional E-UTRAN TDD – GSM handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListGERAN	MeasResultListGERAN		
…			
}			
…			
}			

Table 5.2.6.4.3-5: MeasResultListGERAN: Additional E-UTRAN TDD – GSM handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListGERAN ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity SEQUENCE {			
Geran-CarrierFreq	GERAN-CarrierFreq	Contains the carrier frequency of the target GERAN cell	
Geran-CellIdentity	GERAN-CellIdentity	Contains the Base Station Identity Code (BSIC) and is used %%	
}			
globalCellIdentity SEQUENCE {			
globalcellID-GERAN	GlobalCellId-GERAN		
rac-Id	Not present		
}			
measResult SEQUENCE {			
Rssi		Set according to specific test	
…			
}			
}			

5.2.6.5 Test requirement

Tables 5.2.6.4.1-1, 5.2.6.5-1 and 5.2.6.5-2 defines the primary level settings including test tolerances for E-UTRAN TDD to GSM handover test case.

Table 5.2.6.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN TDD cell

Parameter	Unit	Cell 1	
		T1, T2	**T3**
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.2.1 (OP.1 TDD) and in D.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB		
PBCH_ RB	dB		
PSS_ RA	dB		
SSS_ RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB	0	
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note	dB		
OCNG_ RB Note	dB		
$\hat{E}_s/I_{ot}$	dB	4 + TT	
N_{oc}	dBm/15 kHz	-98 (AWGN)	
RSRP	dBm/15kHz	-94 + TT	
Propagation Condition		AWGN	
NOTE: 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.			

Table 5.2.6.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	**T2, T3**
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-85 + TT	-75 + TT

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to send access bursts on the new DCCH to Cell 2.

The handover delay $T_{Handover\ delay}$ test requirement in this case is expressed as:

Handover delay $T_{Handover\ delay}$ = handover delay + T_{offset} + T_{UL}

Handover delay = 90 ms; this is based on handover delay value as defined in Table 5.2.6.3.-1

T_{offset} = 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} = 4.65 ms; the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame

The handover delay $T_{Handover\ delay}$ shall be less than a total of 100 ms in this test case (note: this gives a total of 99.3 ms but the test allows 100 ms).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.7 E-UTRAN FDD – UTRAN FDD handover: unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Statistical testing for this test is undefined in Annex G*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.2.7.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to UTRAN handover: unknown target cell in RRC_CONNECTED state by meeting the handover to an unknown target cell delay requirements.

5.2.7.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD UE.

5.2.7.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to UTRAN with the activation time "now" or earlier than RRC procedure delay seconds from the end of the last E-UTRAN TTI containing the RRC command, 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.

If the access is delayed to an indicated activation time later than E-UTRAN RRC procedure delay seconds from the end of the last TTI containing the E-UTRAN RRC command, the UE shall be ready to start the transmission of the new uplink DPCCH at the designated activation time + interruption time.

Where:

$D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in TS 36.133 [4] clause 5.3.1.1.2.

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 $T_{interrupt1}$. The $T_{interrupt1}$ equation is defined as:

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

If the target cell is unknown the interruption time shall be less than $T_{interrupt2}$. The $T_{interrupt2}$ equation is defined as:

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

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. 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.

T_{sync} is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 [12] 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.

The phase reference is the UTRA primary CPICH.

The requirements assume that N311 has the smallest possible value i.e. only one "in_sync" is required.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.1 and A.5.2.7.

5.2.7.4 Test description

5.2.7.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.2.7.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are defined in clause 5.2.7.4.3.
5. There is one E-UTRA FDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.7.4.1-1: General Test Parameters for E-UTRAN FDD – UTRAN FDD handover: unknown target cell test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.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	

5.2.7.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1and T2 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. A RRC message implying handover shall be sent to the UE during perod T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. Starting T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table's 5.2.7.5-1 and 5.2.7.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

4. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Tables 5.2.7.5-1 and 5.2.7.5-2.

5. If the UE transmits the UL DPCCH to Cell 2 less than 290 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

6. When T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

7. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code – 50) mod 200 + 100) for next iteration of the test procedure loop.

8. Repeat step 1-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.7.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.7.4.3-1: Common Exception messages for E-UTRAN FDD – UTRAN FDD handover: unknown target cell test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.3-1 Table H.3.3-3

Table 5.2.7.4.3-2: *PhysCellIdentityUTRA-FDD*: Additional E-UTRAN FDD – UTRAN FDD handover: unknown tartet cell test requirement

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysCellIdUTRA-FDD ::= SEQUENCE {	250	This is the typical value range used in UTRAN FDD tests.	

5.2.7.5 Test requirement

Tables 5.2.7.4.1-1, 5.2.7.5-1 and 5.2.7.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – UTRAN FDD handover: unknown target cell test.

Table 5.2.7.5-1: Cell Specific Test requirement Parameters for Cell 1 in E-UTRAN FDD – UTRAN FDD handover: unknown target cell test

Parameter	Unit	Cell 1 (E-UTRA)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.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 + TT	0 + TT
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	0 + TT	0 + TT
RSRP Note 3	dBm/15 KHz	-98 + TT	-98 + TT
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 5.2.7.5-2: Cell Specific Test requirement Parameters for Cell 2 in E-UTRAN – UTRAN FDD handover: unknown target cell test

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 + TT
I_{oc}	dBm/3,84 MHz	-70	-70
CPICH_Ec/Io	dB	-infinity	-14 + TT
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}.			

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the UL DPCCH to Cell 2.

The handover to an unknown target cell delay test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt2}$ (note: the target cell is unknown)

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

T_{IU} = 10 ms; T_{IU} can be up to one UTRA frame (10 ms).

F_{max} = 4 radio frames; The maximum radio frames within the transmission time intervals to fit into DCCH with 40 ms TTI

T_{sync} = 40 ms; In case higher layers indicate the usage of a post-verification period T_{sync} = 0 ms. Otherwise T_{sync} = 40 ms

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2

The handover to an unknown target cell delay shall be less than a total of 290 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 240 ms for $T_{interrupt2}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.8 E-UTRAN FDD – GSM handover: unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *It has not been decided how to handle the scenario that any timing information of Cell 2 should be deleted in the UE in the test procedure*
- *The Statistical testing for this test is undefined in Annex G*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.2.8.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to GSM handover: unknown target cell in RRC_CONNECTED state by meeting the handover to an unknown taret cell delay requirements.

5.2.8.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support GSM UE.

5.2.8.3 Minimum conformance requirements

The handover delay $T_{Handover\ delay}$ shall be less than handover delay + T_{offset} + T_{UL} in RRC_CONNECTED state.

The handover delay given in table 5.2.8.3-1 and interruption time given in table 5.2.8.3-2 requirements 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 [5].

When the UE receives a RRC MOBILITY FROM E-UTRA command with the activation time "now" or earlier than RRC procedure delay (see below) from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT within the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.8.3-1 from the end of the last TTI containing the RRC command.

If the access is delayed to an indicated activation time later than RRC procedure delay from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT at the designated activation time + interruption time.

The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay. If the activation time is used, it corresponds to the CFN of the E-UTRAN channel.

Table 5.2.8.3-1: 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 RRC the MOBILITY FROM E-UTRA COMMAND is received	190

The interruption time is the time between the end of the 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 defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.8.3-2.

Table 5.2.3.3-2: 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

The normative reference for this requirement is TS 36.133 [4] clause 5.3.3 and A.5.2.8.

5.2.8.4 Test description

5.2.8.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.2.8.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are as defined in clause 5.2.8.4.3.
5. There is one E-UTRA FDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.8.4.1-1: General Test Parameters for E-UTRAN FDD – GSM handover: unknown target cell test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.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	

5.2.8.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 may not have any timing information of Cell 2. A RRC message implying handover shall be sent to the UE during perod T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. Starting T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table's 5.2.8.5-1 and 5.2.8.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. The neighbour cell shall broadcast its own BSIC, SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
4. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.2.8.5-1 and 5.2.8.5-2.
5. If the UE sends access bursts on the new DCCH to Cell 2 less than 200 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
6. When T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
7. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
8. Repeat step 1-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.8.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.8.4.3-1: Common Exception messages for E-UTRAN FDD – GSM handover: unknown target cell test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.3-2 Table H.3.3-3

5.2.8.5 Test requirement

Tables 5.2.8.4.1-1, 5.2.8.5-1 and 5.2.8.5-2 defines the primary level settings including test tolerances for E-UTRAN FDD to GSM handover: unknown target cell test.

Table 5.2.8.5-1: Cell Specific Test requirement Parameters for Cell 1 in E-UTRAN FDD – GSM handover: unknown target cell test

Parameter	Unit	Cell 1	
		T1	T2
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.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 + TT	
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4 + TT	
RSRP Note 3	dBm/15 kHz	-94 + TT	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table 5.2.8.5-2: Cell Specific Test requirement Parameters for Cell 2 in E-UTRAN FDD – GSM handover: unknown target cell test

Parameter	Unit	Cell 2 (GSM)	
		T1	T2, T3
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-Infinity	-75 + TT

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to send access bursts on the new DCCH to Cell 2.

The handover to an unknown target cell delay test requirement in this case is expressed as:

Handover delay $T_{Handover\ delay}$ = handover delay + T_{offset} + T_{UL}

Handover delay = 190 ms; this is based on handover delay value as defined in Table 5.2.3.3.-1

T_{offset} = 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} = 4.65 ms; the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame

The handover to an unknown target cell delay shall be less than a total of 200 ms in this test case (note: this gives a total of 199.3 ms but the test allows 200 ms).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.9 E-UTRAN TDD – GSM handover unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *The Statistical testing for this test is undefined in Annex G*

5.2.9.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN TDD to GSM in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements when the target cell is unknown.

5.2.9.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support GSM UE.

5.2.9.3 Minimum conformance requirements

The handover delay $T_{Handover\ delay}$ shall be less than handover delay + T_{offset} + T_{UL} in RRC_CONNECTED state.

The handover delay given in table 5.2.9.3-1 and interruption time given in table 5.2.9.3-2 requirements 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 [5].

When the UE receives a RRC MOBILITY FROM E-UTRA command with the activation time "now" or earlier than RRC procedure delay (see below) from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT within the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.9.3-1 from the end of the last TTI containing the RRC command.

If the access is delayed to an indicated activation time later than RRC procedure delay from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT at the designated activation time + interruption time.

The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay. If the activation time is used, it corresponds to the CFN of the E-UTRAN channel.

Table 5.2.9.3-1: 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 RRC the MOBILITY FROM E-UTRA COMMAND is received	190

The interruption time is the time between the end of the 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 defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.9.3-2.

Table 5.2.9.3-2: 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

The normative reference for this requirement is TS 36.133 [4] clause 5.3.3 and A.5.2.9.

5.2.9.4 Test description

5.2.9.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.2.9.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are as defined in clause 5.2.9.4.3.
5. There is one E-UTRA TDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.9.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.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 3GPP TS 36.211[8]
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211[8]
T1		s	≤7	
T2		s	1	

5.2.9.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table’s 5.2.9.5-1 and 5.2.9.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. The neighbour cell shall broadcast its own BSIC, SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
4. The start of T2 is the instant when the last TTI containing the RRC MobilityFromEUTRACommand message implying handover is sent to the UE, At that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.2.9.5-1. T2 starts.
5. If the UE sends access bursts on the new DCCH to Cell 2 less than 200 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
6 . When T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
7. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
8.Repeat step 1-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.9.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.9.4.3-1: Common Exception messages for E-UTRAN TDD to GSM handover test case;unknown target cell

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.3-2 Table H.3.3-3

5.2.9.5 Test requirement

Tables 5.2.9.4.1-1, 5.2.9.5-1 and 5.2.9.5-2 defines the primary level settings including test tolerances for E-UTRAN TDD to GSM handover test case when the target cell is unknow.

Table 5.2.9.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN TDD cell

Parameter	Unit	Cell 1	
		T1	T2
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.2.1 (OP.1 TDD) and in D.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+ TT	
N_{oc} Note 2	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4+ TT	
RSRP Note 3	dBm/15 kHz	-94+ TT	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

Table 5.2.9.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-Infinity	-75+ TT

The handover delay is defined as the time from the beginning of time period T2, to the moment the UE start to send access bursts on the new DCCH to Cell 2.

The handover delay $T_{\text{Handover delay}}$ test requirement in this case is expressed as:

Handover delay $T_{\text{Handover delay}}$ = handover delay + T_{offset} + T_{UL}

Handover delay = 190 ms; this is based on handover delay value as defined in Table 5.2.9.3.-1

T_{offset} = 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} = 4.65 ms; the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame

The handover delay $T_{Handover\ delay}$ shall be less than a total of 2100 ms in this test case (note: this gives a total of 199.3 ms but the test allows 2100 ms).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.10 E-UTRAN TDD – UTRAN TDD handover:unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *The Statistical testing for this test is undefined in Annex G*
- *The interruption time formula from core spec 36.133 still has brackets*

5.2.10.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN TDD to UTRAN TDD in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements when the target cell is unkown.

5.2.10.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA TDD UE.

5.2.10.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover with the activation time "now" or earlier than RRC procedure delay seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCH or the SYNC-UL within $D_{handover}$ seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

If the access is delayed to an indicated activation time later than RRC procedure delay seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCH at the designated activation time + interruption time.

Where:

$D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in TS 36.133 [4] section 5.3.2.2.

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 DPCH or 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 $T_{interrupt1}$

$$T_{interrupt1}= T_{offset}+T_{UL}+30*F_{SFN}+[20] +10*F_{max} \text{ ms}$$

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

$$T_{interrupt2}= T_{offset}+T_{UL}+30*F_{SFN}+[180] +10*F_{max} \text{ ms}$$

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

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.

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.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.2 and A.5.2.10.

5.2.10.4 Test description

5.2.10.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.2.10.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are defined in clause 5.2.10.4.3.
5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.10.4.1-1: General test parameters for E-UTRA TDD to unknown 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 section A.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.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[8]
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211[8]
Time offset between cells			3 ms	Asynchronous cells 3μs or 92*Ts
Access Barring Information			Not Sent	No additional delays in random access procedure.
TimeToTrigger		dB	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	

5.2.10.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 including activation time "now". The end of the last TTI containing handover message is the beginning of T2 duration.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.

2. Set the parameters according to T1 in Tables 5.2.10.5-1 and 5.2.10.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. The SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

4. The start of T2 is the instant when the last TTI containing the RRC MobilityFromEUTRACommand message implying handover is sent to the UE, At that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.2.10.5-1. T2 starts.

5. If the UE transmits the UL to Cell 2 less than [250ms] from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

6. SS shall change set cell 2 cell parameter id =(current cell 2 cell parameter id +4) mod 16.

7. Repeat step 1-6 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved..

5.2.10.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.10.4.3-1: Common Exception messages for E-UTRA TDD to unknown UTRA TDD cell handover

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.3-1 Table H.3.3-3

5.2.10.5 Test requirement

Tables 5.2.10.4.1-1, 5.2.10.5-1 and 5.2.10.5-2 define the primary level settings including test tolerances for E-UTRAN TDD to unknown UTRAN TDD cell handover test.

Table 5.2.10.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN TDD cell

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
BWchannel	MHz	10	
OCNG Patterns defined in D.2.1 (OP.1 TDD) and in D.2.2(OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RANote 1	dB		
OCNG_RBNote 1	dB		
$\hat{E}_s/I_{ot}$	dB	3+ TT	3+ TT
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-95+ TT	-95+ TT
SCH_RP	dBm/15 kHz	-95+ TT	-95+ TT
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 5.2.10.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN TDD cell

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+TT	-infinity	13+TT
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-infinity	-70+TT	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.

The handover delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit PRACH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

$D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + [180] + 10*F_{max}$ ms

T_{offse}= 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} = 10 ms; The time that can elapse until the appearance of the UL timeslot in the target cell

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

F_{max} = 0; The maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

Maximum RRC procedure delay = 50 ms as defined in TS 36.133

The handover delay $D_{handover}$ shall be less than a total of [250 ms] in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3 Handover from E-UTRAN to non-3GPP RATs

5.3.1 E-UTRAN FDD – HRPD Handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Mobility From EUTRA Command message parameters are undefined*
- *InterRAT-Target and InterRAT-Message field description is FFS*
- *The Message contents are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.3.1.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to HRPD in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.3.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support HRPD.

5.3.1.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 50 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

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.

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 [17], 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 [18], which is specific to HRPD.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.1 and A.5.3.1.

5.3.1.4 Test description

5.3.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.

2. The general test parameter settings are set up according to Table 5.3.1.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are defined in clause 5.3.1.4.3.

5. There is one E-UTRA FDD serving cell and one HRPD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.1.4.1-1: 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 section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.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 TS 36.133 [4] 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		dB	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 section 6.3.5 in 3GPP TS 36.331 [5]
T1		s	5	
T2		s	≤10	
T3		s	1	

5.3.1.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may 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. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table's 5.3.1.5-1 and 5.3.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. The neighbour cell shall broadcast its own PN offset and the measurement cell list of Cell 1 shall contain the PN offset of Cell 2. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.3.1.5-1 and 5.3.1.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event B2.

7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.3.1.5-1 and 5.3.1.5-2.

9. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 127 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

10. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

11. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

12. Repeat steps 1-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions [FFS]

5.3.1.5 Test requirement

Tables 5.3.1.4.1-1, 5.3.1.5-1 and 5.3.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – HRPD handover test.

Table 5.3.1.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.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			

N_{oc} Note 2	dBm/15 kHz	-98 (AWGN)		
RSRP Note 3	dBm/15 KHz	-98 + TT	-98 + TT	-98 + TT
$\hat{E}_s/N_{oc}$	dB	0 + TT	0 + TT	0 +TT
$\hat{E}_s/I_{ot}$	dB	0 + TT	0 + TT	0 + TT
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table 5.3.1.5-2: Cell Specific Test requirement Parameters for Cell 2 HRPD cell

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 + TT	0 + TT
I_{oc}	dBm/1.2288 MHz	-55		
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3 + TT	-3 + TT
Propagation Condition		AWGN		

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the reverse control channel in HRPD to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

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

T_{IU} = 26.66 ms; T_{IU} can be up to one HRPD frame (26.66 ms).

$SW_K = 1$; $SW_K = \left\lceil \frac{\text{srch\_win\_k}}{60} \right\rceil$ where srch_win_k is the number of HRPD chips (60) indicated by the search window for known target HRPD cells in the message

KC = 1; 1 known cell; HRPD cell is identified during T2 and is therefore known before T3

OC = 0; OC is the number of unknown target HRPD cells (0).

Maximum RRC procedure delay = 50 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 127 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 76.66 ms for Tinterrupt – allow 127 ms in the test).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3.2 E-UTRAN FDD – cdma2000 1xRTT Handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Mobility From EUTRA Command message parameters are undefined*
- *InterRAT-Target and InterRAT-Message field description is FFS*
- *The Message contents are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.3.2.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to cdma2000 1xRTT in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.3.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support cdma2000 1xRTT.

5.3.2.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 130 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

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

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 1xRTT, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

A cdma2000 1xRTT 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 [19], 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 cdma2000 1xRTT cell. T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).

SW_K is $SW_K = \left\lceil \frac{\text{srch\_win\_k}}{60} \right\rceil$ where srch_win_k is the number of cdma2000 1xRTT chips indicated by the search window for known target cdma2000 1xRTT 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 cdma2000 1xRTT chips indicated by the search window for unknown target cdma2000 1xRTT cells in the message

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

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

The normative reference for this requirement is TS 36.133 [4] clause 5.4.2 and A.5.3.2.

5.3.2.4 Test description

5.3.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.

2. The general test parameter settings are set up according to Table 5.3.2.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are defined in clause 5.3.2.4.3.

5. There is one E-UTRA FDD serving cell and one cdma2000 1xRTT cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.2.4.1-1: General test parameters for E-UTRAN FDD to cdma2000 1xRTT handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.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 TS 36.133 [4] 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		dB	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 section 6.3.5 in 3GPP TS 36.331 [5]
T1		s	5	
T2		s	≤10	
T3		s	1	

5.3.2.4.2 Test procedure

The test consists of one active cell and one neighbour 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 may 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. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table's 5.3.2.5-1 and 5.3.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. The neighbour cell shall broadcast its own PN offset and the measurement cell list of Cell 1 shall contain the PN offset of Cell 2. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.3.2.5-1 and 5.3.2.5-2.
6. UE shall transmit a MeasurementReport message triggered by Event B2.
7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.3.2.5-1 and 5.3.2.5-2.
9. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 200 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
10. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
11. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
12. Repeat steps 1-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions [FFS]

5.3.2.5 Test requirement

Tables 5.3.2.4.1-1, 5.3.2.5-1 and 5.3.2.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – cdma2000 1xRTT handover test.

Table 5.3.2.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
$BW_{channel}$	MHz	10		
OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.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			
N_{oc} Note 2	dBm/15 kHz	-98 (AWGN)		
RSRP Note 3	dBm/15 KHz	-98 + TT	-98 + TT	-98 + TT
$\hat{E}_s/N_{oc}$	dB	0 + TT	0 + TT	0 +TT
$\hat{E}_s/I_{ot}$	dB	0 + TT	0 + TT	0 + TT
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

Table 5.3.2.5-2: Cell Specific Test requirement Parameters for Cell 2 cdma2000 1xRTT cell

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 + TT	0 + TT
I_{oc}	dBm/1.2288 MHz	-55		
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10 + TT	-10 + TT
Propagation Condition		AWGN		

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the reverse control channel in cdma2000 1xRTT to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

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

T_{IU} = 20 ms; T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).

$SW_K = 1$; $SW_K = \left\lceil \frac{srch\_win\_k}{60} \right\rceil$ where srch_win_k is the number of cdma2000 1xRTT chips (60) indicated by the search window for known target cdma2000 1xRTT cells in the message

KC = 1; 1 known cell; cdma2000 1xRTT cell is identified during T2 and is therefore known before T3

OC = 0; OC is the number of unknown target cdma2000 1xRTT cells (0).

Maximum RRC procedure delay = 130 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 200 ms in this test case (note: this gives a total of 130 ms for maximum RRC procedure delay plus 70 ms for Tinterrupt).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3.3 E-UTRAN FDD – HRPD Handover: unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The MobilityFromEUTRACommand message parameters are undefined*
- *targetRAT-Type and targetRAT-MessageContainer field descriptions are FFS*
- *The Message contents are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.3.3.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to HRPD handover: unknown target cell in RRC_CONNECTED state by meeting the handover to an unknown target cell delay requirements.

5.3.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support HRPD.

5.3.3.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 50 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

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.

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 [17], 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 [18], which is specific to HRPD.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.1 and A.5.3.3.

5.3.3.4 Test description

5.3.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
2. The general test parameter settings are set up according to Table 5.3.3.4.1-1.
3. Propagation conditions are set according to Annex B clause B.0.
4. Message contents are defined in clause 5.3.3.4.3.
5. There is one E-UTRA FDD serving cell and one HRPD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.3.4.1-1: General test parameters for E-UTRAN FDD to HRPD handover: unknown target cell test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.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 section 6.3.5 in 3GPP TS 36.331
T1		s	≤5	
T2		s	1	

5.3.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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. 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. Starting at T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table's 5.3.3.5-1 and 5.3.3.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. The SS shall transmit the message containing Information Element systemTimeInfo as defined in TS 36.331 [5] clause 6.3.1. The neighbour cell shall broadcast its own PN offset. The SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. The SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

6. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table's 5.3.3.5-1 and 5.3.3.5-2.

7. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 127 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

8. When T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

9. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

10. Repeat steps 1-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions [FFS]

5.3.3.5 Test requirement

Tables 5.3.3.4.1-1, 5.3.3.5-1 and 5.3.3.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – HRPD handover: unknown target cell test.

Table 5.3.3.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD to HRPD handover: unknown target cell test case

Parameter	Unit	Cell 1 (E-UTRAN FDD)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.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 + TT	-98 + TT
$\hat{E}_s/N_{oc}$	dB	0 + TT	0 + TT
$\hat{E}_s/I_{ot}$	dB	0 + TT	0 + TT
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 5.3.3.5-2: Cell Specific Test requirement Parameters for Cell 2 E-UTRAN FDD to HRPD handover: unknown target cell test case

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 + TT
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3 + TT
Propagation Condition		AWGN	

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the reverse control channel in HRPD to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

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

T_{IU} = 26.66 ms; T_{IU} can be up to one HRPD frame (26.66 ms).

$SW_O = 1$; $SW_O = \left\lceil \frac{\text{srch\_win\_o}}{60} \right\rceil$ where srch_win_o is the number of HRPD chips (60) indicated by the search window for unknown target HRPD cells in the message

KC = 0; KC is the number of known target HRPD cells (0).

OC = 1; OC is the number of unknown target HRPD cells (1).

Maximum RRC procedure delay = 50 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 127 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 76.66 ms for Tinterrupt – allow 127 ms in the test).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3.4 E-UTRAN FDD – cdma2000 1xRTT Handover: unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Mobility From EUTRA Command message parameters are undefined*
- *targetRAT-Type and targetRAT-MessageContainer field descriptions are FFS*
- *The Message contents are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

5.3.4.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to cdma2000 1xRTT handover: unknown target cell in RRC_CONNECTED state by meeting the handover to an unknown target cell delay requirements.

5.3.4.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support cdma2000 1xRTT.

5.3.4.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 130 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

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

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 1xRTT, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

A cdma2000 1xRTT 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 [19], 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 cdma2000 1xRTT cell. T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).
SW_K	is $SW_K = \left\lceil \frac{srch\_win\_k}{60} \right\rceil$ where srch_win_k is the number of cdma2000 1xRTT chips indicated by the search window for known target cdma2000 1xRTT cells in the message
SW_O	is $SW_O = \left\lceil \frac{srch\_win\_o}{60} \right\rceil$ where srch_win_o is the number of cdma2000 1xRTT chips indicated by the search window for unknown target cdma2000 1xRTT cells in the message
KC	It is the number of known target cdma2000 1xRTT cells in the message, and
OC	It is the number of unknown target cdma2000 1xRTT cells in the message.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.2 and A.5.3.4.

5.3.4.4 Test description

5.3.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.

2. The general test parameter settings are set up according to Table 5.3.4.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are defined in clause 5.3.4.4.3.

5. There is one E-UTRA FDD serving cell and one cdma2000 1xRTT cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.4.4.1-1: General test parameters for E-UTRAN FDD to cdma2000 1xRTT handover: unknown target cell test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.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 section 6.3.5 in 3GPP TS 36.331
T1		s	≤5	
T2		s	1	

5.3.4.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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. 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. Starting at T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table's 5.3.4.5-1 and 5.3.4.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. The SS shall transmit the message containing Information Element systemTimeInfo as defined in TS 36.331 [5] clause 6.3.1. The neighbour cell shall broadcast its own PN offset. The SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. The SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

6. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table's 5.3.4.5-1 and 5.3.4.5-2.

7. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 200 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.

8. When T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

9. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

10. Repeat steps 1-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions [FFS]

5.3.4.5 Test requirement

Tables 5.3.4.4.1-1, 5.3.4.5-1 and 5.3.4.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – cdma2000 1xRTT handover: unknown target cell test.

Table 5.3.4.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD to cdma2000 1xRTT handover: unknown target cell test case

Parameter	Unit	Cell 1 (E-UTRAN FDD)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.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 + TT	-98 + TT
$\hat{E}_s/N_{oc}$	dB	0 + TT	0 + TT
$\hat{E}_s/I_{ot}$	dB	0 + TT	0 + TT
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 5.3.4.5-2: Cell Specific Test requirement Parameters for Cell 2 E-UTRAN FDD to cdma2000 1xRTT handover: unknown target cell test case

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 + TT
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10 + TT
Propagation Condition		AWGN	

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the reverse control channel in cdma2000 1xRTT to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover}$ = maximum RRC procedure delay + $T_{interrupt}$

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

T_{IU} = 20 ms; T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).

$SW_O = 1$; $SW_O = \left\lceil \frac{\text{srch\_win\_o}}{60} \right\rceil$ where srch_win_o is the number of cdma2000 1xRTT chips (60) indicated by the search window for unknown target cdma2000 1xRTT cells in the message

KC = 0; KC is the number of known target cdma2000 1xRTT cells (0).

OC = 1; OC is the number of unknown target cdma2000 1xRTT cells (1).

Maximum RRC procedure delay = 130 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 200 ms in this test case (note: this gives a total of 130 ms for maximum RRC procedure delay plus 70 ms for Tinterrupt).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6 RRC Connection Mobility Control

When the UE is in RRC_CONNECTED, for which security has been activated, initiate the RRC re-establishment procedure in order to continue the RRC connection, the RRC re-establishment process takes place. In this process the UE initiates the procedure when one of the following conditions is met: upon re-entry of the service area after having detected radio link failure, upon handover failure or when lower layers detect problems as defined in TS 36.331 [5] clause 5.3.7.2. After selecting the best cell the UE send a ‘RRC Connection Re-establishment Request message’ to the System Simulator as defined in TS 36.331 [5] clause 5.3.7. The connection re-establishment succeeds only if the concerned cell is prepared i.e has a valid UE context within the specified UE re-establishment delay period.

When the random access procedure is initiated by a PDCCH order or by the MAC sublayer itself, the random access process takes place. This process allows the PDCCH order or RRC optionally to indicate a random access preamble and PRACH resource as defined in TS 36.321 [11] clause 5.1. In this process from the physical layer perspective, the L1 random access procedure encompasses the transmission of random access preamble and random access response as defined in TS 36.213 [8] clause 6.1. The random access procedure is used when establishing the L1 communication between the UE and E-UTRAN.

6.1 RRC Re-establishment

6.1.1 E-UTRAN FDD Intra-frequency RRC Re-establishment

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *Statistical testing of RRC re-establishment delay performance requirements are undefined*

6.1.1.1 Test purpose

To verify that the UE is able to send a RRC Connection Re-establishment Request message to the System Simulator within the specified re-establishment delay limits from the moment it detects a loss in RRC connection.

6.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

6.1.1.3 Minimum conformance 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 cell. The uplink grant is required to transmit *RRCConnectionReestablishmentRequest* message.

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-estbalishment as defined in section 5.3.7 in TS 36.331 [5] is detected by the UE to the time when the UE sends PRACH to the target cell. 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 cell.

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

T_{search} = It is 800 ms if the target cell is unknown by the UE; the target cell 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 [5] for E-UTRAN cell.

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 cell is known.

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

The normative reference for this requirement is TS 36.133 [4] clause 6.1.2.1 and A.6.1.1.

6.1.1.4 Test description

6.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The parameter settings for the cells are set up according to Table 6.1.1.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 6.1.1.4.3.

5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 6.1.1.4.1-1: 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 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
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 3ms or 92160*Ts
T1		s	5	
T2		ms	200	
T3		s	3	

6.1.1.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 6.1.1.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.1.5-1. T2 starts

6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.1.5-1. T3 starts

7. If the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2 within 1.5 s from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

8. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

9. Repeat step 1-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.1.1.4.3-1: Common Exception messages for E-UTRAN FDD Intra-frequency RRC Re-establishment

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.5-1
Default RRC messages and information elements contents exceptions	Table H.3.2-1

Table 6.1.1.4.3-2: MeasConfig-DEFAULT: Additional E-UTRAN intra frequency RRC Re-establishment requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-GENERIC(f1)		
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	Not present		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	Not present		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

6.1.1.5 Test requirement

Table 6.1.1.5-1 defines the primary level settings including test tolerances for E-UTRAN FDD Intra-frequency RRC Re-establishment test case.

Table 6.1.1.5-1: 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 + TT	-Infinity	-Infinity	-3.79 + TT	4 + TT	4 + TT
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7 + TT	-Infinity	-Infinity	4 + TT	4 + TT	4 + TT
RSRP Note 3	dBm/15 KHz	-91 +TT	-Infinity	-Infinity	-94 + TT	-94 + TT	-94 + TT
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.

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 [5] 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, within the allowance of 1.5 s in the test case.

6.1.2 E-UTRAN FDD Inter-frequency RRC Re-establishment

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *Statistical testing of RRC re-establishment delay performance requirements are undefined*

6.1.2.1 Test purpose

To verify that the UE is able to send a RRC Connection Re-establishment Request message to the System Simulator within the specified re-establishment delay limits from the moment it detects a loss in RRC connection.

6.1.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

6.1.2.3 Minimum conformance 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 cell. The uplink grant is required to transmit *RRCConnectionReestablishmentRequest* message.

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-estbalishment as defined in section 5.3.7 in TS 36.331 [5] is detected by the UE to the time when the UE sends PRACH to the target cell. The UE re-establishment delay ($T_{UE\_re\text{-}establish\_delay}$) requirement shall be less than:

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

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

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

T_{search} = It is 800 ms if the target cell is unknown by the UE; the target cell 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 [5] for E-UTRAN cell.

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 cell is known.

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

The normative reference for this requirement is TS 36.133 [4] clause 6.1.2.1 and A.6.1.2.

6.1.2.4 Test description

6.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The parameter settings for the cells are set up according to Table 6.1.2.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 6.1.2.4.3.

5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 6.1.2.4.1-1: 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 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
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 3ms or 92160*Ts
T1		s	5	
T2		ms	200	
T3		s	5	

6.1.2.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 6.1.2.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.2.5-1. T2 starts

6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.2.5-1. T3 starts

7. If the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2 within 3 s from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

8. When T3 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

9. Repeat step 1-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.1.2.4.3-1: Common Exception messages for E-UTRAN FDD Inter-frequency RRC Re-establishment

Default Message Contents	
Common contents of system information blocks exceptions	Table H.2.5-2
Default RRC messages and information elements contents exceptions	Table H.3.2-2

Table 6.1.2.4.3-2: MeasConfig-DEFAULT: Additional E-UTRAN intra frequency RRC Re-establishment requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE OF {			
MeasObjectToAddMod SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-GENERIC(f1)		
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	Not present		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

6.1.2.5 Test requirement

Table 6.1.2.5-1 defines the primary level settings including test tolerances for E-UTRAN FDD Intra-frequency RRC Re-establishment test case.

Table 6.1.2.5-1: 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 + TT	-Infinity	-Infinity	-Infinity	-Infinity	7 + TT
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4 + TT	-Infinity	-Infinity	- Infinity	- Infinity	7 + TT
RSRP Note 3	dBm/15 KHz	-94 + TT	-Infinity	-Infinity	- Infinity	-Infinity	-91 + TT
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.							

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 [5] 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, within the allowance of 3 s in the test case.

6.1.3 E-UTRAN TDD Intra-frequency RRC Re-establishment

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

6.1.3.1 Test purpose

To verify that the UE is able to send a RRC Connection Re-establishment Request message to the System Simulator within the specified re-establishment delay limits from the moment it detects a loss in RRC connection.

6.1.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

6.1.3.3 Minimum conformance 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 cell. The uplink grant is required to transmit *RRCConnectionReestablishmentRequest* message.

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-estbalishment as defined in section 5.3.7 in TS 36.331 [5] is detected by the UE to the time when the UE sends PRACH to the target cell. 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} is the time required by the UE to search the target cell.

T_{search} is [100] ms if the target cell is known by the UE; the target cell is known if it has been measured by the UE in the last 5 seconds.

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

T_{SI} 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 [5] for E-UTRAN cell.

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

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

The normative reference for this requirement is TS 36.133 [4] clause 6.1.2.1 and A.6.1.3.

6.1.3.4 Test description

6.1.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The parameter settings for the cells are set up according to Table 6.1.3.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 6.1.3.4.3.

5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 6.1.3.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.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		ms	0	Minimum consecutive in-sync indications from lower layers
T310		-	1	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			3 µs	Synchronous cells 3µs or 92*Ts
T1		s	5	
T2		s	200 ms	
T3		s	3	

6.1.3.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.Cell 1 is the active cell.
2. SS shall transmit an RRCConnectionReconfiguration message.
3. The UE shall transmit RRCConnectionReconfigurationComplete message.4. Set the parameters according to T1 in Table 6.1.3.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

5.When T1 expires,the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.3.5-1. T2 starts

6. When T2 expires,the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.3.5-1. T3 starts
7. If the UE starts to send PRACH preambles to cell 2 within 1.5 s from the beginning of time period T3. then the number of successful tests is increased by one.
8. The SS shall send *RRCConnectionReestablishmentReject* message in Cell 2 to make the UE move to idle mode.
9. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.Cell 1 is the active cell.
10. Repeat step 4-9 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.1.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.1.3.4.3-1: Common Exception messages for E-UTRAN intra frequency RRC Re-establishment requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-2

Table 6.1.3.4.3-2: SystemInformationBlockType2: Additional E-UTRAN intra frequency RRC Re-establishment requirement

Derivation Path: 36.508 clause 4.4.3.3 Table 4.4.3.3-1 SystemInformationBlockType2			
Information Element	**Value/remark**	**Comment**	**Condition**
SystemInformationBlockType2 ::= SEQUENCE {			
ue-TimersAndConstants SEQUENCE {			
t310	ms0	T310 is disabled	
n310	n1		
t311	ms3000		
n311	n1		
}			
}			

Table 6.1.3.4.3-3: MeasConfig-DEFAULT: Additional E-UTRAN intra frequency RRC Re-establishment requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-GENERIC(f1)		
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	Not present		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	Not present		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

6.1.3.5 Test requirement

Table 6.1.3.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD Intra-frequency RRC Re-establishment test case.

Table 6.1.3.5-1: 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 D.2.1 (OP.1 TDD) and in D.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0			0		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA Note 1	dB						
OCNG_RB Note 1	dB						
$\hat{E}_s/I_{ot}$	dB	1.54+TT	-Infinity	-Infinity	-3.79+TT	4+TT	4+TT
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	7+TT	-Infinity	-Infinity	4+TT	4+TT	4+TT
RSRP Note 3	dBm/15 KHz	-91+TT	-Infinity	-Infinity	-94+TT	-94+TT	-94+TT
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.							

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 [5] 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, within the allowance of 1.5 s in the test case.

6.1.4 E-UTRAN TDD Inter-frequency RRC Re-establishment

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

6.1.4.1 Test purpose

To verify that the UE is able to send a RRC Connection Re-establishment Request message to the System Simulator within the specified re-establishment delay limits from the moment it detects a loss in RRC connection.

6.1.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

6.1.4.3 Minimum conformance 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 cell. The uplink grant is required to transmit *RRCConnectionReestablishmentRequest* message.

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-estbalishment as defined in section 5.3.7 in TS 36.331 [5] is detected by the UE to the time when the UE sends PRACH to the target cell. 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 cell.

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

T_{search} = It is 800 ms if the target cell is unknown by the UE; the target cell 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 [5] for E-UTRAN cell.

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 cell is known.

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

The normative reference for this requirement is TS 36.133 [4] clause 6.1.2.1 and A.6.1.4.

6.1.4.4 Test description

6.1.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The parameter settings for the cells are set up according to Table 6.1.4.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 6.1.4.4.3.

5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 6.1.4.4.1-1: 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 section A. 1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A. 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			3 µs	Synchronous cells 3µs or 92*Ts
T1		s	5	
T2		s	200 ms	
T3		s	5	

6.1.4.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.Cell 1 is the active cell.

2. SS shall transmit an RRCConnectionReconfiguration message.

3. The UE shall transmit RRCConnectionReconfigurationComplete message.

4. Set the parameters according to T1 in Table 6.1.3.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5.When T1 expires,the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.3.5-1. T2 starts.

6. When T2 expires,the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.3.5-1. T3 starts.

7. If the UE starts to send PRACH preambles to cell 2 within 3s from the beginning of time period T3. then the number of successful tests is increased by one.

8. The SS shall send RRCConnectionReestablishmentReject message in Cell 2 to make the UE move to idle mode.

9. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.Cell 1 is the active cell.

10. Repeat step 14-89 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.1.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.1.4.4.3-1: Common Exception messages for E-UTRAN intra frequency RRC Re-establishment requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-2

Table 6.1.4.4.3-2: SystemInformationBlockType2: Additional E-UTRAN intra frequency RRC Re-establishment requirement

Derivation Path: 36.508 clause 4.4.3.3			
Information Element	**Value/remark**	**Comment**	**Condition**
SystemInformationBlockType2 ::= SEQUENCE {			
ue-TimersAndConstants SEQUENCE {			
t310	ms0	T310 is disabled	
n310	n1		
t311	ms5000		
n311	n1		
}			
}			

Table 6.1.4.4.3-3: MeasConfig-DEFAULT: Additional E-UTRAN intra frequency RRC Re-establishment requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE OF {			
MeasObjectToAddMod SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-GENERIC(f1)		
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	Not present		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

6.1.4.5 Test requirement

Table 6.1.4.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD Intra-frequency RRC Re-establishment test case.

Table 6.1.4.5-1: Cell specific test parameters for E-UTRAN TDD inter-frequency RRC Re-establishment 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">2</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="3">10</td><td colspan="3">10</td></tr>
<tr><td>OCNG Patterns defined in A.2.1 (OP.1 TDD) and in A.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>
</table>

$\hat{E}_s/I_{ot}$	dB	4+TT	-Infinity	-Infinity	-Infinity	-Infinity	7+TT
N_{oc} Note 2	dBm/15 KHz	-98					
$\hat{E}_s/N_{oc}$	dB	4+TT	-Infinity	-Infinity	- Infinity	- Infinity	7+TT
RSRP Note 3	dBm/15 KHz	-94+TT	-Infinity	-Infinity	- Infinity	-Infinity	-91+TT
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.							

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 [5] 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, within the allowance of 3 s in the test case.

6.2 Random Access

6.2.1 E-UTRAN FDD – Contention Based Random Access Test

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

6.2.1.1 Test purpose

To verify that the UE behaviour of the random access procedure is according to the E-UTRAN FDD contention based random access requirements in an AWGN channel model and that the PRACH power settings and timing are within the specified limits.

6.2.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

6.2.1.3 Minimum conformance requirements

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is as defined in TS 36.213 [8] clause 6 and the control of the RACH transmission is as defined in TS 36.321 [11] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 36.213 [8] clause 6.1 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 defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preambles transmission counter has been reached.

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.

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.

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

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.

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.

The normative reference for this requirement is TS 36.133 [4] clause 6.2.2.1 and A.6.2.1.

6.2.1.4 Test description

6.2.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.

2. Propagation conditions are set according to Annex B clause B. 0.

3. There is one E-UTRA FDD carrier and one cell specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

6.2.1.4.2 Test procedure

The test consists of a single cell. The UE has a downlink PDSCH allocated centered on the center sub-carrier. The E-UTRAN shall not explicitly signal a Random Access Preamble ID to the UE.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2A.

2. Set the parameters according to Tables 6.2.1.5-1 and 6.2.1.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. The UE shall establish a connection setup with SS, the random access procedure within the connection setup is used in the test.

4. Test 1: Correct behaviour when receiving random access response reception

   4.1. In Test 1, the UE shall send the preamble to the SS. In response to the first 4 preambles, the SS shall transmit a random access response not corresponding to the transmitted random access preamble.

   4.2. The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power when the backoff time expires if all received random access response contain random access preamble identifiers that do not match the transmitted random access preamble.

   4.3. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.

   4.4. The UE shall consider this random access response reception successful and and transmit the msg3.

   4.5. Measure the power of the first preamble and it shall not exceed the values specified in table 6.2.1.5-3. Measure the relative power applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in table 6.2.1.5-4.

5. Test 2: Correct behaviour when not receiving random access response reception

   5.1. Repeat step 1-3.

   5.2. In Test 2, the UE shall send the preamble to the SS. The SS shall not respond to the first 4 preamble.

   5.3. The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power when the backoff time expires if no random access response is received within the RA Response window of 10 sub-frames.

   5.4. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.

   5.5. The UE shall consider this random access response reception successful and transmit the msg3.

   5.6. Measure the power of the first preamble and it shall not exceed the values specified in table 6.2.1.5-3. Measure the relative power applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in table 6.2.1.5-4.

6. Test 3: Correct behaviour when receiving a NACK on msg3

   6.1. Repeat step 1-3.

   6.2. In Test 3, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.

   6.3. The UE shall consider this random access response reception successful and transmit the msg3.

   6.4. The SS shall send NACK to all UE msg3 following a successful random access response.

   6.5. The UE shall consider this contention resolution not successful then re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ retransmission is reached.

7. Test 4: Correct behaviour when receiving an incorrect message over Temporary C-RNTI

   7.1. Repeat step 1-3.

   7.2. In Test 4, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.

7.3. The UE shall consider this random access response reception successful and transmit the msg3.

7.4. The SS 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.

7.5. The UE shall consider the contention resolution not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires.

8. Test 5: Correct behaviour when receiving a correct message over Temporary C-RNTI

8.1. In Test 5, the SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.

8.2. The UE shall consider this random access response reception successful and transmit the msg3.

8.3. The SS 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.

8.4. The UE shall send ACK and consider the contention resolution successful and the random access procedure successfully completed.

9. Test 6: Correct behaviour when contention resolution timer expires

9.1. Repeat step 1-3.

9.2. In Test 6, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.

9.3. The UE shall consider this random access response reception successful and transmit the msg3.

9.4. The SS shall not send a response to a msg3 and allow the contention resolution timer to expire.

9.5. The UE shall consider the contention resolution not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires.

9.6. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.

9.7. The UE shall consider this random access response reception successful and transmit the msg3.

6.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.2.1.4.3-1: Common Exception messages for E-UTRAN FDD –Contention Based Random Access test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-1

Table 6.2.1.4.3-2: *SystemInformationBlockType1*: E-UTRAN FDD – Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.2, Table 4.4.3.2-3 SystemInformationBlockType1			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
p-Max	23 (dBm)		

Table 6.2.1.4.3-3: *RACH-ConfigCommon-DEFAULT*: E-UTRAN FDD – Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {			
preambleInfo SEQUENCE {			
numberOfRA-Preambles	n52		
preamblesGroupAConfig SEQUENCE {}	Not present		
}			
powerRampingParameters SEQUENCE {			
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
}			

Table 6.2.1.4.3-4: *PDSCH-ConfigCommon-DEFAULT*: Additional E-UTRAN FDD – Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-5 PDSCH-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PDSCH-ConfigCommon-DEFAULT ::= SEQUENCE {			
referenceSignalPower	-5 (dBm)		1TX

6.2.1.5 Test requirement

Tables 6.2.1.5-1 and 6.2.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – contention based random access test.

Table 6.2.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD – 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 D.1.1.
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As defined in A.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As defined in A.1.2.
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 + TT	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3 + TT	
Io Note 2	dBm/9 MHz	-65.5 + TT	
RSRP Note 3	dBm/15 KHz	-95 + TT	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331 [5].
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in 3GPP TS 36.101 [2].
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in 3GPP TS 36.211 [9].
Backoff Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321 [11].
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.			

Table 6.2.1.5-2: RACH-Configuration parameters for E-UTRAN 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 Section 6.3.2 in 3GPP TS 36.331 [5].		

The contention based random access is triggered by not explicitly assigning a random access preamble via dedicated signalling in the downlink.

Test 1: Correct behaviour when receiving random access response reception

- To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.1 for the correct behaviour when receiving random access response reception in Test 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 TS 36.133 [4] clause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in TS 36.101 [2] clause 6.3.5.1.1. The accuracy is as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1 and as shown in table 6.2.1.5-3. The relative power applied to additional preambles shall have an accuracy specified in TS 36.101 [2] clause 6.3.5.2.1. The relative power for preamble ramping step is 2 dB as defined in table 6.2.1.5-2. The accuracy is as defined in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1 and as shown in table 6.2.1.5-4.

- The transmit timing of all PRACH transmissions shall be within the accuracy specified in TS 36.133 [4] clause 7.1.2.

Test 2: Correct behaviour when not receiving random access response reception

- To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.2 for the correct behaviour when not receiving random access response reception in Test 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 defined in clause 5.1.4 TS 36.321.

- In addition, the power applied to all preambles shall be in accordance with what is specified in TS 36.133 [4] clause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in TS 36.101 [2] clause 6.3.5.1.1. The accuracy is as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1 and as shown in table 6.2.1.5-3. The relative power applied to additional preambles shall have an accuracy specified in TS 36.101 [2] clause 6.3.5.2.1. The relative power for preamble ramping step is 2 dB as defined in table 6.2.1.5-2. The accuracy is as defined in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1 and as shown in table 6.2.1.5-4.

- The transmit timing of all PRACH transmissions shall be within the accuracy specified in TS 36.133 [4] clause 7.1.2.

Test 3: Correct behaviour when receiving a NACK on msg3

- To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.3 for the correct behaviour when receiving a NACK on msg3 in Test 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 retransmission is reached.

Test 4: Correct behaviour when receiving an incorrect message over Temporary C-RNTI

- To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.5 for the correct behaviour when receiving an incorrect message over Temporary C-RNTI in Test 4, 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.

Test 5: Correct behaviour when receiving a correct message over Temporary C-RNTI

- To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.5 for the correct behaviour when receiving a correct message over Temporary C-RNTI in Test 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.

Test 6: Correct behaviour when contention resolution timer expires

- To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.6 for the correct behaviour when contention resolution timer expires in Test 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.

Table 6.2.1.5-3: Absolute power tolerance for E-UTRAN FDD – Contention Based Random Access test

Tolerance	
Normal Conditions	**Extreme Conditions**
± 9.0 dB	± 12.0 dB

Table 6.2.1.5-4: Relative power tolerance for E-UTRAN FDD – Contention Based Random Access test

power step size (Up or down)	PRACH
ΔP [dB]	[dB]
2 ≤ ΔP < 3	±3.0 + TT
Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed for PRACH allocations	

6.2.2 E-UTRAN FDD – Non-Contention Based Random Access Test

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

6.2.2.1 Test purpose

To verify that the UE behaviour of the random access procedure is according to the E-UTRAN FDD non-contention based random access requirements in an AWGN channel model and that the PRACH power settings and timing are within the specified limits.

6.2.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

6.2.2.3 Minimum conformance requirements

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is as defined in TS 36.213 [8] clause 6 and the control of the RACH transmission is as defined in TS 36.321 [11] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 36.213 [8] clause 6.1 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 defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preambles transmission counter has been reached.

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.

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

The normative reference for this requirement is TS 36.133 [4] clause 6.2.2.2 and A.6.2.2.

6.2.2.4 Test description

6.2.2.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.

2. Propagation conditions are set according to Annex B clause B. 0.

3. There is one E-UTRA FDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

6.2.2.4.2 Test procedure

The test consists of a single cell. The UE has a downlink PDSCH allocated centered on the center sub-carrier. The E-UTRAN shall signal a Random Access Preamble ID to the UE via a PDCCH order.

1. Ensure the UE is in State 3 according to TS 36.508 [7] clause 4.5.3.

2. Set the parameters according to Tables 6.2.2.5-1 and 6.2.2.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. The SS shall signal a Random Access Preamble ID via a PDCCH order to the UE and initiate a Non-contention based Random Access procedure.

4. Test 1: Correct behaviour when receiving Random Access Response

   4.1 In Test 1, the UE shall send the signalled preamble to the SS. In response to the first 4 preambles, the SS shall transmit a random access response not corresponding to the transmitted random access preamble.

   4.2. The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power if all received random access response contain random access preamble identifiers that do not match the transmitted random access preamble.

   4.3. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.

   4.4. The UE shall consider this random access response reception successful.

   4.5. Measure the power of the first preamble and it shall not exceed the values specified in table 6.2.2.5-3. Measure the relative power applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in table 6.2.2.5-4.

5. Test 2: Correct behaviour when not receiving Random Access Response

   5.1. Repeat step 1-3.

   5.2. In Test 2, the UE shall send the signalled preamble to the SS. The SS shall not respond to the first 4 preamble.

   5.3. The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power.

   5.4. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.

   5.5. The UE shall consider this random access response reception successful.

5.6. Measure the power of the first preamble and it shall not exceed the values specified in table 6.2.2.5-3. Measure the relative power applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in table 6.2.2.5-4.

6.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.2.2.4.3-1: Common Exception messages for E-UTRAN FDD – Non-Contention Based Random Access test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-1

Table 6.2.2.4.3-2: *SystemInformationBlockType1*: E-UTRAN FDD – Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.2, Table 4.4.3.2-3 SystemInformationBlockType1			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
p-Max	23 (dBm)		

Table 6.2.2.4.3-3: *RACH-ConfigCommon-DEFAULT*: E-UTRAN FDD – Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {			
preambleInfo SEQUENCE {			
numberOfRA-Preambles	n52		
preamblesGroupAConfig SEQUENCE {}	Not present		
}			
powerRampingParameters SEQUENCE {			
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
}			

Table 6.2.2.4.3-4: *PDSCH-ConfigCommon-DEFAULT*: Additional E-UTRAN FDD – Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-5 PDSCH-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PDSCH-ConfigCommon-DEFAULT ::= SEQUENCE {			
referenceSignalPower	-5 (dBm)		1TX

6.2.2.5 Test requirement

Tables 6.2.2.5-1 and 6.2.2.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – non-contention based random access test.

Table 6.2.2.5-1: Cell Specific Test requirement Parameters for E-UTRAN 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 D.1.1.
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As defined in A.1.1.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As defined in A.1.2.
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 + TT	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3 +TT	
Io Note 2	dBm/9 MHz	-65.5 + TT	
RSRP Note 3	dBm/15 KHz	-95 + TT	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331 [5].
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in 3GPP TS 36.101 [2].
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in 3GPP TS 36.211 [9].
Backoff Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321 [11].
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.			

Table 6.2.2.5-2: RACH-Configuration parameters for E-UTRAN 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 Section 6.3.2 in 3GPP TS 36.331 [5].		

The non-contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

Test 1: Correct behaviour when receiving Random Access Response

- To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.2.1 for the correct behaviour when receiving Random Access Response in Test 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 TS 36.133 [4] clause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in TS 36.101 [2] clause 6.3.5.1.1. The accuracy is as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1 and as shown in table 6.2.2.5-3. The relative power applied to additional preambles shall have an accuracy specified in TS 36.101 [2] clause 6.3.5.2.1. The relative power for preamble ramping step is 2 dB as defined in table 6.2.2.5-2. The accuracy is as defined in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1 and as shown in table 6.2.2.5-4.

- The transmit timing of all PRACH transmissions shall be within the accuracy specified in TS 36.133 [4] clause 7.1.2.

Test 2: Correct behaviour when not receiving Random Access Response

- To test the UE behavior specified in TS 36.133 [4] clause 6.2.2.2.2 for the correct behaviour when not receiving Random Access Response in Test 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 TS 36.133 [4] clause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in TS 36.101 [2] clause 6.3.5.1.1. The accuracy is as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1 and as shown in table 6.2.2.5-3. The relative power applied to additional preambles shall have an accuracy specified in TS 36.101 [2] clause 6.3.5.2.1. The relative power for preamble ramping step is 2 dB as defined in table 6.2.2.5-2. The accuracy is as defined in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1 and as shown in table 6.2.2.5-4.

- The transmit timing of all PRACH transmissions shall be within the accuracy specified in TS 36.133 [4] clause 7.1.2.

Table 6.2.2.5-3: Absolute power tolerance for E-UTRAN FDD – Non-Contention Based Random Access test

Tolerance	
Normal Conditions	Extreme Conditions
± 9.0 dB	± 12.0 dB

Table 6.2.2.5-4: Relative power tolerance for E-UTRAN FDD – Non-Contention Based Random Access test

power step size (Up or down)	PRACH
ΔP [dB]	[dB]
2 ≤ ΔP < 3	±3.0 + TT
Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed for PRACH allocations	

6.2.3 E-UTRAN TDD – Contention Based Random Access Test

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

6.2.3.1 Test purpose

To verify that the UE behaviour of the random access procedure is according to the E-UTRAN TDD contention based random access requirements in an AWGN channel model and that the PRACH power settings and timing are within the specified limits.

6.2.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

6.2.3.3 Minimum conformance requirements

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is as defined in TS 36.213 [8] clause 6 and the control of the RACH transmission is as defined in TS 36.321 [11] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 36.213 [8] clause 6.1 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 defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preambles transmission counter has been reached.

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.

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.

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

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.

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.

The normative reference for this requirement is TS 36.133 [4] clause 6.2.2.1 and A.6.2.3.

6.2.3.4 Test description

6.2.3.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.

2. Propagation conditions are set according to Annex B clause B. 0.

3. There is one E-UTRA TDD carrier and one cell specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

6.2.3.4.2 Test procedure

The test consists of a single cell. The UE has a downlink PDSCH allocated centered on the center sub-carrier. The E-UTRAN shall not explicitly signal a Random Access Preamble ID to the UE.

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2A.

2. Set the parameters according to Tables 6.2.3.5-1 and 6.2.3.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. The UE set up a connection with SS,and the random access procedure used in the connection setup is used in the test.

4. Test 1: Correct behaviour when receiving random access response reception

   4.1 In Test 1, the UE shall send the preamble to the SS. In response to the first 4 preambles, the SS shall transmit a random access response not corresponding to the transmitted random access preamble.

   4.2 The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power when the backoff time expires if all received random access response contain random access preamble identifiers that do not match the transmitted random access preamble.

   4.3 The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.

   4.4The UE shall consider this random access response reception successful and and transmit the msg3.

   4.5 Measure the power of the first preamble and it shall not exceed the values specified in clause table 6.2.3.5-3. Measure the relative power applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in table 6.2.3.5-4.

5. Test 2: Correct behaviour when *not* receiving random access response reception

   5.1 Repeat step 1-3.

   5.2 In Test 2, the UE shall send the preamble to the SS. The SS shall not respond to the first 4 preamble.

   5.3 The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power when the backoff time expires if no random access response is received within the RA Response window of 10 sub-frames.

   5.4 The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.

   5.5 The UE shall consider this random access response reception successful and transmit the msg3.

   5.6 Measure the power of the first preamble and it shall not exceed the values specified in table 6.2.3.5-3. Measure the relative power applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in table 6.2.3.5-4.

6. Test 3: Correct behaviour when receiving a NACK on msg3

   6.1 Repeat step 1-3.

6.2 In Test 3, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preambles have been received by the SS.

6.3 The UE shall consider this random access response reception successful and transmit the msg3.

6.4 The SS shall send NACK all UE msg3 following a successful random access response.

6.5 The UE shall consider this contention resolution not successful then re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ retransmission is reached.

7. Test 4: Correct behaviour when receiving an incorrect message over Temporary C-RNTI

7.1 Repeat step 1-3.

7.2 In Test 4, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after first preambles have been received by the SS.

7.3 The UE shall consider this random access response reception successful and transmit the msg3.

7.4 The SS 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.

7.5 The UE shall consider the contention resolution not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires.

8. Test 5: Correct behaviour when receiving a correct message over Temporary C-RNTI

8.1 Repeat step 1-3

8.2 In Test 5, the SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preambles have been received by the SS.

8.3 The UE shall consider this random access response reception successful and transmit the msg3.

8.4 The SS 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.

8.5 The UE shall send ACK and consider the contention resolution successful and the random access procedure successfully completed.

9. Test 6: Correct behaviour when contention resolution timer expires

9.1 Repeat step 1-3.

9.2 In Test 6, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preambles have been received by the SS.

9.3 The UE shall consider this random access response reception successful and transmit the msg3.

9.4 The SS shall not send a response to a msg3 and allow the contention resolution timer to expire.

9.5 The UE shall consider the contention resolution not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires.

6.2.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.2.3.4.3-1: Common Exception messages for E-UTRAN TDD –Contention Based Random Access test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-1

Table 6.2.3.4.3-2: *SystemInformationBlockType1*: E-UTRAN TDD – Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.2, Table 4.4.3.2-3 SystemInformationBlockType1			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
p-Max	23 (dBm)		

Table 6.2.3.4.3-3: *RACH-ConfigCommon-DEFAULT*: E-UTRAN TDD – Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-5 PDSCH-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {			
preambleInfo SEQUENCE {			
numberOfRA-Preambles	n52		
preamblesGroupAConfig SEQUENCE {}	Not present		
}			
powerRampingParameters SEQUENCE {			
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
}			

Table 6.2.3.4.3-4: *PDSCH-ConfigCommon-DEFAULT*: Additional E-UTRAN TDD – Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PDSCH-ConfigCommon-DEFAULT ::= SEQUENCE {			
referenceSignalPower	-5 (dBm)		1TX

6.2.3.5 Test requirement

Tables 6.2.3.5-1 and 6.2.3.5-2 define the primary level settings including test tolerances for E-UTRAN TDD – contention based random access test.

Table 6.2.3.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD – 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 D.2.1.
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As defined in A.1.2.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As defined in A.2.2.
Special subframe configuration	-	6	As specified in table 4.2-1 in 3GPP TS 36.211[9].
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in 3GPP TS 36.211[9].
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 + TT	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3 + TT	
Io Note 2	dBm/9 MHz	-65.5 + TT	
RSRP Note 3	dBm/15 KHz	-95 + TT	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331 [5].
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in 3GPP TS 36.101 [2].
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in 3GPP TS 36.211 [9].
Backoff Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321 [11].
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.			

Table 6.2.3.5-2: RACH-Configuration parameters for E-UTRAN 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 Section 6.3.2 in 3GPP TS 36.331[5].		

The contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

Test 1: Correct behaviour when receiving random access response reception

To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.1 for the correct behaviour when receiving random access response reception in Test 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 TS 36.133 [4] clause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in TS 36.101 [2] clause 6.3.5.1.1. The accuracy is as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1 and as shown in table 6.2.3.5-3. The relative power applied to additional preambles shall have an accuracy specified in TS 36.101 [2] clause 6.3.5.2.1. The relative power for preamble ramping step is 2 dB as defined in table 6.2.3.5-2. The accuracy is as defined in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1 and as shown in table 6.2.3.5-4.

The transmit timing of all PRACH transmissions shall be within the accuracy specified in TS 36.133 [4] clause 7.1.2.

Test 2: Correct behaviour when not receiving random access response reception

To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.2 for the correct behaviour when not receiving random access response reception in Test 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 defined in clause 5.1.4 TS 36.321.

In addition, the power applied to all preambles shall be in accordance with what is specified in TS 36.133 [4] clause 6.2.2. The power of the first preamble shall be -30 dBm with an accuracy specified in TS 36.101 [2] clause 6.3.5.1.1. The accuracy is as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1 and as shown in table 6.2.3.5-3. The relative power applied to additional preambles shall have an accuracy specified in TS 36.101 [2] clause 6.3.5.2.1. The relative power for preamble ramping step is 2 dB as defined in table 6.2.3.5-2. The accuracy is as defined in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1 and as shown in table 6.2.3.5-4.

The transmit timing of all PRACH transmissions shall be within the accuracy specified in TS 36.133 [4] clause 7.1.2.

Test 3: Correct behaviour when receiving a NACK on msg3

To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.3 for the correct behaviour when receiving a NACK on msg3 in Test 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 retransmission is reached.

Test 4: Correct behaviour when receiving an incorrect message over Temporary C-RNTI

To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.5 for the correct behaviour when receiving an incorrect message over Temporary C-RNTI in Test 4, 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.

Test 5: Correct behaviour when receiving a correct message over Temporary C-RNTI

To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.5 for the correct behaviour when receiving a correct message over Temporary C-RNTI in Test 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.

Test 6: Correct behaviour when contention resolution timer expires

To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.1.6 for the correct behaviour when contention resolution timer expires in Test 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.

Table 6.2.3.5-3: Absolute power tolerance for E-UTRAN TDD – Contention Based Random Access test

Tolerance	
Normal Conditions	**Extreme Conditions**
± 9.0 dB	± 12.0 dB

Table 6.2.3.5-4: Relative power tolerance for E-UTRAN TDD – Contention Based Random Access test

power step size (Up or down)	PRACH
ΔP [dB]	**[dB]**
2 ≤ ΔP < 3	±3.0 + TT
Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed for PRACH allocations	

6.2.4 E-UTRAN TDD – Non-Contention Based Random Access Test

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

6.2.4.1 Test purpose

To verify that the UE behaviour of the random access procedure is according to the E-UTRAN TDD non-contention based random access requirements in an AWGN model and that the PRACH power settings and timing are within the specified limits.

6.2.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

6.2.4.3 Minimum conformance requirements

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is as defined in TS 36.213 [8] clause 6 and the control of the RACH transmission is as defined in TS 36.321 [11] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 36.213 [8] clause 6.1 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 defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preambles transmission counter has been reached.

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.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if no Random Access Response is received within the RA response window.

The normative reference for this requirement is TS 36.133 [4] clause 6.2.2.2 and A.6.2.4.

6.2.4.4 Test description

6.2.4.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.

2. Propagation conditions are set according to Annex B clause B. 0.

3. There is one E-UTRA TDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

6.2.4.4.2 Test procedure

The test consists of a single cell. The UE has a downlink PDSCH allocated centered on the center sub-carrier. The E-UTRAN shall signal a Random Access Preamble ID to the UE via a PDCCH order.

1. Ensure the UE is in State 3 according to TS 36.508 [7] clause 4.5.3.

2. Set the parameters according to Tables 6.2.4.5-1 and 6.2.4.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. The SS shall signal a Random Access Preamble ID via a PDCCH order to the UE and initiate a Non-contention based Random Access procedure.

4.Test 1: Correct behaviour when receiving Random Access Response

4.1. In Test 1, the UE shall send the signalled preamble to the SS. In response to the first 4 preambles, the SS shall transmit a random access response not corresponding to the transmitted random access preamble.

4.2 The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power if all received random access response contain random access preamble identifiers that do not match the transmitted random access preamble.

4.3 The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.

4.4 The UE shall consider this random access response reception successful.

4.5 Measure the power of the first preamble and it shall not exceed the values specified in clause Table 6.2.4.5-3. Measure the relative power applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Table 6.2.4.5-4.

5. Test 2: Correct behaviour when *not* receiving Random Access Response

5.1 Repeat step 1-3.

5.2 In Test 2, the UE shall send the signalled preamble to the SS. The SS shall not respond to the first 4 preamble.

5.3 The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power.

5.4 The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.

5.5 The UE shall consider this random access response reception successful.

5.6 Measure the power of the first preamble and it shall not exceed the values specified in clause Table 6.2.4.5-36.2.4.5. Measure the relative power applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Table 6.2.4.5-4.

6.2.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.2.4.4.3-1: Common Exception messages for E-UTRAN TDD – Non-Contention Based Random Access test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-2

Table 6.2.4.4.3-2: *SystemInformationBlockType1*: E-UTRAN TDD – Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.2, Table 4.4.3.2-3 SystemInformationBlockType1			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
p-Max	23 (dBm)		

Table 6.2.4.4.3-3: *RACH-ConfigCommon-DEFAULT*: E-UTRAN TDD – Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {			
preambleInfo SEQUENCE {			
numberOfRA-Preambles	n52		
preamblesGroupAConfig SEQUENCE {}	Not present		
}			
powerRampingParameters SEQUENCE {			
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
}			

Table 6.2.4.4.3-4: *PDSCH-ConfigCommon-DEFAULT*: Additional E-UTRAN TDD – Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PDSCH-ConfigCommon-DEFAULT ::= SEQUENCE {			
referenceSignalPower	-5 (dBm)		1TX

6.2.4.5 Test requirement

Tables 6.2.4.5-1 and 6.2.4.5-2 define the primary level settings including test tolerances for E-UTRAN TDD – non-contention based random access test.

Table 6.2.4.5-1: Cell Specific Test requirement Parameters for E-UTRAN 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 D.2.1.
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As defined in A.1.2.
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As defined in A.2.2.
Special subframe configuration	-	6	As specified in table 4.2-1 in 3GPP TS 36.211[9].
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in 3GPP TS 36.211[9].
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 + TT	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3 +TT	
Io Note 2	dBm/9 MHz	-65.5 + TT	
RSRP Note 3	dBm/15 KHz	-95 + TT	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331 [5].
Configured UE transmitted power (P_{CMAX})	dBm	23	As defined in clause 6.2.5 in 3GPP TS 36.101 [2].
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in 3GPP TS 36.211 [9].
Backoff Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321 [11].
Propagation Condition	-	AWGN	
Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter. Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.			

Table 6.2.4.5-2: RACH-Configuration parameters for E-UTRAN 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 Section 6.3.2 in 3GPP TS 36.331 [5].		

The non-contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink.

Test 1: Correct behaviour when receiving Random Access Response

To test the UE behaviour specified in TS 36.133 [4] clause 6.2.2.2.1 for the correct behaviour when receiving Random Access Response in Test 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 TS 36.133 [4] clause 6.2.4. The power of the first preamble shall be -30 dBm with an accuracy specified in TS 36.101 [2] clause 6.3.5.1.1. The accuracy is as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1 and as shown in table 6.2.4.5-3. The relative power applied to additional preambles shall have an accuracy specified in TS 36.101 [2] clause 6.3.5.2.1. The relative power for preamble ramping step is 2 dB as defined in table 6.2.4.5-2. The accuracy is as defined in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1 and as shown in table 6.2.4.5-4.

The transmit timing of all PRACH transmissions shall be within the accuracy specified in TS 36.133 [4] clause 7.1.2.

Test 2: Correct behaviour when *not* receiving Random Access Response

To test the UE behavior specified in TS 36.133 [4] clause 6.2.2.2.2 for the correct behaviour when *not* receiving Random Access Response in Test 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 TS 36.133 [4] clause 6.2.4. The power of the first preamble shall be -30 dBm with an accuracy specified in TS 36.101 [2] clause 6.3.5.1.1. The accuracy is as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1 and as shown in table 6.2.4.5-3. The relative power applied to additional preambles shall have an accuracy specified in TS 36.101 [2] clause 6.3.5.2.1. The relative power for preamble ramping step is 2 dB as defined in table 6.2.4.5-2. The accuracy is as defined in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1 and as shown in table 6.2.4.5-4.

The transmit timing of all PRACH transmissions shall be within the accuracy specified in TS 36.133 [4] clause 7.1.2.

Table 6.2.4.5-3: Absolute power tolerance for E-UTRAN TDD – Non-Contention Based Random Access test

Tolerance	
Normal Conditions	Extreme Conditions
± 9.0 dB	± 12.0 dB

Table 6.2.4.5-4: Relative power tolerance for E-UTRAN TDD – Non-Contention Based Random Access test

power step size (Up or down)	PRACH
ΔP [dB]	[dB]
2 ≤ ΔP < 3	±3.0 + TT
Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed for PRACH allocations	

7 Timing and Signalling Characteristics

The timing requirements are applicable for the uplink physical channels and signals specified in TS 36.211 [9] clause 5 (for uplink physical channels) as defined.

7.1 UE Transmit Timing

7.1.1 E-UTRAN FDD – UE Transmit Timing Accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

7.1.1.1 Test purpose

To verify the UE have the capability to follow the frame timing change of the connected System Simulator. The method used is that the UE initial transmit timing accuracy, the maximum amount of timing change in one adjustment, and the minimum and maximum adjustment rate are within the specified limits based on the requirements.

7.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.1.1.3 Minimum conformance 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 defined in TS 36.133 [4] clause 7.1.2 and shown in table 7.1.1.3-1. 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 uplink frame transmission takes place $(N_{\text{TA}} + N_{\text{TA offset}})\times T_s$ before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell. The reference point for the UE initial transmit timing control requirement shall be the downlink timing minus $(N_{\text{TA\_Ref}} + N_{\text{TA offset}})\times T_s$.

where:

N_{TA} is $0 \le N_{TA} \le 20512$

N_{TA_Ref} is 0 for PRACH; $(N_{\text{TA\_Ref}} + N_{\text{TA offset}})$ (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 TS 36.133 [4] clause 7.3 was applied. $N_{\text{TA\_Ref}}(N_{\text{TA\_Ref}} + N_{\text{TA offset}})$ (in T_s units) for other channels is not changed until next timing advance is received.

$N_{TA\ offset}$ is 0 for frame structure type 1 as defined in TS 36.211 [9] clause 8.1.T_S denotes the basic time unit. The size of various fields in the time domain is expressed as a number of time units T_S = 1/(15000 x 2048) seconds.

Table 7.1.1.3-1: 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 [9]	

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 except when the timing advance in TS 36.133 [4] 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 $\pm T_e$**.** The reference timing shall be $(N_{\text{TA\_Ref}} + N_{\text{TA offset}})\times T_s$ before the downlink timing.

All adjustments made to the UE uplink timing shall follow these rules:

1) The maximum amount of the timing change in one adjustment shall be T_q.

2) The minimum adjustment rate shall be 7 * × T_S per second.

3) The maximum adjustment rate shall be T_q per 200 ms.

Where the maximum autonomous time adjustment step T_q is defined in TS 36.133 [4] clause 7.1.2 and shown in table 7.1.1.3-2.

Table 7.1.1.3-2: T_q Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T_q
1.4	16*T_S
3	8*T_S
5	4*T_S
≥10	2*T_S
Note: T_S is the basic timing unit defined in TS 36.211 [9]	

The normative reference for this requirement is TS 36.133 [4] clause 7.1 and A.7.1.1.

NOTE 1: Due to the fact that the UE can update its timing at any interval, including just less than 200 ms, when evaluating the maximum adjustment rate in any 200 ms period an additional 2 * Ts uncertainty must be allowed for since there exists the possiblity of two timing adjustments during the evaluation period.

NOTE 2: The minimum adjustment rate of 7 * T_S per second is only to be evaluated from the end of the received downlink frame until the UE has converged on the new reference cell.

7.1.1.4 Test description

7.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.

2. Propagation conditions are set according to Annex B clause B. 0.

3. There is one E-UTRA FDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

7.1.1.4.2 Test procedure

The test consists of a single cell. The transmit timing accuracy is verified related to the downlink frame timing of Cell 1. The downlink timing of Cell 1 is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS (Sounding Reference Symbols) used as a measurement reference facilitating the SS timing estimation.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.

2. Set the parameters according to Tables 7.1.1.5-1, 7.1.1.5-2 and 7.1.1.5-3 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. After a connection is set up with Cell 1, the SS shall check that the UE transmit timing offset is within $N_{TA} \times T_S \pm T_e$ with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

6. The SS adjusts the downlink timing for Cell 1 to a delay of $+64 \times T_S$ (approximately +2 μs) for ≥3 MHz downlink bandwidth and a delay of $+128\times T_S$ (approximately +4 μs) for 1.4MHz downlink bandwidth compared to that in step 5).

7. The SS shall check that the time adjustment step size and the adjustment rate are according to the specified limits for the maximum adjustment step T_q, the minimum adjustment rate ($7 \times T_S$ per second) and the maximum adjustment rate (T_q per 200 ms) until the UE transmit timing offset is within $N_{TA} \times T_S \pm T_e$ with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

8. The SS shall check that the UE transmit timing offset stays within $N_{TA} \times T_S \pm T_e$ with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

9. Repeat step 1-8 for each sub-test in Tables 7.1.1.5-1, 7.1.1.5-2 and 7.1.1.5-3 as appropriate.

7.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.1.1.4.3-1: Common Exception messages for UE transmit timing accuracy for E-UTRAN FDD test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.4-1 Table H.3.4-2

Table 7.1.1.4.3-2: *SoundingRS-RL-ConfigCommon-DEFAULT*: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-21 SoundingRS-UL-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRS-UL-ConfigCommon-DEFAULT ::= SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig		Set according to specific test; bs5 for Test 1 and Test 2 and bw7 for Test 3	
srs-SubframeConfig		Set according to specific test; sc1 for Test 1 and Test 3 and sc3 for Test 2	FDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	Not present		FDD
}			

Table 7.1.1.4.3-3: *SoudingRS-UL-ConfigDedicated-DEFAULT*: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-22 SoundingRS-UL-ConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRS-UL-ConfigDedicated-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
srs-Bandwidth	bw0	bw0 used with no frequency hopping. bw3 used with frequency hopping	
srs-HoppingBandwidth	hbw0		
freqDomainPosition	0		
duration	TRUE	Indefinite duration	
srs-ConfigIndex		Set according to specific test; 0 for Test 1 and 77 for Test 2 and 0 for Test 3	
transmissionComb	0		
cyclicShift	cs0	No cyclic shift	
}			
}			

Table 7.1.1.4.3-4: *MAC-MainConfig-RBC*: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.5-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
dl-SCH-Config SEQUENCE {}	Not present		
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
setup SEQUENCE {			
onDurationTimer	[psf1]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf80 typical value in simulations	
sf80	0		
}			
shortDRX	Not present		
}			
}			

7.1.1.5 Test requirement

Tables 7.1.1.5-1, 7.1.1.5-2 and 7.1.1.5-3 define the primary level settings including test tolerances for UE transmit timing accuracy for E-UTRAN FDD test.

Table 7.1.1.5-1: Cell Specific Test requirement Parameters for UE transmit timing accuracy for E-UTRAN FDD test case

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Value</th></tr>
<tr><th>Test 1</th><th>Test 2</th><th>Test 3</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Channel Bandwidth ($BW_{channel}$)</td><td>MHz</td><td>10</td><td>10</td><td>1.4</td></tr>
<tr><td>DRX cycle</td><td>Ms</td><td>OFF</td><td>80 [Note5]</td><td>OFF</td></tr>
<tr><td>PDCCH/PCFICH/PHICH Reference measurement channel [Note1]</td><td></td><td>R.6 FDD</td><td>R.6 FDD</td><td>R.8 FDD</td></tr>
<tr><td>OCNG Pattern [Note2]</td><td></td><td>OP.2 FDD</td><td>OP.2 FDD</td><td>OP.4 FDD</td></tr>
<tr><td>PBCH_RA</td><td rowspan="11">dB</td><td rowspan="11">0</td><td rowspan="11">0</td><td rowspan="11">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>OCNG_RA [Note3]</td></tr>
<tr><td>OCNG_RB [Note3]</td></tr>
<tr><td>N_{oc}</td><td>dBm/15 kHz</td><td>-98</td><td>-98</td><td>-98</td></tr>
<tr><td>$\hat{E}_s / I_{ot}$</td><td>dB</td><td>3 + TT</td><td>3 + TT</td><td>3 + TT</td></tr>
<tr><td>$\hat{E}_s / N_{oc}$</td><td>dB</td><td>3 + TT</td><td>3 + TT</td><td>3 + TT</td></tr>
<tr><td rowspan="2">Io [Note4]</td><td>dBm/9 MHz</td><td>-65.5 + TT</td><td>-65.5 + TT</td><td>N/A</td></tr>
<tr><td>dBm/1.08 MHz</td><td>N/A</td><td>N/A</td><td>-74.7 + TT</td></tr>
<tr><td>Propagation condition</td><td>-</td><td>AWGN</td><td>AWGN</td><td>AWGN</td></tr>
<tr><td colspan="5">Note 1: For the reference measurement channels, see section A.2.1.
Note 2: For the OCNG pattern, see section D.1.2.
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 7.1.1.5-3.</td></tr>
</table>

Table 7.1.1.5-2: Sounding Reference Symbol Configuration to be used in UE transmit timing accuracy for E-UTRAN FDD test case

Field	Test 1	Test 2	Test 3	Comment
	Value			
srs-BandwidthConfig	bw5	bw5	bw7	
srs-SubframeConfig	sc1	sc3	sc1	
ackNackSRS-SimultaneousTransmission	FALSE	FALSE	FALSE	
srsMaxUpPts	N/A	N/A	N/A	Not applicable for FDD
srs-Bandwidth	0	0	0	No hopping
srs-HoppingBandwidth	hbw0	hbw0	hbw0	
freqDomainPosition	0	0	0	
duration	TRUE	TRUE	TRUE	Indefinite duration
srs-ConfigIndex	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
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].				

Table 7.1.1.5-3: DRX Configuration to be used in UE transmit timing accuracy for E-UTRAN FDD test case

Field	Test2	Comment
	Value	
onDurationTimer	[psf1]	
drx-InactivityTimer	[psf1]	
drx-RetransmissionTimer	[sf1]	
longDRX-CycleStartOffset	[sf80]	
shortDRX	disable	
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].		

The reference point for the UE initial transmit timing control test requirement shall be the downlink timing minus $(N_{\text{TA\_Ref}} + N_{\text{TA offset}})\times T_s$.

The UE shall be capable of changing the transmission timing according to the received downlink frame. When the transmission timing error between the UE and the reference cell exceeds $\pm T_e$ the UE is required to adjust its timing to within $\pm T_e$.

For 10 MHz channel bandwidth, the following sequence of events shall be used to verify that the requirements are met. The test sequence shall be carried out in RRC_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms (Test 1 and Test 2 respectively):

1) After a connection is setup with Cell 1, the test system (SS) shall verify that the UE transmit timing offset is within N_{TA} x T_S ± 12 x T_S with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

2) The test system (SS) adjusts the downlink transmit timing for the cell by +64 x T_S (approximately +2μs) compared to that in step 1.

3) The test system (SS) shall verify that for Test 1 and Test 2 the adjustment step size and the adjustment rate shall be according to the requirements in TS 36.133 [4] clause 7.1.2 and shown in table 7.1.1.3-2 until the UE transmit timing offset is within N_{TA} x T_S ± 12 x T_S with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

4) The test system (SS) shall verify that the UE transmit timing offset stays within N_{TA} x T_S ± 12 x T_S with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

For 1.4 MHz channel bandwidth, the following sequence of events shall be used to verify that the requirements are met. The test sequence shall be carried out in RRC_CONNECTED for non-DRX (Test 3):

1) After a connection is setup with Cell 1, the test system (SS) shall verify that the UE transmit timing offset is within N_{TA} x T_S ± 24 x T_S with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

2) The test system (SS) adjusts the downlink transmit timing for the cell by +128 x T_S (approximately +4µs) compared to that in step 1.

3) The test system (SS) shall verify that for Test 3 the adjustment step size and the adjustment rate shall be according to the requirements in TS 36.133 [4] clause 7.1.2 and shown in table 7.1.1.3-2 until the UE transmit timing offset is within N_{TA} x T_S ± 24 x T_S with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

4) The test system (SS) shall verify that the UE transmit timing offset stays within N_{TA} x T_S ± 24 x T_S with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.An illustration of the measurement principle is shown in Figure 7.1.1.5-1.

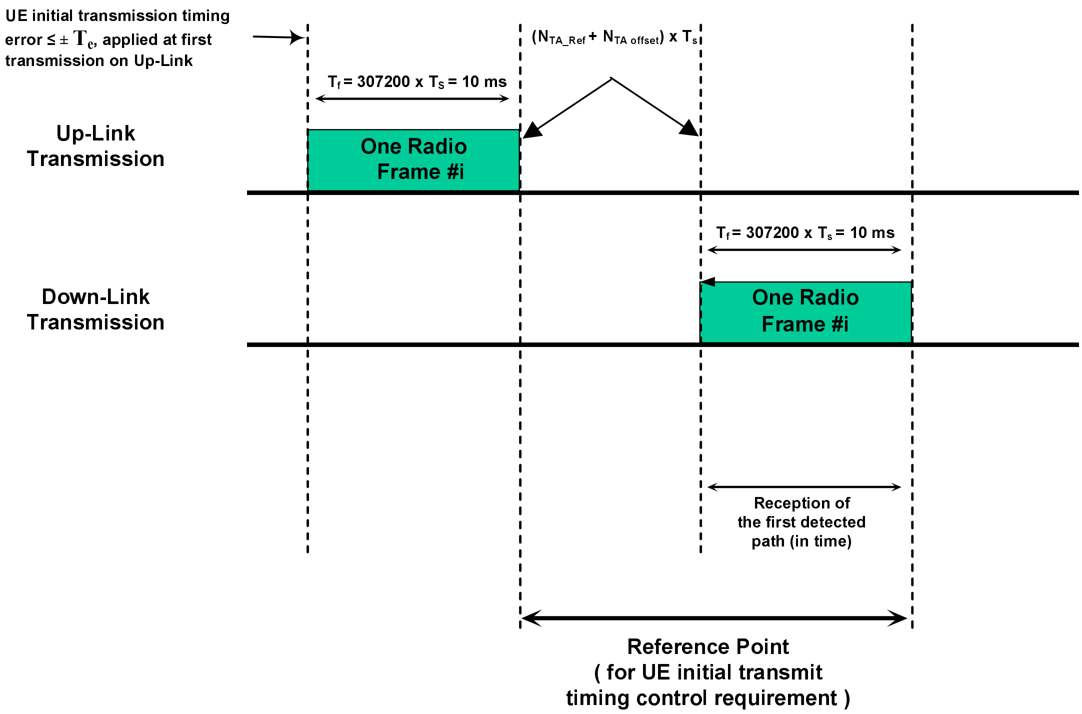

Figure 7.1.1.5-1: Illustration of measurement principle

7.1.2 E-UTRAN TDD – UE Transmit Timing Accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *Statistic testing of this test case is not defined*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

7.1.2.1 Test purpose

To verify the UE have the capability to follow the frame timing change of the connected System Simulator. The method used is that the UE initial transmit timing accuracy, the maximum amount of timing change in one adjustment, and the minimum and maximum adjustment rate are within the specified limits based on the requirements.

7.1.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.1.2.3 Minimum conformance 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 as defined in table 7.1.2-1 of TS 36.133 [4] clause 7.1.2. 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 uplink frame transmission takes place $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_s$ before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell. The reference point for the UE initial transmit timing control requirement shall be the downlink timing minus $(N_{\text{TA\_Ref}} + N_{\text{TA offset}}) \times T_s$.

where:

N_{TA} is $0 \le N_{TA} \le 20512$

N_{TA_Ref} is 0 for PRACH; N $(N_{\text{TA\_Ref}} + N_{\text{TA offset}})$ (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 TS 36.133 [4] clause 7.3 was applied. N_{TA_Ref} in T_s units)for other channels is not changed until next timing advance is received.

$N_{TA\ offset}$ is 624 for frame structure type 2 as defined in TS 36.211 [9] clause 8.1. T_S denotes the basic time unit. The size of various fields in the time domain is expressed as a number of time units T_S = 1/(15000 x 2048) seconds.

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 except when the timing advance in TS 36.133 [4] 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 $\pm T_e$. The reference timing shall be $(N_{\text{TA\_Ref}} + N_{\text{TA offset}}) \times T_s$ before the downlink timing.

All adjustments made to the UE uplink timing $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_s$ shall follow these rules:

1) The maximum amount of the timing change in one adjustment shall be T_q.

2) The minimum adjustment rate shall be $7 \times T_S$ per second.

3) The maximum adjustment rate shall be T_q per 200 ms.

Where the maximum timing error value T_e is specified in table 7.1.2.3-1 and maximum autonomous time adjustment step T_q is specified in table 7.1.2.3-2.

The normative reference for this requirement is TS 36.133 [4] clause 7.1 and A.7.1.2.

Table 7.1.2.3-1: 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	

Table 7.1.2.3-2: T_q Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	$T_{q\_}$
1.4	$16*T_S$
3	$8*T_S$
5	$4*T_S$
≥10	$2*T_S$
Note: T_S is the basic timing unit defined in TS 36.211	

NOTE 1: Due to the fact that the UE can update its timing at any interval, including just less than 200 ms, when evaluating the maximum adjustment rate in any 200 ms period an additional 2* T_q uncertainity must be allowed for since there exists the possiblity of two timing adjustmentd during the evaluateion period.

NOTE 2: The minimum adjustment rate of $7 \times T_S$ per second is only to be evaluted from the end of the received downlink frame until the UE has converged on the new reference cell.

7.1.2.4 Test description

7.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz and 1.4 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noises source to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
2. Propagation conditions are set according to Annex B clause B.0.
3. There is one E-UTRA TDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

7.1.2.4.2 Test procedure

The test consists of a single cell. The transmit timing accuracy is verified related to the downlink frame timing of Cell 1. The downlink timing of Cell 1 is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS (Sounding Reference Symbols) used as a measurement reference facilitating the SS timing estimation.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Tables 7.1.2.5-1 and 7.1.2.5-2 and 7.1.2.5-3 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. After a connection is set up with Cell 1, the SS shall check that the UE transmit timing offset is within $(N_{TA} +624)\times T_S \pm T_e$ with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
6. The SS adjusts the downlink timing for Cell 1 to a delay of $+64 \times T_S$ (approximately +2 µs) for ≥3 MHz downlink bandwidth and a delay of $+128\times T_S$ (approximately +4 µs) for 1.4MHz downlink bandwidth compared to that in step 5.
7. The SS shall check that the time adjustment step size and the adjustment rate are according to the specified limits the maximum adjustment step T_q, the minimum adjustment rate ($7 \times T_S$ per second) and the maximum adjustment rate (T_q per 200 ms) until the UE transmit timing offset is within $N_{TA} \times T_S \pm T_e$ with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
8. The SS shall check that the UE transmit timing offset stays within $(N_{TA} +624)\times T_S \pm T_e$ with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
9. Repeat step 1-8 for each sub-test in Tables 7.1.2.5-1, 7.1.2.5-2 and 7.1.2.5-3 as appropriate.

7.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.1.2.4.3-1: Common Exception messages for UE transmit timing accuracy for E-UTRAN FDD test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.4-1 Table H.3.4-2

Table 7.1.2.4.3-2: *SoundingRS-UL-ConfigCommon-DEFAULT*: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: 36.508 clause 4.6.3			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRsUl-ConfigCommon-DEFAULT ::= SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig		Set according to specific test; bw5 for Test 1 and Test 2 , bw7 for Test 3	
srs-SubframeConfig	src3		TDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	FALSE		
}			

Table 7.1.2.4.3-*3*: *SoundingRS-UL-ConfigDedicated-DEFAULT*: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: 36.508 clause 4.6.3			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRSUL-ConfigDedicated-DEFAULT ::= CHOICE {			
enable SEQUENCE {			
srsBandwidth	bw0	bw0 used with no frequency hopping. bw3 used with frequency hopping	
srsHoppingBandwidth	hbw0		
freqDomainPosition	0		
duration	TRUE	indefinite duration	
srs-ConfigIndex		Set according to specific test; 0 for Test 1 and 77 for Test 2	
transmissionComb	0		
cyclicShift	cs0	No cyclic shift	
}			
}			

Table 7.1.2.4.4-3: MAC-MainConfig-RBC: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: 36.508 clause 4.8.2			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
dl-SCH-Config SEQUENCE {}	Not present		
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp_5 AND DRX_S
setup SEQUENCE {			
onDurationTimer	[psf1]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf80 typical value in simulations	
sf80	0		
}			
shortDRX	Not present		
}			
}			

7.1.2.5 Test requirement

Tables 7.1.2.5.1-1-1, 7.1.2.5-2 and 7.1.2.5.1-3 define the primary level settings including test tolerances for UE transmit timing for E-UTRAN TDD test.

Table 7.1.2.5-1: 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
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				
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
$\hat{E}_s / I_{ot}$	dB	3 + TT	3 + TT	3 + TT
$\hat{E}_s / N_{oc}$	dB	3 + TT	3 + TT	3 + TT
Io[Note6]	dBm/9 MHz	-65.5 + TT	-65.5 + TT	N/A
	dBm/1.08 MHz	N/A	N/A	-74.7 + TT
Propagation condition	-	AWGN	AWGN	AWGN

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: For the reference measurement channels, see section A.2.1.
Note 4 For the OCNG pattern, see section D.1.2.
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 7.1.2.5-3.

Table 7.1.2.5-2: Sounding Reference Signal 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
Note: For further information see section 6.3.2 in 3GPP TS 36.331.				

Table 7.1.2.5-3: 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	[sf1]	
longDRX-CycleStartOffset	[sf80]	
shortDRX	disable	
Note: For further information see section 6.3.2 in 3GPP TS 36.331.		

The reference point for the UE initial transmit timing control test requirement shall be the downlink timing minus $(N_{\text{TA\_Ref}} + N_{\text{TA offset}}) \times T_s$ seconds.

The UE shall be capable of changing the transmission timing according to the received downlink frame. When the transmission timing error between the UE and the reference cell exceeds $\pm T_e$ seconds the UE is required to adjust its timing to within $\pm T_e$ seconds.

For the 10MHz channel bandwidth, the following sequence of events shall be used to verify that the requirements are met. The test sequence shall be carried out in RRC_CONNECTED for both non-DRX and DRX with a cycle length of 80 ms (Test 1 and Test 2 respectively):

1) After a connection is setup with Cell 1, the test system (SS) 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.

2) The test system (SS) adjusts the downlink transmit timing for the cell by $+64 \times T_S$ (approximately +2μs) compared to that in step 1.

3) The test system (SS) shall verify that for Test 1 and Test 2 the adjustment step size and the adjustment rate shall be according to the requirements in TS 36.133 [4] 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.

4) The test system (SS) shall verify that the UE transmit timing offset stays within (N_{TA} +624)× T_S ± 12 × T_S with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.

For the 1.4MHz channel bandwidth, the test sequence shall be carried out in RRC_CONNECTED for non-DRX (Tests 3):

1) 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)×T_S ± 24×T_S with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

2) The test system adjusts the downlink transmit timing for the cell by +128×T_S (approximately +4µs) compared to that in (a).

3) The test system shall verify that for test 1 the adjustment step size and the adjustment rate shall be according to the requirements in TS 36.133 [4] clause 7.1.2 until the UE transmit timing offset is within (N_{TA} +624)×T_S ± 24×T_S with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

4) The test system shall verify that the UE transmit timing offset stays within (N_{TA} +624)×T_S ± 24×T_S with respect to the first detected path (in time) of the corresponding downlink frame of cell 1.

An illustration of the measurement principle is shown in Figure 7.1.2.5-4.

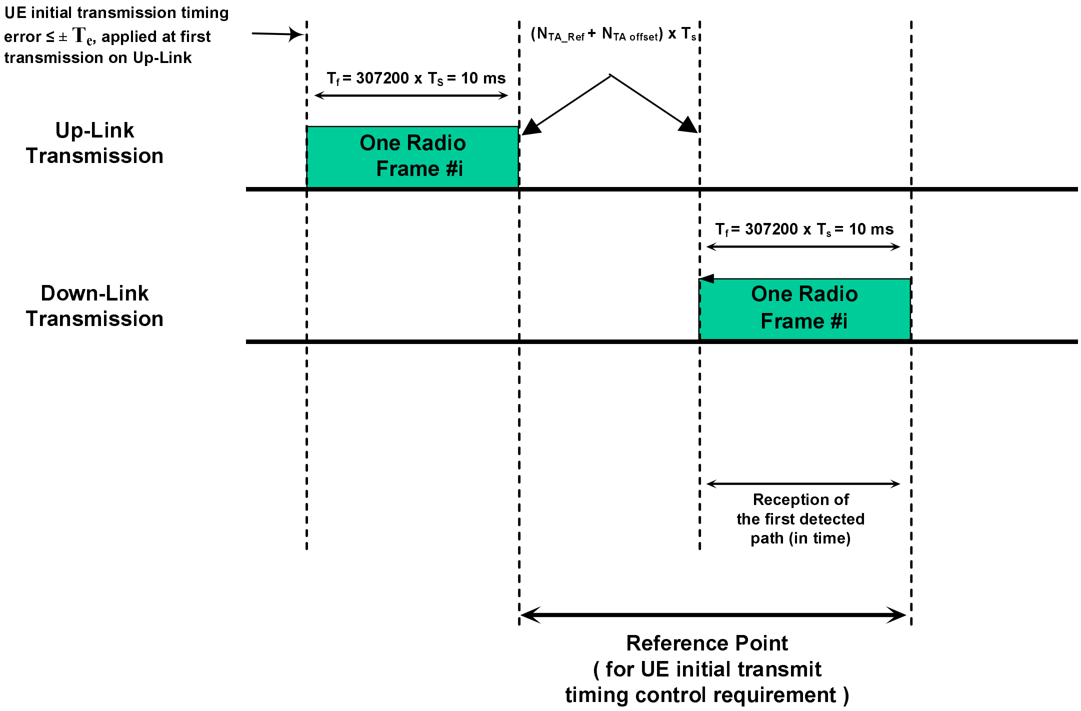

Figure 7.1.2.5-4: Illustration of measurement principle

7.2 UE Timing Advance

7.2.1 E-UTRAN FDD – UE Timing Advance Adjustment Accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *For the timing advance adjustment accuracy requirements the UE shall adjust the timing of its transmission with a relative accuracy better than or equal to [±4 ×T_S] have not been confirmed*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

7.2.1.1 Test purpose

To verify the UE in RRC_CONNECTED state adjusts the timing of its tramsissions with accuracy by meeting the E-UTRAN FDD timing advance adjustment requirements in an AWGN model.

7.2.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.2.1.3 Minimum conformance requirements

The timing advance is initiated from E-UTRAN with MAC message that implies and adjustment of the timing advance according to TS 36.321 [11] clause 5.2.

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

The UE shall adjust the timing of its transmission with a relative accuracy better than or equal to [$\pm 4 \times T_S$] seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command is expressed in multiple of $16 \times T_S$ and is relative to the current uplink timing.

In case of random access response, 11-bit timing advance command, T_A, indicates N_{TA} values by index values of T_A = 0, 1, 2, ..., 1282, where an amount of the time alignment is given by $N_{TA} = T_A \times 16$ according to TS 36.213 [8] clause 4.2.3. N_{TA} is defined in TS 36.211 [9].

In other cases, 6-bit timing advance command, T_A, indicates adjustment of the current N_{TA} value, $N_{TA,old}$, to the new N_{TA} value, $N_{TA,new}$, by index values of T_A = 0, 1, 2,..., 63, where $N_{TA,new} = N_{TA,old} + (T_A - 31) \times 16$ according to TS 36.213 [8] clause 4.2.3. Adjustment of N_{TA} value by a positive or a negative amount indicates advancing or delaying the uplink transmission timing by a given amount respectively.

For UE timers, the UE shall comply with the timer accuracies according to TS 36.133 [4] table 7.2.2-1. The requirements are only related to the actual timing measurements internally in the UE.

The normative reference for this requirement is TS 36.133 [4] clause 7.3 and A.7.2.1.

7.2.1.4 Test description

7.2.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.

2. The general test parameter settings are set according to Table 7.2.1.4.1-1.

3. Propagation conditions are set according to Annex B clause B. 0.

4. There is one E-UTRA FDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.2.1.4.1-1: General Test Parameters for E-UTRAN FDD – UE timing advance adjustment accuracy test case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.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	

7.2.1.4.2 Test procedure

The test consists of a single cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and SRS are sent from the UE and received by the SS. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured. The Timing Advance Command value shall be set to 31 during T1 and the Timing Advance Command value shall be set to 39 for T2 . The UE Time Alignment Timer (timeAlignmentTimer IE), defined in TS 36.321 [11] clause 5.2, shall be configured so that it does not expire in the duration of the test.

1. Ensure the UE is in State 3 according to TS 36.508 [7] clause 4.5.3.

2. Set the parameters according to T1 in Tables 7.2.1.5-1 and 7.2.1.5-2. Propagation conditions are set according to Annex B clause B.1.1.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. SS shall transmit one message with a timing advance command, T_A. The timing advance command, T_A, shall be set to 31 which indicate adjustment of the current N_{TA} value. The timing advance adjustment during T1 shall be N_{TA} = 0.

6. The UE shall transmit SRS and adjust its uplink timing at the beginning of sub-frame n+6 for a timing advance command T_A received in sub-frame n. Sub-frame n is the sub-frame where the UE received the time advance command.

7. When T1 expires, the SS shall switch the timing advance command (T_A) from T1 to T2 as specified in Table 7.2.1.5-1.

8. SS shall transmit a sequence of messages with timing advance command, T_A. The timing advance command, T_A, shall be set to 39] which indicate adjustment of the current N_{TA} value. The timing advance adjustment during T2 shall be N_{TA} = 128.

9. The UE shall transmit SRS and adjust its uplink timing at the beginning of sub-frame n+6 for a timing advance command T_A received in sub-frame n. Sub-frame n is the sub-frame where the UE received the time advance command.

10. The result from the SRS and adjustment of the timing advance in step 9) is used to measure that the UE adjust the timing of its transmission with a relative accuracy better than or equal to [$\pm 4 \times T_S$] to the signalled timing advance value compared to the timing of preceding uplink transmission.

11. If the UE adjust the timing of its transmission within a relative accuracy greater than or equal to [$\pm 4 \times T_S$] to the signalled timing advance value compared to the timing of preceding uplink transmission then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

12. Repeat step 1-11 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.2.1.4.3-1: Common Exception messages for E-UTRAN FDD – UE timing advance adjustment accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.4-1 Table H.3.4-2

Table 7.2.1.4.3-2: *SoundingRS-UL-ConfigCommon-DEFAULT*: Additional E-UTRAN FDD – UE timing advance adjustment accuracy test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-21 SoundingRS-UL-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRS-UL-ConfigCommon-DEFAULT ::= SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig	bw5	Channel-bandwidth-dependent parameter	
srs-SubframeConfig	sc3		FDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	Not present		FDD
}			
}			

Table 7.2.1.4.3-3: *SoundingRSUL-ConfigDedicated-DEFAULT*: Additional E-UTRAN FDD – UE timing advance adjustment accuracy test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-22 SoundingRS-UL-ConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRS-UL-ConfigDedicated-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
srs-Bandwidth	bw0	bw0 used with no frequency hopping. bw3 used with frequency hopping	
srs-HoppingBandwidth	hbw0		
freqDomainPosition	0		
duration	TRUE	Indefinite duration	
srs-ConfigIndex	7	SRS periodicity of 10	FDD
transmissionComb	0		
cyclicShift	cs0	No cyclic shift	
}			
}			

Table 7.2.1.4.3-4: *MAC-MainConfig-RBC*: Additional E-UTRAN FDD – UE timing advance adjustment accuracy test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.5-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
dl-SCH-Config SEQUENCE {}	Not present		
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
…			
timeAlignmentTimerDedicated	Infinity		

7.2.1.5 Test requirement

Tables 7.1.1.4.1-1, 7.1.1.5-1 and 7.1.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – UE timing advance adjustment accuracy test.

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 meet the requirements in TS 36.133 [4] clause 7.3.2.2.

Table 7.2.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD – UE timing advance adjustment accuracy test case

Parameter	Unit	Value	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in D.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 + TT	
N_{oc}	dBm/15 KHz	-98	
$\hat{E}_s/N_{oc}$	dB	3 + TT	
Io Note2	dBm/9 MHz	-65.5 + TT	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.			

Table 7.2.1.5-2: Sounding Reference Symbol Configuration to be used in E-UTRAN FDD – UE timing advance adjustment accuracy test case

Field	Value	Comment
srs-BandwidthConfig	bw5	
srs-SubframeConfig	sc3	Once every 5 subframes
ackNackSRS-SimultaneousTransmission	FALSE	
srsMaxUpPts	N/A	Not applicable for E-UTRAN FDD
srs-Bandwidth	0	No hopping
srs-HoppingBandwidth	hbw0	
freqDomainPosition	0	
duration	TRUE	Indefinite duration
srs-ConfigIndex	7	SRS periodicity of 10.
transmissionComb	0	
cyclicShift	cs0	No cyclic shift
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [15].		

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7.2.2 E-UTRAN TDD – UE Timing Advance Adjustment Accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

7.2.2.1 Test purpose

The purpose of the test is to verify E-UTRAN TDD Timing Advance adjustment accuracy requirements, in an AWGN model.

7.2.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.2.2.3 Minimum conformance requirements

The timing advance is initiated from E-UTRAN with MAC message that implies and adjustment of the timing advance according to TS 36.321 [11] clause 5.2.

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

The UE shall adjust the timing of its transmission with a relative accuracy better than or equal to [$\pm 4 \times T_S$] seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command is expressed in multiple of $16 \times T_S$ and is relative to the current uplink timing.

In case of random access response, 11-bit timing advance command, T_A, indicates N_{TA} values by index values of T_A = 0, 1, 2, ..., 1282, where an amount of the time alignment is given by $N_{TA} = T_A \times 16$ according to TS 36.213 [8] clause 4.2.3. N_{TA} is defined in TS 36.211 [9].

In other cases, 6-bit timing advance command, T_A, indicates adjustment of the current N_{TA} value, $N_{TA,old}$, to the new N_{TA} value, $N_{TA,new}$, by index values of T_A = 0, 1, 2,..., 63, where $N_{TA,new} = N_{TA,old} + (T_A - 31) \times 16$ according to TS 36.213 [8] clause 4.2.3. Adjustment of N_{TA} value by a positive or a negative amount indicates advancing or delaying the uplink transmission timing by a given amount respectively.

For UE timers, the UE shall comply with the timer accuracies according to TS 36.133 [4] table 7.2.2-1. The requirements are only related to the actual timing measurements internally in the UE.

The normative reference for this requirement is TS 36.133 [4] clause 7.3 and A.7.2.2

7.2.2.4 Test description

7.2.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noises source to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.

2. The general test parameter settings are set according to Table 7.2.2.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. There is one E-UTRA TDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.2.2.4-1 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 section A.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.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	

7.2.2.4.2 Test procedure

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), 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. The Timing Advance Command value shall be set to 31 during T1 and the Timing Advance Command value shall be set to 39 for T2. The UE Time Alignment Timer (timeAlignmentTimer IE), defined in TS 36.321 [11] clause 5.2, shall be configured so that it does not expire in the duration of the test.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3.
2. Set the parameters according to T1 in Tables 7.2.2.5-1, 7.2.2.5-2 and 7.2.2.5-3. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. SS shall transmit one message with a timing advance command, T_A. The timing advance command, T_A, shall be set to 31 which indicate adjustment of the current N_{TA} value. The timing advance adjustment during T1 shall be N_{TA} = 0.
6. The UE shall transmit SRS and adjust its uplink timing from the beginning of sub-frame n+6 for a timing advance command T_A received in sub-frame n. Sub-frame n is the sub-frame where the UE receive the time advance command.

7. When T1 expires, the SS shall switch the timing advance command (T_A) from T1 to T2 as specified in Table 7.2.1.5-1.

8. SS shall transmit a sequence of messages with timing advance command, T_A. The timing advance command, T_A, shall be set to 39 which indicate adjustment of the current N_{TA} value. The timing advance adjustment during T2 shall be N_{TA} = 128.

9. The UE shall transmit SRS and adjust its uplink timing from the beginning of sub-frame n+6 for a timing advance command T_A received in sub-frame n. Sub-frame n is the sub-frame where the UE receive the time advance command.

10. The timing of the first SRS transmission after sub-frame n+6 and adjustment of the timing advance in step 9) is used to measure that the UE adjust the timing of its transmission with a relative accuracy better than or equal to [$\pm 4 \times T_S$] to the signalled timing advance value compared to the timing of preceding uplink transmission.

11. If the UE adjust the timing of its transmission within a relative accuracy greater than or equal to [$\pm 4 \times T_S$] to the signalled timing advance value compared to the timing of preceding uplink transmission then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

12. Repeat step 1-11 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.2.2.4.3-1: Common Exception messages for E-UTRAN TDD – UE timing advance adjustment accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.4-1 Table H.3.4-2

Table 7.2.2.4.3-2: *SoundingRS-UL-ConfigCommon-DEFAULT*: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: 36.508 clause 4.6.3			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRSUL-ConfigCommon-DEFAULT ::= SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig	bw5	Channel-bandwidth-dependent parameter	
srs-SubframeConfig	src3		TDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	FALSE		
}			

Table 7.2.2.4.3-3: *SoundingRS-UL-ConfigDedicated-DEFAULT*: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: 36.508 clause 4.6.3			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRSUL-ConfigDedicated-DEFAULT ::= CHOICE {			
enable SEQUENCE {			
srsBandwidth	bw0	bw0 used with no frequency hopping. bw3 used with frequency hopping	
srsHoppingBandwidth	hbw0		
freqDomainPosition	0		
duration	TRUE	Indefinite duration	
srs-ConfigIndex	7	SRS periodicity of 10	
transmissionComb	0		
cyclicShift	cs0	No cyclic shift	
}			
}			

Table 7.2.1.4.3-4: *MAC-MainConfig-RBC*: Additional E-UTRAN TDD – UE timing advance adjustment accuracy test requirement

Derivation Path: 36.508 clause 4.8.2			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
dl-SCH-Config SEQUENCE {}	Not present		
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
…			
timeAlignmentTimerDedicated	infinity		

7.2.2.5 Test requirement

Tables 7.1.2.4.1-1, 7.1.2.5-1 and 7.1.2.5-2 define the primary level settings including test tolerances for E-UTRAN TDD – UE timing advance adjustment accuracy test.

Table 7.2.2.5-1 Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Value</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>Special subframe configuration[Note1]</td><td></td><td colspan="2">6</td></tr>
<tr><td>Uplink-downlink configuration[Note2]</td><td></td><td colspan="2">1</td></tr>
<tr><td>OCNG Patterns defined in D.2.1 (OP.1 TDD)</td><td></td><td colspan="2">OP.1 TDD</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[Note3]</td><td>dB</td></tr>
<tr><td>OCNG_RB[Note3]</td><td>dB</td></tr>
<tr><td>Timing Advance Command (T_A)</td><td></td><td>31</td><td>39</td></tr>
<tr><td>$\hat{E}_s/I_{ot}$</td><td>dB</td><td colspan="2">3+TT</td></tr>
<tr><td>N_{oc}</td><td>dBm/15 KHz</td><td colspan="2">-98</td></tr>
<tr><td>$\hat{E}_s/N_{oc}$</td><td>dB</td><td colspan="2">**3**+TT</td></tr>
<tr><td>Io[Note4]</td><td>dBm/9 MHz</td><td colspan="2">-65.5+TT</td></tr>
<tr><td>Propagation Condition</td><td></td><td colspan="2">AWGN</td></tr>
<tr><td colspan="4">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 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.</td></tr>
</table>

Table 7.2.2.5-2: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
Note: For further information see section 6.3.2 in 3GPP TS 36.331.		

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 UE shall adjust the timing of its transmissions with an relative accuracy better than or equal to [±4* T_S seconds] +TT to the signalled timing advance value compared to the timing of preceding uplink transmission.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7.3 UE Transmit Timing

7.3.1 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *Some test parameters are still undefined since they are not settled in TS36.133*

7.3.1.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in TS36.133 section 7.6.

7.3.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.3.1.3 Minimum conformance requirements

When the downlink radio link quality 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 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 TS36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS36.213. Two successive indications from Layer 1 shall be separated by at least [10] ms.

The transmitter power shall be turned off within [40] ms after expiry of T310 timer as specified in TS36.331section 5.3.11.

The normative reference for this requirement is TS36.133 [4] clause 7.6.2 and A.7.3.1.

7.3.1.4 Test description

The test consists of four subtests with one cell configured; the difference between the subtests is the number of transmitter antennas and the propagation channel. Each subtest consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 7.3.1.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

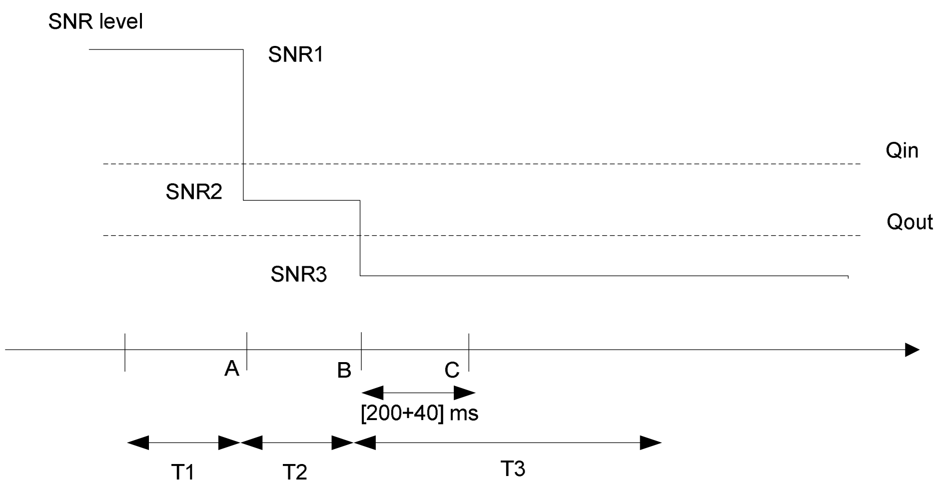

Figure 7.3.1.4-1: SNR variation for out-of-sync testing

(Editor's note: Behaviours of continuing the transmissions of PUCHH when T310 timer is running could be verified in the tests for in-sync.)

7.3.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources or faders to the UE antenna connectors as stated below.
   For subtest 1:As Shown in TS 36.508 [7] Annex A figure A.9 (without using the faders).
   For subtest 2: As Shown in TS 36.508 [7] Annex A figure A.10 (without using the faders).
   For subtest 3: As Shown in TS 36.508 [7] Annex A figure A.9
   For subtest 4: As Shown in TS 36.508 [7] Annex A figure A.10
   2. The general test parameter settings for the different subtests are set up according to Table 7.3.1.4-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 7.3.1.4.3

5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.1.4.1-1: General test parameters for E-UTRAN FDD out-of-sync testing

Parameter		Unit	Value				Comment
			Test 1	Test 2	Test 3	Test 4	
PDSCH parameters			R.0 FDD	R.1 FDD	R.0 FDD	R.1 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	R.6 FDD	R.7 FDD	As specified in section A.2.1
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	
Transmit antennas			1	2	1	2	
In sync transmission parameters	DCI format		1C	1C	1C	1C	As defined in section 5.3.3.1.4 in TS 36.212
	Number of Control OFDM symbols		2	2	2	2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in TS36.133 in section 7.6.1 and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	4	4	
	ρ_A, ρ_B		0	-3	0	-3	
	Ratio of PDCCH to RS EPRE		0	-3	0	-3	
	Ratio of PCFICH to RS EPRE		4	1	4	1	
Out of sync transmission parameters	DCI format		1A	1A	1A	1A	As defined in section 5.3.3.1.4 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 TS36.133 in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	8	8	
	ρ_A, ρ_B		0	-3	0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	
DRX			OFF	OFF	OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	0	0	T310 is disabled
T311 timer		ms	1000	1000	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	2	2	2	Minimum CQI reporting periodicity
Propagation channel			AWGN	AWGN	ETU 70 Hz	ETU 70 Hz	
T1		s	[1]	[1]	[1]	[1]	
T2		s	[0.4]	[0.4]	[0.4]	[0.4]	
T3		s	[0.5]	[0.5]	[0.5]	[0.5]	

7.3.1.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 7.3.1.5-1 for subtest 1 and 2 and according to T1 in Table and 7.3.1.5-2 for subtest 3 and 4. Propagation conditions are set according to Annex B clause B.1.1 for subtests 1 and 2 and according to B.2.2 for subtests 3 and 4. T1 starts.
3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.1.5-1 for subtests 1 and 2 and according to T2 in Table and 7.3.1.5-2 for subtests 3 and 4. T2 starts.
4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.1.5-1 for subtests 1 and 2 and according to T3 in Table and 7.3.1.5-2 for subtests 3 and 4. T3 starts.
5. If the SS stops receiving CQI reports within [200 + 40] ms from the start of T3 the number of successful tests is increased by one otherwise the number of failed tests is increased by one.
6. Repeat steps 2-5 for all subtests until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.1.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.2.4-1

Table 7.3.1.4.3-2: *CQI-ReportConfig-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

Derivation Path: 36.331 clause 6.3.2			
Information Element	**Value/remark**	**Comment**	**Condition**
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIODIC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	2	INTEGER (0..767)	
cqi-pmi-ConfigIndex	[0]	INTEGER (0..511)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	[1]	INTEGER (0..1023) Arbitrarily selected as a representative value	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

7.3.1.5 Test requirement

Table 7.3.1.5-1: 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		
Transmit antennas		1			2		
OCNG Pattern defined in D.1 (FDD)		OP.1 FDD			OP.1 FDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	0			-3		
PDCCH_RB	dB	0			-3		
PBCH_RA	dB	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						
SNR1	dB	[-4.7 +TT]			[-4.9 +TT]		
SNR2	dB	[-9.5 +TT]			[-9.5 +TT]		
SNR3	dB	[-13.5 +TT]			[-13.5 +TT]		
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.

Table 7.3.1.5-2: 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		
Transmit antennas		1			2		
OCNG Pattern defined in D.1 (FDD)		OP.1 FDD			OP.1 FDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	0			-3		
PDCCH_RB	dB	0			-3		
PBCH_RA	dB	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						
SNR1	dB	[-1.4 +TT]			[-2.3 +TT]		
SNR2	dB	[-5.5 +TT]			[-6.2 +TT]		
SNR3	dB	[-11.5 +TT]			[-12.2 +TT]		
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.							

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During time duration T1 and T2 the UE shall continuously report CQI according to the configured CQI mode (PUCCH 1-0) with a periodicity of 2 ms.

The UE shall stop reporting the CQI within [200 + 40] ms from the start of the time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.2 E-UTRAN FDD Radio Link Monitoring Test for In-sync

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *Some test parameters are still undefined since they are not settled in TS36.133*

7.3.2.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in TS36.133 section 7.6.

7.3.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.3.2.3 Minimum conformance requirements

When the downlink radio link quality 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 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 TS36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS36.213. Two successive indications from Layer 1 shall be separated by at least [10] ms.

The transmitter power shall be turned off within [40] ms after expiry of T310 timer as specified in section 5.3.11 in [2].

The normative reference for this requirement is TS36.133 [4] clause 7.6.2 and A.7.3.2.

7.3.2.4 Test description

The test consists of two subtests with one cell configured; the difference between the subtests is the number of transmitter antennas. Each subtest consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.2.4-1 shows the different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

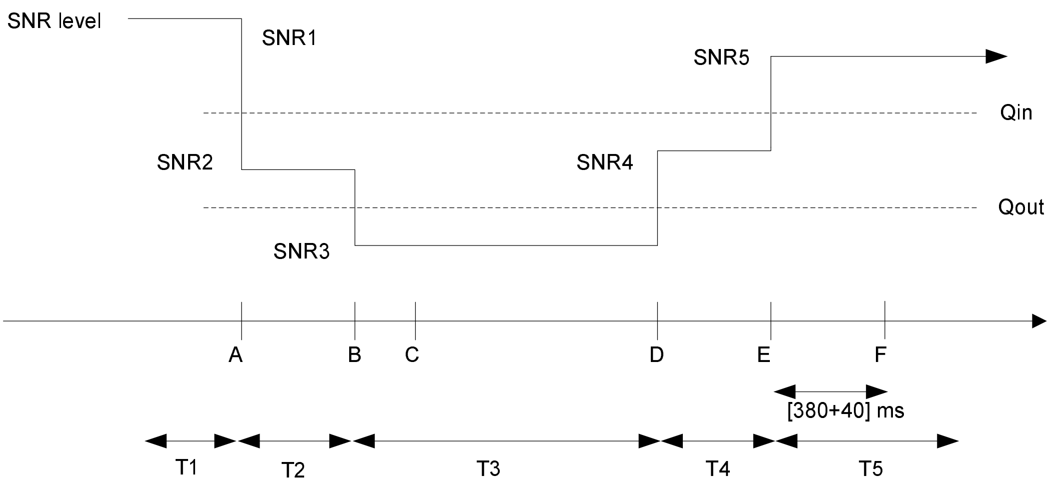

Figure 7.3.2.4-1: SNR variation for in-sync testing

(Editor's note 1: T310 timer, which starts at Point B (the best scenario), would expire 100 + 40 ms after Point E. "100 + 40 ms" would correspond the safety margin for in-sync detection for in-sync detection at Point E.)

(Editor's note 2: T310 timer, which starts 200 + 40 ms after Point B (the worst scenario), would expire 480 ms after Point E. Therefore, the verification should be conducted at Point F (380 + [40] ms after Point E).)

(Editor's note 3: Behaviours of starting T310 timer could be verified in the tests for out-of-sync.)

7.3.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. For subtest 1 (one transmitter antenna): Connect the SS (node B emulator) and faders, to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.9.
   For subtest 2 (two transmitter antennas): Connect the SS (node B emulator) and faders, to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.10.

2. The general test parameter settings for the different subtest are set up according to Table 7.3.2.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 7.3.2.4.3.

5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.2.4.1-1: General test parameters for E-UTRAN FDD in-sync testing

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PDSCH parameters			R.0 FDD	R.1 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	As specified in section A.2.1
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	
Transmit antennas			1	2	
In sync transmission parameters (Not transmitted)	DCI format		1C	1C	As defined in section 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 TS36.133 section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE		0	-3	
	Ratio of PCFICH to RS EPRE		4	1	
Out of sync transmission parameters (Not transmitted)	DCI format		1A	1A	As defined in section 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 in TS36.133 section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	
DRX			OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	[2000]	[2000]	T310 is enabled
T311 timer		ms	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	2	Minimum CQI reporting periodicity
Propagation channel			ETU 70 Hz	ETU 70 Hz	
T1		s	[0.5]	[0.5]	
T2		s	[0.4]	[0.4]	
T3		s	[1.36]	[1.36]	
T4		s	[0.4]	[0.4]	
T5		s	[1]	[1]	

7.3.2.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 7.3.2.5-1 for subtests 1 and 2 respectively. Propagation conditions are set according to Annex B.2.2. T1 starts.
3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.2.5-1. T2 starts.
4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.2.5-1. T3 starts.
5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.3.2.5-1. T4 starts.
6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.3.2.5-1. T5 starts.
7. If the SS stops receiving CQI reports before point F ([520] ms after the start of time duration T5) in Figure 7.3.2.4-1 the UE fails the test.
8. Repeat steps 2-7 for both subtests until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.2.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for in-sync

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.2.4-2

Table 7.3.2.4.3-2 : *CQI-ReportConfig-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring Test for in-sync

Derivation Path: 36.331 clause 6.3.2			
Information Element	**Value/remark**	**Comment**	**Condition**
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic CHOICE {			CQI_PERIODIC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	2	INTEGER (0..767)	
cqi-pmi-ConfigIndex	[0]	INTEGER (0..511)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	[1]	INTEGER (0..1023) Arbitrarily selected as a representative value	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

7.3.2.5 Test requirement

Table 7.3.2.5-1: 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				
Transmit antennas		1					2				
OCNG Pattern defined in D.1 (FDD)		OP.1 FDD					OP.1 FDD				
ρ_A, ρ_B		0					-3				
PCFICH_RB	dB	4					1				
PDCCH_RA	dB	0					-3				
PDCCH_RB	dB	0					-3				
PBCH_RA	dB	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										
SNR1	dB	[-1.4 +TT]					[-2.3 +TT]				
SNR2	dB	[-5.5 +TT]					[-6.2 +TT]				
SNR3	dB	[-11.5 +TT]					[-12.2 +TT]				
SNR4	dB	[-6.4 +TT]					[-7.3 +TT]				
SNR5	dB	[-1.4 +TT]					[-2.3 +TT]				
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.											

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During time duration T1, T2, T3, T4 and T5 the UE shall continuously report CQI according to the configured CQI mode (PUCCH 1-0) with a periodicity of 2 ms.

If the UE stops reporting the CQI before Point F ([420] ms after the start of the time duration T5), the UE fails the tests.

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.3 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*

- *The Test tolerances applicable to this test are undefined*
- *Some test parameters are still undefined since they are not settled in TS36.133*

7.3.3.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in TS36.133 section 7.6.

7.3.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.3.3.3 Minimum conformance requirements

When the downlink radio link quality 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 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 TS36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS36.213. Two successive indications from Layer 1 shall be separated by at least [10] ms.

The transmitter power shall be turned off within [40] ms after expiry of T310 timer as specified in TS36.331 section 5.3.11.

The normative reference for this requirement is TS36.133 [4] clause 7.6.2 and A.7.3.3.

7.3.3.4 Test description

The test consists of four subtests with one cell configured; the difference between the subtests is the number of transmitter antennas and the propagation channel. Each subtest consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 7.3.4.1-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

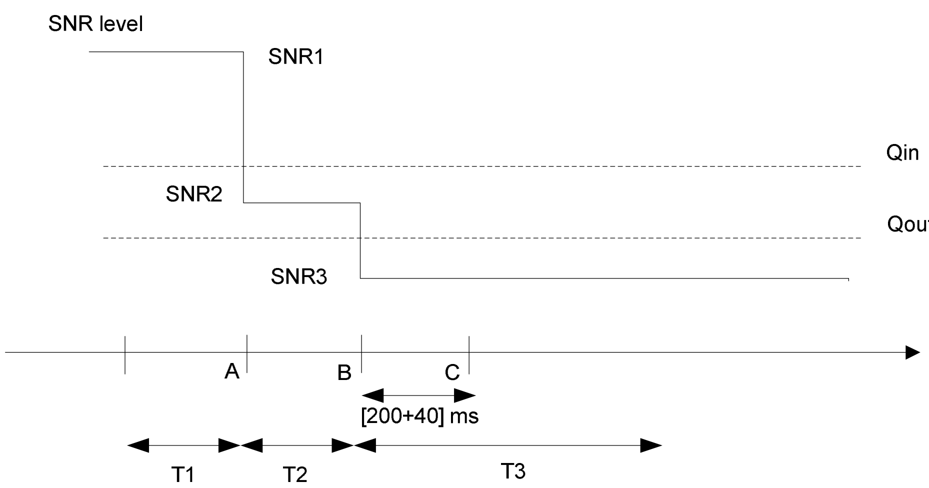

Figure 7.3.3.4-1: SNR variation for out-of-sync testing

(Editor's note: Behaviours of continuing the transmissions of PUCHH when T310 timer is running could be verified in the tests for in-sync.)

7.3.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources or faders to the UE antenna connectors as stated below.
   , fFor subtests 1: As Shown in TS 36.508 [7] Annex A figure A.9 (without using the faders).
   For subtest 2: As Shown in TS 36.508 [7] Annex A figure A.10 (without using the faders).
   For subtest 3: As Shown in TS 36.508 [7] Annex A figure A.9
   For subtest 4: As Shown in TS 36.508 [7] Annex A figure A.10

2. The general test parameter settings for the different subtests are set up according to Table 7.3.3.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 7.3.3.4.3.

6. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.3.4.1-1: General test parameters for E-UTRAN TDD out-of-sync testing

Parameter		Unit	Value				Comment
			Test 1	Test 2	Test 3	Test 4	
PDSCH parameters			R.0 TDD	R.1 TDD	R.0 TDD	R.1 TDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			R.6 TDD	R.7 TDD	R.6 TDD	R.7 TDD	As specified in section A.2.1
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	
Transmit antennas			1	2	1	2	
In sync transmission parameters	DCI format		1C	1C	1C	1C	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	2	2	In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in TS36.133 in section 7.6.1 and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	4	4	
	ρ_A, ρ_B		0	-3	0	-3	
	Ratio of PDCCH to RS EPRE		0	-3	0	-3	
	Ratio of PCFICH to RS EPRE		4	1	4	1	
Out of sync transmission parameters	DCI format		1A	1A	1A	1A	As defined in section 5.3.3.1.4 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 TS36.133 in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	8	8	
	ρ_A, ρ_B		0	-3	0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	
DRX			OFF	OFF	OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	0	0	T310 is disabled
T311 timer		ms	1000	1000	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	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]	

7.3.3.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 7.3.3.5-1 for subtests 1 and 2 and according to T1 in Table and 7.3.3.5-2 for subtest 3 and 4. Propagation conditions are set according to Annex B clause B.1.1 for subtests 1 and 2 and according to B.2.2 for subtests 3 and 4. T1 starts.
3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.3.5-1 for subtests 1 and 2 and according to T2 in Table and 7.3.3.5-2 for subtests 3 and 4. T2 starts.
4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.3.5-1 for subtests 1 and 2 and according to T3 in Table and 7.3.3.5-2 for subtests 3 and 4. T3 starts.
5. If the SS stops receiving CQI reports within [200 + 40] ms from the start of T3 the number of successful tests is increased by one otherwise the number of failed tests is increased by one.
6. Repeat steps 2-5 for all subtests until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.3.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.3.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.2.4-1

Table 7.3.3.4.3-2: *CQI-ReportConfig-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync

Derivation Path: 36.331 clause 6.3.2			
Information Element	**Value/remark**	**Comment**	**Condition**
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic CHOICE {			CQI_PERIODIC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	2	INTEGER (0..767)	
cqi-pmi-ConfigIndex	[0]	INTEGER (0..511)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	[1]	INTEGER (0..1023) Arbitrarily selected as a representative value	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

7.3.3.5 Test requirement

Table 7.3.3.5-1: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel Number		1			1		
$BW_{channel}$	MHz	10			10		
Transmit antennas		1			2		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in D.2 (TDD)		OP.1 TDD			OP.1 TDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	0			-3		
PDCCH_RB	dB	0			-3		
PBCH_RA	dB	0			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 3]	dB						
OCNG_RB[Note 3]	dB						
SNR1	dB	[-5.1+TT]			[-5.2+TT]		
SNR2	dB	[-9.1+TT]			[-9.2+TT]		
SNR3	dB	[-13.1+TT]			[-13.2+TT]		
N_{oc}	dBm/15 kHz	-98			-98		
Propagation condition		AWGN			AWGN		

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.

Table 7.3.3.5-2: 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		
Transmit antennas		1			2		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in D.2 (TDD)		OP.1 TDD			OP.1 TDD		
ρ_A, ρ_B		0			-3		
PCFICH_RB	dB	4			1		
PDCCH_RA	dB	0			-3		
PDCCH_RB	dB	0			-3		
PBCH_RA	dB	0			-3		
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA[Note 3]	dB						
OCNG_RB[Note 3]	dB						
SNR1	dB	[-1.4+TT]			[-2.3+TT]		
SNR2	dB	[-5.3+TT]			[-5.9+TT]		
SNR3	dB	[-11.3+TT]			[-11.9+TT]		
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 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.

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During time duration T1 and T2 the UE shall continuously report CQI according to the configured CQI mode (PUCCH 1-0) with a periodicity of 1 ms.

The UE shall stop reporting the CQI within [200 + 40] ms from the start of the time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.4 E-UTRAN TDD Radio Link Monitoring Test for In-sync

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *Some test parameters are still undefined since they are not settled in TS36.133*

7.3.4.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in TS36.133 section 7.6.

7.3.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.3.4.3 Minimum conformance requirements

When the downlink radio link quality 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 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 TS36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS36.213. Two successive indications from Layer 1 shall be separated by at least [10] ms.

The transmitter power shall be turned off within [40] ms after expiry of T310 timer as specified in section 5.3.11 in [2].

The normative reference for this requirement is TS36.133 [4] clause 7.6.2 and A.7.3.4.

7.3.4.4 Test description

The test consists of 2 subtests with one cell configured; the difference between the subtests is the number of transmitter antennas. Each subtest consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.4.4-1 shows the different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

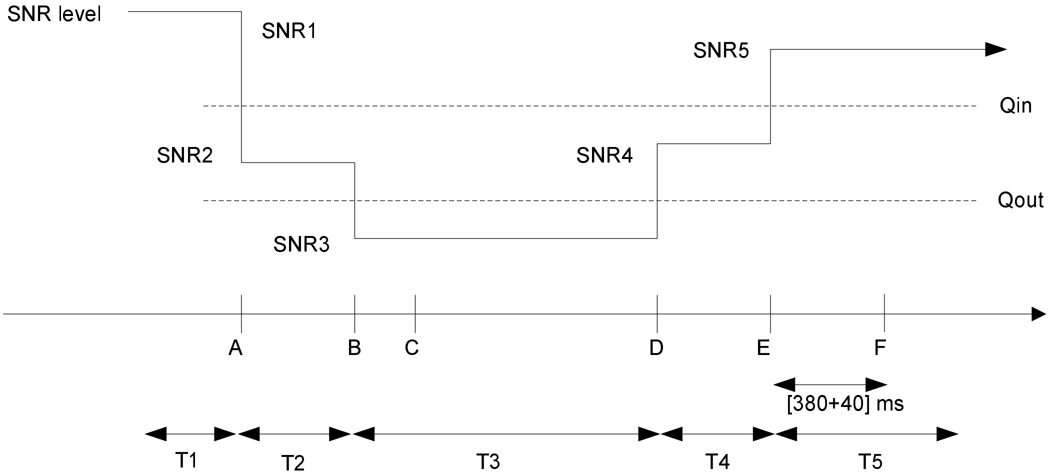

Figure 7.3.4.4-1: SNR variation for in-sync testing

(Editor's note 1: T310 timer, which starts at Point B (the best scenario), would expire *100* + 40 ms after Point E. "*100* + 40 ms" would correspond the safety margin for in-sync detection for in-sync detection at Point E.)

(Editor's note 2: T310 timer, which starts 200 + 40 ms after Point B (the worst scenario), would expire *380* ms after Point E. Therefore, the verification should be conducted at Point F (*380* + [40] ms after Point E).)

(Editor's note 3: Behaviours of starting T310 timer could be verified in the tests for out-of-sync.)

7.3.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. For subtest 1 (one transmitter antenna): Connect the SS (node B emulator) and faders, to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.9.
   For subtest 2 (two transmitter antennas): Connect the SS (node B emulator) and faders, to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.10.

2. The general test parameter settings for the different subtest are set up according to Table 7.3.4.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 7.3.4.4.3.

6. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.4.4.1-1: General test parameters for E-UTRAN TDD in-sync testing

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PDSCH parameters			R.0 TDD	R.1 TDD	As specified in section [A.2.1]
PCFICH/PDCCH/PHICH parameters			R.6 TDD	R.7 TDD	As specified in section [A.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 ($BW_{channel}$)		MHz	10	10	
Transmit antennas			1	2	
In sync transmission parameters (Not transmitted)	DCI format		1C	1C	As defined in section 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 TS36.133 section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE		0	-3	
	Ratio of PCFICH to RS EPRE		4	1	
Out of sync transmission parameters (Not transmitted)	DCI format		1A	1A	As defined in section 5.3.3.1.4 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 TS36.133 section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		0	-3	
	Ratio of PDCCH to RS EPRE	dB	4	1	
	Ratio of PCFICH to RS EPRE	dB	4	1	
DRX			OFF	OFF	
Layer 3 filtering			Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	[2000]	[2000]	T310 is enabled
T311 timer		ms	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	1	1	Minimum CQI reporting periodicity
Propagation channel			ETU 70 Hz	ETU 70 Hz	
T1		s	[0.5]	[0.5]	
T2		s	[0.4]	[0.4]	
T3		s	[1.46]	[1.46]	
T4		s	[0.4]	[0.4]	
T5		s	[1]	[1]	

7.3.4.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 7.3.4.5-1 for subtest 1 and 2 respectively. Propagation conditions are set according to Annex B.2.2. T1 starts.
3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.4.5-1. T2 starts.
4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.4.5-1. T3 starts.
5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.3.4.5-1. T4 starts.
6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.3.4.5-1. T5 starts.
7. If the SS stops receiving CQI reports before point F ([520] ms after the start of time duration T5) in Figure 7.3.4.4-1 the UE fails the test.
8. Repeat steps 2-7 for both subtests until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.3.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.4.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for in-sync

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.2.4-2

Table 7.3.4.4.3-2: *CQI-ReportConfig-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring Test for In-sync

Derivation Path: 36.331 clause 6.3.2			
Information Element	**Value/remark**	**Comment**	**Condition**
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic CHOICE {			CQI_PERIODIC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	2	INTEGER (0..767)	
cqi-pmi-ConfigIndex	[0]	INTEGER (0..511)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	[1]	INTEGER (0..1023) Arbitrarily selected as a representative value	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

7.3.4.5 Test requirement

Table 7.3.4.5-1: 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				
Transmit antennas		1					2				
Special subframe configuration[Note1]		6					6				
Uplink-downlink configuration[Note2]		1					1				
OCNG Pattern defined in D.2 (TDD)		OP.1 TDD					OP.1 TDD				
ρ_A, ρ_B		0					-3				
PCFICH_RB	dB	4					1				
PDCCH_RA	dB	0					-3				
PDCCH_RB	dB	0					-3				
PBCH_RA	dB	0					-3				
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA[Note 3]	dB										
OCNG_RB[Note 3]	dB										
SNR1	dB	[-1.4+TT]					[-2.3+TT]				
SNR2	dB	[-5.3+TT]					[-5.9+TT]				
SNR3	dB	[-11.3+TT]					[-11.9+TT]				
SNR4	dB	[-6.4+TT]					[-7.3+TT]				
SNR5	dB	[-1.4+TT]					[-2.3+TT]				
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 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.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During time duration T1, T2, T3, T4 and T5 the UE shall continuously report CQI according to the configured CQI mode (PUCCH 1-0) with a periodicity of 1 ms.

If the UE stops reporting the CQI before Point F ([520] ms after the start of the time duration T5), the UE fails the tests.

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.5 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *The test procedure is in a draft*
- *Some test parameters and requirements are still within brackets since they are not settled in TS36.133*

7.3.5.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in TS36.133 section 7.6.

7.3.5.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.3.5.3 Minimum conformance requirements

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 TS36.133 Table 7.6.2.2-1 will be used.

When the downlink radio link quality 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 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 TS36.331.

When the downlink radio link quality 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 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 TS36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS36.213. 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 section 5.3.11 in TS36.331, 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 of T310 timer.

The transmitter power shall be turned off within [40] ms after expiry of T310 counter as specified in section 5.3.11 in TS36.311.

The normative reference for this requirement is TS36.133 [4] clause 7.6.2 and A.7.3.5.

7.3.5.4 Test description

The test consists of two subtests with one cell configured; the difference between the subtests is the DRX cycle length, number of transmit antennas and the propagation conditions. Each subtest consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 7.3.5.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

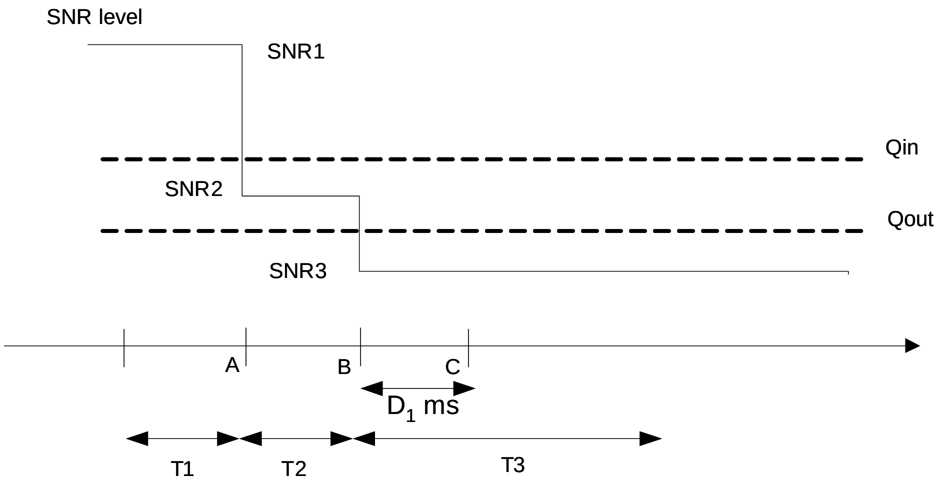

Figure 7.3.5.4-1: SNR variation for out-of-sync testing in DRX

7.3.5.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources or faders to the UE antenna connectors as stated below.
   For subtest 1: As Shown in TS 36.508 [7] Annex A figure A.10
   For subtest 2: As Shown in TS 36.508 [7] Annex A figure A.9 (without using the faders)

2. The general test parameter settings for the different subtests are set up according to Table 7.3.5.4-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 7.3.5.4.3

5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.5.4.1-1: General test parameters for E-UTRAN FDD out-of-sync in DRX testing

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Value</th><th rowspan="2">Comment</th></tr>
<tr><th>Test 1</th><th>Test 2</th></tr>
<tr><td colspan="2">PDSCH parameters</td><td></td><td>R.1 FDD</td><td>R.0 FDD</td><td>As specified in section A.1.1.</td></tr>
<tr><td colspan="2">PCFICH/PDCCH/PHICH parameters</td><td></td><td>R.7 FDD</td><td>R.6 FDD</td><td>As specified in section A.2.1.</td></tr>
<tr><td colspan="2">Active cell</td><td></td><td>Cell 1</td><td>Cell 1</td><td>Cell 1 is on E-UTRA RF channel number 1</td></tr>
<tr><td colspan="2">CP length</td><td></td><td>Normal</td><td>Normal</td><td></td></tr>
<tr><td colspan="2">E-UTRA RF Channel Number</td><td></td><td>1</td><td>1</td><td>One E-UTRA FDD carrier frequency is used.</td></tr>
<tr><td colspan="2">E-UTRA Channel Bandwidth ($BW_{channel}$)</td><td>MHz</td><td>10</td><td>10</td><td></td></tr>
<tr><td colspan="2">Transmit antennas</td><td></td><td>2</td><td>1</td><td></td></tr>
<tr><td rowspan="6">In sync transmission parameters</td><td>DCI format</td><td></td><td>1C</td><td>1C</td><td>As defined in section 5.3.3.1.4 in TS 36.212</td></tr>
<tr><td>Number of Control OFDM symbols</td><td></td><td>2</td><td>2</td><td rowspan="5">In sync threshold Q_{in} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in TS36.133 in section 7.6.1 and Table 7.6.1-2 respectively.</td></tr>
<tr><td>Aggregation level</td><td>CCE</td><td>4</td><td>4</td></tr>
<tr><td>ρ_A, ρ_B</td><td></td><td>-3</td><td>0</td></tr>
<tr><td>Ratio of PDCCH to RS EPRE</td><td></td><td>-3</td><td>0</td></tr>
<tr><td>Ratio of PCFICH to RS EPRE</td><td></td><td>1</td><td>4</td></tr>
<tr><td rowspan="6">Out of sync transmission parameters</td><td>DCI format</td><td></td><td>1A</td><td>1A</td><td>As defined in section 5.3.3.1.3 in TS 36.212</td></tr>
<tr><td>Number of Control OFDM symbols</td><td></td><td>2</td><td>2</td><td rowspan="5">Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in TS36.133 in section 7.6.1 and Table 7.6.1-1 respectively.</td></tr>
<tr><td>Aggregation level</td><td>CCE</td><td>8</td><td>8</td></tr>
<tr><td>ρ_A, ρ_B</td><td></td><td>-3</td><td>0</td></tr>
<tr><td>Ratio of PDCCH to RS EPRE</td><td>dB</td><td>1</td><td>4</td></tr>
<tr><td>Ratio of PCFICH to RS EPRE</td><td>dB</td><td>1</td><td>4</td></tr>
<tr><td colspan="2">DRX cycle</td><td>ms</td><td>40</td><td>1280</td><td>See Table 7.3.5.5-2</td></tr>
<tr><td colspan="2">Layer 3 filtering</td><td></td><td>Enabled</td><td>Enabled</td><td>Counters:
N310 = 1; N311 = 1</td></tr>
<tr><td colspan="2">T310 timer</td><td>ms</td><td>0</td><td>0</td><td>T310 is disabled</td></tr>
<tr><td colspan="2">T311 timer</td><td>ms</td><td>1000</td><td>1000</td><td>T311 is enabled</td></tr>
<tr><td colspan="2">Periodic CQI reporting mode</td><td></td><td>PUCCH 1-0</td><td>PUCCH 1-0</td><td>As defined in table 7.2.2-1 in TS 36.213.</td></tr>
<tr><td colspan="2">CQI reporting periodicity</td><td>ms</td><td>2</td><td>2</td><td>Minimum CQI reporting periodicity</td></tr>
<tr><td colspan="2">Propagation channel</td><td></td><td>ETU 70 Hz</td><td>AWGN</td><td>.</td></tr>
<tr><td colspan="2">T1</td><td>s</td><td>[4]</td><td>[32]</td><td></td></tr>
<tr><td colspan="2">T2</td><td>s</td><td>[1.6]</td><td>[12.8]</td><td></td></tr>
<tr><td colspan="2">T3</td><td>s</td><td>[1.8]</td><td>[13]</td><td></td></tr>
</table>

7.3.5.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 7.3.5.5-1 for subtest 1 and 2. Propagation conditions are set according to Annex B clause B.2.2 for subtests 1 and according to B.1.1 for subtests 2. T1 starts.

3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.5.5-1 for subtests 1 and 2. T2 starts.

4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.5.5-1 for subtests 1 and 2. T3 starts.

5. For subtest 1: If the SS stops receiving CQI reports within D_1 = [900] ms from the start of T3 the number of successful tests is increased by one otherwise the number of failed tests is increased by one.
   For subtest 2: If the SS stops receiving CQI reports within D_1 = [6500] ms from the start of T3 the number of successful tests is increased by one otherwise the number of failed tests is increased by one.

6. Repeat steps 2-5 for all subtests until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.3.5.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.5.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.2.4-1

Table 7.3.5.4.3-2: *CQI-ReportConfig-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

Derivation Path: 36.331 clause 6.3.2			
Information Element	**Value/remark**	**Comment**	**Condition**
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIODIC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	2	INTEGER (0..767)	
cqi-pmi-ConfigIndex	[0]	INTEGER (0..511)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	[1]	INTEGER (0..1023) Arbitrarily selected as a representative value	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.5.4.3-3: *MAC-MainConfig-RBC*: E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf2]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
[sf40]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[infinity]		

Table 7.3.5.4.3-4: *MAC-MainConfig-RBC*: E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #2 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf2]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf1280 typical value in real network for best-effort services.	
[sf1280]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[infinity]		

Table 7.3.5.4.3-5: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 and #2 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
…			
schedulingRequestConfig	SchedulingRequest-Config-DEFAULT		
}			

Table 7.3.5.4.3-6: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 and #2 requirements

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

7.3.5.5 Test requirement

Table 7.3.5.5-1: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring subtests #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		
Transmit antennas		2			1		
OCNG Pattern defined in D.1 (FDD)		OP.1 FDD			OP.1 FDD		
ρ_A, ρ_B		-3			0		
PCFICH_RB	dB	1			4		
PDCCH_RA	dB	-3			0		
PDCCH_RB	dB	-3			0		
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						
SNR1	dB	[-2.3+TT]			[-4.7+TT]		
SNR2	dB	[-6.2+TT]			[-9.5+TT]		
SNR3	dB	[-12.2+TT]			[-13.5+TT]		
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.

Table 7.3.5.5-2: DRX-Configuration for E-UTRAN FDD Radio Link Monitoring out-of-sync in DRX test

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	[psf2]	[psf2]	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	[psf1]	[psf1]	
drx-RetransmissionTimer	[sf1]	[sf1]	
longDRX-CycleStartOffset	[sf40]	[sf1280]	
shortDRX	disable	disable	

Table 7.3.5.5-3: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD Radio Link Monitoring out-of-sync in DRX test

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	[infinity]	[infinity]	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	[0]	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In subtest 1 and subtest 2 during time duration T1 and T2 the UE shall report CQI according to the configured CQI mode (PUCCH 1-0) once every DRX cycle.

In subtest 1 the UE shall stop reporting the CQI within duration D_1 = [900] ms from the start of the time duration T3.

In subtest 2 the UE shall stop reporting the CQI within duration D_1 = [6500] ms from the start of the time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.6 E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefinedt*
- *Some test parameters and requirements are still within brackets since they are not settled in TS36.133*
- *The test requirement is unclear in TS36.133, hence the Test Procedure and the Test requirement section is not completed*

7.3.6.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in TS36.133 section 7.6.

7.3.6.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.3.6.3 Minimum conformance requirements

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 TS36.133 Table 7.6.2.2-1 will be used.

When the downlink radio link quality 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 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 TS36.331.

When the downlink radio link quality 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 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 TS36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS36.213. 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 section 5.3.11 in TS36.331, 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 of T310 timer.

The transmitter power shall be turned off within [40] ms after expiry of T310 counter as specified in section 5.3.11 in TS36.311.

The normative reference for this requirement is TS36.133 [4] clause 7.6.2 and A.7.3.6.

7.3.6.4 Test description

The test consists of one subtest with one cell configured. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.6.4-1 shows the different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

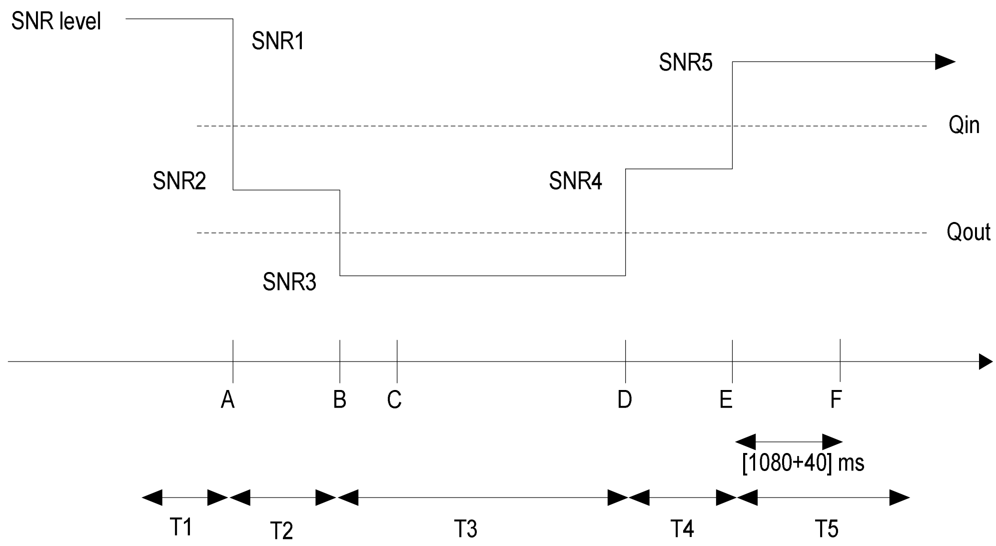

Figure 7.3.6.4-1: SNR variation for in-sync testing in DRX

7.3.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.18.
2. The general test parameter settings for the test is set up according to Table 7.3.6.4-1.
3. Propagation conditions are set according to Annex B clauses B.0.
4. Message contents are defined in clause 7.3.6.4.3
5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.6.4.1-1: General test parameters for E-UTRAN FDD in-sync in DRX testing

Parameter		Unit	Value	Comment
PDSCH parameters			R.0 FDD	As specified in section A.1.1.
PCFICH/PDCCH/PHICH parameters			R.6 FDD	As specified in section A.2.1.
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	
Transmit antennas			1	
In sync transmission parameters (Not transmitted)	DCI format		1C	As defined in section 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 TS36.133in section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Not transmitted)	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in TS36.133 in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle		ms	40	See Table A.7.3.6.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	[2000]	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity
Propagation channel			AWGN	
T1		s	[4]	
T2		s	[1.6]	
T3		s	[1.46]	
T4		s	[0.4]	
T5		s	[4]	

7.3.6.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 7.3.6.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.6.5-1. T2 starts.

4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.6.5-1. T3 starts.

5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.3.6.5-1. T4 starts.

6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.3.6.5-1. T5 starts.

7. If the SS stops receiving CQI reports before [FFS]

8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.3.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.6.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.2.4-2

Table 7.3.6.4.3-2: *CQI-ReportConfig-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX

Derivation Path: 36.331 clause 6.3.2			
Information Element	**Value/remark**	**Comment**	**Condition**
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIODIC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	2	INTEGER (0..767)	
cqi-pmi-ConfigIndex	[0]	INTEGER (0..511)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	[1]	INTEGER (0..1023) Arbitrarily selected as a representative value	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.6.4.3-3: *MAC-MainConfig-RBC*: E-UTRAN FDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf2]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
[sf40]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[infinity]		

Table 7.3.6.4.3-4: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN FDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
…			
schedulingRequestConfig	SchedulingRequest-Config-DEFAULT		
}			

Table 7.3.6.4.3-5: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN FDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

7.3.6.5 Test requirement

Table 7.3.6.5-1: Cell specific test parameters for E-UTRAN FDD (cell # 1) for In-sync radio link monitoring test

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
Transmit antennas		1				
OCNG Pattern defined in D.1.1. (FDD)		OP.1 FDD				
ρ_A, ρ_B		0				
PCFICH_RB	dB	4				
PDCCH_RA	dB	0				
PDCCH_RB	dB	0				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA[Note1]	dB					
OCNG_R B[Note1]	dB					
SNR1	dB	[-4.7+TT]				
SNR2	dB	[-9.5+TT]				
SNR3	dB	[-13.5+TT]				
SNR4	dB	[-8.7+TT]				
SNR5	dB	[-4.7+TT]				
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.						

Table 7.3.6.5-2: DRX-Configuration for E-UTRAN FDD Radio Link Monitoring in-sync in DRX test

Field	Value	Comment
onDurationTimer	[psf2]	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	[psf1]	
drx-RetransmissionTimer	[sf1]	
longDRX-CycleStartOffset	[sf40]	
shortDRX	disable	

Table 7.3.6.5-3: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD Radio Link Monitoring in-sync in DRX test

Field	Value	Comment
TimeAlignmentTimer	[infinity]	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the entire test from time period T1 to T5 the UE shall report CQI according to the configured CQI mode (PUCCH 1-0) once every DRX cycle.

[FFS]

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.7 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *The test procedure is in a draft*
- *Some test parameters and requirements are still within brackets since they are not settled in TS36.133*
- *The CQI reporting periodicity in Table 7.3.7.4.1-1 should be 1ms, editorial error in TS36.133*

7.3.7.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in TS36.133 section 7.6.

7.3.7.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.3.7.3 Minimum conformance requirements

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 TS36.133 Table 7.6.2.2-1 will be used.

When the downlink radio link quality 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 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 TS36.331.

When the downlink radio link quality 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 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 TS36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS36.213. 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 section 5.3.11 in TS36.331, 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 of T310 timer.

The transmitter power shall be turned off within [40] ms after expiry of T310 counter as specified in section 5.3.11 in TS36.311.

The normative reference for this requirement is TS36.133 [4] clause 7.6.2 and A.7.3.7.

7.3.7.4 Test description

The test consists of two subtests with one cell configured; the difference between the subtests is the DRX cycle length, number of transmit antennas and the propagation conditions. Each subtest consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 7.3.7.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

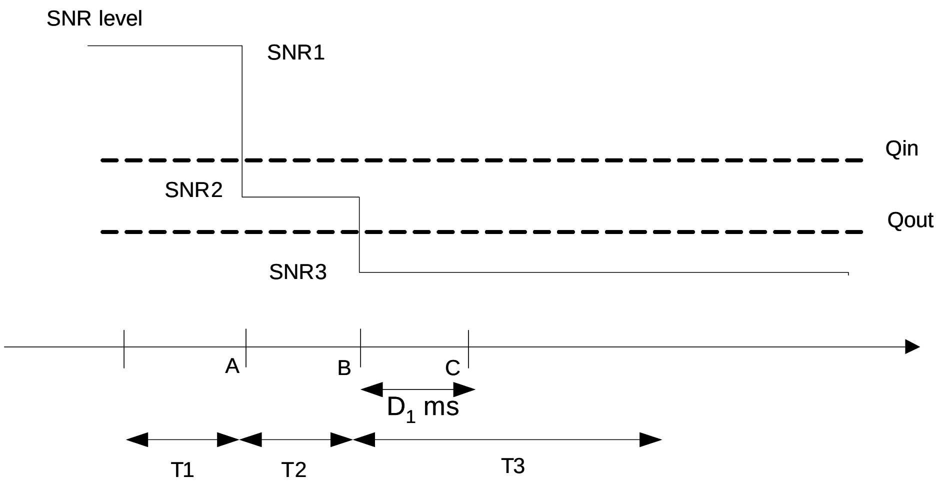

Figure 7.3.7.4-1: SNR variation for out-of-sync testing in DRX

7.3.7.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources or faders to the UE antenna connectors as stated below.
   For subtest 1: As Shown in TS 36.508 [7] Annex A figure A.10
   For subtest 2: As Shown in TS 36.508 [7] Annex A figure A.9 (without using the faders)

2. The general test parameter settings for the different subtests are set up according to Table 7.3.7.4-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 7.3.7.4.3

5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.7.4.1-1: General test parameters for E-UTRAN TDD out-of-sync in DRX testing

Parameter		Unit	Value		Comment
			Test 1	Test 2	
PDSCH parameters			R.1 TDD	R.0 TDD	As specified in section A.1.2.
PCFICH/PDCCH/PHICH parameters			R.7 TDD	R.6 TDD	As specified in section A.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 ($BW_{channel}$)		MHz	10	10	
Transmit antennas			2	1	
In sync transmission parameters	DCI format		1C	1C	As defined in section 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 TS36.133 in section 7.6.1 and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	4	
	ρ_A, ρ_B		-3	0	
	Ratio of PDCCH to RS EPRE		-3	0	
	Ratio of PCFICH to RS EPRE		1	4	
Out of sync transmission parameters	DCI format		1A	1A	As defined in section 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 TS36.133 in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	8	
	ρ_A, ρ_B		-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 7.3.7.5-2
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]	

7.3.7.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 7.3.7.5-1 for subtest 1 and 2. Propagation conditions are set according to Annex B clause B.2.2 for subtests 1 and according to B.1.1 for subtests 2. T1 starts.

3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.7.5-1 for subtests 1 and 2. T2 starts.

4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.7.5-1 for subtests 1 and 2. T3 starts.

5. For subtest 1: If the SS stops receiving CQI reports within D_1 = [900] ms from the start of T3 the number of successful tests is increased by one otherwise the number of failed tests is increased by one.
   For subtest 2: If the SS stops receiving CQI reports within D_1 = [6500] ms from the start of T3 the number of successful tests is increased by one otherwise the number of failed tests is increased by one.

6. Repeat steps 2-5 for all subtests until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.3.7.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.7.4.3-1: Common Exception messages for E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.2.4-1

Table 7.3.7.4.3-2: *CQI-ReportConfig-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

Derivation Path: 36.331 clause 6.3.2			
Information Element	**Value/remark**	**Comment**	**Condition**
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIODIC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	2	INTEGER (0..767)	
cqi-pmi-ConfigIndex	[0]	INTEGER (0..511)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	[1]	INTEGER (0..1023) Arbitrarily selected as a representative value	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.7.4.3-3: *MAC-MainConfig-RBC*: E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf2]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
[sf40]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[infinity]		

Table 7.3.7.4.3-4: *MAC-MainConfig-RBC*: E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #2 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf2]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf1280 typical value in real network for best-effort services.	
[sf1280]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[infinity]		

Table 7.3.7.4.3-5: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 and #2 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
…			
schedulingRequestConfig	SchedulingRequest-Config-DEFAULT		
}			

Table 7.3.7.4.3-6: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 and #2 requirements

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

7.3.7.5 Test requirement

Table 7.3.7.5-1: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring subtests #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		
Transmit antennas		2			1		
Special subframe configuration[Note1]		6			6		
Uplink-downlink configuration[Note2]		1			1		
OCNG Pattern defined in D.2 (TDD)		OP.1 TDD			OP.1 TDD		
ρ_A, ρ_B		-3			0		
PCFICH_RB	dB	1			4		
PDCCH_RA	dB	-3			0		
PDCCH_RB	dB	-3			0		
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						
SNR1	dB	[-2.3+TT]			[-4.7+TT]		
SNR2	dB	[-6.2+TT]			[-9.5+TT]		
SNR3	dB	[-12.2+TT]			[-13.5+TT]		
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 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.

Table 7.3.7.5-2: DRX-Configuration for E-UTRAN TDD Radio Link Monitoring out-of-sync in DRX test

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	[psf2]	[psf2]	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	[psf1]	[psf1]	
drx-RetransmissionTimer	[sf1]	[sf1]	
longDRX-CycleStartOffset	[sf40]	[sf1280]	
shortDRX	disable	disable	

Table 7.3.7.5-3: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD Radio Link Monitoring out-of-sync in DRX test

Field	Test1 Value	Test2 Value	Comment
TimeAlignmentTimer	[infinity]	[infinity]	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	[0]	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In test 1 and test 2 during time duration T1 and T2 the UE shall report CQI according to the configured CQI mode (PUCCH 1-0) once every DRX cycle.

In test 1 the UE shall stop reporting the CQI within duration D_1 = [900] ms from the start of the time duration T3.

In test 2 the UE shall stop reporting the CQI within duration D_1 = [6500] ms from the start of the time duration T3.

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.8 E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefinedt*
- *Some test parameters and requirements are still within brackets since they are not settled in TS36.133*
- *The test requirement is unclear in TS36.133, hence the Test Procedure and the Test requirement section is not completed*
- *The CQI reporting periodicity in Table 7.3.7.4.1-1 should be 1ms, editorial error in TS36.133*

7.3.8.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in TS36.133 section 7.6.

7.3.8.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.3.8.3 Minimum conformance requirements

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 TS36.133 Table 7.6.2.2-1 will be used.

When the downlink radio link quality 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 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 TS36.331.

When the downlink radio link quality 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 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 TS36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS36.213. 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 section 5.3.11 in TS36.331, 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 of T310 timer.

The transmitter power shall be turned off within [40] ms after expiry of T310 counter as specified in section 5.3.11 in TS36.311.

The normative reference for this requirement is TS36.133 [4] clause 7.6.2 and A.7.3.8.

7.3.8.4 Test description

The test consists of one subtest with one cell configured. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.8.4-1 shows the different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

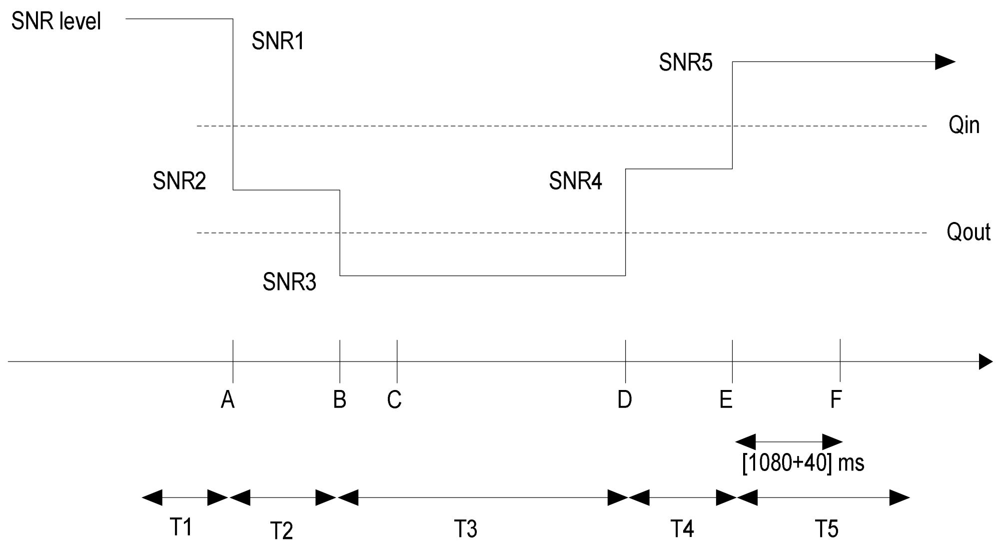

Figure 7.3.8.4-1: SNR variation for in-sync testing in DRX

7.3.8.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.18.

2. The general test parameter settings for the test is set up according to Table 7.3.8.4-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 7.3.8.4.3

5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.8.4.1-1: General test parameters for E-UTRAN TDD in-sync in DRX testing

Parameter		Unit	Value	Comment
PDSCH parameters			R.0 TDD	As specified in section A.1.2.
PCFICH/PDCCH/PHICH parameters			R.6 TDD	As specified in section A.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	
Transmit antennas			1	
In sync transmission parameters (Not transmitted)	DCI format		1C	As defined in section 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 TS36.133in section and Table 7.6.1-2 respectively.
	Aggregation level	CCE	4	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE		0	
	Ratio of PCFICH to RS EPRE		4	
Out of sync transmission parameters (Not transmitted)	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	Out of sync threshold Q_{out} and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in TS36.133 in section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρ_A, ρ_B		0	
	Ratio of PDCCH to RS EPRE	dB	4	
	Ratio of PCFICH to RS EPRE	dB	4	
DRX cycle		ms	40	See Table A.7.3.8.1-3
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	[2000]	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	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]	

7.3.8.4.2 Test procedure

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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 7.3.8.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.8.5-1. T2 starts.

4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.8.5-1. T3 starts.

5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.3.8.5-1. T4 starts.

6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.3.8.5-1. T5 starts.

7. If the SS stops receiving CQI reports before [FFS]

8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

7.3.8.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.8.4.3-1: Common Exception messages for E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.2.4-2

Table 7.3.8.4.3-2: *CQI-ReportConfig-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX

Derivation Path: 36.331 clause 6.3.2			
Information Element	**Value/remark**	**Comment**	**Condition**
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIODIC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	2	INTEGER (0..767)	
cqi-pmi-ConfigIndex	[0]	INTEGER (0..511)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	[1]	INTEGER (0..1023) Arbitrarily selected as a representative value	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.8.4.3-3: *MAC-MainConfig-RBC*: E-UTRAN TDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf2]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
[sf40]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[infinity]		

Table 7.3.8.4.3-4: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN TDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
…			
schedulingRequestConfig	SchedulingRequest-Config-DEFAULT		
}			

Table 7.3.8.4.3-5: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN TDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

7.3.8.5 Test requirement

Table 7.3.8.5-1: Cell specific test parameters for E-UTRAN TDD (cell # 1) for In-sync radio link monitoring test

Parameter	Unit	Test 1				
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number		1				
$BW_{channel}$	MHz	10				
Transmit antennas		1				
Special subframe configuration[Note1]		6				
Uplink-downlink configuration[Note2]		1				
OCNG Pattern defined in D.2.1. (TDD)		OP.1 TDD				
ρ_A, ρ_B		0				
PCFICH_RB	dB	4				
PDCCH_RA	dB	0				
PDCCH_RB	dB	0				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA[Note1]	dB					
OCNG_R B[Note1]	dB					
SNR1	dB	[-4.7+TT]				
SNR2	dB	[-9.5+TT]				
SNR3	dB	[-13.5+TT]				
SNR4	dB	[-8.7+TT]				
SNR5	dB	[-4.7+TT]				
N_{oc}	dBm/15 kHz	-98				
Propagation condition		AWGN				

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.

Table 7.3.8.5-2: DRX-Configuration for E-UTRAN TDD Radio Link Monitoring in-sync in DRX test

Field	Value	Comment
onDurationTimer	[psf2]	As specified in section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	[psf1]	
drx-RetransmissionTimer	[sf1]	
longDRX-CycleStartOffset	[sf40]	
shortDRX	disable	

Table 7.3.8.5-3: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD Radio Link Monitoring in-sync in DRX test

Field	Value	Comment
TimeAlignmentTimer	[infinity]	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the entire test from time period T1 to T5 the UE shall report CQI according to the configured CQI mode (PUCCH 1-0) once every DRX cycle.

[FFS]

The rate of correct events observed during repeated tests shall be at least 90%.

8 UE Measurements Procedures

When the UE is in RRC_CONNECTED state on a cell, UE reports measurement information in accordance with the measurement configuration as provided by the System Simulator. To initiate a specific measurement, the System Simulator sends a 'RRC Connection Reconfiguration message' to the UE including a measurement ID and type, a command (setup, modify, release), the measurement objects, the measurement quantity, the reporting quantities and the reporting criteria (periodical/event-triggered), after that the measurement reporting process takes place. In this process when the reporting criteria are fulfilled the UE sends a 'Measurement Report message' to the System Simulator including the measurement ID and the results. The reporting criteria that trigger the UE to send a 'Measurement Report message' to the System Simulator is event-triggered as defined in TS 36.331 [5] clause 5.5.3. The measurement reporting succeeds only if the measurement report is sent within the specified measurement reporting delay period.

8.1 E-UTRAN FDD intra frequency measurements

8.1.1 E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in asynchronous cells

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.1.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions in asynchronous cells within the E-UTRA FDD-FDD intra frequency cell search requirements.

8.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

8.1.1.3 Minimum conformance requirements

The measurement reporting delay shall be less than $T_{identify\_intra}$ in RRC_CONNECTED state.

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within

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

Where:

$T_{basic\_identify\_E\text{-}UTRA\_FDD,\ intra}$ is 800 ms.

$T_{Measurement\_Period,Intra}$ = 200 ms. The measurement period for intra-frequency RSRP measurements.

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.

A cell shall be considered detectable when

- RSRP related side condition given in TS 36.133 [4] clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP ≥ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21 and SCH Ês/Iot ≥ - 6 dB,
- SCH_RP $|_{dBm}$≥ -126 dBm for Band 9 and SCH Ês/Iot ≥ - 6 dB,

- SCH_RP $|_{dBm} \geq$ -125 dBm for Bands 2, 5, 7, 17 and SCH Ês/Iot $\geq$ - 6 dB,
- SCH_RP SCH_RP $|_{dBm} \geq$ -124 dBm for Bands 3, 8, 12, 13, 14 and SCH Ês/Iot $\geq$ - 6 dB.

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 all identified cells but the reporting rate of RSRP and RSRQ measurements of cells from UE physical layer to higher layers may be decreased.

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

Where:

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

$T_{Measurement\_Period\ Intra}$ = 200 ms. The measurement period for intra-frequency RSRP measurements.

T_{Intra}: This is the 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.

The measurement accuracy for all measured cells shall be as specified in TS 36.133 [4] clause 9.1.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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. 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 TS 36.133 [4] clause 8.1.2.2.1.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 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 $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected.The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.2.1 and A.8.1.1.

8.1.1.4 Test description

8.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 8.1.1.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.1.1.4.3.

5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.1.1.4.1-1: 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.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.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	-3	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
Time offset between cells	ms	3	Asynchronous cells 3ms or 92160*Ts
T1	s	5	
T2	s	5	

8.1.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 8.1.1.5-1. Propagation conditions are set according to Annex B clauses B.1.1 and B.2.2. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.1.1.5-1.

6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.1.1.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1

Table 8.1.1.4.3-2: *MeasurementConfiguration-DEFAULT*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigEUTRA-A3		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	Not present		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 8.1.1.4.3-3: *ReportConfigEUTRA-A3*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-6 (-3 dB)	-3 is actual value in dB (-6 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.1.1.4.3-4: *MeasuredResults*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.1.1.4.3-5: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult			
rsrpResult	Not present		
rsrqResult SEQUENCE {	Not present		
…			
}			
}			

8.1.1.5 Test requirement

Tables 8.1.1.4.1-1 and 8.1.1.5-1 define the primary level settings including test tolerances for E-UTRAN FDD-FDD event triggered reporting under fading propagation conditions in asynchronous cells test.

Table 8.1.1.5-1: Cell Specific Test requirement 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 D.1.1 (OP.1 FDD) and in D.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 + TT	-3.79 + TT	-Infinity	1.54 + TT
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT	-Infinity	7 + TT
RSRP Note 4	dBm/15 KHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
SCH_RP Note 4	dBm/15 KHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
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.					

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 2.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_intra}$

$$T_{identify\_intra} = T_{basic\ identify\ E-UTRA\_FDD,\ intra} \cdot \frac{T_{Measurement\ Period,\ Intra}}{T_{Intra}}$$

$T_{basic\_identify\_E-UTRA\_FDD,\ intra}$= 800 ms

$T_{Measurement\_Period,Intra}$ = 200 ms

T_{Intra} = 200 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.1.2 E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.1.2.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions in synchronous cells within the E-UTRA FDD-FDD intra frequency cell search requirements.

8.1.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

8.1.2.3 Minimum conformance requirements

The measurement reporting delay shall be less than $T_{identify\_intra}$ in RRC_CONNECTED state.

When no DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within

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

Where:

$T_{basic\_identify\_E\text{-}UTRA\_FDD,\ intra}$ is 800 ms.

$T_{Measurement\_Period,Intra}$ = 200 ms. The measurement period for intra-frequency RSRP measurements.

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.

A cell shall be considered detectable when

- RSRP related side condition given in TS 36.133 [4] clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP $\geq$ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21 and SCH Ês/Iot $\geq$ 6 dB,
- SCH_RP $|_{dBm}\geq$ -126 dBm for Band 9 and SCH Ês/Iot > - 6 dB,
- SCH_RP $|_{dBm}\geq$ -125 dBm for Bands 2, 5, 7, 17 and SCH Ês/Iot > - 6 dB,
- SCH_RP SCH_RP $|_{dBm}\geq$-124 dBm for Bands 3, 8, 12, 13, 14 and SCH Ês/Iot > - 6 dB.

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 $Y_{\text{measurement intra}}$ 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 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.

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

Where:

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

$T_{\text{Measurement\_Period Intra}}$ = 200 ms. The measurement period for intra-frequency RSRP measurements.

T_{Intra}: This is the 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.

The measurement accuracy for all measured cells shall be as specified in TS 36.133 [4] clause 9.1.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify intra}}$ defined in TS 36.133 [4] clause 8.1.2.2.1.2. When L3 filtering is used 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 TS 36.133 [4] section 8.1.2.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period Intra}}$ provided the timing to that cell has not changed more than ± 50 Ts and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.2.1 and A.8.1.2.

8.1.2.4 Test description

8.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 8.1.2.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.1.2.4.3.

5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.1.2.4.1-1: General Test Parameters for E-UTRAN FDD-FDD 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.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in clause A.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	-3	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	ms	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in Table 8.1.2.5-2
Time offset between cells	µs	3	Synchronous cells 3µs or 92*Ts
T1	s	5	
T2	s	5	

8.1.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 8.1.2.5-1. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.1.2.5-1.

6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9.Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.1.2.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.6-2

Table 8.1.2.4.3-2: *MeasurementConfiguration-DEFAULT*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigEUTRA-A3		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	Not present		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 8.1.2.4.3-3: *ReportConfigEUTRA-A3*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-6 (-3 dB)	-3 is actual value in dB (-6 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.1.2.4.3-4: *MeasuredResults*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.1.2.4.3-5: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult			
rsrpResult	Not present		
rsrqResult SEQUENCE {	Not present		
…			
}			
}			

8.1.2.5 Test requirement

Tables 8.1.2.4.1-1, 8.1.2.5-1, and 8.1.2.5-2 define the primary level settings including test tolerances for E-UTRAN FDD-FDD event triggered reporting under fading propagation conditions in synchronous cells test.

Table 8.1.2.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD 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 D.1.1 (OP.1 FDD) and in D.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 + TT	-3.79 + TT	-Infinity	1.54 + TT
N_{oc} Note 3	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT	-Infinity	7 + TT
RSRP Note 4	dBm/15 KHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
SCH_RP Note 4	dBm/15 KHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
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.					

Table 8.1.2.5-2: Reference DRX-Configuration to be used in E-UTRAN FDD-FDD event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Value	Comments
Reference configuration	DRX_L	As defined in 4.8.2.1.5 in TS 36.508 [7.]
onDurationTimer	psf6	
drx-InactivityTimer	psf1920	
drx-RetransmissionTimer	sf16	
longDRX-CycleStartOffset	sf1280, 0	
shortDRX	disabled	
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].		

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 2.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_intra}$

$$T_{identify\_intra} = T_{basic\ identify\ E-UTRA\_FDD,\ intra} \cdot \frac{T_{Measurement\ Period,\ Intra}}{T_{Intra}}$$

$T_{basic\_identify\_E\text{-}UTRA\_FDD,\ intra}$ = 800 ms

$T_{Measurement\_Period,Intra}$ = 200 ms

T_{Intra} = 200 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.1.3 E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.1.3.1 Test purpose

To verify the UE's ability to make a correct reporting of an event in DRX under fading propagation conditions in synchronous cells within the E-UTRA FDD-FDD intra frequency cell search requirements.

8.1.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

8.1.3.3 Minimum conformance requirements

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\ intra}$ as defined in table 8.1.2.2.1.2-1 of TS 36.133 [4] clause 8.1.2.2.1.2.

A cell shall be considered detectable when

- RSRP related side condition given in TS 36.133 [4] clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP $\geq$ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 20 and SCH Ês/Iot $\geq$ 6 dB,
- SCH_RP $|_{dBm} \geq$ -126 dBm for Band 9 and SCH Ês/Iot > - 6 dB,
- SCH_RP $|_{dBm} \geq$ -125 dBm for Bands 2, 5, 7, 17 and SCH Ês/Iot > - 6 dB,
- SCH_RP SCH_RP $|_{dBm} \geq$-124 dBm for Bands 3, 8, 12, 13, 14 and SCH Ês/Iot > - 6 dB.

In the RRC_CONNECTED state with DRX cycles of 80 ms or greater the measurement period for intra frequency measurements is $T_{measure\_intra}$ as defined in table 8.1.2.2.1.2-2 of TS 36.133 [4] clause 8.1.2.2.1.2. The UE shall be capable of performing RSRP measurement 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 $T_{measure\_intra}$.

The measurement accuracy for all measured cells shall be as specified in TS 36.133 [4] clause 9.1.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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 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 TS 36.133 [4] clause 8.1.2.2.1.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 8.1.2.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.2.1 and A.8.1.4.

8.1.3.4 Test description

8.1.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 8.1.3.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.1.3.4.3.

5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.1.3.4.1-1: 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 section A.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD		As specified in section A.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	-3		
CP length		Normal		
Hysteresis	dB	0		
Time To Trigger	dB	0		
Filter coefficient		0		L3 filtering is not used
DRX		ON		DRX related parameters are defined in Table 8.1.3.5-2
Time offset between cells		3 µs		Synchronous cells 3µs or 92*Ts
T1	s	5		
T2	s	5	30	

8.1.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

In Test 1 when DRX = 40 ms is used, UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle. In Test 2 when DRX = 1280 ms is used, the uplink time alignment is not maintained and the UE needs to use RACH to obtain uplink allocation for measurement reporting.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 8.1.3.5-1, 8.1.3.5-2 and 8.1.3.5-3. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.1.3.5-1 and 8.1.3.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms for Test 1 or less than 25602 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

10. Repeat step 1-9 for each sub-test in Table 8.1.3.4.1-1 as appropriate.

8.1.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.1.3.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra frequency event triggered reporting in DRX under fading propagation conditions test 1 and 2 requirements

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2

Table 8.1.3.4.3-2: *ReportConfigEUTRA-A3*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting with in DRX under fading propagation conditions test 1 and 2 requirements

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventide CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-6 (-3 dB)	-3 is actual value in dB (-6 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.1.3.4.3-3: *MAC-MainConfig-RBC*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions test 1 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf1]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
[sf40]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[sf500]		

Table 8.1.3.4.3-4: *MAC-MainConfig-RBC*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting in DRX under fading propagation conditions test 2 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf1]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf1280 typical value in real network for real-time services.	
[sf1280]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[sf500]		

Table 8.1.3.4.3-5: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions test 1 and 2 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
…			
schedulingRequestConfig	SchedulingRequest-Config-DEFAULT		
}			

Table 8.1.3.4.3-6: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions test 1 and 2 requirements

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

Table 8.1.3.4.3-7: *MeasuredResults*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting in DRX under fading propagation conditions test 1 and 2 requirements

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.1.3.4.3-8: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD intra frequency event triggered reporting in DRX under fading propagation conditions test 1 and 2 requirements

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA {			
physCellId	PhysCellId		
cgi-Info SEQUENCE {			
cellglobalId-EUTRA	cellGlobalId-EUTRA		
trackingAreaCode	trackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

8.1.3.5 Test requirement

Tables 8.1.3.4.1-1, 8.1.3.5-1, 8.1.3.5-2 and 8.1.3.5-3 define the primary level settings including test tolerances for E-UTRAN FDD-FDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used test.

Table 8.1.3.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions

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 D.1.1 (OP.1 FDD) and in D.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 + TT	-3.79 + TT	-Infinity	1.54 + TT
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT	-Infinity	7 + TT
RSRP Note 3	dBm/15 KHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
SCH_RP Note 3	dBm/15 KHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
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 8.1.3.5-2: DRX Configuration to be used for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	[psf1]	[psf1]	As specified in section 6.3.2 in 3GPP TS 36.331 [5]
drx-InactivityTimer	[psf1]	[psf1]	
drx-RetransmissionTimer	[sf1]	[sf1]	
longDRX-CycleStartOffset	[sf40]	[sf1280]	
shortDRX	disable	disable	

Table 8.1.3.5-3: TimeAlignmentTimer and sr-ConfigIndex-Configuration to be used for E-UTRAN FDD-FDD intra-frequency event triggered reporting in DRX under fading propagation conditions

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	[sf500]	[sf500]	As specified in section 6.3.2 in 3GPP TS 36.331 [5]
sr-ConfigIndex	[0]	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213 [8].

In Test 1 when DRX = 40 ms is used, the overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 2 on PUSCH.

The overall delays measured when DRX cycle length is 40 ms in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 40 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_intra}$

$T_{identify\_intra}$ = 800 ms. When DRX cycle length is 40 ms than the $T_{identify\_intra}$ is 0.8 s.

TTI insertion uncertainty = 2 ms

The overall delays measured when DRX cycle length is 40 ms shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

In Test 2 when DRX = 1280 ms is used, the overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to Cell 2 on PUSCH..

The overall delays measured when DRX cycle length is 1280 ms in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 1280 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_intra}$

$T_{identify\_intra}$ = 25600 ms. When DRX cycle length is 1280 ms than the $T_{identify\_intra}$ is 20 s x 1280 ms.

TTI insertion uncertainty = 2 ms

The overall delays measured when DRX cycle length is 1280 ms shall be less than a total of 25602 ms in this test case (note: this gives a total of 25600 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.1.4 E-UTRAN FDD-FDD Intra-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.1.4.1 Test purpose

To verify the UE's ability to make a correct reporting of an event in DRX when L3 filtering is used in AWGN propagation conditions in asynchronous cells within the E-UTRA FDD-FDD intra frequency cell search in DRX requirements.

8.1.4.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

8.1.4.3 Minimum conformance requirements

When DRX is in use the UE shall be able to identify a new detectable FDD intra frequency cell within $T_{identify\ intra}$ as defined in table 8.1.2.2.1.2-1 of TS 36.133 [4] clause 8.1.2.2.1.2.

A cell shall be considered detectable when

- RSRP related side condition given in TS 36.133 [4] clause 9.1 are fulfilled for a corresponding Band,
- SCH_RP $\geq$ -127 dBm for Bands 1, 4, 6, 10, 18, 19 and SCH Ês/Iot $\geq$ 6 dB,
- SCH_RP $|_{dBm}\geq$ -126 dBm for Band 9 and SCH Ês/Iot > - 6 dB,
- SCH_RP $|_{dBm}\geq$ -125 dBm for Bands 2, 5, 7, 11, 17 and SCH Ês/Iot > - 6 dB,
- SCH_RP SCH_RP $|_{dBm}\geq$-124 dBm for Bands 3, 8, 12, 13, 14 and SCH Ês/Iot > - 6 dB.

In the RRC_CONNECTED state with DRX cycles of 40 ms or greater the measurement period for intra frequency measurements is $T_{measure\_intra}$ as defined in table 8.1.4.3-1. The UE shall be capable of performing RSRP measurement 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 8.1.4.3-1: Requirement to measure FDD intra frequency cells

DRX cycle length (s)	$T_{measure\_intra}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

The measurement accuracy for all measured cells shall be as specified in TS 36.133 [4] clause 9.1.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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 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 TS 36.133 [4] clause 8.1.2.2.1.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] 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 $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.2.1 and A.8.1.4.

8.1.4.4 Test description

8.1.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.
2. The general test parameter settings are set up according to Table 8.1.4.4.1-1.
3. Propagation conditions are set according to Annex B clauses B.0.
4. Message contents are defined in clause 8.1.4.4.3.
5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.1.4.4.1-1: General Test Parameters for E-UTRAN FDD-FDD intra-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 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.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	
Neighbour A3-Offset Ofn	dB	[-14]	
CP length		Normal	
Hysteresis	dB	0	
Time To Trigger	dB	0	
Filter coefficient		[9]	L3 filtering is used
DRX		ON	DRX related parameters are defined in Table 8.1.4.5-2
Time offset between cells		3 ms	Asynchronous cells
T1	S	30	
T2	S	7	

8.1.4.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively.

In the Test when DRX = 1280 ms is used, a non-zero L3 filtering is configured. The uplink time alignment is not maintained and UE needs to use RACH to obtain UL allocation for measurement reporting.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 8.1.4.5-1, 8.1.4.5-2 and 8.1.4.5-3. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.1.4.5-1 and 8.1.4.5-2.
6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 6402 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
10. Repeat step 1-9 for each sub-test in Table 8.1.4.4.1-1 as appropriate.

8.1.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.1.4.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used in test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2

Table 8.1.4.4.3-2: *ReportConfigEUTRA-A3*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used in test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventide CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-14 (-7 dB)	-7 is actual value in dB (-14 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.1.3.4.3-3: *MAC-MainConfig-RBC*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used in test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	[n5]		
periodicBSR-Timer	[sf20]		
retxBSR-Timer	[sf1280]		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	[psf1]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {		sf1280 typical value in real network for real-time services.	
[sf1280]	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[sf500]		

Table 8.1.4.4.3-4: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used in test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
…			
schedulingRequestConfig	SchedulingRequest-Config-DEFAULT		
}			

Table 8.1.4.4.3-5: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

Table 8.1.4.4.3-6: *MeasuredResults*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.1.4.4.3-7: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA {			
physCellId	PhysCellId		
cgi-Info SEQUENCE {			
cellglobalId-EUTRA	cellGlobalId-EUTRA		
trackingAreaCode	trackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

Table 8.1.4.4.3-8: *FilterCoefficient*: Additional E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
filterCoefficient	fc9		

8.1.4.5 Test requirement

Tables 8.1.4.4.1-1, 8.1.4.5-1, 8.1.4.5-2 and 8.1.4.5-3 define the primary level settings including test tolerances for E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions in asynchronous cells with DRX when L3 filtering is used test.

Table 8.1.4.5-1: Cell Specific Test Parameters for E-UTRAN FDD-FDD intra-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 D.1.1 (OP.1 FDD) and in D.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] + TT	[4] + TT	[4] + TT	[24] + TT
N_{oc} Note 2	dBm/15 KHz	-98			
$\hat{E}_s/N_{oc}$	dB	[4] + TT	[4] + TT	[4] + TT	[24] + TT
RSRP Note 3	dBm/15 KHz	[-94] + TT	[-94] + TT	[-94] + TT	[-74] + TT
SCH_RP Note 3	dBm/15 KHz	[-94] + TT	[-94] + TT	[-94] + TT	[-74] + TT
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 8.1.4.5-2: DRX-Configuration to be used in E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used

Field	Value	Comment
onDurationTimer	[psf1]	As specified in section 6.3.2 in 3GPP TS 36.331 [5].
drx-InactivityTimer	[psf1]	
drx-RetransmissionTimer	[sf1]	
longDRX-CycleStartOffset	[sf1280]	
shortDRX	disable	

Table 8.1.4.5-3: *TimeAlignmentTimer* and *sr-ConfigIndex*-Configuration to be used in E-UTRAN FDD-FDD intra-frequency event triggered reporting under AWGN propagation conditions with DRX when L3 filtering is used

Field	Value	Comment
TimeAlignmentTimer	[sf500]	As specified in section 6.3.2 in 3GPP TS 36.331 [5].
sr-ConfigIndex	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 [5] and section 10.1 in 3GPP TS 36.213 [8].

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to Cell 2 on PUSCH.

The overall delays measured when DRX cycle length is 1280 ms in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 1280 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{measure\_intra}$

$T_{measure\_intra}$ = 6400 ms. When DRX cycle length is 1280 ms than the $T_{measure\_intra}$ is 5 s x 1280 ms. As defined in table 8.1.4.3-1.

TTI insertion uncertainty = 2 ms

The overall delays measured when DRX cycle length is 1280 ms shall be less than a total of 6402 ms in this test case (note: this gives a total of 6400 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.1.4 Void

8.2 E-UTRAN TDD intra frequency measurements

8.2.1 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *Some values from the core specification are still in brackets*

8.2.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions in synchronous cells within the E-UTRA TDD-TDD intra frequency cell search requirements.

8.2.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

8.2.1.3 Minimum conformance requirements

When no DRX is in use the UE shall be able to identify a new detectable TDD intra frequency cell within

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

where

$T_{basic\_identify\_E-UTRA\_TDD, intra}$ is [800] ms

A cell shall be considered detectable when

- RSRP related side condition given in TS 36.133 [4] Section 9.1 are fulfilled for a corresponding Band,
- SCH_RP $\geq$ -127 dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot $\geq$ - 6 dB.

$T_{Measurement\_Period\ Intra}$ = [200] ms. The measurement period for Intra frequency RSRP measurements.

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 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 at least 8 identified intra-frequency cells but the reporting rate of RSRP measurements of cells from UE physical layer to higher layers may be decreased.

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

where

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

$T_{Measurement\_Period\ Intra}$ = [200] ms. The measurement period for Intra frequency RSRP measurements.

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.

The measurement accuracy for all measured cells shall be as specified in TS 36.133 [4] sub-clause 9.1.

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in TS 36.133 [4] section 9.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that 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 TS 36.133 [4] Section 8.1.2.2.2.1 When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 8.1.2.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.2.2 and A.8.1.2.

8.2.1.4 Test description

8.2.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 8.2.1.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.2.1.4.3.

5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.2.1.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.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	-3	
CP length		Normal	
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211. The same configuration in both cells
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211. The same configuration in both cells
Hysteresis	dB	0	
Time To Trigger	s	0	
Filter coefficient		0	L3 filtering is not used
DRX		DRX_L	As specified in Table 8.2.1.5-2
Time offset between cells	μs	3	Synchronous cells 3μs or 92*Ts
T1	s	5	
T2	s	5	

8.2.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. In the measurement control information it is indicated to the UE that event-triggered reporting with Event A3 is used. PDCCHs indicating new transmissions 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 8.2.1.5-1. Propagation conditions are set according to Annex B clauses B.1.1 and B.2.2.T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.2.1.5-1.
6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
9.
9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.2.1.4.3-1: Common Exception messages for E-UTRAN TDD-TDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2

Table 8.2.1.4.3-2: *ReportConfigEUTRA-A3*: Additional E-UTRAN TDD-TDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-6 (-3 dB)	-3 is actual value in dB (-6 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.2.1.4.3-3: *MeasuredResults*: Additional E-UTRAN TDD-TDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1		
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.2.1.4.3-4: *MeasResultListEUTRA*: Additional E-UTRAN TDD-TDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultLIstEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity			
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA			
tac-ID			
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

8.2.1.5 Test requirement

Tables 8.2.1.4.1-1, 8.2.1.5-1, and 8.2.1.5-2 define the primary level settings including test tolerances for E-UTRAN TDD-TDD event triggered reporting under fading propagation conditions in synchronous cells test.

Table 8.2.1.5-1: 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.2.1 (OP.1 TDD) and in A.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}	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94+TT	-94+TT	-Infinity	-91+TT
$\hat{E}_s/I_{ot}$	dB	4+TT	4+TT	-Infinity	7+TT
SCH_RP	dBm/15 kHz	-94+TT	-94+TT	-Infinity	-91+TT
$\hat{E}_s/N_{oc}$	dB	4	3.7	-Infinity	7.3
Propagation Condition		ETU70			
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.					

Table 8.2.1.5-2: Reference DRX-Configuration to be used in E-UTRAN TDD-TDD event triggered reporting under fading propagation conditions in synchronous cells

Parameter	Value	Comments
Reference configuration	DRX_L	As defined in 4.8.2.1.5 in TS 36.508 [7.]
onDurationTimer	psf6	
drx-InactivityTimer	psf1920	
drx-RetransmissionTimer	sf16	
longDRX-CycleStartOffset	sf1280, 0	
shortDRX	disabled	
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].		

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 2.

The 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.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_intra}$

$$T_{identify\_intra} = T_{basic\ identify\ E-UTRA\_TDD,\ intra} \cdot \frac{T_{Measurement\ Period,\ Intra}}{T_{Intra}}$$

$T_{basic\_identify\_E-UTRA\_TDD, intra}$ = 800 ms

$T_{Measurement\_Period,Intra}$ = 200 ms

T_{Intra} = 200 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.2.2 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.2.2.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions in synchronous cells with DRX within the E-UTRA TDD-TDD intra frequency cell search in DRX requirements.

8.2.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

8.2.2.3 Minimum conformance requirements

Note: The state when no DRX is used is assumed to be the one in which the DRX Inactivity Timer is running, and the state when DRX is used is assumed to be otherwise for this performance requirement.

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 8.2.2.3-1

Table 8.2.2.3-1: 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)]
0.08<DRX-cycle≤2.56	[Note2(20)]
Note1: Number of DRX cycle depends upon the DRX cycle in use Note2: Time depends upon the DRX cycle in use	

A cell shall be considered detectable when

- RSRP related side condition given in TS 36.133 [4] Section 9.1 are fulfilled for a corresponding Band,
- SCH_RP ≥ -127 dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ - 6 dB.

In the RRC_CONNECTED state with DRX cycles of 80ms or greater the measurement period for intra frequency measurements is $T_{measure\_intra}$ as shown in table 8.2.2.3-2. The UE shall be capable of performing RSRP measurements for TS 45.008 [15] 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 8.2.2.3-2: Requirement to measure TDD intra frequency cells

DRX cycle length (s)	$T_{measure\_intra}$ (s) (DRX cycles)
≤0.04	0.2 (Note1)
0.04<DRX-cycle≤2.56	Note2 (5)
Note1: Number of DRX cycle depends upon the DRX cycle in use. Note2: Time depends upon the DRX cycle in use.	

The measurement accuracy for all measured cells shall be as specified in TS 36.133 [4] sub-clause 9.1.

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in TS 36.133 [4] section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in TS 36.133 [4] section 8.1.2.2.2.2.1.3 Event Triggered Reporting.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that 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 TS 36.133 [4] Section 8.1.2.2.2.2 When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 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 $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.2.2.2 and A.8.2.2.

8.2.2.4 Test description

8.2.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 8.2.2.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.2.2.4.3.

5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.2.2.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD		As specified in section A.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	-3		
CP length		Normal		
Special subframe configuration		6		As specified in table 4.2-1 in TS 36.211[9]. The same configuration in both cells
Uplink-downlink configuration		1		As specified in table 4.2-2 in TS 36.211[9]. 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 8.2.2.4-2
Time offset between cells	µs	3		Synchronous cells 3µs or 92*Ts
T1	s	5		
T2	s	5	30	

8.2.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations 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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 8.2.2.5-1. Propagation conditions are set according to Annex B clauses B.1.1 and B.2.2. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.2.2.5-1.

6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms for Test 1 and 25602 ms for Test 2 then the number of

successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

10. Repeat step 1-9 for each sub-test in Table 8.2.2.4.1-1 as appropriate.

8.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.2.2.4.3-1: Common Exception messages for E-UTRAN TDD-TDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2

Table 8.2.2.4.3-2: RRCConnectionReconfiguration: Additional E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used test requirement

Derivation Path: TS 36.508 [7] clause 4.6.1, Table 4.6.1-8 RRCConnectionReconfiguration			
Information Element	**Value/remark**	**Comment**	**Condition**
RRCConnectionReconfiguration ::= SEQUENCE {			
rrc-TransactionIdentifier	RRC-TransactionIdentifier-DL		
criticalExtensions CHOICE {			
c1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
measConfig			
	MeasConfig-DEFAULT		MEAS
radioResourceConfigDedicated SEQUENCE {			
MAC-MainConfig-RBC SEQUENCE {			
drx-Config CHOICE {			
setup SEQUENCE {			
onDurationTimer	[psf1]		
drx-InactivityTimer	[psf1]		
drx-RetransmissionTimer	[sf1]		
longDRX-CycleStartOffset CHOICE {			
[sf40]	0	For Test 1	
[sf1280]	0	For Test 2	
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	[sf500]		
PhysicalConfigDedicated SEQUENCE {			
…		…	
schedulingRequestConfig	SchedulingRequest-Config-DEFAULT		
}			
}			
}			
}			
}			

Table 8.2.2.4.3-3: ReportConfigEUTRA-A3: Additional E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-6 (-3 dB)	-3 is actual value in dB (-6 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.2.2.4.3-4: SchedulingRequest-Config-DEFAULT: Additional E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20: SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	Channel-bandwidth-dependent parameter	
sr-ConfigIndex	0		
dsr-TransMax	n4		
}			
}			

Table 8.2.2.4.3-5: MeasResults: Additional E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell SEQUENCE {			
rsrpResult	INTEGER(0..97)	Set according to specific test	
rsrqResult	INTEGER(0..34)	Set according to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.2.2.4.3-6: MeasResultListEUTRA: Additional E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultsLIstEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId	INTEGER (0..503)	
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalCellIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

8.2.2.5 Test requirement

Tables 8.2.2.5-1, 8.2.2.5-2 and 8.2.2.5-3 defines the primary level settings including test tolerances for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used test.

Table 8.2.2.5-1: 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 D.2.1 (OP.1 TDD) and in D.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+TT	-94+TT	-Infinity	-91+TT
$\hat{E}_s/I_{ot}$	dB	4+TT	-3.79+TT	-Infinity	1.54+TT
SCH_RP Note 3	dBm/15 kHz	-94+TT	-94+TT	-Infinity	-91+TT
$\hat{E}_s/N_{oc}$	dB	4+TT	4+TT	-Infinity	7+TT
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 8.2.2.5-2: 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 section 6.3.2 in 3GPP TS 36.331
drx-InactivityTimer	[psf1]	[psf1]	
drx-RetransmissionTimer	[sf1]	[sf1]	
longDRX-CycleStartOffset	[sf40]	[sf1280]	
shortDRX	disable	disable	

Table 8.2.2.5-3: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD-TDD intra-frequency event triggered reporting in DRX under fading propagation conditions in synchronous cells

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	[sf500]	[sf500]	As specified in section 6.3.2 in 3GPP TS 36.331
sr-ConfigIndex	[0]	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 and section 10.1 in 3GPP TS 36.213.

TTI insertion uncertainty = 2 ms

In Test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 802 (note: a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty) 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 25602 (note: a total of 25600 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty) 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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.3 E-UTRAN FDD-FDD Inter-frequency Measurements

8.3.1 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.3.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions in asynchronous cells within the E-UTRA FDD inter-frequency cell search requirements. This test will partly verify the FDD-FDD inter-frequency cell search requirements in section 8.1.2.3.

8.3.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

8.3.1.3 Minimum conformance requirements

When measurement gaps are scheduled 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 TS 36.133 [4] section 8.1.2.1.1 and T_{Inter1} is defined in TS36.133 [4] section 8.1.2.1.

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

- $RSRP|_{dBm} \geq$ -125 dBm and for Bands 1, 4, 6, 10, 11, 18, 19, 21 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq$ -124 dBm for Bands 9 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq$ -123 dBm for Bands 2, 5, 7, 17 and RSRP Ês/Iot ≥ -4 dB,
- $RSRP|_{dBm} \geq$ -122 dBm for Bands 3, 8, 12, 13, 14 and RSRP Ês/Iot ≥ -4 dB,
- other RSRP related side conditions given in Section 9.1 are fulfilled,
- $SCH\_RP|_{dBm} \geq$ -125 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm} \geq$ -124 dBm for Band 9 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP\ |_{dBm} \geq$ -123 dBm for Bands 2, 5, 7, 17 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP\ |_{dBm} \geq$ -122 dBm for Bands 3, 8, 12, 13, 14 and SCH Ês /Iot ≥ -4 dB.

When measurement gaps are scheduled for FDD inter frequency measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in TS 36.133 sub-clause 9.1.3 with measurement period given by table 8.3.1.3-1.

Table 8.3.1.3-1: RSRP 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
TBD	TBD	TBD
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 8.3.1.3-1.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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 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 TS 36.133 [4] clause 8.1.2.3.1.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 8.1.2.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.3.1 and A.8.3.1.

8.3.1.4 Test description

8.3.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 8.3.1.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.3.1.4.3.

5. There are two E-UTRA FDD carriers and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.3.1.4.1-1: 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 section A.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.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 3GPP TS 36.133 section 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	ms	3	Asynchronous cells 3ms or 92160*Ts
T1	s	5	
T2	s	5	

8.3.1.4.2 Test procedure

The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. Gap pattern configuration is configured before T2 begins to enable inter-frequency monitoring.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 8.3.1.5-1. Propagation conditions are set according to Annex B clauses B.1.1 and B.2.2. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.3.1.5-1.
6. UE shall transmit a MeasurementReport message triggered by Event A3. If the measurement reporting delay from the beginning of time period T2 is less than 3842ms the number of successful tests is increased by one. If the UE fails to report the event within the measurement reporting delay requirement then the number of failure tests is increased by one.
7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit a RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.3.1.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-3

Table 8.3.1.4.3-2: *ReportConfigEUTRA-A3*: Additional E-UTRAN FDD-FDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-12 (-6 dB)	-6 is actual value in dB (-12 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.3.1.4.3-3: *MeasResults*: Additional E-UTRAN FDD-FDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId			
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.3.1.4.3-4: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

8.3.1.5 Test requirement

Tables 8.3.1.4.1-1 and 8.3.1.5-1 define the primary level settings including test tolerances for event triggered reporting under fading propagation conditions in asynchronous inter frequency cells test.

Table 8.3.1.5-1: Cell specific test requirement parameters for E-UTRAN FDD-FDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Cell 1</th><th colspan="2">Cell 2</th></tr>
<tr><th>T1</th><th>T2</th><th>T1</th><th>T2</th></tr>
<tr><td>E-UTRA RF Channel Number</td><td></td><td colspan="2">1</td><td colspan="2">2</td></tr>
<tr><td>$BW_{channel}$</td><td>MHz</td><td colspan="2">10</td><td colspan="2">10</td></tr>
<tr><td>OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.1.2 (OP.2 FDD)</td><td></td><td colspan="2">OP.1 FDD</td><td colspan="2">OP.2 FDD</td></tr>
<tr><td>PBCH_RA</td><td>dB</td><td colspan="2" rowspan="13">0</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>N_{oc} Note 3</td><td>dBm/15 kHz</td><td colspan="4">-98</td></tr>
<tr><td>RSRP Note 4</td><td>dBm/15 kHz</td><td>-94 + TT</td><td>-94 + TT</td><td>-Infinity</td><td>-91 + TT</td></tr>
<tr><td>$\hat{E}_s/I_{ot}$</td><td>dB</td><td>4 + TT</td><td>4 + TT</td><td>-Infinity</td><td>7 + TT</td></tr>
<tr><td>SCH_RP</td><td>dBm/15 kHz</td><td>-94 + TT</td><td>-94 + TT</td><td>-Infinity</td><td>-91 + TT</td></tr>
<tr><td>$\hat{E}_s/N_{oc}$</td><td>dB</td><td>4 + TT</td><td>4 + TT</td><td>-Infinity</td><td>7 + TT</td></tr>
<tr><td>Propagation Condition</td><td></td><td colspan="4">ETU70</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.
Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
Note 2: Interference from other cells and noise sources not specified in the test is 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.</td></tr>
</table>

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3842 ms from the beginning of time period T2.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 2.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = 3840 ms

TTI insertion uncertainty = TTI_{DCCH} = 1 ms; $2xTTI_{DCCH}$ = 2 ms

The overall delays measured shall be less than a total of 3842 ms in this test case (note: this gives a total of 3840 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

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.

8.3.2 E-UTRAN FDD-FDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.3.2.1 Test purpose

To verify the UE's ability to make a correct reporting of an event in DRX under fading propagation conditions in asynchronous cells within the E-UTRA FDD-FDD inter frequency cell search requirements.

8.3.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

8.3.3.3 Minimum conformance requirements

When measurement gaps are scheduled the UE shall be able to identify a new FDD inter-frequency within $T_{Identify\_Inter}$ as shown in table 8.3.3.3-1:

Table 8.3.3.3-1: Requirement to identify a newly detectable FDD inter-frequency 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 TS 36.133 [4] clause 8.1.2.3.1.1 are applicable	Non DRX Requirements in TS 36.133 [4] 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		

The non DRX requirements in TS 36.133 [4] clause 8.1.2.3.1.1 states that when measurement gaps are scheduled 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 TS 36.133 [4] section 8.1.2.1.1 and T_{Inter1} is defined in TS36.133 [4] section 8.1.2.1.

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

- RSRP|dBm≥ -125 dBm and for Bands 1, 4, 6, 10, 11, 18, 19, 21 and RSRP Ês/Iot ≥ -4 dB,
- RSRP|dBm≥ -124 dBm for Bands 9 and RSRP Ês/Iot ≥ -4 dB,
- RSRP|dBm≥ -123 dBm for Bands 2, 5, 7, 17 and RSRP Ês/Iot ≥ -4 dB,
- RSRP|dBm≥ -122 dBm for Bands 3, 8, 12, 13, 14 and RSRP Ês/Iot ≥ -4 dB,
- other RSRP related side conditions given in Section 9.1 are fulfilled,
- $SCH\_RP|_{dBm}$≥ -125 dBm for Bands 1, 4, 6, 10 11, 18, 19, 21 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP|_{dBm}$≥ -124 dBm for Band 9 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP\ |_{dBm}$≥ -123 dBm for Bands 2, 5, 7, 17 and SCH Ês/Iot ≥ -4 dB,
- $SCH\_RP\ |_{dBm}$≥ -122 dBm for Bands 3, 8, 13, 14 and SCH Ês/Iot ≥ -4 dB.

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 8.1.2.3.1.2-1 of TS 36.133 [4] clause 8.1.2.3.1.2.

The measurement accuracy for all measured cells shall be as specified in TS 36.133 [4] clause 9.1.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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 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 TS 36.133 [4] clause 8.1.2.2.1.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 8.1.2.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.3.1 and A.8.3.2.

8.3.2.4 Test description

8.3.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.
2. The general test parameter settings are set up according to Table 8.3.2.4.1-1.
3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.3.2.4.3.

5. There are two E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.3.2.4.1-1: General Test Parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells

Parameter	Unit	Test 1	Test 2	Comment
		Value		
PDSCH parameters		DL Reference Measurement Channel R.0 FDD		As specified in section A.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 section A.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 3GPP TS 36.133 section 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 8.3.2.5-2
Time offset between cells		3 ms		Asynchronous cells 3ms or 92160*Ts
T1	s	5		
T2	s	5	30	

8.3.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

In Test 1 when DRX = 40 ms is used, UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle. In Test 2 when DRX = 1280 ms is used, the uplink time alignment is not maintained and the UE needs to use RACH to obtain uplink allocation for measurement reporting.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 8.3.2.5-1, 8.3.2.5-2 and 8.3.2.5-3. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.3.2.5-1.

6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 3842 ms for Test 1 or less than 25602 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop. Repeat step 1-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

9. Repeat step 1-8 for each sub-test in Table 8.3.2.4.1-1 as appropriate.

8.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.3.2.4.3-1: Common Exception messages for E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test 1 and 2 requirements

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-3 Table H.3.7-1 Table H.3.7-2 Table H.3.7-3

Table 8.3.2.4.3-2: *ReportConfigEUTRA-A3*: Additional E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test 1 and 2 requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventide CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-12 (-6 dB)	-6 is actual value in dB (-12 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.3.2.4.3-3: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test 1 and 2 requirements

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

Table 8.3.2.4.3-4: *MeasuredResults*: Additional E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test 1 and 2 requirements

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.3.2.4.3-5: *MeasResultListEUTRA*: Additional E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test 1 and 2 requirements

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA {			
physCellId	PhysCellId		
cgi-Info SEQUENCE {			
cellglobalId-EUTRA	cellGlobalId-EUTRA		
trackingAreaCode	trackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

8.3.2.5 Test requirement

Tables 8.3.2.4.1-1, 8.3.2.5-1, 8.3.2.5-2 and 8.3.2.5-3 define the primary level settings including test tolerances for E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells test.

Table 8.3.2.5-1: Cell Specific Test Parameters for E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used 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 D.1.1 (OP.1 FDD) and in D.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 + TT	-94 + TT	-Infinity	-91 + TT
$\hat{E}_s/I_{ot}$	dB	4 + TT	4 +TT	-Infinity	7 +TT
SCH_RP Note 3	dBm/15 kHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT	-Infinity	7 + TT
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 8.3.2.5-2: DRX-Configuration to be used in E-UTRAN FDD-FDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions

Field	Test1 Value	Test2 Value	Comment
onDurationTimer	[psf1]	[psf1]	
drx-InactivityTimer	[psf1]	[psf1]	
drx-RetransmissionTimer	[sf1]	[sf1]	
longDRX-CycleStartOffset	[sf40]	[sf1280]	
shortDRX	disable	disable	

Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].

Table 8.3.2.5-3: *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 section 6.3.2 in 3GPP TS 36.331 [5].
sr-ConfigIndex	[0]	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213 [8].

In Test 1 when DRX = 40 ms is used, the overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 2 on PUSCH.

The overall delays measured when DRX cycle length is 40 ms in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 40 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{Identify\_Inter}$

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

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.

T_{Inter1} = 60 ms. It is defined in table 8.1.2.1-1 of TS36.133 [4] clause 8.1.2.1.

N_{freq} = 1. It is defined in TS 36.133 [4] clause 8.1.2.1.1.

TTI insertion uncertainty = 2 ms

The overall delays measured when DRX cycle length is 40 ms shall be less than a total of 3842 ms in this test case (note: this gives a total of 3840 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

In Test 2 when DRX = 1280 ms is used, the overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to Cell 2 on PUSCH.

The overall delays measured when DRX cycle length is 1280 ms in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 1280 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_intra}$

$T_{identify\_intra}$ = 25600 ms. When DRX cycle length is 1280 ms than the $T_{identify\_intra}$ is 20 s x 1280 ms.

TTI insertion uncertainty = 2 ms

The overall delays measured when DRX cycle length is 1280 ms shall be less than a total of 25602 ms in this test case (note: this gives a total of 25600 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.4 E-UTRAN TDD-TDD inter frequency measurements

8.4.1 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.4.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions in synchronous cells within the E-UTRA TDD inter-frequency cell search requirements. This test will partly verify the TDD-TDD inter-frequency cell search requirements in section 8.1.2.3.

8.4.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

8.4.1.3 Minimum conformance requirements

When measurement gaps are scheduled the UE shall be able to identify a new TDD 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 TDD inter-frequency cell is defined.

T_{inter1} is defined in TS 36.133 [4] section 8.1.2.1

N_{freq} is defined in TS 36.133 [4] section 8.1.2.1.1.

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

- $RSRP|_{dBm} \geq -125$ dBm and for Bands 33, 34, 35, 36, 37, 38, 39, 40 and RSRP Ês/Iot ≥ -4 dB,
- other RSRP related side conditions given in Section 9.1 are fulfilled,
- $SCH\_RP|_{dBm} \geq -125$ dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ -4 dB.

When measurement gaps are scheduled for TDD inter frequency measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in TS 36.133 sub-clause 9.1.3 with measurement period ($T_{Measurement\_Period\_TDD\_Inter}$) given by table 8.4.4.1.3-1.

Table 8.4.1.3-1: $T_{Measurement\_Period\_TDD\_Inter}$ 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. Note 2: T_s is defined in 3GPP TS 36.211 [9].						

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 $T_{Measurement\_Period\_TDD\_Inter}$.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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. 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 TS 36.133 [4] clause 8.1.2.3.2.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 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 $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.3.2 and A.8.4.1.

8.4.1.4 Test description

8.4.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 8.4.1.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.4.1.4.3.

5. There are two E-UTRA TDD carriers and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.4.1.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Gap Pattern Id		1	As specified in 3GPP TS 36.133 section 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 3GPP TS 36.211 section 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	dB	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells	μs	3	Synchronous cells 3μs or 92*Ts
T1	s	5	
T2	s	10	

8.4.1.4.2 Test procedure

The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. Gap pattern configuration is configured before T2 begins to enable inter-frequency monitoring.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 8.4.1.5-1. Propagation conditions are set according to Annex B clauses B.1.1 and B.2.2. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.4.1.5-1.
6. UE shall transmit a MeasurementReport message triggered by Event A3. If the measurement reporting delay from the beginning of time period T2 is less than 7682 ms the number of successful tests is increased by one. If the UE fails to report the event within the measurement reporting delay requirement then the number of failure tests is increased by one.
7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit a RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.4.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.4.1.4.3-1: *RRCConnectionReconfiguration*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.1, Table 4.6.1-8 RRCConnectionReconfiguration			
Information Element	**Value/remark**	**Comment**	**Condition**
RRCConnectionReconfiguration ::= SEQUENCE {			
Rrc-TransactionIdentifier	RRC-TransactionIdentifier-DL		
criticalExtensions CHOICE {			
C1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
measurementConfiguration			
	MeasurementConfiguration-DEFAULT		MEAS

Table 8.4.1.4.3-2: *MeasConfig-DEFAULT*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModList	ReportConfigEUTRA-A3		
measIdToRemoveList	Not present		
measIdToAddModList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
}			

Table 8.4.1.4.3-3: *ReportConfigEUTRA-A3*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-12 (-6 dB)	-6 is actual value in dB (-6 * 0.5 dB)	
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.4.1.4.3-4: *MeasResults*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measiD			
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.4.1.4.3-5: *MeasResultListEUTRA*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA {			
MeasResultEUTRA ::= SEQUENCE {			
physCellId	PhysicalCellIdentity		
cgi-Info SEQUENCE {			
cellglobalId-EUTRA	GlobalCellId-EUTRA		
tac-IDrackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

8.4.1.5 Test requirement

Tables 8.4.1.4.1-1 and 8.4.1.5-1 define the primary level settings including test tolerances for event triggered reporting under fading propagation conditions in asynchronous inter frequency cells test.

Table 8.4.1.5-1: 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 D.2.1 (OP.1 TDD) and in D.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 + TT	4 + TT	-Infinity	7 + TT
N_{oc} Note 3	dBm/15 kHz	-98 + TT			
RSRP Note 4	dBm/15 kHz	-94 + TT	-94 + TT	-Infinity	-91 + TT
SCH_RP	dBm/15 kHz	-94 + TT	-94 + TT	-infinity	-91 + TT
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT	-Infinity	7 + TT
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.					

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7682 ms from the beginning of time period T2.

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 7682 ms in this test case (note: a total of 7680 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

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%.

1) 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.

8.4.2 E-UTRAN TDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in synchronous cells

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*

- *The Test tolerances applicable to this test are undefined*

8.4.2.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions in synchronous cells with DRX within the E-UTRA TDD-TDD inter frequency cell search in DRX requirements.

8.4.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

8.4.2.3 Minimum conformance requirements

When DRX is in use the UE shall be able to identify a new detectable E-UTRAN TDD inter frequency cell within $T_{identify\_inter}$ as shown in table 8.4.2.3-1.

Table 8.4.2.3-1: 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 section 8.1.2.3.2.1 are applicable	Non DRX Requirements in section 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$|_{dBm}$≥ -125 dBm and for Bands 33, 34, 35, 36, 37, 38, 39, 40 and RSRP Ês/Iot ≥ -4 dB,
- RSRP related side conditions given in TS 36.133 [4] Section 9.1 are fulfilled,
- SCH_RP$|_{dBm}$≥ -125 dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ -4 dB.

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 8.4.2.3-2.

Table 8.4.2.3-2: Requirement to measure TDD interfrequency cells

DRX cycle length (s)	$T_{measure\_inter}$ (s) (DRX cycles)
≤0.84	Non DRX Requirements in section 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 measurement accuracy for all measured cells shall be as specified in TS 36.133 [4] sub-clause 9.1.

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in TS 36.133 [4] section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in TS 36.133 [4] section 8.1.2.3.2.2.1.3 Event Triggered Reporting.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: [2] x TTI_{DCCH}. This measurement reporting delay excludes a delay which 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 TS 36.133 [4] Section 8.1.2.3.2.2 When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 8.1.2.2.1.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.3.2.2 and A.8.4.2.

8.4.2.4 Test description

8.4.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.
2. The general test parameter settings are set up according to Table 8.4.2.4.1-1.
3. Propagation conditions are set according to Annex B clauses B.0.
4. Message contents are defined in clause 8.4.2.4.3.
5. There are two cells on different carrier frequencies and gap pattern configuration # 0 as defined in TS 36.133[4] Table 8.1.2.1-1 is provided. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.4.2.4.1-1: 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 section A.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 section A.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 3GPP TS 36.133 section 8.1.2.1.
Uplink-downlink configuration		1		As specified in 3GPP TS 36.211 section 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 8.4.2.4.1-2
Time offset between cells	µs	3		Synchronous cells 3µs or 92*Ts
T1	s	5		
T2	s	5	30	

Table 8.4.2.4.1-2: 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	[sf1]	[sf1]	
longDRX-CycleStartOffset	[sf40]	[sf1280]	
shortDRX	disable	disable	

Table 8.4.2.4.1-3: *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 section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	[0]	[0]	For further information see section 6.3.2 in 3GPP TS 36.331 and 10.1 in 3GPP TS 36.213.

8.4.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations 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 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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 8.4.2.5-1. Propagation conditions are set according to Annex B clauses B.1.1 and B.2.2. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.4.2.5-1.
6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 3842 ms for Test 1 and 25602 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9.

9. Repeat step 1-88 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

1010. Repeat step 1-99 for each sub-test in Table 8.4.2.4.1-1 as appropriate.

8.4.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.4.2.4.3-1: RRCConnectionReconfiguration: Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: TS 36.508 [7] clause 4.6.1, Table 4.6.1-8 RRCConnectionReconfiguration			
Information Element	**Value/remark**	**Comment**	**Condition**
RRCConnectionReconfiguration ::= SEQUENCE {			
rrc-TransactionIdentifier	RRC-TransactionIdentifier-DL		
criticalExtensions CHOICE {			
c1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
measConfig			
	MeasConfig-DEFAULT		MEAS
radioResourceConfigDedicated	RadioResourceConfigDedicated- SRB2-DRB(n, m)		SRB1-SRB2-DRB(n,m)
}			
}			
}			
}			

Table 8.4.2.4.3-2: MeasConfig-DEFAULT: Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModList	ReportConfigEUTRA-A3		
measIdToRemoveList	Not present		
measIdToAddModiList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
}			

Table 8.4.2.4.3-3: ReportConfigEUTRA-A3: Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-12 (-6 dB)	-3 is actual value in dB (-6 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.4.2.4.3-4: RadioResourceConfigDedicated- SRB2-DRB(n,m): Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3 Table 4.6.3-16: RadioResourceConfigDedicated- SRB2-DRB(n,m)			
Information Element	**Value/remark**	**Comment**	**Condition**
RadioResourceConfigDedicated-SRB2-DRB(n, m) ::= SEQUENCE {		n is the number of AM RLC DRBs (1..N) m is the number of UM RLC DRBs (0..M)	
sps-Config	Not present		
physicalConfigDedicated	PhysicalConfigDedicated - DEFAULT using condition RBC		
}			
NOTE: In cases where no RLC-UM bearer is configured, large DRX Cycle length is used. In cases where at least one RLC-UM bearer is configured, small DRX Cycle length is used.			

Table 8.4.2.4.3-5: *MAC-MainConfig-RBC*: Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5 Table 4.8.2.1.5-1: MAC-MainConfig-RB			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp_5 AND DRX_S/L
release	NULL		
setup SEQUENCE {			
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	sf1		
longDRX-CycleStartOffset CHOICE {		sf40/sf1280 typical value in real network for real-time services.	
[sf40]	0	For Test 1	
[sf1280]	0	For Test 2	
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	sf500		
}			

Table 8.4.2.4.3-6: PhysicalConfigDedicated-DEFAULT: Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1: PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
schedulingRequestConfig			
	SchedulingRequest-Config-DEFAULT		RBC
}			

Condition	Explanation
SRB1	Used at configuration of SRB1 during RRC connection (re-)establishment
RBC	Used at configuration of a radio bearer combination during SRB2+DRB establishment

Table 8.4.2.4.3-7: SchedulingRequest-Config-DEFAULT: Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20: SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	Channel-bandwidth-dependent parameter	
sr-ConfigIndex	0		
dsr-TransMax	n4		
}			
}			

Table 8.4.2.4.3-8: MeasResults: Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell SEQUENCE {			
rsrpResult	INTEGER(0..97)	Set according to specific test	
rsrqResult	INTEGER(0..34)	Set according to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.4.2.4.3-9: MeasResultListEUTRA: Additional E-UTRAN TDD-TDD inter-frequency event triggered reporting when DRX is used in fading propagation conditions test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultsLIstEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId	INTEGER (0..503)	
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalCellIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	According to specific test		
rsrqResult	Not present		
…			
}			
}			

8.4.2.5 Test requirement

Tables 8.4.2.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells when DRX is used test.

Table 8.4.2.5-1: 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 D.2.1 (OP.1 TDD) and in D.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+TT	-94+TT	-Infinity	-91+TT
$\hat{E}_s/I_{ot}$	dB	4+TT	4+TT	-Infinity	7+TT
SCH_RP Note 3	dBm/15 kHz	-94+TT	-94+TT	-Infinity	-91+TT
$\hat{E}_s/N_{oc}$	dB	4+TT	4+TT	-Infinity	7+TT
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.

In Test1 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 3842 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.

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 3842 ms in this test case (note: a total of 3840 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

In Test2 the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 25602ms 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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.5 E-UTRAN FDD – UTRAN measurements

8.5.1 E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.5.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions within the E-UTRA FDD – UTRA FDD cell search requirements.

8.5.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD.

8.5.1.3 Minimum conformance requirements

The measurement reporting delay shall be less than $T_{identify,\ UTRA\_FDD}$ in RRC_CONNECTED state.

When explicit neighbour list is provided and no DRX is used the UE shall be able to identify a new detectable cell within

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

Where:

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms. This is the time period used in the inter-RAT equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

T_{Inter1} = 30 ms. This is the minimum available time for inter-RAT measurement during 480 ms period

N_{Freq}: This is the number of UTRA carriers being monitored

A cell shall be considered detectable when

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io ≥ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

When measurement gaps are scheduled for UTRA FDD inter RAT measurement the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in TS 36.133 [4] clause 9.2 of with measurement period given by

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

Where:

$X_{basic\ measurement\ UTRA\_FDD}$ = 6 (cells)

$T_{Measurement\_Period\ UTRA\_FDD}$ = 480 ms. The period used for calculating the measurement period.

$T_{basic\_measurement\_UTRA\_FDD}$ = 50 ms. This is the time period used in the equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

T_{Inter1} = 30 ms. This is the minimum available time for inter-RAT measurement during 480 ms period

N_{Freq}: This is the number of UTRA carriers being monitored

If the UE does not need measurement gaps to perform UTRA FDD measurements, the measurement period for UTRA FDD measurements is 480 ms.

The UE shall be capable of performing UTRA FDD CPICH measurements for $X_{basic\ measurement\ UTRA\_FDD}$ inter-frequency cells per FDD frequency for up to 3 UTRA FDD carriers and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_UTRA\_FDD}$.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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 any events that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu 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: 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 TS 36.133 [4] clause 8.1.2.4.1.1.1. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.1 and A.8.5.1.

8.5.1.4 Test description

8.5.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.

2. The general test parameter settings are set up according to Table 8.5.1.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.5.1.4.3.

5. There is one E-UTRA FDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.5.1.4.1-1: General Test Parameters for E-UTRAN FDD- UTRAN FDD event triggered reporting under fading propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Gap Pattern Id		1	As specified in 3GPP TS 36.133 [4] 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.
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	

8.5.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table’s 8.5.1.5-1 and 8.5.1.5-2. Propagation conditions are set according to Annex B clause B.2. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table’s 8.5.1.5-1 and 8.5.1.5-2.
6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delay measured from the beginning of time period T2 is less than 4802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
7. After the SS receive the MeasurementReport message in step 4) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. The SS shall set Cell 2 primary scambling code = ((current cell 2 primary scmbling code – 50) mod 200 + 100) for the next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.5.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.5.1.4.3-1: Common Exception messages for E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1

Table 8.5.1.4.3-2: *MeasConfig-DEFAULT*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigInterRAT-B1-UTRA		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 8.5.1.4.3-3: *ReportConfigInterRAT-B1-UTRA*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7B ReportConfigInterRAT-B1(EUTRA-Thres)			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-UTRA(UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
b1-Threshold-UTRA CHOICE {			
thresholdUTRA-EcN0	13 (-18 dB)	-18 dB is actual EcNO value in dB ((13 – 49)/2 dB)	

Table 8.5.1.4.3-4: *MeasuredResults*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.5.1.4.3-5: *MeasResultListUTRA*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
fdd	PhysCellIdUTRA-FDD		
}			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdUTRA		
lcoatonAreaCode	Not present		
routingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSCP		Set according to specific test	
utra-EcN0		Set according to specific test	
…			
}			
}			

Table 8.5.1.4.3-6: *PhysCellIdentityUTRA-FDD*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysCellIdUTRA-FDD ::= SEQUENCE {	250	This is the typical value range used in UTRAN FDD tests.	

8.5.1.5 Test requirement

Tables 8.5.1.4.1-1, 8.5.1.5-1 and 8.5.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions in synchronous cells test.

Table 8.5.1.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD event triggered reporting under fading propagation conditions

Parameter	Unit	Cell 1	
		T1	**T2**
E-UTRA RF Channel Number		1	
$BW_{channel}$	MHz	10	
OCNG Pattern defined in D.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 + TT	4 + TT
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94 + TT	-94 + TT
SCH_RP	dBm/15 kHz	-94 + TT	-94 + TT
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table 8.5.1.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN FDD event triggered reporting 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 + TT
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14 + TT
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B1 triggered measurement report to Cell 2.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify,\ UTRA\_FDD}$

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

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms

T_{Inter1} = 30 ms

N_{Freq} = 1

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 4802 ms in this test case (note: this gives a total of 4800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.5.2 E-UTRAN FDD - UTRAN FDD SON ANR cell search reporting under AWGN propagation conditions

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.5.2.1 Test purpose

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 section 8.1.2.4.7.1.

8.5.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD.

8.5.2.3 Minimum conformance requirements

When no DRX is used the UE shall be able to identify a new cell within:

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

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

A cell shall be considered identifiable following conditions are fulfilled:

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

If the UE is unable to identify the UTRA cell for SON within 8*$T_{identify,\ UTRA\_FDD}$ ms, the UE may stop searching UTRA cells for SON.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.7 and A.8.5.2.

8.5.2.4 Test description

8.5.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.18.

2. The general test parameter settings are set up according to Table 8.5.2.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.5.2.4.3.

5. There is one E-UTRA FDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.5.2.4.1-1: 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 section A.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A. 2.1.
Gap Pattern Id		1	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.
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	

8.5.2.4.2 Test procedure

The test consists of one active E-UTRAN cell and one neighbour UTRAN cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3 according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Tables 8.5.2.5-1 and 8.5.2.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 8.5.2.5-1 and 8.5.2.5-2.

6. The UE shall transmit a MeasurementReport message containing thr primary scrambling code of cell 2. If the overall delays measured from the beginning of time period T2 is less than 4802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Repeat step 1-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved. FFS

8.5.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.5.2.4.3-1: Common Exception messages for E-UTRAN FDD-UTRAN FDD cell search reporting for SON ANR in AWGN propagation conditions

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1

Table 8.5.2.4.3-2: *MeasurementConfiguration-DEFAULT*: Additional E-UTRAN FDD-UTRAN FDD cell search reporting for SON ANR in AWGN propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigInterRAT-SON-UTRA		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 8.5.2.4.3-3: *ReportConfigInterRAT-SON-ANR*: Additional E-UTRAN FDD-UTRAN FDD cell search reporting for SON ANR in AWGN propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-SON-UTRA::= SEQUENCE {			
triggerType CHOICE {			
periodical SEQUENCE {			
purpose ENUMERATED {	reportStrongestCellForSON		
}			
}			
}			
}			
ThresholdUTRA ::= CHOICE {			
utra-EcN0	[13 (-18 dB)]	-18 dB is actual EcNO value in dB ((13 – 49)/2 dB)	
}			

Table 8.5.2.4.3-4: *MeasuredResults*: Additional E-UTRAN FDD-UTRAN FDD cell search reporting for SON ANR in AWGN propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.5.2.4.3-5: *MeasResultListEUTRA*: Additional E-UTRAN FDD-UTRAN FDD cell search reporting for SON ANR in AWGN propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultUTRA			
MeasResultUTRA ::= SEQUENCE {			
physCellId CHOICE {			
fdd	PhysCellUTRA-FDD	The primary scrambling code, as defined in TS 25.331	
}			
Cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdUTRA		
locationAreaCode	Not present		
RoutingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSCP		Set according to specific test	
utra-EcN0		Set according to specific test	
…			
}			
}			
}			
}			

8.5.2.5 Test requirement

Tables 8.5.2.4.1-1, 8.5.2.5-1 and 8.5.2.5-2 define the primary level settings including test tolerances for UTRAN FDD cell search for SON ANR under AWGN propagation conditions test.

Table 8.5.2.5-1: 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 + TT	4 + TT
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT
RSRP Note 4	dBm/15 kHz	-94 + TT	-94 + TT
SCH_RP	dBm/15 kHz	-94 + TT	-94 + TT
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 + TT
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-15 + TT
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}.

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than 4802 ms from the beginning of time period T2.

When no DRX is used the UE shall be able to identify a new cell within:

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

Where:

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

T_{Inter1} = 30 ms.TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 4802 ms in this test case (note: this gives a total of 4800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

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.

8.5.3 E-UTRAN FDD – UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Statistical Testing requirements in Annex G are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.5.3.1 Test purpose

To verify the UE's ability to make a correct reporting of an event in DRX under fading propagation conditions within the E-UTRA FDD – UTRA FDD cell search requirements.

8.5.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD.

8.5.3.3 Minimum conformance requirements

The measurement reporting delay shall be less than $T_{identify,\ UTRA\_FDD}$ in RRC_CONNECTED state.

When explicit neighbour list is provided and DRX is used the UE shall be able to identify a new detectable cell belonging to the neighbour cell list within Tidentify, UTRA_FDD as in table 8.5.3.3-1.

Table 8.5.3.3-1: Requirements 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 TS 36.133 [4] section 8.1.2.4.1.1 are applicable	Non DRX Requirements in TS 36.133 [4] section 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	2.56* Nfreq (20* 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 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 8.5.3.3-2.

Table 8.5.3.3-2: Requirements 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 TS 36.133 [4] section 8.1.2.4.1.1 are applicable	Non DRX Requirements in TS 36.133 [4] section 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 TS 36.133 [4] clause 9.1.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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 any events that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu 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: 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 TS 36.133 [4] clause 8.1.2.4.1.1.1. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.1.2 and A.8.5.3.

8.5.3.4 Test description

8.5.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.
2. The general test parameter settings are set up according to Table 8.5.3.4.1-1.
3. Propagation conditions are set according to Annex B clauses B.0.
4. Message contents are defined in clause 8.5.3.4.3.
5. There is one E-UTRA FDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.5.3.4.1-1: General Test Parameters for E-UTRAN FDD- UTRAN FDD event triggered reporting when DRX is used under 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 section A.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 section A.2.1.
Gap Pattern Id		0		As specified in 3GPP TS 36.133 [4] 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.
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 [9]
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table 8.5.3.5-2
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	

8.5.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

In Test 1 when DRX = 40 ms is used, UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle. In Test 2 when DRX = 1280 ms is used, the uplink time alignment is not maintained and the UE needs to use RACH to obtain uplink allocation for measurement reporting.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 8.5.3.5-1, 8.5.3.5-2, 8.5.3.5-3 and 8.5.3.5-5. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 8.5.3.5-1 and 8.5.3.5-4.

6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delays measured from the beginning of time period T2 is less than 2402 ms for Test 1 or less than 25602 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. The SS shall set Cell 2 primary scambling code = ((current cell 2 primary scambling code - 50) mod 200 + 100) for next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

10. Repeat step 1-9 for each sub-test in Table 8.3.2.4.1-1 as appropriate.

8.5.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.5.3.4.3-1: Common Exception messages for E-UTRAN FDD – UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-4 Table H.3.7-1 Table H.3.7-2 Table H.3.7-3

Table 8.5.3.4.3-2: *ReportConfigInterRAT-B1-UTRA*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7B ReportConfigInterRAT-B1(EUTRA-Thres)			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-UTRA(UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
b1-Threshold-UTRA CHOICE {			
thresholdUTRA-EcN0	13 (-18 dB)	-18 dB is actual EcNO value in dB ((13 – 49)/2 dB)	

Table 8.5.3.4.3-3: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

Table 8.5.3.4.3-4: *MeasuredResults*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.5.3.4.3-5: *MeasResultListUTRA*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
fdd	PhysCellIdUTRA-FDD		
}			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdUTRA		
lcoatonAreaCode	Not present		
routingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSCP		Set according to specific test	
utra-EcN0		Set according to specific test	
…			
}			
}			

Table 8.5.3.4.3-6: *PhysCellIdentityUTRA-FDD*: Additional E-UTRAN FDD – UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysCellIdUTRA-FDD ::= SEQUENCE {	250	This is the typical value range used in UTRAN FDD tests.	

8.5.3.5 Test requirement

Tables 8.5.3.4.1-1, 8.5.3.5-1 and 8.5.3.5-4 define the primary level settings including test tolerances for E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions in synchronous cells test.

Table 8.5.3.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD event triggered reporting 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 D.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 + TT	4 + TT
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94 + TT	-94 + TT
SCH_RP	dBm/15 kHz	-94 + TT	-94 + TT
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT
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 8.5.3.5-2: 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	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].			

Table 8.5.3.5-3: *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 section 6.3.2 in 3GPP TS 36.331 [5].
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213 [8].

Table 8.5.3.5-4: Cell Specific Test requirement Parameters for Cell 2 UTRAN FDD event triggered reporting 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 + TT
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14 + TT
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

In Test 1 when DRX = 40 ms is used, the overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B1 triggered measurement report to Cell 2 on PUSCH.

The overall delays measured when DRX cycle length is 40 ms in the test may be up to $2\text{x}TTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 40 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify,\ UTRA\_FDD}$=

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

Where:

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms. It is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

T_{Inter1} = 60 ms.

N_{freq} = 1. It is defined in TS 36.133 [4] clause 8.1.2.1.1.

TTI insertion uncertainty = 2 ms

The overall delays measured when DRX cycle length is 40 ms shall be less than a total of 2402 ms in this test case (note: this gives a total of 2400 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

In Test 2 when DRX = 1280 ms is used, the overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to Cell 2 on PUSCH.

The overall delays measured when DRX cycle length is 1280 ms in the test may be up to $2\text{x}TTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 1280 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_UTRA\_FDD}$

$T_{identify\_UTRA\_FDD}$ = 25600 ms. When DRX cycle length is 1280 ms the $T_{identify\_UTRA\_FDD}$ is 20 x 1280 ms.

TTI insertion uncertainty = 2 ms

The overall delays measured when DRX cycle length is 1280 ms shall be less than a total of 25602 ms in this test case (note: this gives a total of 25600 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.6 E-UTRAN TDD – UTRAN FDD measurements

8.6.1 E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *It has not been decided how to handle the scenario that any timing information of Cell 2 should be deleted in the UE in the test procedure*

8.6.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions within the E-UTRA TDD – UTRA FDD cell search requirements.

8.6.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA FDD.

8.6.1.3 Minimum conformance requirements

The measurement reporting delay shall be less than $T_{identify,\ UTRA\_FDD}$ in RRC_CONNECTED state.

When explicit neighbour list is provided and no DRX is used the UE shall be able to identify a new detectable cell belonging to the monitored set within

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

Where:

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms. This is the time period used in the inter-RAT equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

T_{Inter1} = 30 ms. This is the minimum available time for inter-RAT measurement during 480 ms period

N_{Freq}: This is the number of UTRA carriers being monitored

A cell shall be considered detectable when

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io ≥ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

When measurement gaps are scheduled for UTRA FDD inter RAT measurement the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in TS 36.133 [4] clause 9.2 of with measurement period given by

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

Where:

$X_{\text{basic measurement UTRA\_FDD}}$ = 6 (cells)

$T_{\text{Measurement\_Period UTRA\_FDD}}$ = 480 ms. The period used for calculating the measurement period.

$T_{\text{basic\_measurement\_UTRA\_FDD}}$ = 50 ms. This is the time period used in the equation where the maximum allowed time for the UE to identify a new UTRA FDD cell is defined.

T_{Inter1} = 30 ms. This is the minimum available time for inter-RAT measurement during 480 ms period

N_{Freq}: This is the number of UTRA carriers being monitored

If the UE does not need measurement gaps to perform UTRA FDD measurements, the measurement period for UTRA FDD measurements is 480 ms.

The UE shall be capable of performing UTRA FDD CPICH measurements for $X_{\text{basic measurement UTRA\_FDD}}$ inter-frequency cells per FDD frequency for up to 3 UTRA FDD carriers, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{\text{Measurement\_UTRA\_FDD}}$.

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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 any events that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu 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: 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 $T_{\text{identify UTRA\_FDD}}$ defined in TS 36.133 [4] clause 8.1.2.4.1.1.1. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.2 and A.8.6.1.

8.6.1.4 Test description

8.6.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.
2. The general test parameter settings are set up according to Table 8.6.1.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.6.1.4.3.

5. There is one E-UTRA TDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.6.1.4.1-1: 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 section A.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2.
Gap Pattern Id		1	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.
Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211. Applicable to cell 1.
Uplink-downlink configuration		1	As specified in table 4.2-2 in 3GPP 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	

8.6.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table's 8.6.1.5-1 and 8.6.1.5-2. Propagation conditions are set according to Annex B clause B.2. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 8.6.1.5-1 and 8.6.1.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delays measured from the beginning of time period T2 is less than 4802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 4) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Repeat step 1-7 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

8.6.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.6.1.4.3-1: Common Exception messages for E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1

Table 8.6.1.4.3-2: *MeasurementConfiguration-DEFAULT*: Additional E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigInterRAT-B1-UTRA		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 8.6.1.4.3-3: *ReportConfigInterRAT-B1-UTRA*: Additional E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-UTRA(UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
b1-Threshold-UTRA CHOICE {			
thresholdUTRA-EcN0	13 (-18dB)	The actual value is (IE value – 49)/2 dB	

Table 8.6.1.4.3-4: *MeasuredResults*: Additional E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1		
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.6.1.4.3-5: *MeasResultListUTRA*: Additional E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity CHOICE {			
cellIdentityFDD	UTRA-FDD-CellIdentity		
}			
globalCellIdentity SEQUENCE {			
globalcellID-UTRA	GlobalCellId-UTRA		
lac-Id	Not present		
rac-Id	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
mode CHOICE {			
fdd SEQUENCE {			
cpich-RSCP		Set according to specific test	
cpich-EcN0		Set according to specific test	
…			
}			
}			
}			
}			

8.6.1.5 Test requirement

Tables 8.6.1.4.1-1, 8.6.1.5-1 and 8.6.1.5-2 define the primary level settings including test tolerances for E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions in synchronous cells test.

Table 8.6.1.5-1: 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 D.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}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94	-94
SCH_RP	dBm/15 kHz	-94	-94
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table 8.6.1.5-2: Cell specific test parameters for UTRAN FDD (cell # 2) for event triggered reporting of UTRAN FDD cell under fading propagation conditions

Parameter	Unit	Cell 2	
		T1	T2
UTRA RF Channel Number		1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	N/A	
OCNS		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity	-1.8
I_{oc}	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-Infinity	-14
Propagation Condition		Case 5 (Note 3)	
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}. Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B1 triggered measurement report to Cell 2.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify, UTRA\_FDD}$

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

$T_{basic\_identify\_UTRA\_FDD}$ = 300 ms

T_{Inter1} = 30 ms

N_{Freq} = 1

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 4802 ms in this test case (note: this gives a total of 4800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.7 E-UTRAN TDD – UTRAN measurements

8.7.1 E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *It only includes 1.28 Mcps TDD option related requirements*

8.7.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions within the E-UTRA TDD – UTRA TDD cell search requirements.

8.7.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA TDD.

8.7.1.3 Minimum conformance requirements

The measurement reporting delay shall be less than $T_{identify,\ UTRA\_TDD}$ in RRC_CONNECTED state.

When explicit neighbour list is provided and no DRX is used the UE shall be able to identify a new detectable cell belonging to the monitored set within

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

If the UE does not require transmit gap to perform inter-RAT UTRA TDD measurements, the UE shall be able to identify a new detectable inter-RAT UTRA TDD cell belonging to the monitored set within 5000 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.

When measurement gaps are scheduled for UTRA TDD inter RAT measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in TS 36.133 [4] clause 9.3 with measurement period given by

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

If the UE does not need measurement gaps to perform UTRA TDD measurements, the measurement period for UTRA TDD measurements is 480 ms.

The UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements for $X_{basic\ measurementUTRA\_TDD}$ inter-frequency cells per TDD frequency of the monitored set for up to 3 UTRA TDD carrier frequencies, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_UTRA\_TDD}$.

$X_{basic\ measurementUTRA\_TDD} = 6$

$T_{Measurement\_Period\ UTRA\_TDD}$ = 480 ms is the period used for calculating the measurement period $T_{measurement\_UTRA\_TDD}$ for UTRA TDD P-CCPCH RSCP measurements.

$T_{basic\_identify\_UTRA\_TDD}$ = 800 ms is the time period used in the inter RAT equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

$T_{basic\_measurement\_UTRA\_TDD}$ = 50 ms is the time period used in the equation for defining the measurement period for inter RAT P-CCPCH RSCP measurements.

N_{freq} and T_{inter1} are defined in TS 36.133 [4] section 8.1.2.1.1

Reported measurements in periodically triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

Reported measurements in event triggered measurement reports shall meet the requirements in TS 36.133 [4] section 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 TS 36.133 [4] Section 8.1.2.4.3.1.1 When L3 filtering is used an additional delay can be expected.

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in TS 36.133 [4] section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in TS 36.133 [4] section 8.1.2.4.3.1.4 Event Triggered Reporting.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.3 and A.8.7.1.

8.7.1.4 Test description

8.7.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.
2. The general test parameter settings are set up according to Table 8.7.1.4.1-1.
3. Propagation conditions are set according to Annex B clauses B.0.
4. Message contents are defined in clause 8.7.1.4.3.
5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.7.1.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.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 3GPP TS 36.133 section 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	dB	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	
Time offset between cells	ms	3	Asynchronous cells 3ms or 92160*Ts
Ofn	dB	0	
Hys	dB	0	
Thresh	dBm	-87	
T1	s	5	
T2	s	10	

8.7.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table’s 8.7.1.5-1 and 8.7.1.5-2. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table’s 8.7.1.5-1 and 8.7.1.5-2.
6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delay measured from the beginning of time period T2 is less than 6402 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. SS shall change to set cell 2 cell parameter id =(current cell 2 cell parameter id +4) mod 16.
9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.7.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.7.1.4.3-1: Common Exception messages for E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	**Table H.3.1-1**

Table 8.7.1.4.3-2: *MeasConfig-DEFAULT*: Additional E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigInterRAT-B1-UTRA		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
neighbourCellConfiguration	Not present		
speedDependentParameters	Not present		
}			

Table 8.7.1.4.3-3: *ReportConfigInterRAT-B1-UTRA*: Additional E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.508 clause 4.6.6 Table 4.6.6-7B			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-UTRA(UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
b1-Threshold-UTRA CHOICE {			
thresholdUTRA-RSCP	28	UTRA-Thres is actual RSCP value in dBm	UTRA-TDD
}			
}			
}			
}			
timeToTrigger	ms0	Value range FFS	
}			
}			
}			

Table 8.7.1.4.3-4: *MeasuredResults*: Additional E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.7.1.4.3-5: *MeasResultListUTRA*: Additional E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
tdd	PhysCellIdUTRA-TDD	INTEGER (0..127)	
}			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdUTRA		
locationAreaCode	Not present		
routingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSRP	[FFS]	Set according to specific test INTEGER (-5..91)	
…			
}			
}			

Table 8.7.1.4.3-6: CellGlobalId-UTRA: Additional E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
CellGlobalIdUTRA ::= SEQUENCE {			
plmn-Identity	PLMN-Identity		
cellIdentity		BIT STRING (SIZE (28))	
}			

8.7.1.5 Test requirement

Tables 8.7.1.4.1-1, 8.7.1.5-1 and 8.7.1.5-2 define the primary level settings including test tolerances for E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions in synchronous cells test.

Table 8.7.1.5-1: 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 D.2.1 (OP.1 TDD)		OP.1 TDD	
PBCH_RA	dB	0	0
PBCH_RB	dB		
PSS_RB	dB		
SSS_RB	dB		
PCFICH_PA	dB		
PHICH_PA	dB		
PHICH_PB	dB		
PDCCH_PA	dB		
PDCCH_PB	dB		
PDSCH_PA	dB		
PDSCH_PB	dB		
OCNG_RA[Note1]	dB		
OCNG_RB[Note1]	dB		
$\hat{E}_s/I_{ot}$	dB	9+TT	9+TT
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-89+TT	-89+TT
SCH_RP	dBm/15kHz	-89+TT	-89+TT
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 8.7.1.5-2: 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+TT	-3+TT		
DwPCH_Ec/Ior	dB			0+TT	0+TT
OCNS_Ec/Ior[NOTE2]	dB	-3+TT	-3+TT		
$\hat{I}_{or}/I_{oc}$	dB	-inf	5+TT	-inf	5+TT
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-inf	-78+TT	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 3GPP TS 25.102					

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one [Event B1] triggered measurement report to Cell 2.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify,\ UTRA\_TDD}$

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

$T_{basic\_identify\_UTRA\_TDD}$ = 800 ms

T_{Inter1} = 60 ms

N_{Freq} = 1

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of [6402 ms] in this test case (note: this gives a total of 6400 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.7.2 E-UTRAN TDD – UTRAN TDD cell search when DRX is used under fading propagation conditions

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *It only includes 1.28 Mcps TDD option related requirements*

8.7.2.1 Test purpose

The test cases are to verify that the UE makes correct reporting of an event in DRX. These tests will partly verify E-UTRA TDD to UTRA TDD cell search requirements when DRX is used in TS 36.133 [4] section 8.1.2.4.3.2.

8.7.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA TDD.

8.7.2.3 Minimum conformance requirements

When explicit neighbour list is provided and DRX is used 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 8.7.2.3-1

Table 8.7.2.3-1: 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 TS 36.133[4] section 8.1.2.4.3.1 are applicable	Non DRX Requirements in TS 36.133[4] section 8.1.2.4.3.1 are applicable
0.64≤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 ≥ -8 dB,
- DwPCH_Ec/Io ≥ -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 8.7.2.3-2.

Table 8.7.2.3-2: 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 TS 36.133[4] section 8.1.2.4.3.1 are applicable	Non DRX Requirements in TS 36.133[4] section 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 TS 36.133[4] sub-clause 9.1.

Reported measurements in periodically triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

Reported measurements in event triggered measurement reports shall meet the requirements in TS 36.133 [4] section 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 TS 36.133 [4] Section 8.1.2.4.3.2 When L3 filtering is used an additional delay can be expected.

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements TS 36.133 [4] in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in TS 36.133 [4] section 8.1.2.4.3.2.2 Event Triggered Reporting.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.3.2 and A.8.7.2.

8.7.2.4 Test description

8.7.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.
2. The general test parameter settings are set up according to Table 8.7.2.4.1-1.
3. Propagation conditions are set according to Annex B clauses B.0.
4. Message contents are defined in clause 8.7.2.4.3.
5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.Cell 2 (UTRAN TDD cell) is to be searched. Gap pattern configuration # 0 as defined in TS 36.133 [4] table 8.1.2.1-1 is provided.

Table 8.7.2.4.1-1: 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 section A.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 section A.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 3GPP TS 36.133 section 8.1.2.1.
Uplink-downlink configuration		1		As specified in 3GPP TS 36.211 section 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		53		As specified in table 5.7.1-3 in 3GPP TS 36.211
CP length of cell 1		Normal		
Ofn	dB	0		
Hys	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 8.7.2.5-3
Time offset between cells	ms	3		Asynchronous cells 3ms or 92160*Ts
T1	s	5		
T2	s	8	30	

8.7.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations 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 aligmnent timer to keep UE uplink time aligmnend. Furhtermore UE is allocated wit hPUSCH resource at every DRX cycle. In Test 2 the uplink time aligment is not maintained and UnE needs to use RACH to obtain UL allocation for measurement reporting.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table’s 8.7.2.5-1 and 8.7.2.5-2. T1 starts.
3. The SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table’s 8.7.2.5-1 and 8.7.2.5-2.
6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delay measured from the beginning of time period T2 is less than 6402ms for Test1 or less than 25602ms for Test2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. SS shall set Cell 2 cell parameter id=(current Cell 2 cell parameter id+4) mod 16 for next iteration of the test procedure loop.
9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
10. Repeat step 1-9 for each sub-test in Table 8.7.2.4.1-1 as appropriate.

8.7.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.7.2.4.3-1: Common Exception messages for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	**Table H.3.1-1** **Table H.3.1-4**

Table 8.7.2.4.3-2: *ReportConfigInterRAT-B1-UTRA*: Additional E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Derivation Path: 36.508 clause 4.6.6 Table 4.6.6-7B			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-UTRA(UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
b1-Threshold-UTRA CHOICE {			
thresholdUTRA-RSCP	32	UTRA-Thres + 115 UTRA-Thres is actual RSCP value in dBm	UTRA-TDD
}			
}			
}			
}			
hysteresis	0	The actual value is IE value * 0.5 dB INTEGER (0..30)	
timeToTrigger	ms0		
}			
}			
}			

Table 8.7.2.4.3-3: *RadioResourceConfigDedicated-SRB1-SRB2-DRB(n,m)*: Additional E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Derivation Path: TS 36.508 [7] clause 4.6.3 Table 4.6.3-18: RadioResourceConfigDedicated-SRB1-SRB2-DRB(n,m)			
Information Element	**Value/remark**	**Comment**	**Condition**
RadioResourceConfigDedicated-SRB1-SRB2-DRB(n, m) ::= SEQUENCE {		n is the number of AM RLC DRBs (1..N) m is the number of UM RLC DRBs (0..M)	
physicalConfigDedicated	PhysicalConfigDedicated - DEFAULT using condition RBC		
sps-Configuration	Not present		
}			
NOTE: In cases where no RLC-UM bearer is configured, large DRX Cycle length is used. In cases where at least one RLC-UM bearer is configured, small DRX Cycle length is used.			

Table 8.7.2.4.3-4: *MAC-MainConfig-RBC*: Additional E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5 Table 4.8.2.1.5-1: MAC-MainConfig-RB			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp_5 AND DRX_S/L
release	NULL		
setup SEQUENCE {			
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf40/sf1280 typical value in real network for real-time services.	
[sf40]	0	For Test 1	
[sf1280]	0	For Test 2	
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	sf500		
}			

Table 8.7.2.4.3-5: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1: PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
schedulingRequestConfig			
	SchedulingRequest-Config-DEFAULT		RBC
}			

Condition	Explanation
SRB1	Used at configuration of SRB1 during RRC connection (re-)establishment
RBC	Used at configuration of a radio bearer combination during SRB2+DRB establishment

Table 8.7.2.4.3-6: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20: SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	Channel-bandwidth-dependent parameter	
sr-ConfigIndex	0		
dsr-TransMax	n4		
}			
}			

Table 8.7.2.4.3-7: *MeasuredResults*: Additional E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.7.2.4.3-8: *MeasResultListUTRA*: Additional E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
tdd	PhysCellIdUTRA-TDD	INTEGER (0..127)	
}			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdUTRA		
locationAreaCode	Not present		
routingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSRP	[FFS]	Set according to specific test INTEGER (-5..91)	
…			
}			
}			

Table 8.7.2.4.3-9: *CellGlobalId-UTRA*: Additional E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
CellGlobalIdUTRA ::= SEQUENCE {			
plmn-Identity	PLMN-Identity		
cellIdentity		BIT STRING (SIZE (28))	
}			

8.7.2.5 Test requirement

The common test parameters are given in Tables 8.7.2.4.1-1, 8.7.2.5-1 and 8.7.2.5-2. DRX configuration for Test1 and Test2 are given in Table 8.7.2.5-3 and time alignment timer and scheduling request related parameters in Table 8.7.2.5-4.

Table 8.7.2.5-1: 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)

<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 Patterns defined in D.2.1 (OP.1 TDD)</td><td></td><td colspan="2">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_RB</td><td>dB</td></tr>
<tr><td>SSS_RB</td><td>dB</td></tr>
<tr><td>PCFICH_PA</td><td>dB</td></tr>
<tr><td>PHICH_PA</td><td>dB</td></tr>
<tr><td>PHICH_PB</td><td>dB</td></tr>
<tr><td>PDCCH_PA</td><td>dB</td></tr>
<tr><td>PDCCH_PB</td><td>dB</td></tr>
<tr><td>PDSCH_PA</td><td>dB</td></tr>
<tr><td>PDSCH_PB</td><td>dB</td></tr>
<tr><td>OCNG_RA Note1</td><td>dB</td></tr>
<tr><td>OCNG_RB Note1</td><td>dB</td></tr>
<tr><td>$\hat{E}_s/I_{ot}$</td><td>dB</td><td>4+TT</td><td>4+TT</td></tr>
<tr><td>N_{oc} Note 2</td><td>dBm/15kHz</td><td colspan="2">-98</td></tr>
<tr><td>RSRP Note 3</td><td>dBm/15kHz</td><td>-94+TT</td><td>-94+TT</td></tr>
<tr><td>SCH_RP Note 3</td><td>dBm/15kHz</td><td>-94+TT</td><td>-94+TT</td></tr>
<tr><td>Propagation Condition</td><td></td><td colspan="2">ETU70</td></tr>
<tr><td colspan="4">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.</td></tr>
</table>

Table 8.7.2.5-2: Cell specific test parameters for E-UTRAN TDD to UTRAN 1.28Mcps TDD cell search when DRX is used in fading propagation conditions(cell 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+TT	3+TT		
DwPCH_Ec/Ior	dB			0+TT	0+TT
OCNS_Ec/Ior NOTE2	dB	-3+TT	3+TT		
$\hat{I}_{or}/I_{oc}$	dB	-inf	9+TT	-inf	9+TT
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-inf	-74+TT	n.a.	n.a.
Propagation Condition		Case 3 NOTE3			
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior. Note 3: Case 3 propagation conditions are defined in Annex B of 3GPP TS 25.102					

Table 8.7.2.5-3: 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 8.7.2.5-4: *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 section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and 10.1 in 3GPP TS 36.213.

In Test1 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 6402ms from the beginning of time period T2. The measurement reporting delay is defined as the time from the beginning of time period T2, to the moment when the UE send the measurement report on PUSCH.

The overall delays measured shall be less than a total of 6402 ms in this test case (note: this gives a total of 6400 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

In Test2 the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than 25602ms 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

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.7.3 E-UTRAN TDD - UTRAN TDD SON ANR cell search reporting under AWGN propagation conditions

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *This is the first verion for this test case*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *The test requirement time has an editorial fault in the core spec and are therefore within brackets*
- *The message context is not completed*

8.7.3.1 Test purpose

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 section 8.1.2.4.7.1.

8.7.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

8.7.3.3 Minimum conformance requirements

When no DRX is used the UE shall be able to identify a new cell within:

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

$\mathrm{T}_{\mathrm{basic\_identify\_UTRA\_TDD}}$ = 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*$\mathrm{T}_{\mathrm{identify,\ UTRA\_TDD}}$ ms, the UE may stop searching UTRA TDD cells for SON.

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 section 8.1.2.4.13.1.1 in TS36.133 and in section 8.1.2.4.13.1.2 in TS36.133 for non DRX and DRX cases respectively. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.13 and A.8.7.3.

8.7.3.4 Test description

8.7.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.18.
2. The general test parameter settings are set up according to Table 8.7.3.4.1-1.
3. Propagation conditions are set according to Annex B clauses B.0.
4. Message contents are defined in clause 8.7.3.4.3.
5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.7.3.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Gap Pattern Id		1	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.
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 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	6	

8.7.3.4.2 Test procedure

The test consists of one active E-UTRAN cell and one neighbour UTRAN cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3 according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Tables 8.7.3.5-1 and 8.7.3.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 8.7.3.5-1 and 8.7.3.5-2.
6. The UE shall transmit a MeasurementReport message containing the primary scrambling code of cell 2. If the overall delays measured from the beginning of time period T2 is less than [4802 FFS] ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. Repeat step 1-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.7.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.7.3.4.3-1: Common Exception messages for E-UTRAN TDD-UTRAN TDD cell search reporting for SON ANR in AWGN propagation conditions

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1

Table 8.7.3.4.3-2: *MeasurementConfiguration-DEFAULT*: Additional E-UTRAN TDD-UTRAN TDD cell search reporting for SON ANR in AWGN propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModifyList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	ReportConfigInterRAT-SON-UTRA		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

Table 8.7.3.4.3-3: *ReportConfigInterRAT-SON-ANR*: Additional E-UTRAN TDD-UTRAN TDD cell search reporting for SON ANR in AWGN propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-SON-UTRA::= SEQUENCE {			
triggerType CHOICE {			
periodical SEQUENCE {			
purpose ENUMERATED {	reportStrongestCellForSON		
}			
}			
}			
}			
ThresholdUTRA ::= CHOICE {			
utra-RSCP	[44 (-70 dBm)]	-70 dBm is actual RSCP value in dBm (44-114)dBm)	
}			

Table 8.7.3.4.3-4: *MeasuredResults*: Additional E-UTRAN TDD-UTRAN TDD cell search reporting for SON ANR in AWGN propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.7.3.4.3-5: *MeasResultListEUTRA*: Additional E-UTRAN TDD-UTRAN TDD cell search reporting for SON ANR in AWGN propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultUTRA			
MeasResultUTRA ::= SEQUENCE {			
physCellId CHOICE {			
TDD	PhysCellIdUTRA-TDD	The primary scrambling code, as defined in TS 25.331	
}			
Cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdUTRA		
locationAreaCode	Not present		
RoutingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSCP		Set according to specific test	
…			
}			
}			
}			
}			

[FFS]

8.7.3.5 Test requirement

Tables 8.7.3.4.1-1, 8.7.3.5-1 and 8.7.3.5-2 define the primary level settings including test tolerances for UTRAN TDD cell search for SON ANR under AWGN propagation conditions test.

Table 8.7.3.5-1: 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 D.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+TT	4+TT
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4+TT	4+TT
RSRP Note 4	dBm/15 kHz	-94+TT	-94+TT
SCH_RP	dBm/15 kHz	-94+TT	-94+TT
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+TT	
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.					

The UE shall send the first measurement report containing the primary scrambling code of cell 2, with a measurement reporting delay less than [4800 FFS] ms from the beginning of time period T2.

When no DRX is used 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.

[FFS]

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.

8.8 E-UTRAN FDD – GSM measurements

8.8.1 E-UTRAN FDD – GSM event triggered reporting in AWGN

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.8.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event when doing inter-RAT (GSM) measurements under AWGN condition within the E-UTRA FDD – GSM cell search requirements.

8.8.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support GSM UE.

8.8.1.3 Minimum conformance requirements

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 in TS 36.133 [4] is configured by E-UTRAN 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.

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in section 8.1.2.1 in TS 36.133 [4] 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 [4] as $N_{freq} = N_{freq,\ E\text{-}UTRA} + N_{freq,\ UTRA} + M_{gsm}$

Where:

$N_{freq,\ E\text{-}UTRA}$ is the number of E-UTRA carriers being monitored

$N_{freq,\ UTRA}$ is the number of UTRA carriers being monitored

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 Measurement Gap Repetition Period (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

The UE shall meet the measurement accuracy requirements stated for RXLEV in TS 45.008 [15], 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.

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 section 8.1.2.4.5.1.2.1 of TS 36.133 [4].

- **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 section 8.1.2.4.5.1.2.2 of TS 36.133 [4].

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 section 8.1.2.4.5.1 in TS 36.133 [4] when a measurement gap pattern sequence is activated.

- The UE shall perform measurement reporting as defined in TS 36.331 [5].

- The UE shall perform BSIC identification if BSIC verified measurements are activated by RRC. 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 [5].

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 of TS 36.133 [4].

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in TS 45.005 [16].

This measurement shall be based on the measurement gaps used for Initial BSIC identification as described in section 8.1.2.4.5.1.2 of TS 36.133 [4].

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 of TS 36.133 [4]. The requirements in the table represent the time required to guarantee at least two attempts to decode the BSIC for one GSM BCCH carrier.

Reported measurements in event triggered measurement reports shall meet the requirements in section TS 36.331 [5].

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 section 8.1.2.4.5.1 of TS 36.133 [4]).

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 section 8.1.2.4.5.1. of TS 36.133 [4] When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.5 and A.8.8.1

8.8.1.4 Test description

8.8.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The general test parameter settings are set up according to Table 8.8.1.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.8.1.4.3.

5. There is one E-UTRA FDD carrier and one GSM cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.8.1.4.1-1: 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 section A.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1.
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 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	

8.8.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A 3 according to TS 36.508 [7] clause 4.5.3A3A.

2. Set the parameters according to T1 in Table’s 8.8.1.5-1 and 8.8.1.5-2. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table’s 8.8.1.5-1 and 8.8.1.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event B1. If the measurement reporting delay measured from the beginning of time period T2 is less than 3122 ms then the number of successful tests is increased by one. If the UE fails to report the event within the measurement reporting delay requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

8.8.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.8.1.4.3-1: Common Exception messages for E-UTRAN FDD – GSM Event triggered reporting in AWGN

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-6

Table 8.8.1.4.3-2: *ReportConfigInterRAT-B1-GERAN*: Additional E-UTRAN FDD – GSM Event triggered reporting in AWGN

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7A ReportConfigInterRAT-B1-GERAN(GERAN-Thres)			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-GERAN(GERAN-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventIdeventide CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
B1-Threshold-GERAN CHOICE {			
thresholdGERAN	30 (-80 dBm)	-80 is actual value in dBm (30 – 110 dBm)	

Table 8.8.1.4.3-5: *MeasuredResults*: Additional E-UTRAN FDD – GSM Event triggered reporting in AWGN

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListGERAN ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
MeasResultGERAN SEQUENCE {			
carrierFreq	CarrierFreqGERAN	Contains the carrier frequency of the target GERAN cell	
physCellId	PhysCellIdGERAN	Contains the Base Station Identity Code (BSIC)	
}			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdGERAN		
routingAreaCode	Not present		
}			
measResult SEQUENCE {			
rssi		Set according to specific test	
…			
}			
}			

Table 8.8.1.4.3-4: *MeasResultListGERAN:* Additional E-UTRAN FDD – GSM Event triggered reporting in AWGN

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListGERAN ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
MeasResultGERAN SEQUENCE {			
carrierFreq	CarrierFreqGERAN	Contains the carrier frequency of the target GERAN cell	
physCellId	PhysCellIdGERAN	Contains the Base Station Identity Code (BSIC)	
}			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdGERAN		
routingAreaCode	Not present		
}			
measResult SEQUENCE {			
rssi		Set according to specific test	
...			
}			
}			

8.8.1.5 Test requirement

Tables 8.8.1.4.1-1, 8.8.1.5-1 and 8.8.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD-GSM event triggered reporting under AWGN conditions.

Table 8.8.1.5-1: 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 D.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+TT	4+TT
$\hat{E}_s/N_{oc}$		4+TT	4+TT
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94+TT	-94+TT
SCH_RP	dBm/15 kHz	-94+TT	-94+TT
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table 8.8.1.5-2: 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+TT
GSM BSIC		N/A	Valid

The overall delay measured is defined as the time from the beginning of time period T2, to the moment the UE sends one Event B1 triggered measurement report including BSIC of Cell 2.

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.

The overall delay measured shall be less than a total of 3122 ms in this test case. (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 plus the TTI insertion uncertainty of 2ms).

The event triggered measurement reporting delay = 2*$T_{Measurement\ Period,\ GSM}$ = 2* 480 ms = 960 ms.

Initial BSIC identification delay = 2160 ms.

TTI insertion uncertainty = 2 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.8.2 E-UTRAN FDD – GSM event triggered reporting when DRX is used in AWGN

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Statistical Testing requirements in Annex G are undefined*
- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.8.2.1 Test purpose

To verify the UE's ability to make a correct reporting of an event in DRX when doing inter-RAT (GSM) measurements under AWGN condition within the E-UTRA FDD – GSM cell search requirements.

8.8.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support GSM UE.

8.8.2.3 Minimum conformance requirements

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 in TS 36.133 [4] is configured by E-UTRAN 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.

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in section 8.1.2.1 in TS 36.133 [4]. 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 in TS 36.133 [4]. The parameter N_{freq} is defined in clause 8.1.2.1.1 [4] as $N_{freq} = N_{freq,\ E\text{-}UTRA} + N_{freq,\ UTRA} + M_{gsm}$

Where:

$N_{freq,\ E\text{-}UTRA}$ is the number of E-UTRA carriers being monitored

$N_{freq,\ UTRA}$ is the number of UTRA carriers being monitored

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 Measurement Gap Repetition Period (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

The UE shall meet the measurement accuracy requirements stated for RXLEV in TS 45.008 [15], 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.

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. The requirements for BSIC re-confirmation can be found in section 8.1.2.4.5.1.2.2 of TS 36.133 [4].

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 section 8.1.2.4.5.2.1 in TS 36.133 [4] when a measurement gap pattern sequence is activated.
- The UE shall perform measurement reporting as defined in TS 36.331 [5].
- The UE shall perform BSIC identification if BSIC verified measurements are activated by RRC. 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 [5].

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 $8*T_{re-confirm,GSM}$ 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.

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in TS 45.005 [16].

This measurement shall be made on GSM cells that are required with BSIC verified.

For DRX cycle length ≤ 40 ms, the initial GSM BSIC identification requirements corresponding to the non DRX requirements as specified in section 8.1.2.4.5.1.2.1 in TS 36.133 [4] 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 section 8.1.2.1.1 in TS 36.133 [4].

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.

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, GSM BSIC re-confirmation requirements corresponding to the non DRX requirements as specified in section 8.1.2.4.5.1.2.2 in TS 36.133 [4] 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 section 8.1.2.4.5.2.2.1 in TS 36.133 [4]. The parameter N_{freq} is defined in section 8.1.2.1.1 in TS 36.133 [4].

Reported measurements in event triggered measurement reports shall meet the requirements in section TS 36.331 [5].

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 section 8.1.2.4.5.1 of TS 36.133 [4]).

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 section 8.1.2.4.5.1 of TS 36.133 [4]. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.5.2 and A.8.8.2.

8.8.2.4 Test description

8.8.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The general test parameter settings are set up according to Table 8.8.2.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.8.2.4.3.

5. There is one E-UTRA FDD carrier and one GSM cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.8.2.4.1-1: 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 section A.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD		As specified in section A.1.2.
Gap Pattern Id		0		As specified in 3GPP TS 36.133 [4] 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 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 [9]
Access Barring Information	-	Not Sent		No additional delays in random access procedure.
DRX		ON		DRX related parameters are defined in Table 8.8.2.5-2
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	

8.8.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. 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 durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

In Test 1 when DRX = 40 ms is used, UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle. In Test 2 when DRX = 1280 ms is used, the uplink time alignment is not maintained and the UE needs to use RACH to obtain uplink allocation for measurement reporting.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table 8.8.2.5-1, 8.8.2.5-2, 8.8.2.5-3 and 8.8.2.5-4. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 8.8.2.5-1 and 8.8.1.5-4.

6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delays measured from the beginning of time period T2 is less than 3122 ms for Test 1 or less than 42802 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

10. Repeat step 1-9 for each sub-test in Table 8.8.2.4.1-1 as appropriate.

8.8.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.8.2.4.3-1: Common Exception messages for E-UTRAN FDD – GSM Event triggered reporting when DRX is used in AWGN

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-6 Table H.3.7-1 Table H.3.7-2 Table H.3.7-3

Table 8.8.2.4.3-2: *ReportConfigInterRAT-B1-GERAN*: Additional E-UTRAN FDD – GSM Event triggered reporting in AWGN

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7A ReportConfigInterRAT-B1-GERAN(GERAN-Thres)			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-GERAN(GERAN-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventIdeventide CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
B1-Threshold-GERAN CHOICE {			
thresholdGERAN	30 (-80 dBm)	-80 is actual value in dBm (30 – 110 dBm)	

Table 8.8.2.4.3-3: *SchedulingRequest-Config-DEFAULT*: Additional E-UTRAN FDD-GSM Event triggered reporting when DRX is used in AWGN

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	[0]		
dsr-TransMax	n4		
}			
}			

Table 8.8.2.4.3-4: *MeasuredResults*: Additional E-UTRAN FDD – GSM Event triggered reporting when DRX is used in AWGN

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListGERAN	MeasResultListGERAN		
…			
}			
…			
}			

Table 8.8.2.4.3-5: *MeasResultListGERAN:* Additional E-UTRAN FDD – GSM Event triggered reporting when DRX is used in AWGN

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListGERAN ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
MeasResultGERAN SEQUENCE {			
carrierFreq	CarrierFreqGERAN	Contains the carrier frequency of the target GERAN cell	
physCellId	PhysCellIdGERAN	Contains the Base Station Identity Code (BSIC)	
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdGERAN		
routingAreaCode	Not present		
}			
measResult SEQUENCE {			
rssi		Set according to specific test	
…			
}			
}			

8.8.2.5 Test requirement

Tables 8.8.2.4.1-1, 8.8.2.5-1 and 8.8.2.5-4 define the primary level settings including test tolerances for E-UTRAN FDD-GSM event triggered reporting when DRX is used under AWGN conditions.

Table 8.8.2.5-1: Cell specific test parameters for E-UTRAN FDD (Cell # 1) for 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 D.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 + TT	4 + TT
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94 + TT	-94 + TT
SCH_RP	dBm/15 kHz	-94 + TT	-94 + TT
$\hat{E}_s/N_{oc}$	dB	4 + TT	4 + TT
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 8.8.2.5-2: DRX-Configuration to be used in E-UTRAN FDD - GSM Event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
onDurationTimer	psf1	psf1	
drx-InactivityTimer	psf1	psf1	
drx-RetransmissionTimer	sf1	sf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].			

Table 8.8.2.5-3: *TimeAlignmentTimer* and *sr-ConfigIndex*-Configuration to be used in E-UTRAN FDD-GSM Event triggered reporting when DRX is used in AWGN

Field	Test1	Test2	Comment
	Value	Value	
TimeAlignmentTimer	sf500	sf500	For further information see section 6.3.2 in 3GPP TS 36.331 [5].
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213 [8].

Table 8.8.2.5-4: 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+TT
GSM BSIC		N/A	Valid

In Test 1 when DRX = 40 ms is used, the overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B1 triggered measurement report to Cell 2 on PUSCH.

The overall delays measured when DRX cycle length is 40 ms in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 40 ms test requirement is expressed as:

Overall delays measured = $2*T_{Measurement\ Period,\ GSM} + T_{identify,\ GSM}$

$T_{Measurement\ Period,\ GSM}$ = 480 ms (as specified in table 8.1.2.4.5.2.1-1 of TS36.133 [4] clause 8.1.2.4.5.2.1)

$T_{identify,\ GSM}$ = 2160 ms (as specified in table 8.1.2.4.5.1.2.1-1 of TS36.133 [4] clause 8.1.2.4.5.1.2.1)

The overall delays measured when DRX cycle length is 40 ms shall be less than a total of 3120 ms in this test case.

In Test 2 when DRX = 1280 ms is used, the overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to Cell 2 on PUSCH.

The overall delays measured when DRX cycle length is 1280 ms in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured when DRX cycle length is 1280 ms test requirement is expressed as:

Overall delays measured = $2*T_{Measurement\ Period,\ GSM} + N_{freq} * 30s$

$T_{Measurement\ Period,\ GSM}$ = 6400 ms (as specified in table 8.1.2.4.5.2.1-1 of TS36.133 [4] clause 8.1.2.4.5.2.1)

N_{freq} = 1 (as specified in TS36.133 clause 8.1.2.1.1)

N_{freq} * 30 s = 30000 ms (as specified in TS36.133 [4] clause 8.1.2.4.5.2.2.2 for when DRX cycle length > 40 ms)

The overall delays measured when DRX cycle length is 1280 ms shall be less than a total of 42800 ms in this test case.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.9 E-UTRAN FDD – UTRAN TDD measurements

8.9.1 E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.9.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event under fading propagation conditions within the E-UTRA FDD – UTRA TDD cell search requirements.

8.9.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRAN TDD UE..

8.9.1.3 Minimum requirement

The measurement reporting delay shall be less than $T_{identify,\ UTRA\_TDD}$ in RRC_CONNECTED state.

When explicit neighbour list is provided and no DRX is used the UE shall be able to identify a new detectable cell belonging to the monitored set within

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

where

$T_{basic\_identify\_UTRA\_TDD}$ = 800 ms is the time period used in the inter RAT equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

T_{Inter1} = 30 ms. This is the minimum available time for inter-RAT measurement during 480 ms period

N_{Freq}: This is the number of UTRA carriers being monitored

If the UE does not require transmit gap to perform inter-RAT UTRA TDD measurements, the UE shall be able to identify a new detectable inter-RAT UTRA TDD cell belonging to the monitored set within 5000 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.

When measurement gaps are scheduled for UTRA TDD inter RAT measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in Section 9.3 with measurement period given by

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

Where:

$T_{Measurement\_Period\ UTRA\_TDD}$ = 480 ms is the period used for calculating the measurement period $T_{measurement\_UTRA\_TDD}$ for UTRA TDD P-CCPCH RSCP measurements.

$T_{basic\_identify\_UTRA\_TDD}$ = 800 ms is the time period used in the inter RAT equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

$T_{basic\_measurement\_UTRA\_TDD}$ = 50 ms is the time period used in the equation for defining the measurement period for inter RAT P-CCPCH RSCP measurements.

N_{freq} and T_{inter1} are defined in section 8.1.2.1.1

If the UE does not need measurement gaps to perform UTRA TDD measurements, the measurement period for UTRA TDD measurements is 480 ms.

The UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements for $X_{basic\ measurementUTRA\_TDD}$ inter-frequency cells per TDD frequency of the monitored set for up to 3 UTRA TDD carrier frequencies, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_UTRA\_TDD.}$ Where $X_{basic\ measurementUTRA\_TDD}$= 6.

Reported measurements in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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 TS 36.133 [4] Section 8.1.2.4.3.1.1 When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.3 and A.8.9.

8.9.1.4 Test description

8.9.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15.
2. The general test parameter settings are set up according to Table 8.9.1.4.1-1.
3. Propagation conditions are set according to Annex B clauses B.0.
4. Message contents are defined in clause 8.9.1.4.3.
5. There is one E-UTRA FDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.9.1.4.1-1: 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 section A.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.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	-71	UTRA TDD PCCPCH RSCP threshold for event B1.
Hysteresis	dB	0	
CP length		Normal	
TimeToTrigger	dB	0	
Filter coefficient		0	L3 filtering is not used
DRX			OFF
T1	s	5	
T2	s	15	

8.9.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table's 8.9.1.5-1 and 8.9.1.5-2. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 8.9.1.5-1 and 8.9.1.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delay measured from the beginning of time period T2 is less than 12880 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 4) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. SS shall change set cell 2 cell parameter id =(current cell 2 cell parameter id +4) mod 16.

9. Repeat step 1-8 until the confidence level according to Tables G.2.6-1 in Annex G clause G.2 is achieved.

8.9.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.9.1.4.3-1: Common Exception messages for E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-4

Table 8.9.1.4.3-2: *ReportConfigInterRAT-B1-UTRA*: Additional E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-UTRA(UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
b1-Threshold-UTRA CHOICE {			
utra-RSCP	44	UTRA-Thres is actual RSCP value in dBm UTRA-Thres + 115	
}			
}			
}			
}			
hysteresis	0		

Table 8.9.1.4.3-3: *MeasuredResults*: Additional E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCellsCHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.9.1.4.3-4: *MeasResultListUTRA*: Additional E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellIdphysicallCellIdentity CHOICE {			
tdd	UTRA-TDD-CellIdentity		
}			
cgi-Info SEQUENCE {			
cellGlobalId	GlobalCellId-UTRA		
locationAreaCode	Not present		
routingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSCP	Set according to specific test		
}			
}			

Table 8.9.1.4.3-5: CellGlobalId-UTRA: Additional E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
CellGlobalIdUTRA ::= SEQUENCE {			
plmn-Identity	PLMN-Identity		
cellIdentity		BIT STRING (SIZE (28))	
}			

8.9.1.5 Test requirement

Tables 8.9.1.4.1-1, 8.9.1.5-1 and 8.9.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions in synchronous cells test.

Table A.8.9.1.5-1: 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 D.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+TT	-94+TT
$\hat{E}_s/I_{ot}$	dB	4+TT	4+TT
P-SCH_RP	dBm	-94+TT	
S-SCH_RP	dBm	-94+TT	
Propagation Condition		ETU70	
Note 1: OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.			

Table A.8.9.1.5-2: 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+TT	
DwPCH_Ec/Ior	dB	-Infinity			0+TT
OCNS_Ec/Ior		-Infinity		-3+TT	
$\hat{I}_{or}/I_{oc}$	dB	-Infinity		9+TT	
I_{oc}	dBm/1.28 MHz	-70			
PCCPCH_RSCP	dB	-Infinity		-64+TT	
Propagation Condition		Case 3 (NOTE2)			
NOTE 1: The DPCH of the cell is located in a timeslot other than 0. NOTE 2: Case 3 propagation conditions are specified in TS 25.102 Annex B.					

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B1 triggered measurement report to Cell 2.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify,\ UTRA\_TDD}$

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

$T_{basic\_identify\_UTRA\_TDD}$ = 800 ms

T_{Inter1} = 30 ms

N_{Freq} = 1

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 12802 ms in this test case (note: this gives a total of 12800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.10 E-UTRAN TDD – GSM measurements

8.10.1 E-UTRAN TDD – GSM event triggered reporting in AWGN

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.10.1.1 Test purpose

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 TS 36.133[4] section 8.1.2.4.6.

8.10.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support GSM.

8.10.1.3 Minimum conformance requirements

The requirements in this section apply only to UE supporting E-UTRAN TDD 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 TS 36.133[4] Table 8.1.2.1-1 is configured by E-UTRAN 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.

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in TS 36.133[4] section 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 TS 36.133[4] section 8.1.2.1.1.

The UE shall meet the measurement accuracy requirements stated for RXLEV in TS 45.008 [15], 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, when at least 25% of the measurement gaps available for GSM monitoring purposes are used for GSM RSSI purposes 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.

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 TDD 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 TS 36.133[4] section 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 TS 36.133[4] section 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 TS 36.133[4] section 8.1.2.4.5.1 when a measurement gap pattern sequence is activated.
- The UE shall perform measurement reporting as defined in TS 36.331 [5].
- The UE shall perform BSIC identification if BSIC verified measurements are activated by RRC. 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 [5].

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 8.10.1.3-1.

Table 8.10.1.3-1: 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 TS 45.005 [16].

This measurement shall be based on the measurement gaps used for Initial BSIC identification as described in TS 36.133[4] section 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 8.10.1.3-2. The requirements in the table represent the time required to guarantee at least two attempts to decode the BSIC for one GSM BCCH carrier.

Table 8.10.1.3-2

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

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 TS 36.133[4] section 8.1.2.4.5.1.2, the UE shall attempt to decode the BSIC falling within the measurement gap according to table 8.10. 1.3 - 2. If more than one BSIC can be decoded within the same measurement gap, priority shall be given to the least recently decoded BSIC.

If the UE fails to decode the BSIC after two successive attempts or if the UE has not been able to re-confirm the BSIC for a GSM cell within $T_{re-confirm,GSM}$ seconds, the UE shall abort the BSIC re-confirmation attempts for that GSM cell. The GSM cell shall be treated as a new GSM cell with unidentified BSIC and the GSM cell shall be moved to the initial BSIC identification procedure, see TS 36.133[4] section 8.1.2.4.5.1.2.1.

Reported measurements in periodically triggered measurement reports shall meet the requirements in section TS 36.331[5].

Reported measurements in event triggered measurement reports shall meet the requirements in section TS 36.331[5].

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 TS 36.133[4] section 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 TS 36.133[4] section 8.1.2.4.5.1. When L3 filtering is used an additional delay can be expected.

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in TS 36.133[4] section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in TS 36.133[4] section 8.1.2.4.5.1.4 Event Triggered Reporting.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.5.1 and A8.10.1

8.10.1.4 Test description

8.10.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15 for UEs that support receive diversity.

2. The general test parameter settings are set up according to Table 8.10.1.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.10.1.4.3.

5. There is one E-UTRA TDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.10.1.4.1-1: 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 section A.1.2.
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2.
Gap Pattern Id		0	As specified in 3GPP TS 36.133[4] 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 Absolute RF Channel Number 1 (GSM cell)
Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration		1	As specified in table 4.2-2 in 3GPP 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	

8.10.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to T1 in Table’s 8.10.1.5-1 and 8.10.1.5-2. T1 starts.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table’s 8.10.1.5-1 and 8.10.1.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delay measured from the beginning of time period T2 is less than 3122 ms then the number of successful tests is increased by one. If the

UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.10.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.10.1.4.3-1: Common Exception messages for E-UTRAN TDD-GSM event triggered reporting under fading propagation conditions

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	**Table H.3.1-1**

Table 8.10.1.4.3-2: *MeasurementConfiguration-DEFAULT*: Additional E-UTRAN TDD – GSM event triggered reporting under fading propagation conditions

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModList	ReportConfigInterRAT-B1-GERAN		
measIdToRemoveList	Not present		
measIdToAddModList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
}			

Table 8.10.1.4.3-3: *ReportConfigInterRAT-B1-GERAN*: Additional E-UTRAN FDD – GSM Event triggered reporting in AWGN

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7A ReportConfigInterRAT-B1-GERAN(GERAN-Thres)			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-GERAN(GERAN-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventIdeventide CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
B1-Threshold-GERAN CHOICE {			
thresholdGERAN	30 (-80 dBm)	-80 is actual value in dBm (30 – 110 dBm)	

Table 8.10.1.4.3-4: *MeasuredResults*: Additional E-UTRAN TDD – GSM event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListGERAN	MeasResultListGERAN		
…			
}			
…			
}			

Table 8.10.1.4.3-5: *MeasResultListGERAN*: Additional E-UTRAN TDD – GSM event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListGERAN ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
carrierFreq	CarrierFreqGERAN		
physCellId CHOICE {			
networkColourCode		BIT STRING(SIZE(3))	
baseStationColourCode		BIT STRING(SIZE(3))	
}			
cgi_Info SEQUENCE {			
cellGlobalId	CellGlobalIdGERAN		
routingAreaCode	Not present		
}			
measResult SEQUENCE {			
rssi		Set according to specific test	
…			
}			
}			

Table 8.10.1.4.3-6: *CarrierFreqGERAN*: Additional E-UTRAN TDD – GSM event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
CarrierFreqGERAN ::= SEQUENCE {			
arfcn		INTEGER (0..1023)	
bandIndicator		ENUMERATED {dcs1800, pcs1900}	
}			

Table 8.10.1.4.3-7: *CellGlobalIdGERAN*: Additional E-UTRAN TDD – GSM event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
CellGlobalIdGERAN ::= SEQUENCE {			
plmn-Identity	PLMN-Identity		
localtionAreaCode		BIT STRING (SIZE (16))	
cellIdentity		BIT STRING (SIZE (16))	
}			

8.10.1.5 Test requirement

The test parameters are given in Tables 8.10.1.4.1-1, 8.10.1.5-1 and 8.10.1.5-2 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 8.10.1.5-1: 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 D.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+TT	4+TT
N_{oc} Note 3	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	4+TT	4+TT
RSRP Note 4	dBm/15 kHz	-94+TT	-94+TT
SCH_RP	dBm/15 kHz	-94+TT	-94+TT
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 8.10.1.5-2: 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+TT
GSM BSIC		N/A	Valid
Propagation Condition		AWGN	

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.

The overall delays measured shall be less than a total of 3122 ms in this test case (note: this gives 960 ms for measurement reporting delay plus 2160 for BSIC identification and plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.10.2 E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

8.10.2.1 Test purpose

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 TS 36.133[4] section 8.1.2.4.6.

8.10.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support GSM.

8.10.2.3 Minimum conformance requirements

The requirements in this section apply only to UE supporting E-UTRAN TDD 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 TS 36.133[4] Table 8.1.2.1-1 is configured by E-UTRAN 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.

This measurement shall be based on measurement gaps allocated for GSM carrier RSSI measurement as described in TS 36.133[4] section 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 8.10.2.3-1. The parameter N_{freq} is defined in TS 36.133[4] section 8.1.2.1.1.

Table 8.10.2.3-1: GSM measurement period for large DRX

DRX cycle length (s)	$T_{measure,GSM}$ (s) (DRX cycles)
≤0.04	Non DRX Requirements are applicable
[0.08]	0.48 (6*N_{freq})
[0.16]	0.8 (5*N_{freq})
[0.32]	1.6 (5*N_{freq})
[0.64]	3.2 (5*N_{freq})
[1.28]	6.4 (5*N_{freq})
[2.56]	12.8 (5*N_{freq})

The UE shall meet the measurement accuracy requirements stated for RXLEV in TS 45.008 [15], 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.

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 TS 36.133[4] section 8.1.2.4.5.2.1 when a measurement gap pattern sequence is activated.
- The UE shall perform measurement reporting as defined in TS 36.331 [5].
- The UE shall perform BSIC identification if BSIC verified measurements are activated by RRC. 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 [5].

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 TS 45.005 [16].

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 section TS 36.133 [4] 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 TS 36.133 [4] section 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.

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 TS 36.133 [4] section 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 TS 36.133 [4] section 8.1.2.4.5.2.2.1. The parameter N_{freq} is defined in TS 36.133 [4] section 8.1.2.1.1.

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 36.331[5].

Reported measurements in event triggered measurement reports shall meet the requirements in section 36.331[5].

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 TS 36.133 [4] section 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 TS 36.133 [4] section 8.1.2.4.5.2.1. When L3 filtering is used an additional delay can be expected.

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in TS 36.133[4] section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in TS 36.133[4] section 8.1.2.4.5.2.4 Event Triggered Reporting.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.5.2 and A8.10.2

8.10.2.4 Test description

8.10.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.2.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.15 for UEs that support receive diversity.

2. The general test parameter settings are set up according to Table 8.10.2.4.1-1.

3. Propagation conditions are set according to Annex B clauses B.0.

4. Message contents are defined in clause 8.10.2.4.3.

5. In these tests, there are two cells, one E-UTRAN cell and one GSM cell, and gap pattern configuration # 0 as defined in TS 36.133 [4] Table 8.1.2.1-1 is provided. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 8.10.2.4.1-1: 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 section A.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 section A.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 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 3GPP TS 36.211 section 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 8.10.2.5-2
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	

8.10.2.4.2 Test procedure

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. Furthermore 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.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table's 8.10.2.5-1 and 8.10.2.5-4. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 8.10.2.5-1 and 8.10.2.5-4.
6. UE shall transmit a MeasurementReport message triggered by Event B1. If the overall delay measured from the beginning of time period T2 is less than 3120 ms for Test1 or less than 42.8 seconds for Test2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for next iteration of the test procedure loop.
9. Repeat step 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
10. Repeat step 1-9 for each sub-test in Table 8.10.2.4.1-1 as appropriate.

8.10.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.10.2.4.3-1: Common Exception messages for E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	**Table H.3.1-1**

Table 8.10.2.4.3-2: *MeasurementConfiguration-DEFAULT*: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasurementConfiguration-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasurementConfiguration-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModList	ReportConfigInterRAT-B1-GERAN		
measIdToRemoveList	Not present		
measIdToAddModList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
}			

Table 8.10.2.4.3-3: *ReportConfigInterRAT-B1-GERAN*: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B1-GERAN(GERAN-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
b1-ThresholdGERAN	30	GERAN-Thres is actual value in dBm	
}			
}			
}			
hysteresis	0	The actual value is IE value * 0.5 dB INTEGER(0..30)	
timeToTrigger	ms0		
}			
}			
}			

Table 8.10.2.4.3-4: RadioResourceConfigDedicated-SRB1-SRB2-DRB(n,m): Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: TS 36.508 [7] clause 4.6.3 Table 4.6.3-18: RadioResourceConfigDedicated-SRB1-SRB2-DRB(n,m)			
Information Element	**Value/remark**	**Comment**	**Condition**
RadioResourceConfigDedicated-SRB1-SRB2-DRB(n, m) ::= SEQUENCE {		n is the number of AM RLC DRBs (1..N) m is the number of UM RLC DRBs (0..M)	
physicalConfigDedicated	PhysicalConfigDedicated - DEFAULT using condition RBC		
sps-Configuration	Not present		
}			
NOTE: In cases where no RLC-UM bearer is configured, large DRX Cycle length is used. In cases where at least one RLC-UM bearer is configured, small DRX Cycle length is used.			

Table 8.10.2.4.3-5: MAC-MainConfig-RBC: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5 Table 4.8.2.1.5-1: MAC-MainConfig-RB			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp_5 AND DRX_S/L
release	NULL		
setup SEQUENCE {			
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf40/sf1280 typical value in real network for real-time services.	
[sf40]	0	For Test 1	
[sf1280]	0	For Test 2	
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	sf500		
}			

Table 8.10.2.4.3-6: PhysicalConfigDedicated-DEFAULT: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1: PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
schedulingRequestConfig			
	SchedulingRequest-Config-DEFAULT		RBC
}			

Condition	Explanation
SRB1	Used at configuration of SRB1 during RRC connection (re-)establishment
RBC	Used at configuration of a radio bearer combination during SRB2+DRB establishment

Table 8.10.2.4.3-7: SchedulingRequest-Config-DEFAULT: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20: SchedulingRequest-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	Channel-bandwidth-dependent parameter	
sr-ConfigIndex	0		
dsr-TransMax	n4		
}			
}			

Table 8.10.2.4.3-8: *MeasuredResults*: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListGERAN	MeasResultListGERAN		
…			
}			
…			
}			

Table 8.10.2.4.3-9: *MeasResultListGERAN*: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListGERAN ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
carrierFreq	CarrierFreqGERAN		
physCellId CHOICE {			
networkColourCode		BIT STRING(SIZE(3))	
baseStationColourCode		BIT STRING(SIZE(3))	
}			
cgi_Info SEQUENCE {			
cellGlobalId	CellGlobalIdGERAN		
routingAreaCode	Not present		
}			
measResult SEQUENCE {			
rssi		Set according to specific test	
…			
}			
}			

Table 8.10.2.4.3-10: *CarrierFreqGERAN*: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
CarrierFreqGERAN ::= SEQUENCE {			
arfcn		INTEGER (0..1023)	
bandIndicator		ENUMERATED {dcs1800, pcs1900}	
}			

Table 8.10.2.4.3-11: *CellGlobalIdGERAN*: Additional E-UTRAN TDD-GSM event triggered reporting when DRX is used in AWGN

Derivation Path: 36.331 clause 6.3.4			
Information Element	**Value/remark**	**Comment**	**Condition**
CellGlobalIdGERAN ::= SEQUENCE {			
plmn-Identity	PLMN-Identity		
localtionAreaCode		BIT STRING (SIZE (16))	
cellIdentity		BIT STRING (SIZE (16))	
}			

8.10.2.5 Test requirement

Cell specific test parameters are given in Table 8.10.2.5-1 for E-UTRAN and in Table A.8.10.2.5-4 for GSM. DRX configuration for Test1 and Test2 are given in Table 8.10.2.5-2 and time alignment timer and scheduling request related parameters in Table 8.10.2.5-3.

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. Furthermore 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 8.10.2.5-1: 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 D.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+TT	4+TT
N_{oc} Note 2	dBm/15 kHz	-98	
RSRP Note 3	dBm/15 kHz	-94+TT	-94+TT
SCH_RP	dBm/15 kHz	-94+TT	-94+TT
$\hat{E}_s/N_{oc}$	dB	4+TT	4+TT
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 8.10.2.5-2: 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 section 6.3.2 in 3GPP TS 36.331.			

Table 8.10.2.5-3: *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 section 6.3.2 in 3GPP TS 36.331.
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213.

Table 8.10.2.5-4: 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+TT
GSM BSIC		N/A	Valid

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.

The event triggered measurement reporting delay =2*$T_{measure,GSM}$ (ms) + 2160 ms = 2*480 ms + 2160 ms = 3120 ms

Initial BSIC identification delay = 2160 ms.

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 event triggered measurement reporting delay = 2*$T_{measure,GSM}$ (s) + 30 seconds = 2* 6.4 seconds + 30 seconds = 42.8 seconds.

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

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.11 Monitoring of Multiple Layers

8.11.1 Multiple E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions

[FFS]

8.11.2 E-UTRAN TDD – E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined.*
- Statistical testing of cell re-selection delay performance requirements are undefined

8.11.2.1 Test purpose

To verify that the UE makes correct reporting of two event when doing inter frequency measurements.

8.11.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

8.11.2.3 Minimum conformance requirements

When measurement gaps are scheduled the UE shall be able to identify a new TDD 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 TDD inter-frequency cell is defined.

T_{inter1} is defined in TS 36.133 [4] section 8.1.2.1

N_{freq} is defined in TS 36.133 [4] section 8.1.2.1.1.

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

- RSRP$|_{dBm}$ ≥ -125 dBm and for Bands 33, 34, 35, 36, 37, 38, 39, 40 and RSRP Ês/Iot ≥ -4 dB,
- other RSRP related side conditions given in Section 9.1 are fulfilled,
- SCH_RP$|_{dBm}$≥ -125 dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH Ês/Iot ≥ -4 dB.

When measurement gaps are scheduled for TDD inter frequency measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in TS 36.133 sub-clause 9.1.3 with measurement period ($T_{Measurement\_Period\_TDD\_Inter}$) given by table 8.4.4.1.3-1.

Table 8.4.1.3-1: $T_{Measurement\_Period\_TDD\_Inter}$ 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. Note 2: T_s is defined in 3GPP TS 36.211 [9].						

Where:

T_{inter1} is defined in TS 36.133 [4] section 8.1.2.1

N_{freq} is defined in TS 36.133 [4] section 8.1.2.1.1.

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 $T_{Measurement\_Period\_TDD\_Inter.}$

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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. 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 TS 36.133 [4] clause 8.1.2.3.2.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 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 $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.3.2.

8.11.2.4 Test description

8.11.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The general test parameter settings are set up according to Table 8.11.2.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 8.11.2.4.3.

5. There are three E-UTRA cells, cell1, cell2 and cell3, all on different frequencies in the test. Cell 1 (EUTRA TDD cell on RF channel number 1) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 8.11.2.4.1-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.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 3GPP TS 36.211 section 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 3GPP TS 36.133 section 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 3μs or 92*Ts
T1	s	5	
T2	s	10	

8.11.4.4.2 Test procedure

This test scenario comprised of 3 E-UTRA TDD cells operating on different frequency. The test consists of two 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 is used. At T1 the UE is camped on to Cell 1.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 8.11.4.5-1and Table 8.11.4.5-2. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.11.4.5-1and Table 8.11.4.5-2.
6. UE shall transmit two MeasurementReport message triggered by two event A3 for cell 2 and cell 3, respectively. If the overall delays measured from the beginning of time period T2 is less than 7682 ms for event A3 for cell 2 report then the number of successful tests is increased by one. If the UE fails to report the event A3 for cell 2 within the overall delays measured requirement then the number of failure tests is increased by one. If the overall delays measured from the beginning of time period T2 is less than 7682ms for event A3 for cell 3 report then the number of successful tests is increased by one. If the UE fails to report the event A3 for cell 3 within the overall delays measured requirement then the number of failure tests is increased by one.
7. After the SS receives the MeasurementReport messages in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

8.11.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.11.4.4.3-1: Common Exception messages

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1

Table 8.11.4.4.3-2: *MeasConfig-DEFAULT*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModList	ReportConfigEUTRA-A3		
measIdToRemoveList	Not present		
measIdToAddModList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
}			

Table 8.11.4.4.3-3: *ReportConfigEUTRA-A3*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-12 (-6 dB)	-6 is actual value in dB (-6 * 0.5 dB)	
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.11.4.4.3-4: *MeasResults*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	[1]		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.11.4.4.3-5: *MeasResultListEUTRA*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA {			
MeasResultEUTRA ::= SEQUENCE {			
physCellId	PhysicalCellIdentity		
cgi-Info SEQUENCE {			
cellglobalId-EUTRA	GlobalCellId-EUTRA		
tac-IDrackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

8.11.2.5 Test requirement

Tables 8.11.2.5-1 and 8.11.2.5-2 define the primary level settings including test tolerances for three E-UTRAN TDD cells.

Table A.8.11.2.5-1: 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 D.2.1 (OP.1 TDD) and in D.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+TT	0+TT	-inf	3+TT	-inf	3+TT
SCH_RP Note 4	dBm/15 kHz	-98	-98	-inf	-95	-inf	-95
$\hat{E}_s/N_{oc}$	dB	0+TT	0+TT	-inf	3+TT	-inf	3+TT
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.							

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.

The overall delays measured test requirement for Event A3 is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_inter}$

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

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 TDD inter-frequency cell is defined.

T_{inter1}=60ms

N_{freq}=2.

TTI insertion uncertainty = 2 ms

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7682ms from the beginning of time period T2 (note: this gives a total of 7680 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

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%.

8.11.4 InterRAT E-UTRA TDD to E-UTRA TDD and UTRA TDD cell search

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined.*
- Statistical testing of cell re-selection delay performance requirements are undefined

8.11.4.1 Test purpose

To verify that the UE makes correct reporting of an event when doing inter frequency measurements and UTRA TDD measurements.

8.11.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA TDD UE.

8.11.4.3 Minimum conformance requirements

When measurement gaps are scheduled 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.

T_{inter1} is defined in TS 36.133 [4] section 8.1.2.1

N_{freq} is defined in TS 36.133 [4] section 8.1.2.1.1.

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

- $RSRP|_{dBm} \geq -125$ dBm and for Bands 33, 34, 35, 36, 37, 38, 39, 40 and RSRP $\hat{E}s/Iot \geq -4$ dB,
- other RSRP related side conditions given in Section 9.1 are fulfilled,
- $SCH\_RP|_{dBm} \geq -125$ dBm for Bands 33, 34, 35, 36, 37, 38, 39, 40 and SCH $\hat{E}s/Iot \geq -4$ dB.

When measurement gaps are scheduled for TDD inter frequency measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in TS 36.133 sub-clause 9.1.3 with measurement period ($T_{Measurement\_Period\_TDD\_Inter}$) given by table 8.4.4.1.3-1.

Table 8.4.1.3-1: $T_{Measurement\_Period\_TDD\_Inter}$ 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. Note 2: T_s is defined in 3GPP TS 36.211 [9].						

Where:

T_{inter1} is defined in TS 36.133 [4] section 8.1.2.1

N_{freq} is defined in TS 36.133 [4] section 8.1.2.1.1.

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 $T_{Measurement\_Period\_TDD\_Inter.}$

Reported measurements contained in event triggered measurement reports shall meet the requirements in TS 36.133 [4] 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. 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 TS 36.133 [4] clause 8.1.2.3.2.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\_intra}$ defined in TS 36.133 [4] section 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 $T_{Measurement\_Period\ Intra}$ 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 an additional delay can be expected

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.3.2.

The measurement reporting delay shall be less than $T_{identify,\ UTRA\_TDD}$ in RRC_CONNECTED state.

When explicit neighbour list is provided and no DRX is used the UE shall be able to identify a new detectable cell belonging to the monitored set within

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

If the UE does not require transmit gap to perform inter-RAT UTRA TDD measurements, the UE shall be able to identify a new detectable inter-RAT UTRA TDD cell belonging to the monitored set within 5000 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.

When transmission gaps are scheduled for UTRA TDD inter RAT measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in TS 36.133 [4] clause 9.3 with measurement period given by

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

If the UE does not need measurement gaps to perform UTRA TDD measurements, the measurement period for UTRA TDD measurements is 480 ms.

The UE shall be capable of performing UTRA TDD P-CCPCH RSCP measurements for $X_{basic\ measurementUTRA\_TDD}$ inter-frequency cells per TDD frequency of the monitored set for up to 3 UTRA TDD carrier frequencies, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_UTRA\_TDD}$.

$X_{basic\ measurement\ TDDinter} = 6$

$T_{Measurement\_Period\ UTRA\_TDD}$ = 480 ms is the period used for calculating the measurement period $T_{measurement\_UTRA\_TDD}$ for UTRA TDD P-CCPCH RSCP measurements.

$T_{basic\_identify\_UTRA\_TDD}$ = 800 ms is the time period used in the inter RAT equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

$T_{basic\_measurement\_UTRA\_TDD}$ = 50 ms is the time period used in the equation for defining the measurement period for inter RAT P-CCPCH RSCP measurements.

N_{freq} and T_{inter1} are defined in TS 36.133 [4] section 8.1.2.1.1

Reported measurements in periodically triggered measurement reports shall meet the requirements in TS 36.133 [4] section 9.

Reported measurements in event triggered measurement reports shall meet the requirements in TS 36.133 [4] section 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 TS 36.133 [4] Section 8.1.2.4.3.1.1 When L3 filtering is used an additional delay can be expected.

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in TS 36.133 [4] section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in TS 36.133 [4] section 8.1.2.4.3.1.4 Event Triggered Reporting.

The normative reference for this requirement is TS 36.133 [4] clause 8.1.2.4.3.

8.11.4.4 Test description

8.11.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

2. The general test parameter settings are set up according to Table 8.11.4.4.1-1.

3. Propagation conditions are set according to Annex B clause B.0.

4. Message contents are as defined in clause 8.11.4.4.3.

5. There are two E-UTRA TDD cells operating on different frequency and one UTRA TDD cell specified in the test. Cell 1 (EUTRA TDD cell on RF channel number 1) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 8.11.4.4-1: 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 section A.1.2
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.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 3GPP TS 36.133 section 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
Hys	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	-88	Absolute E-UTRAN RSRP threshold for event B2
Thresh2	dBm	-83	Absolute UTRAN RSCP threshold for event B2
Hysteresis	dB	0	
TimeToTrigger	dB	0	
Filter coefficient		0	L3 filtering is not used
T1	s	5	During T1, cell 2 and cell 3 shall be powered off, and during the off time the physical layer cell identity shall be changed.
T2	s	15	

8.11.4.4.2 Test procedure

This test scenario comprised of 2 E-UTRA TDD cells operating on different frequency, and 1 UTRA TDD cell. 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. At T1 the UE is camped on to Cell 1.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to T1 in Table 8.11.4.5-1and Table 8.11.4.5-2. T1 starts.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.11.4.5-1and Table 8.11.4.5-2.

6. UE shall transmit a MeasurementReport message triggered by event A3 and B2. If the overall delays measured from the beginning of time period T2 is less than 7760 ms for event A3 report then the number of successful tests is increased by one. If the UE fails to report the event A3 within the overall delays measured requirement then the number of failure tests is increased by one. If the overall delays measured from the beginning of time period T2 is less than 12.88s for event B2 report then the number of successful tests is increased by one. If the UE fails to report the event B2 within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receives the MeasurementReport messages in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop. Set Cell 3 primary scambling code = ((current cell 3 primary scmbling code – 50) mod 200 + 100) for the next iteration of the test procedure loop.

9. Repeat step 1-8 until the confidence level according to Table G.2.6-1 in Annex G clause G.2 is achieved.

8.11.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 8.11.4.4.3-1: Common Exception messages

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1

Table 8.11.4.4.3-2: *MeasConfig-DEFAULT*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList	Not present		
reportConfigToRemoveList	Not present		
reportConfigToAddModList	ReportConfigEUTRA-A3 ReportConfigInterRAT-B2-UTRA		
measIdToRemoveList	Not present		
measIdToAddModList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
}			

Table 8.11.4.4.3-3: *ReportConfigEUTRA-A3*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigEUTRA ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-12 (-6 dB)	-6 is actual value in dB (-6 * 0.5 dB)	
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 8.11.4.4.3-4: *ReportConfigInterRAT-B2-UTRA*: Additional E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.508 clause 4.6.6 Table 4.6.6-7B			
Information Element	**Value/remark**	**Comment**	**Condition**
ReportConfigInterRAT-B2-UTRA(UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
threshold-RSRP	53(-88dBm)	INTEGER(0..97), the mapping table is Table 9.1.4-1 in [36.133]	
b2-Threshold2 CHOICE {			
B2-Threshold-UTRA CHOICE {			
thresholdUTRA-RSCP	32(UTRA-Thres + 115)	UTRA-Thres is actual RSCP value in dBm	UTRA-TDD
}			
}			
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	ms0	Value range FFS	
}			
}			
}			

Table 8.11.4.4.3-5: *MeasResults*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	[1]		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 8.11.4.4.3-6: *MeasResultListEUTRA*: Additional E-UTRAN TDD-TDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA {			
MeasResultEUTRA ::= SEQUENCE {			
physCellId	PhysicalCellIdentity		
cgi-Info SEQUENCE {			
cellglobalId-EUTRA	GlobalCellId-EUTRA		
tac-IDrackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

Table 8.11.4.4.3-7: *MeasuredResults*: Additional E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	[2]		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListUTRA	MeasResultListUTRA		
…			
}			
…			
}			

Table 8.11.4.4.3-8: *MeasResultListUTRA*: Additional E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
tdd	PhysCellIdUTRA-TDD	INTEGER (0..127)	
}			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdUTRA		
locationAreaCode	Not present		
routingAreaCode	Not present		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
utra-RSRP		Set according to specific test INTEGER (-5..91)	
…			
}			
}			

8.11.4.5 Test requirement

Tables 8.11.4.5-1 and 8.11.4.5-2 define the primary level settings including test tolerances for two E-UTRAN TDD cells and one UTRAN FDD cell.

Table 8.11.4.5-1: 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 D.2.1 (OP.1 TDD) and in D.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	4+TT	4+TT	-Infinity	7+TT
N_{oc}	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94+TT	-94+TT	-Infinity	-91+TT
SCH_RP	dBm/15 kHz	-94+TT	-94+TT	-infinity	-91+TT
Propagation Condition		AWGN		ETU70	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The resources for uplink transmission are assigned to the UE priori to the start of time period T2. Note 3: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

Table 8.11.4.5-2: 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+TT	-Infinity	9+TT
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-Infinity	-74+TT	n.a.	
Propagation Condition		Case 3			
Note1: The DPCH of all cells are located in a timeslot other than 0. Note2: In the case of multi-frequency network, the UTRA RF Channel Number can be set for the primary frequency in this test. Note3: P-CCPCH RSCP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					

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.

The overall delays measured test requirement for Event A3 is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify\_inter}$

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

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 TDD inter-frequency cell is defined.

T_{inter1}=60ms

N_{freq}=2.

TTI insertion uncertainty = 2 ms

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 7682ms from the beginning of time period T2 (note: this gives a total of 7680 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

Similarly, the overall delays measured test requirement for Event B2 is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify,UTRA\_TDD}$

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

Where:

$T_{basic\_identify\_UTRA\_TDD}$ = 800 ms is the time period used in the inter RAT equation where the maximum allowed time for the UE to identify a new UTRA TDD cell is defined.

$T_{basic\_measurement\_UTRA\_TDD}$ = 50 ms is the time period used in the equation for defining the measurement period for inter RAT P-CCPCH RSCP measurements.

T_{inter1}=60ms

N_{freq}=2.

TTI insertion uncertainty = 2 ms

The UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than 1202m8s from the beginning of time period T2 (note: this gives a total of 12.8 s for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

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%.

9 Measurement Performance Requirements

When the UE is in RRC_CONNECTED state on a cell, physical layer measurements as defined in TS 36.214 [12] clause 5 are initiated and reported to higher layers. To initiate a specific measurement, the System Simulator sends a ‘RRC Connection Reconfiguration message’ to the UE including a measurement ID and type, a command (setup, modify, release), the measurement objects, the measurement quantity, the reporting quantities and the reporting criteria (periodical/event-triggered), the physical layer measurement process takes place. In this process when the reporting criteria are fulfilled the UE sends a ‘Measurement Report message’ to the System Simulator including the measurement

ID and the results. The reporting criteria that trigger the UE to send a 'Measurement Report message' to the System Simulator is periodical as defined in TS 36.331 [5] clause 5.5.4. The physical layer measurements succeed only if the performance results in terms of accuracy are within the specified limits.

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.

The accuracy requirements in this clause are applicable for AWGN radio propagation conditions and assume independent interference (noise) at each receiver antenna port.

The reported measurement results after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period.

The accuracy requirements are valid for the reported measurement results after layer 1 filtering.

Unless explicitly stated:

- In state RRC_CONNECTED
- Reported measurements shall be within defined range in 90 % of the cases.
- Measurement channel is as defined in Annex A. This measurement channel is used both in active cell and cells to be measured.
- Propagation condition is AWGN as defined in Annex B.
- Physical channels used as defined in Annex C.
- Cell 1 is the active cell.
- Single task reporting.
- Power control is active.

9.1 RSRP

9.1.1 FDD Intra frequency RSRP Accuracy

9.1.1.1 FDD Intra Frequency Absolute RSRP Accuracy

9.1.1.1.1 Test purpose

To verify that the FDD intra-frequency absolute RSRP measurement accuracy is within the specified limit for all bands.

9.1.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

9.1.1.1.3 Minimum conformance requirements

The absolute accuracy of RSRP is defined as the RSRP measured from a cell on the same frequency as that of the serving cell.

The accuracy requirements in table 9.1.1.1.3-1 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 Section 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39 and 40

RSRP|dBm≥ -126 dBm for Bands 9

$RSRP|_{dBm} \geq$ -125 dBm for Bands 2, 5, 7, 17

$RSRP|_{dBm} \geq$ -124 dBm for Bands 3, 8, 12, 13, 14

Table 9.1.1.1.3-1: RSRP FDD Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6	±9	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -70dBm/ $BW_{Channel}$	-118dBm/15kHz … -70dBm/ $BW_{Channel}$	-120dBm/15kHz … -70dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8	±11	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$]
Note: Io is assumed to have constant EPRE across the bandwidth.							

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 9.1.1.1.3-2. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.1.1.3-2: 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

The normative reference for this requirement is TS 36.133 [4] clause 9.1.2.1, clause 9.1.4 and A.9.1.1.

9.1.1.1.4 Test description

9.1.1.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.1.1.1.4.3.
4. All cells are in the same carrier frequency. Cell 1 is the serving cell and Cell 2 is the target cell. Cell 1 is the cell used for connection setup with the power levels set according to Annex C.0 and C.1 for this test.

9.1.1.1.4.2 Test procedure

1. Ensure that the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Table 9.1.1.1.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
3. SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. UE shall transmit periodically MeasurementReport messages.
6. SS shall check RSRP reported value in MeasurementReport messages. The SS shall calculate the actual RSRP power of Cell 2 as defined in TS 36.214 [12] clause 5.1.3 which is compared to the reported RSRP value from the same Cell 2 for each MeasurementReport message according to Table 9.1.1.1.5-3.
7. SS shall check the MeasurementReport messages transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.
8. Repeat step 1-7 for each sub-test in Table 9.1.1.1.5-2 as appropriate.

9.1.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 9.1.1.1.4.3-1: Common Exception messages for RSRP FDD Intra frequency absolute accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-1 Table H.3.5-3

Table 9.1.1.1.4.3-2: *MeasuredResults*: Additional RSRP FDD Intra frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.1.1.1.4.3-3: *MeasResultListEUTRA*: Additional RSRP FDD Intra frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.1.1.1.5 Test requirement

Table 9.1.1.1.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRP FDD intra-frequency relative accuracy test shall meet the reported values test requirements in table 9.1.1.1.5-3.

Table 9.1.1.1.5-1: Void

Table 9.1.1.1.5-2: RSRP FDD Intra frequency absolute accuracy 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.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.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and D.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 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-106.7		-88.0		-116.0	
	Bands 2, 5, 7 and 17						-114.0	
	Bands 3, 8, 12, 13, 14						-113.0	
	Band 9						-115.0	
$\hat{E}_s/I_{ot}$		dB	1.88	-4.97	1.88	-4.97	0.09	-4.96
RSRP Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-100.7	-104.7	-82.0	-86.0	-113.0	-116.2
	Bands 2, 5, 7 and 17						-111.0	-114.2
	Bands 3, 8, 12, 13, 14						-110.0	-113.2
	Band 9						-112.0	-115.2
Io Note3	Bands 1, 4, 6,10, 11, 18, 19 and 21	dBm/9 MHz	-70.75		-52.05		-82.25	
	Bands 2, 5, 7 and 17						-80.25	
	Bands 3, 8, 12, 13, 14						-79.25	
	Band 9						-81.25	
$\hat{E}_s/N_{oc}$		dB	6.0	2.0	6.0	2.0	3.0	-0.2
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 9.1.1.1.5-3: RSRP FDD Intra frequency absolute accuracy requirements for the reported values

	Test 1	Test 2	Test 3			
	All bands	All bands	Bands 1, 4, 6, 10, 18, 19	Bands 2, 5, 7, 11, 17	Bands 3, 8, 12, 13, 14	Band 9
Normal Conditions						
Lowest reported value (Cell 2)	RSRP_29	RSRP_45	RSRP_17	RSRP_19	RSRP_20	RSRP_18
Highest reported value (Cell 2)	RSRP_43	RSRP_64	RSRP_32	RSRP_34	RSRP_35	RSRP_33
Extreme Conditions						
Lowest reported value (Cell 2)	RSRP_26	RSRP_42	RSRP_14	RSRP_16	RSRP_17	RSRP_15
Highest reported value (Cell 2)	RSRP_46	RSRP_67	RSRP_35	RSRP_37	RSRP_38	RSRP_36

9.1.1.2 FDD Intra Frequency Relative Accuracy of RSRP

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.1.1.2.1 Test purpose

To verify that the FDD intra-frequency relative accuracy measurement of RSRP is within the specified limit for all bands.

9.1.1.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

9.1.1.2.3 Minimum conformance requirements

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 9.1.1.2.3-1 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 Section 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm} \geq$ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40

$RSRP1,2|_{dBm} \geq$ -126 dBm for Bands 9

$RSRP1,2|_{dBm} \geq$ -125 dBm for Bands 2, 5, 7, 17

$RSRP1,2|_{dBm} \geq$ -124 dBm for Bands 3, 8, 12, 13, 14

Table 9.1.1.2.3-1: RSRP FDD Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -3 dB	dBm	±2	±3	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±3	±3	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$

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.

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 9.1.1.1.3-2. The range in the signalling may be larger than the guaranteed accuracy range.

The normative reference for this requirement is TS 36.133 [4] clause 9.1.2.2, clause 9.1.4 and A.9.1.1.

9.1.1.2.4 Test description

9.1.1.2.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in Figure [FFS in clause FFS of this document].
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.1.1.2.4.3.
4. All cells are in the same carrier frequency. Cell 1 is the serving cell and Cell 2 is the target cell. Cell 1 is the cell used for connection setup with the power levels set according to Annex C.0 and C.1 for this test.

9.1.1.2.4.2 Test procedure

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Table 9.1.1.2.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
3. SS shall transmit an RRCConnectionReconfiguration message on cell.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. UE shall transmit periodically MeasurementReport messages.
6. SS shall check the RSRP value of Cell 1 and Cell 2 in MeasurementReport messages. The SS shall calculate the actual RSRP power of Cell 1 and Cell 2 as defined in TS 36.214 [12] clause 5.1.3. The reported RSRP value for Cell 1 is compared to the reported RSRP value for Cell 2 for each MeasurementReport message according to Table 9.1.1.2.5-3.

7. The result from the power level difference of the RSRP values for Cell 1 and Cell 2 reported by the UE in step 6) is compared to the actual power level difference of RSRP for Cell 1 and Cell 2.

8. SS shall check the MeasurementReport messages transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

9. Repeat step 1-8 for each sub-test in Table 9.1.1.2.5-2 as appropriate.

9.1.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 9.1.1.2.4.3-1: Common Exception messages for RSRP FDD Intra frequency relative accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-1 Table H.3.5-3

Table 9.1.1.2.4.3-2: *MeasuredResults*: Additional RSRP FDD intra frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.1.1.2.4.3-3: *MeasResultListEUTRA*: Additional RSRP FDD intra frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.1.1.2.5 Test requirement

Table 9.1.1.2.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRP FDD intra-frequency relative accuracy test shall meet the accuracy test requirements in table 9.1.1.2.5-1 and the reported values test requirements in table 9.1.1.2.5-3.

Table 9.1.1.2.5-1: RSRP FDD Intra frequency relative accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -3 dB	dBm	±2 + TT	±3 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±3 + TT	±3 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

Table 9.1.1.2.5-2: RSRP FDD Intra frequency relative accuracy 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.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.1.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and D.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 1, 4, 6, 10, 18 and 19	dBm/15 kHz	-106	-106	-88	-88	-116	
	Bands 2, 5, 7, 11, 17						-114	
	Bands 3, 8, 12, 13, 14						-113	
	Band 9						-115	
$\hat{E}_s/I_{ot}$		dB	2.5+TT	-6+TT	2.5+TT	-6+TT	0.46+TT	-5.76+TT
RSRP Note3	Bands 1, 4, 6,10, 11, 18, 19 and 21	dBm/15 kHz	-100+TT	-105+TT	-82+TT	-87+TT	-113+TT	-117+TT
	Bands 2, 5, 7 and 17						-111+TT	-115+TT
	Bands 3, 8, 12, 13, 14						-110+TT	-114+TT
	Band 9						-112+TT	-116+TT
Io Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/9 MHz	-70+TT	-70+TT	-52+TT	-52+TT	-82.43+TT	
	Bands 2, 5, 7 and 17						-80.43+TT	
	Bands 3, 8, 12, 13, 14						-79.43+TT	
	Band 9						-81.43+TT	
$\hat{E}_s/N_{oc}$		dB	6+TT	1+TT	6+TT	1+TT	3+TT	-1+TT
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 9.1.1.2.5-3: RSRP FDD Intra frequency relative accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRP_(x - FFS)	RSRP_(x - FFS)	RSRP_(x - FFS)
Highest reported value (Cell 2)	RSRP_(x + FFS)	RSRP_(x + FFS)	RSRP_(x + FFS)
Extreme Conditions			
Lowest reported value (Cell 2)	RSRP_(x - FFS)	RSRP_(x - FFS)	RSRP_(x - FFS)
Highest reported value (Cell 2)	RSRP_(x + FFS)	RSRP_(x + FFS)	RSRP_(x + FFS)
RSRP_x is the reported value of Cell 1			

9.1.2 TDD Intra frequency RSRP Accuracy

9.1.2.1 TDD Intra Frequency Absolute RSRP Accuracy

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.1.2.1.1 Test purpose

To verify that the TDD intra-frequency absolute RSRP measurement accuracy is within the specified limit for all bands.

9.1.2.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

9.1.2.1.3 Minimum conformance requirements

The absolute accuracy of RSRP is defined as the RSRP measured from 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 Section 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 21, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP|dBm≥ -126 dBm for Bands 9,

$RSRP|_{dBm} \geq$ -125 dBm for Bands 2, 5, 7, 17,

$RSRP|_{dBm} \geq$ -124 dBm for Bands 3, 8, 12, 13, 14.

Table 9.1.2.1.3-1: RSRP TDD Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 111, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6	±9	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -70dBm/ $BW_{Channel}$	-118dBm/15kHz … -70dBm/ $BW_{Channel}$	-120dBm/15kHz … -70dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8	±11	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

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 9.1.2.1.3-2. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.2.1.3-2: 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

The normative reference for this requirement is TS 36.133 [4] clause 9.1.2.1, clause 9.1.4 and A.9.1.2.

9.1.2.1.4 Test description

9.1.2.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. Propagation conditions are set according to Annex B clause B.0.

3. Message contents are defined in clause 9.1.2.1.4.3.

4. All cells are in the same carrier frequency. Cell 1 is the serving cell and Cell 2 is the target cell. Cell 1 is the cell used for connection setup with the power levels set according to Annex C.0 and C.1 for this test.

9.1.2.1.4.2 Test procedure

1. Ensure that the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to Table 9.1.2.1.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. SS shall transmit an RRCConnectionReconfiguration message on cell 1.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. UE shall transmit periodically MeasurementReport messages.

6. SS shall check RSRP reported value in MeasurementReport messages. According to Table 9.1.2.1.5-3 the SS shall calculate the actual RSRP measurement value of Cell2 as defined in TS 36.214 [12] clause 5.1.1 which is compared to the reported RSRP value from the same Cell 2 for each MeasurementReport message according to Table 9.1.2.1.5-3.

7. SS shall check the MeasurementReport message transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

8. Repeat step 1-7 for each sub-test in Table 9.1.2.1.5-2 as appropriate.

9.1.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.1.2.1.4.3-1: Common Exception message for RSRP TDD intra frequency absolute accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-1 Table H.3.5-3

Table 9.1.2.1.4.3-2: *MeasResults*: Additional RSRP TDD intra frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell			
rsrpResult	INTEGER(0..97)		
rsrqResult	INTEGER(0..34)		
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.1.2.1.4.3-3: *MeasResultListEUTRA*: Additional RSRP TDD intra frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultsLIstEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId	INTEGER (0..503)	
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalCellIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult	According to specific test		
rsrqResult	Not present		
…			
}			
}			

9.1.2.1.5 Test requirement

Table 9.1.2.1.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRP TDD intra-frequency absolute accuracy test shall meet the accuracy test requirements in table 9.1.2.1.5-1 and the reported values test requirements in table 9.1.2.1.5-3.

Table 9.1.2.1.5-1: RSRP TDD Intra frequency absolute accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 111, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6 + TT	±9 + TT	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8 + TT	±11 + TT	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ 119dBm/15kHz … -50dBm/ $BW_{Channel}$	-70dBm/ 118dBm/15kHz … -50dBm/ $BW_{Channel}$	-70dBm/ 120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

Table 9.1.2.1.5-2: RSRP TDD Intra frequency absolute accuracy 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.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.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in D.2.1 (OP.1 TDD) and D.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0	0	0	0
N_{oc} [Note3]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-106	-106	-88	-88	-116	
$\hat{E}_s/I_{ot}$		dB	2.5+TT	-6+TT	2.5+TT	-6+TT	0.5+TT	-5.76 +TT
RSRP[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-100+TT	-105+TT	-82+TT	-87+TT	-113 +TT	-117 +TT
Io[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-70+TT	-70+TT	-52+TT	-52+TT	-81.52+TT	
$\hat{E}_s/N_{oc}$		dB	6+TT	1+TT	4+TT	1+TT	3+TT	-1+TT
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP 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.

Table 9.1.2.1.5-3: RSRP TDD Intra frequency absolute accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRP_FFS	RSRP_FFS	RSRP_FFS
Highest reported value (Cell 2)	RSRP_FFS	RSRP_FFS	RSRP_FFS
Extreme Conditions			
Lowest reported value (Cell 2)	RSRP_FFS	RSRP_FFS	RSRP_FFS
Highest reported value (Cell 2)	RSRP_FFS	RSRP_FFS	RSRP_FFS

9.1.2.2 TDD Intra Frequency Relative Accuracy of RSRP

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.1.2.2.1 Test purpose

To verify that the TDD intra-frequency relative accuracy measurement of RSRP is within the specified limit for all bands.

9.1.2.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

9.1.2.2.3 Minimum conformance requirements

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 9.1.2.2.3-1 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 Section 7.3 for reference sensitivity are fulfilled.

$RSRP1,2|_{dBm} \geq$ -127 dBm for Bands 1, 4, 6, 10, 11, 21, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP1,2|_{dBm} \geq$ -126 dBm for Bands 9,

$RSRP1,2|_{dBm} \geq$ -125 dBm for Bands 2, 5, 7, 17,

$RSRP1,2|_{dBm} \geq$ -124 dBm for Bands 3, 8, 12, 13, 14.

Table 9.1.2.2.3-1: RSRP TDD Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -3 dB	dBm	±2	±3	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±3	±3	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

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 9.1.2.1.3-2. The range in the signalling may be larger than the guaranteed accuracy range.

The normative reference for this requirement is TS 36.133 [4] clause 9.1.2.2, clause 9.1.4 and A.9.1.2.

9.1.2.2.4 Test description

9.1.2.2.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14. .
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.1.2.2.4.3.
4. All cells are in the same carrier frequency. Cell 1 is the serving cell and Cell 2 is the target cell. Cell 1 is the cell used for connection setup with the power levels set according to Annex C.0 and C.1 for this test.

9.1.2.2.4.2 Test procedure

1. Ensure that the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Table 9.1.2.2.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
3. SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. UE shall transmit periodically MeasurementReport messages.
6. SS shall check the reported RSRP value of Cell 1 and Cell 2 in MeasurementReport messages. According to Table 9.1.2.2.5-3 the SS shall calculate the actual RSRP measurement value of Cell 1 and Cell 2 as defined in TS 36.214 [12] clause 5.1.1. The reported RSRP measurement value for Cell 1 is compared to the reported RSRP measurement value for Cell 2 for each MeasurementReport message according to Table 9.1.2.2.5-3.

7. The result from the power level difference of the RSRP values for Cell 1 and Cell 2 reported by the UE in step 6) is compared to the actual power level difference of RSRP for Cell 1 and Cell 2.

8. SS shall check the MeasurementReport messages transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

9. Repeat step 1-8 for each sub-test in Table 9.1.2.2.5-2 as appropriate.

9.1.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.1.2.2.4.3-1: Common Exception messages for RSRP TDD intra frequency relative accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-1 Table H.3.5-3

Table 9.1.2.2.4.3-2: *MeasResults*: Additional RSRP TDD intra frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell			
rsrpResult	INTEGER(0..97)		
rsrqResult	INTEGER(0..34)		
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.1.2.2.4.3-3: *MeasResultListEUTRA*: Additional RSRP TDD intra frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultsLIstEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId			
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		According to specific test	
rsrqResult	Not present		
…			
}			
}			

9.1.2.2.5 Test requirement

Table 9.1.2.2.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRP TDD intra-frequency relative accuracy test shall meet the accuracy test requirements in table 9.1.2.2.5-1 and the reported values test requirements in table 9.1.2.2.5-3. The mapping of measured quantity is defined in Table 9.1.2.2.5-3. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.2.2.5-1: RSRP TDD Intra frequency relative accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -3 dB	dBm	±2 + TT	±3 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±3 + TT	±3 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

Table 9.1.2.2.5-2: RSRP TDD Intra frequency relative accuracy 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.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.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in D.2.1 (OP.1 TDD) and D.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA[Note2]								
OCNG_RB[Note2]								
N_{oc}[Note3]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-106	-106	-88	-88	-116	
$\hat{E}_s/I_{ot}$		dB	2.5+TT	-6+TT	2.5+TT	-6+TT	0.5+TT	-5.76 +TT
RSRP[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-100 +TT	-105 +TT	-82+TT	-87+TT	-113 +TT	-117 +TT
Io[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-70+TT	-70+TT	-52+TT	-52+TT	-82.43+TT	
$\hat{E}_s/N_{oc}$		dB	6+TT	1+TT	4+TT	1+TT	3+TT	-1+TT
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP 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.

Table 9.1.2.2.5-3: RSRP TDD Intra frequency relative accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRP_(x - FFS)	RSRP_(x - FFS)	RSRP_(x - FFS)
Highest reported value (Cell 2)	RSRP_(x + FFS)	RSRP_(x + FFS)	RSRP_(x + FFS)
Extreme Conditions			
Lowest reported value (Cell 2)	RSRP_(x - FFS)	RSRP_(x - FFS)	RSRP_(x - FFS)
Highest reported value (Cell 2)	RSRP_(x + FFS)	RSRP_(x + FFS)	RSRP_(x + FFS)
RSRP_x is the reported value of Cell 1			

9.1.3 FDD Inter frequency RSRP Accuracy

9.1.3.1 FDD - FDD Inter Frequency Absolute RSRP Accuracy

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.1.3.1.1 Test purpose

To verify that the FDD inter-frequency absolute RSRP measurement accuracy is within the specified limit for all bands.

9.1.3.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

9.1.3.1.3 Minimum conformance requirements

The absolute accuracy of RSRP is defined as the RSRP measured from a cell that has different carrier frequency from the serving cell.

The accuracy requirements in table 9.1.3.1.3-1 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 Section 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40

RSRP|dBm≥ -126 dBm for Bands 9

RSRP|dBm≥ -125 dBm for Bands 2, 5, 7, 17

RSRP|dBm≥ -124 dBm for Bands 3, 8, 12, 13, 14

Table 9.1.3.1.3-1: RSRP FDD Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6	±9	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -70dBm/ $BW_{Channel}$	-118dBm/15kHz … -70dBm/ $BW_{Channel}$	-120dBm/15kHz … -70dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8	±11	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

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 9.1.1.1.3-2. The range in the signalling may be larger than the guaranteed accuracy range.

The normative reference for this requirement is TS 36.133 [4] clause 9.1.3.1, clause 9.1.4 and A.9.1.3.

9.1.3.1.4 Test description

9.1.3.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.1.3.1.4.3.
4. Cell 1 and Cell 2 are on the different carrier frequencies. Cell 1 is the serving cell and Cell 2 is the target cell. Cell 1 is the cell used for connection setup with the power levels set according to Annex C.0 and C.1 for this test.

9.1.3.1.4.2 Test procedure

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Table 9.1.3.1.5-2 for the test interval as appropriate. Propagation conditions are set according to Annex B clause B.1.1
3. SS shall transmit an RRCConnectionReconfiguration message on cell.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. UE shall transmit periodically MeasurementReport messages.
6. SS shall check RSRP reported value in MeasurementReport messages. The SS shall calculate the actual RSRP power of Cell 2 as defined in TS 36.214 [12] clause 5.1.3 which is compared to the reported RSRP value from the same Cell 2 for each MeasurementReport message according to Table 9.1.3.1.5-3.
7. SS shall check the MeasurementReport message transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

8. Repeat step 1-7 for each sub-test in Table 9.1.3.1.5-2 as appropriate.

9.1.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 9.1.3.1.4.3-1: Common Exception messages for RSRP FDD Inter frequency absolute accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-1 Table H.3.5-3

Table 9.1.3.1.4.3-2: *MeasuredResults*: Additional RSRP FDD Inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.1.3.1.4.3-3: *MeasResultListEUTRA*: Additional RSRP FDD Inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.1.3.1.5 Test requirement

Table 9.1.3.1.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRP FDD inter-frequency absolute accuracy test shall meet the accuracy test requirements in table 9.1.3.1.5-1 and the reported values test requirements in table 9.1.3.1.5-3.

Table 9.1.3.1.5-1: RSRP FDD Inter frequency absolute accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6 + TT	±9 + TT	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -70dBm/ $BW_{Channel}$	-118dBm/15kHz … -70dBm/ $BW_{Channel}$	-120dBm/15kHz … -70dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8 + TT	±11 + TT	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

Table 9.1.3.1.5-2: RSRP FDD - FDD Inter frequency absolute accuracy 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.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.2.1			R.6 FDD		R.6 FDD	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and D.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 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-88.65	-88.65	-109	-116
	Bands 2, 5, 7, and 17				-107	-114
	Bands 3, 8, 12, 13, 14				-106	-113
	Band 9				-108	-115
$\hat{E}_s/I_{ot}$		dB	10+TT	10+TT	14+TT	-5+TT
RSRP Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	78.65+TT	78.65+TT	-95+TT	-121+TT
	Bands 2, 5, 7 and 17				-93+TT	-119+TT
	Bands 3, 8, 12, 13, 14				-92	-118+TT
	Band 9				-94	-120+TT
Io Note3	Bands 1, 4, 6, 10, 18 and 19	dBm/9 MHz	-49.5+TT	49.5+TT	-67.05+TT	-87.03+TT
	Bands 2, 5, 7, 11, 17				-65.05+TT	-85.03+TT
	Bands 3, 8, 12, 13, 14				-64.05+TT	-84.03+TT
	Band 9				-66.05+TT	-86.03+TT
$\hat{E}_s/N_{oc}$		dB	10+TT	10+TT	14+TT	-5+TT
Propagation condition		-	AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 9.1.3.1.5-3: RSRP FDD Inter frequency absolute accuracy requirements for the reported values

	Test 1	Test 2
Normal Conditions		
Lowest reported value (Cell 2)	RSRP_FFS	RSRP_FFS
Highest reported value (Cell 2)	RSRP_FFS	RSRP_FFS
Extreme Conditions		
Lowest reported value (Cell 2)	RSRP_FFS	RSRP_FFS
Highest reported value (Cell 2)	RSRP_FFS	RSRP_FFS

9.1.3.2 FDD - FDD Inter Frequency Relative Accuracy of RSRP

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.1.3.2.1 Test purpose

To verify that the FDD inter-frequency relative accuracy measurement of RSRP is within the specified limit for all bands.

9.1.3.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

9.1.3.2.3 Minimum conformance requirements

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 9.1.3.2.3-1 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 Section 7.3 for reference sensitivity are fulfilled.

$RSRP1|_{dBm} \geq$ -127 dBm if RSRP1 is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39 and 40,

$RSRP1|_{dBm} \geq$ -126 dBm if RSRP1 is on Band 9,

$RSRP1|_{dBm} \geq$ -125 dBm if RSRP1 is on Bands 2, 5, 7, 17,

$RSRP1|_{dBm} \geq$ -124 dBm if RSRP1 is on Bands 3, 8, 12, 13, 14

$RSRP2|_{dBm} \geq$ -127 dBm if RSRP2 is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39 and 40,

$RSRP2|_{dBm} \geq$ -126 dBm if RSRP2 is on Band 9,

$RSRP2|_{dBm} \geq$ -125 dBm if RSRP2 is on Bands 2, 5, 7, 17,

$RSRP2|_{dBm} \geq$ -125 dBm if RSRP2 is on Bands 3, 8, 12, 13, 14 .

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

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.3.2.3-1: RSRP FDD Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRP is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	RSRP is on Bands 2, 5, 7, 17	RSRP is on Bands 3, 8, 12, 13, 14	RSRP is on Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -6dB	dBm	±6	±6	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

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 9.1.1.1.3-2. The range in the signalling may be larger than the guaranteed accuracy range.

The normative reference for this requirement is TS 36.133 [4] clause 9.1.3.2, clause 9.1.4 and A.9.1.3.

9.1.3.2.4 Test description

9.1.3.2.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.1.3.2.4.3.
4. Cell 1 and Cell 2 are on the different carrier frequencies. Cell 1 is the serving cell and Cell 2 is the target cell. Cell 1 is the cell used for connection setup with the power levels set according to Annex C.0 and C.1 for this test.

9.1.3.2.4.2 Test procedure

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Table 9.1.3.2.5-2 for the test interval as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
3. SS shall transmit an RRCConnectionReconfiguration message on cell.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. UE shall transmit periodically MeasurementReport messages.
6. SS shall check the RSRP value of Cell 1 and Cell 2 in MeasurementReport messages. The SS shall calculate the actual RSRP power of Cell 1 and Cell 2 as defined in TS 36.214 [12] clause 5.1.3. The reported RSRP value for Cell 1 is compared to the reported RSRP value for Cell 2 for each MeasurementReport message according to Table 9.1.3.2.5-3.
7. The result from the power level difference of the RSRP values of Cell 1 and Cell 2 reported by the UE in Step 6) is compared to the actual power level difference of RSRP for Cell 1 and Cell 2.
8. SS shall check the MeasurementReport messages transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.
9. Repeat step 1-8 for each sub-test in Table 9.1.3.2.5-2 as appropriate.

9.1.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 9.1.3.2.4.3-1: Common Exception messages for RSRP FDD Inter frequency relative accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-1 Table H.3.5-3

Table 9.1.3.2.4.3-2: *MeasuredResults*: Additional RSRP FDD Inter frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.1.3.2.4.3-3: *MeasResultListEUTRA*: Additional RSRP FDD Inter frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.1.3.2.5 Test requirement

Table 9.1.3.2.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRP FDD inter-frequency relative accuracy test shall meet the accuracy test requirements in table 9.1.3.2.5-1 and the reported values test requirements in table 9.1.3.2.5-3.

Table 9.1.3.2.5-1: RSRP FDD Inter frequency relative accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRP is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	RSRP is on Bands 2, 5, 7, 17	RSRP is on Bands 3, 8, 12, 13, 14	RSRP is on Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -6dB	dBm	±6 + TT	±6 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

Table 9.1.3.2.5-2: RSRP FDD - FDD Inter frequency relative accuracy 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
Measurement gap configuration			0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27	
PDSCH Reference measurement channel defined in A.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.2.1			R.6 FDD		R.6 FDD	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and D.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 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-88.65	-88.65	-109	-116
	Bands 2, 5, 7, and, 17				-107	-114
	Bands 3, 8, 12, 13, 14				-106	-113
	Band 9				-108	-115
$\hat{E}_s/I_{ot}$		dB	10+TT	10+TT	14+TT	-5+TT
RSRP Note3	Bands 1, 4, 6,10, 11, 18, 19 and 21	dBm/15 kHz	-78.65+TT	-78.65+TT	-95+TT	-121+TT
	Bands 2, 5, 7 and 17				-93+TT	-119+TT
	Bands 3, 8, 12, 13, 14				-92	-118+TT
	Band 9				-94	-120+TT
Io Note3	Bands 1, 4, 6,10, 18, 19 and 21	dBm/9 MHz	-49.5+TT	-49.5+TT	-67.05+TT	-87.03+TT
	Bands 2, 5 and 7, 17				-65.05+TT	-85.03+TT
	Bands 3, 8, 12, 13, 14				-64.05+TT	-84.03+TT
	Band 9				-66.05+TT	-86.03+TT
$\hat{E}_s/N_{oc}$		dB	10+TT	10+TT	14+TT	-5+TT
Propagation condition		-	AWGN		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3:	RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 9.1.3.2.5-3: RSRP FDD Inter frequency relative accuracy requirements for the reported values

	Test 1	Test 2
Normal Conditions		
Lowest reported value (Cell 2)	RSRP_(x - FFS)	RSRP_(x - FFS)
Highest reported value (Cell 2)	RSRP_(x + FFS)	RSRP_(x + FFS)
Extreme Conditions		
Lowest reported value (Cell 2)	RSRP_(x - FFS)	RSRP_(x - FFS)
Highest reported value (Cell 2)	RSRP_(x + FFS)	RSRP_(x + FFS)
RSRP_x is the reported value of Cell 1		

9.1.4 TDD Inter frequency RSRP Accuracy

9.1.4.1 TDD – TDD Inter Frequency Absolute RSRP Accuracy

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.1.4.1.1 Test purpose

To verify that the TDD inter-frequency absolute RSRP measurement accuracy is within the specified limit for all bands.

9.1.4.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

9.1.4.1.3 Minimum conformance requirements

The absolute accuracy of RSRP is defined as the RSRP measured from a cell that has different carrier frequency from the serving cell.

The accuracy requirements in Table 9.1.4.1.3-1 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 Section 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 11, 21, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP|dBm≥ -126 dBm for Bands 9,

RSRP|dBm≥ -125 dBm for Bands 2, 5, 7, 17,

RSRP|dBm≥ -124 dBm for Bands 3, 8, 12, 13, 14

Table 9.1.4.1.3-1: RSRP TDD-TDD Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 11, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6	±9	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -70dBm/ $BW_{Channel}$	-118dBm/15kHz … -70dBm/ $BW_{Channel}$	-120dBm/15kHz … -70dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8	±11	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

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 Table9.1.2.1.3-2. The range in the signalling may be larger than the guaranteed accuracy range.

The normative reference for this requirement is TS 36.133 [4] clause 9.1.3.1 , clause 9.1.4 and A.9.1.4.

9.1.4.1.4 Test description

9.1.4.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.1.4.1.4.3.
4. Cell 1 and Cell 2 are on the different carrier frequencies. Cell 1 is the serving cell and Cell 2 is the target cell. Cell 1 is the cell used for connection setup with the power levels set according to Annex C.0 and C.1 for this test.

9.1.4.1.4.2 Test procedure

1. Ensure that the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Table 9.1.4.1.5-2 for the test interval as appropriate. Propagation conditions are set according to Annex B clause B.1.1
3. SS shall transmit an RRCConnectionReconfiguration message on cell.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. UE shall transmit periodically MeasurementReport messages.
6. SS shall check the reported RSRP value in MeasurementReport messages. According to Table 9.1.4.1.5-3 the SS shall calculate the actual RSRP power of Cell 2 as defined in TS 36.214 [12] clause 5.1.1 which is compared to the reported RSRP value from the same Cell 2 for each MeasurementReport message according to Table 9.1.4.1.5-3.
7. SS shall check the MeasurementReport message transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

8. Repeat step 1-7 for each sub-test in Table 9.1.4.1.5-2 as appropriate.

9.1.4.1.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.1.4.1.4.3-1: Common Exception messages for RSRP TDD - TDD Inter frequency absolute accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-2 Table H.3.5-3

Table 9.1.4.1.4.3-2: *MeasResults*: Additional RSRP TDD - TDD Inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	1		
measResultServCell			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.1.4.1.4.3-3: *MeasResultListEUTRA*: Additional RSRP TDD - TDD Inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultsLIstEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId	INTEGER (0..503)	
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalCellIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		According to specific test	
rsrqResult	Not present		
…			
}			
}			

9.1.4.1.5 Test requirement

Table 9.1.4.1.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRP TDD inter-frequency absolute accuracy test shall meet the accuracy test requirements in table 9.1.4.1.5-1 and the reported values test requirements in table 9.1.4.1.5-3.

Table 9.1.4.1.5-1: RSRP TDD-TDD Inter frequency absolute accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot ≥ -6 dB	dBm	±6 + TT	±9 + TT	-121dBm/15kHz … -70dBm/ $BW_{Channel}$	-119dBm/15kHz … -70dBm/ $BW_{Channel}$	-118dBm/15kHz … -70dBm/ $BW_{Channel}$	-120dBm/15kHz … -70dBm/ $BW_{Channel}$
RSRP for Ês/Iot ≥ -6 dB	dBm	±8 + TT	±11 + TT	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$	-70dBm/ $BW_{Channel}$ … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

Table 9.1.4.1.5-2: RSRP TDD-TDD Inter frequency absolute accuracy 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.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.2.2			R.6 TDD		R.6 TDD	
OCNG Patterns defined in D.2.1 (OP.1 TDD) and D.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0	0
N_{oc} [Note3]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-88.65	-88.65	-109	-116
$\hat{E}_s/I_{ot}$		dB	10+TT	10+TT	14+TT	-5+TT
RSRP[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40.	dBm/15 kHz	-78.65 +TT	-78.65 +TT	-95+TT	-121+TT
Io[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-49.5 +TT	-49.5 +TT	-67.05 +TT	-87.03 +TT
$\hat{E}_s/N_{oc}$		dB	10+TT	10+TT	14+TT	-5+TT
Propagation condition		-	AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP 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.

Table 9.1.4.1.5-3: RSRP TDD-TDD Inter frequency absolute accuracy requirements for the reported values

	Test 1	Test 2
Normal Conditions		
Lowest reported value (Cell 2)	RSRP_FFS	RSRP_FFS
Highest reported value (Cell 2)	RSRP_FFS	RSRP_FFS
Extreme Conditions		
Lowest reported value (Cell 2)	RSRP_FFS	RSRP_FFS
Highest reported value (Cell 2)	RSRP_FFS	RSRP_FFS

9.1.4.2 TDD - TDD Inter Frequency Relative Accuracy of RSRP

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.1.4.2.1 Test purpose

To verify that the TDD inter-frequency relative accuracy measurement of RSRP is within the specified limit for all bands.

9.1.4.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

9.1.4.2.3 Minimum conformance requirements

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 9.1.4.2.3-1 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 Section 7.3 for reference sensitivity are fulfilled.

$RSRP1|_{dBm} \geq$ -127 dBm if RSRP1 is on Bands 1, 4, 6, 10, 11, 21, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP1|_{dBm} \geq$ -126 dBm if RSRP1 is on Band 9,

$RSRP1|_{dBm} \geq$ -125 dBm if RSRP1 is on Bands 2, 5, 7, 17,

$RSRP1|_{dBm} \geq$ -124 dBm if RSRP1 is on Bands 3, 8, 12, 13, 14,

$RSRP2|_{dBm} \geq$ -127 dBm if RSRP2 is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40

$RSRP2|_{dBm} \geq$ -126 dBm if RSRP2 is on Band 9,

$RSRP2|_{dBm} \geq$ -125 dBm if RSRP2 is on Bands 2, 5, 7, 17,

$RSRP2|_{dBm} \geq$ -125 dBm if RSRP2 is on Bands 3, 8, 12, 13, 14

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

| Channel 1_Io -Channel 2_Io | ≤ 20 dB

Table 9.1.4.2.3-1: RSRP TDD-TDD Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRP is on Bands 1, 4, 6, 10, 11, 21, 33, 34, 35, 36, 37, 38, 39 and 40	RSRP is on Bands 2, 5, 7, 17	RSRP is on Bands 3, 8, 12, 13, 14	RSRP is on Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -6dB	dBm	±6	±6	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

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 Table9.1.2.1.3-2. The range in the signalling may be larger than the guaranteed accuracy range.

The normative reference for this requirement is TS 36.133 [4] clause 9.1.3.2, clause 9.1.4 and A.9.1.4.

9.1.4.2.4 Test description

9.1.4.2.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.1.4.2.4.3.
4. Cell 1 and Cell 2 are on the different carrier frequencies. Cell 1 is the serving cell and Cell 2 is the target cell. Cell 1 is the cell used for connection setup with the power levels set according to Annex C.0 and C.1 for this test.

9.1.4.2.4.2 Test procedure

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Table 9.1.4.2.5-2 for the test interval as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
3. SS shall transmit an RRCConnectionReconfiguration message on cell.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. UE shall transmit periodically MeasurementReport messages.
6. SS shall check the reported RSRP value of Cell 1 and Cell 2 in MeasurementReport messages. The SS shall calculate the actual RSRP measurement value of Cell 1 and Cell 2 as defined in TS 36.214 [12] clause 5.1.1. The reported RSRP value for Cell 1 is compared to the reported RSRP value for Cell 2 for each MeasurementReport message according to Table 9.1.4.2.5-3.
7. The result from the power level difference of the calculated RSRP measurement values of cell Cell 1 and cell Cell 2 reported by the UE in Step 6) is compared to the actual power level difference of RSRP reported values for cell Cell 1 and cell Cell 2.

8. SS shall check the MeasurementReport messages transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

9. Repeat step 1-8 for each sub-test in Table 9.1.4.2.5-2 as appropriate.

9.1.4.2.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.1.4.2.4.3-1: Common Exception messages for RSRP TDD - TDD Inter frequency relative accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-2 Table H.3.5-3

Table 9.1.4.2.4.3-2: *MeasResults*: Additional RSRP TDD - TDD Inter frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	[1]		
measResultServCell			
rsrpResult		According to specific test	
rsrqResult		According to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.1.7.2.4.3-3: *MeasResultListEUTRA*: Additional RSRP TDD – TDD Inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultLIstEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId	INTEGER (0..503)	
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		According to specific test	
rsrqResult	Not present		
…			
}			
}			

9.1.4.2.5 Test requirement

Table 9.1.4.2.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRP TDD inter-frequency relative accuracy test shall meet the accuracy test requirements in table 9.1.4.2.5-1 and the reported values test requirements in table 9.1.4.2.5-3. The mapping of measured quantity is defined in Table 9.1.4.2.5-3. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.1.4.2.5-1: RSRP TDD-TDD Inter frequency relative accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRP is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39 and 40	RSRP is on Bands 2, 5, 7, 17	RSRP is on Bands 3, 8, 12, 13, 14	RSRP is on Band 9
				Io	Io	Io	Io
RSRP for Ês/Iot > -6dB	dBm	±6 + TT	±6 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

Table 9.1.4.2.5-2: RSRP TDD-TDD Inter frequency relative accuracy 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 inA.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.2.2		R.6 TDD		R.6 TDD	
OCNG Patterns defined in D.2.1 (OP.1 TDD) and D.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA	dB	0	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA[Note2]					
OCNG_RB[Note2]					
N_{oc} [Note3] Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-88.65	-88.65	-109	-116
$\hat{E}_s/I_{ot}$	dB	10+TT	10+TT	14+TT	-5+TT
RSRP[Note4] Bands 33, 34, 35, 36, 37, 38, 39 and 40.	dBm/15 kHz	-78.65 +TT	-78.65 +TT	-95+TT	-121+TT
Io[Note4] Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-49.5 +TT	-49.5 +TT	-67.05 +TT	-87.03 +TT
$\hat{E}_s/N_{oc}$	dB	10+TT	10+TT	14+TT	-5+TT
Propagation condition	-	AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP 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.

Table 9.1.4.2.5-3: RSRP TDD-TDD Inter frequency relative accuracy requirements for the reported values

	Test 1	Test 2
Normal Conditions		
Lowest reported value (Cell 2)	RSRP_(x - FFS)	RSRP_(x - FFS)
Highest reported value (Cell 2)	RSRP_(x + FFS)	RSRP_(x + FFS)
Extreme Conditions		
Lowest reported value (Cell 2)	RSRP_(x - FFS)	RSRP_(x - FFS)
Highest reported value (Cell 2)	RSRP_(x + FFS)	RSRP_(x + FFS)
RSRP_x is the reported value of Cell 1		

9.2 RSRQ

9.2.1 FDD Intra frequency RSRQ Accuracy

9.2.1.1 FDD Intra Frequency Absolute RSRQ Accuracy

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *The RSRQ FDD – FDD inter frequency absolute accuracy test requirements for the reported values are undefined*

9.2.1.1.1 Test purpose

To verify that the FDD intra frequency absolute RSRQ measurement accuracy is within the specified limit for all bands.

9.2.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

9.2.1.1.3 Minimum conformance requirements

The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell on the same frequency as that of the serving cell.

The accuracy requirements in table 9.2.1.1.3-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40

RSRP|dBm≥ -126 dBm for Bands 9

$RSRP|_{dBm} \geq$ -125 dBm for Bands 2, 5, 7, 17

$RSRP|_{dBm} \geq$ -124 dBm for Bands 3, 8, 12, 13, 14

Table 9.2.1.1.3-1: RSRQ FDD intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

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 9.2.1.1.3-2.

Table 9.2.1.1.3-2: RSRQ FDD Intra frequency absolute accuracy 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

The normative reference for this requirement is TS 36.133 [4] clause 9.1.5.1 and A.9.2.1.

9.2.1.1.4 Test description

9.2.1.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. Propagation conditions are set according to Annex B clause B.0.

3. Message contents are defined in clause 9.2.1.1.4.3.

4. There is one E-UTRA FDD carrier and two cells specified in each test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

9.2.1.1.4.2 Test procedure

The three tests consist of Cell 1, serving cell and Cell 2, target cell. The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell on the same frequency as that of the serving cell, Cell 1.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to Table 9.2.1.1.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. UE shall transmit periodically MeasurementReport messages.

6. SS shall check the RSRQ value in MeasurementReport messages. The SS shall calculate the actual RSRQ power of Cell 2 as defined in TS 36.214 [12] clause 5.1.3 which is compared to the reported RSRQ value from the same Cell 2 for each MeasurementReport message according to Table 9.2.1.1.5-3.

7. The SS shall check MeasurementReport messages transmitted by the UE until the confidence level according to G.2.3-1 in Annex G.2 is achieved.

8. Repeat step 1-7 for each sub-test in Table 9.2.1.1.5-2 as appropriate.

9.2.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.2.1.1.4.3-1: Common Exception messages for RSRQ FDD intra frequency absolute accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-1 Table H.3.5-1 Table H.3.5-4

Table 9.2.1.1.4.3-2: *MeasuredResults*: Additional RSRQ FDD intra frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.2.1.1.4.3-3: *MeasResultListEUTRA*: Additional RSRQ FDD intra frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.2.1.1.5 Test requirement

Table 9.2.1.1.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRQ FDD intra frequency absolute accuracy test shall meet the accuracy test requirements in Table 9.2.1.1.5-1.

The RSRQ FDD intra frequency absolute accuracy test for the reported values shall meet the requirements in Table 9.2.1.1.5-3.

Table 9.2.1.1.5-1: RSRQ FDD intra frequency absolute accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

Table 9.2.1.1.5-2: Cell Specific Test requirement Parameters for RSRQ FDD intra frequency absolute accuracy

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.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.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and D.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-84.76 + TT	-84.76 + TT	-103.85 + TT	-103.85 + TT	-116 + TT	
	Bands 2, 5and 7						-114 + TT	
	Bands 3, 8, 13, …						-113 + TT	
	Band 9						-115 + TT	
$\hat{E}_s/I_{ot}$		dB	-1.76 + TT	-1.76 + TT	-4.7 + TT	-4.7 + TT	-5.4 + TT	-5.4 + TT
RSRP Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-81.76 + TT	-81.76 + TT	-106.75 + TT	-106.75 + TT	-120 + TT	-120 + TT
	Bands 2, 5 and 7						-118 + TT	-118 + TT
	Bands 3, 8, 13, …						-117 + TT	-117 + TT
	Band 9						-119 + TT	-119 + TT
RSRQ Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dB	-14.77 + TT	-14.77 + TT	-16.76 + TT	-16.76 + TT	-17.33 + TT	-17.33 + TT
	Bands 2, 5 and 7							
	Bands 3, 8, 13, …							
	Band 9							
Io Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/9 MHz	-50 + TT	-50 + TT	-73 + TT	-73 + TT	-85.67 + TT	
	Bands 2, 5 and 7						-83.67 + TT	
	Bands 3, 8, 13, …						-82.67 + TT	
	Band 9						-84.67 + TT	
$\hat{E}_s/N_{oc}$		dB	3 + TT	3 + TT	-2.9 + TT	-2.9 + TT	-4 + TT	-4 + TT
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 9.2.1.1.5-3: RSRQ FDD Intra frequency absolute accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Highest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Extreme Conditions			
Lowest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Highest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS

9.2.2 TDD Intra frequency RSRQ Accuracy

9.2.2.1 TDD Intra Frequency Absolute RSRQ Accuracy

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.2.2.1.1 Test purpose

To verify that the TDD intra frequency absolute RSRQ measurement accuracy is within the specified limit for all TDD bands.

9.2.2.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

9.2.2.1.3 Minimum conformance requirements

The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell on the same frequency as that of the serving cell.

The accuracy requirements in table 9.2.2.1.3-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40

RSRP|dBm≥ -126 dBm for Bands 9

$RSRP|_{dBm}$≥ -125 dBm for Bands 2, 5, 7, 17

$RSRP|_{dBm}$≥ -124 dBm for Bands 3, 8, 12, 13, 14

Table 9.2.2.1.3-1: RSRQ TDD intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

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 9.2.2.1.3-2.

Table 9.2.2.1.3-2: RSRQ TDD Intra frequency absolute accuracy 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

The normative reference for this requirement is TS 36.133 [4] clause 9.2.2.1 and A.9.2.2.

9.2.2.1.4 Test description

9.2.2.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. Propagation conditions are set according to Annex B clause B.0.

3. Message contents are defined in clause 9.2.2.1.4.3.

4. There is one E-UTRA TDD carrier and two cells specified in each test. Cell 1 is the cell used for call setup with the power level set according to clause C.0 and C.1 for this test.

9.2.2.1.4.2 Test procedure

The three tests consist of Cell 1, serving cell and Cell 2, target cell. The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell on the same frequency as that of the serving cell, Cell 1.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to Table 9.2.2.1.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. UE shall transmit periodically MeasurementReport messages.

6. SS shall check the RSRQ value in MeasurementReport messages. The SS shall calculate the actual RSRQ power value of cell 2 as defined in TS 36.214 [12] clause 5.1.3 which is compared to the reported RSRQ value from the same Cell2 for each MeasurementReport message according to Table 9.2.2.1.5-3.

7. The SS shall check MeasurementReport messages transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

8. Repeat step 1-7 for each sub-test in Table 9.2.2.1.5-2 as appropriate.

9.2.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.2.1.2.4.3-1: Common Exception messages for RSRQ TDD intra frequency absolute accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-1 Table H.3.5-4

Table 9.2.2.1.4.3-4: *MeasuredResults*: Additional RSRQ TDD intra frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	[1]		
meaResuCellItsServing			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}m,			
easResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.2.2.1.4.3-5: *MeasResultListEUTRA*: Additional RSRQ TDD intra frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellIdphysicalCellIdentity	PhysicCgi-infoalCellIdentity		
cellGlobalIdglobalCellIdentity SEQUENCE {			
	GlobalCellId-EUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.2.2.1.5 Test requirement

Table 9.2.2.1.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRQ TDD intra frequency absolute accuracy test shall meet the accuracy test requirements in Table 9.2.2.1.5-1.

The RSRQ TDD intra frequency absolute accuracy test for the reported values shall meet the requirements in Table 9.2.2.1.5-3.

Table 9.2.2.1.5-1: RSRQ TDD intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

Table 9.2.2.1.5-2: Cell Specific Test requirement Parameters for RSRQ TDD intra frequency absolute accuracy

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 PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA[Note2] OCNG_RB[Note2]		dB	0	0	0	0	0	0
N_{oc} [Note3]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-84.76 + TT	-84.76 + TT	-103.85 + TT	-103.85 + TT	-116 + TT	
$\hat{E}_s/I_{ot}$		dB	-1.76 + TT	-1.76 + TT	-4.7 + TT	-4.7 + TT	-5.4 + TT	-5.4 + TT
RSRP[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-81.76 + TT	-81.76 + TT	-106.75 + TT	-106.75 + TT	-120 + TT	-120 + TT
RSRQ[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dB	-14.77 + TT	-14.77 + TT	-16.76 + TT	-16.76 + TT	-17.33 + TT	-17.33 + TT
Io[Note4]	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-50 + TT	-50 + TT	-73 + TT	-73 + TT	-85.67 + TT	
$\hat{E}_s/N_{oc}$		dB	3 + TT	3 + TT	-2.9 + TT	-2.9 + TT	-4 + TT	-4 + TT
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP 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.

Table 9.2.2.1.5-3: RSRQ TDD Intra frequency absolute accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Highest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Extreme Conditions			
Lowest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Highest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

9.2.3 FDD – FDD Inter frequency RSRQ Accuracy

9.2.3.1 FDD – FDD Inter Frequency Absolute RSRQ Accuracy

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *The RSRQ FDD – FDD inter frequency absolute accuracy test requirements for the reported values are undefined*

9.2.3.1.1 Test purpose

To verify that the FDD – FDD inter frequency absolute RSRQ measurement accuracy is within the specified limit for all bands.

9.2.3.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

9.2.3.1.3 Minimum conformance requirements

The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell that has different carrier frequency from the serving cell.

The accuracy requirements in table 9.2.3.1.3-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in TS 36.101 [2] clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP|dBm≥ -126 dBm for Bands 9,

$RSRP|_{dBm}\geq$ -125 dBm for Bands 2, 5, 7, 17

$RSRP|_{dBm}\geq$ -124 dBm for Bands 3, 8, 12, 13, 14

Table 9.2.3.1.3-1: RSRQ FDD – FDD inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Bands 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

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 9.2.3.1.3-2.

Table 9.2.3.1.3-2: RSRQ FDD – FDD Inter frequency absolute accuracy 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

The normative reference for this requirement is TS 36.133 [4] clause 9.1.6.1 and A.9.2.3.

9.2.3.1.4 Test description

9.2.3.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.2.3.1.4.3.
4. There are two E-UTRA FDD carriers and one cell on each carrier specified in each test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

9.2.3.1.4.2 Test procedure

The three tests consist of Cell 1, serving cell and Cell 2, target cell. The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell that has different carrier frequency from the serving cell, Cell 1.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to Table 9.2.3.1.5-2 for the test interval as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. UE shall transmit periodically MeasurementReport messages.

6. SS shall check the RSRQ value in MeasurementReport messages. The SS shall calculate the actual RSRQ power value of Cell 2 as defined in TS 36.214 [12] clause 5.1.3 which is compared to the reported RSRQ value from the same Cell 2 for each MeasurementReport message according to Table 9.2.3.1.5-3.

7. The SS shall check MeasurementReport messages transmitted by the UE until the confidence level according to table G.2.3-1 in Annex G.2 is achieved.

8. Repeat step 1-7 for each test interval in Table 9.2.3.1.5-2 as appropriate.

9.2.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.2.3.1.4.3-1: Common Exception messages for RSRQ FDD – FDD inter frequency absolute accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-1 Table H.3.5-2 Table H.3.5-4

Table 9.2.3.1.4.3-2: *MeasuredResults*: Additional RSRQ FDD – FDD inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.2.3.1.4.3-3: *MeasResultListEUTRA*: Additional RSRQ FDD – FDD inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId		
cgi-Info SEQUENCE {			
cellGlobalId	CellGlobalIdEUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult			
rsrpResult	Not present		
rsrqResult	Not present		
…			
}			
}			

9.2.3.1.5 Test requirement

Table 9.2.3.1.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRQ FDD – FDD inter frequency absolute accuracy test shall meet the accuracy test requirements in Table 9.2.3.1.5-1.

The RSRQ FDD – FDD inter frequency absolute accuracy test for the reported values shall meet the requirements in Table 9.2.3.2.5-3.

Table 9.2.3.1.5-1: RSRQ FDD – FDD inter frequency absolute accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Bands 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note : Io is assumed to have constant EPRE across the bandwidth.							

Table 9.2.3.1.5-2: Cell Specific Test requirement Parameters for RSRQ FDD – FDD inter frequency absolute accuracy

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
Measurement gap configuration			0	-	0	-	0	-
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.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.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and D.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 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-80 + TT	-80 + TT	-104 + TT	-104 + TT	-119 + TT	-119 + TT
	Bands 2, 5 and 7						-117 + TT	-117 + TT
	Bands 3, 8, 13, …						-116 + TT	-116 + TT
	Band 9						-118 + TT	-118 + TT
$\hat{E}_s/I_{ot}$		dB	-1.75 + TT	-1.75 + TT	-4.7 + TT	-4.7 + TT	-4.5 + TT	-4.5 + TT
RSRP Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-81.75 + TT	-81.75 + TT	-108.70 + TT	-108.70 + TT	-123.50 + TT	-123.50 + TT
	Bands 2, 5 and 7						-121.50 + TT	-121.50 + TT
	Bands 3, 8, 13, …						-120.50 + TT	-120.50 + TT
	Band 9						-122.50 + TT	-122.50 + TT
RSRQ Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dB	-14.76 + TT	-14.76 + TT	-16.76 + TT	-16.76 + TT	-16.61 + TT	-16.61 + TT
	Bands 2, 5 and 7							
	Bands 3, 8, 13, …							
	Band 9							
Io Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/9 MHz	-50 + TT	-50 + TT	-74.95 + TT	-74.95 + TT	-89.90 + TT	-89.90 + TT
	Bands 2, 5 and 7						-87.90 + TT	-87.90 + TT
	Bands 3, 8, 13, …						-86.90 + TT	-86.90 + TT
	Band 9						-88.90 + TT	-88.90 + TT
$\hat{E}_s/N_{oc}$		dB	-1.75 + TT	-1.75 + TT	-4.7 + TT	-4.7 + TT	-4.5 + TT	-4.5 + TT
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 9.2.3.1.5-3: RSRQ FDD – FDD inter frequency absolute accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Highest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Extreme Conditions			
Lowest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Highest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS

9.2.3.2 FDD – FDD Inter Frequency Relative Accuracy of RSRQ

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*
- *The RSRQ FDD – FDD inter frequency relative accuracy test requirements for the reported values are undefined*

9.2.3.2.1 Test purpose

To verify that the FDD – FDD inter frequency relative accuracy measurement of RSRQ is within the specified limit for all bands.

9.2.3.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

9.2.3.2.3 Minimum conformance requirements

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 9.2.3.2.3-1 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 [2] clause 7.3 for reference sensitivity are fulfilled.

$RSRP1|_{dBm} \geq$ -127 dBm if RSRP1 is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP1|_{dBm} \geq$ -126 dBm if RSRP1 is on Band 9,

$RSRP1|_{dBm} \geq$ -125 dBm if RSRP1 is on Bands 2, 5, 7, 17,

$RSRP1|_{dBm} \geq$ -124 dBm if RSRP1 is on Bands 3, 8, 12, 13, 14,

$RSRP2|_{dBm} \geq$ -127 dBm if RSRP2 is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP2|_{dBm} \geq$ -126 dBm if RSRP2 is on Band 9,

$RSRP2|_{dBm} \geq -125$ dBm if RSRP2 is on Bands 2, 5, 7, 17,

$RSRP2|_{dBm} \geq -125$ dBm if RSRP2 is on Bands 3, 8, 12, 13, 14.

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq [27] dB$$

| Channel 1_Io -Channel 2_Io | ≤ [20] dB

Table 9.2.3.2.3-1: RSRQ FDD – FDD inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRQ is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	RSRQ is on Bands 2, 5, 7, 17	RSRQ is on Bands 3, 8, 12, 13, 14	RSRQ is on Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 3	± 4	-121dBm/15kHz … -50dBm	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 4	± 4	-121dBm/15kHz … -50dBm	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

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 9.2.3.2.3-2.

Table 9.2.3.2.3-2: RSRQ FDD – FDD Inter frequency relative accuracy 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

The normative reference for this requirement is TS 36.133 [4] clause 9.1.6.2 and A.9.2.3.

9.2.3.2.4 Test description

9.2.3.2.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.1.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. Propagation conditions are set according to Annex B clause B.0.

3. Message contents are defined in clause 9.2.3.2.4.3.

4. There are two E-UTRA FDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

9.2.3.2.4.2 Test procedure

The three tests consist of Cell 1, serving cell and Cell 2, target cell. The relative accuracy of RSRQ is defined as the RSRQ measured from one cell compared to the RSRQ measured from another cell on a different frequency.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.

2. Set the parameters according to Table 9.2.3.2.5-2 for the test interval as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. UE shall transmit periodically MeasurementReport messages.

6. SS shall check the RSRQ value of Cell 1 and Cell 2 in MeasurementReport messages. According to Table 9.2.3.2.5-3 the SS shall calculate the actual RSRQ power as defined in TS 36.214 [12] clause 5.1.3 of Cell 1 and Cell 2. The reported RSRQ value for Cell 1 is compared to the reported RSRQ value for Cell 2 for each MeasurementReport message.

7. The result from the power level difference of the RSRQ value reported from Cell 1 compared to Cell 2 in step 6) is compared to the actual power level difference of RSRQ for Cell 1 and Cell 2.

8. The SS shall check MeasurementReport messages transmitted by the UE until the confidence level according to G.2.3-1 in Annex G.2 is achieved.

9. Repeat step 1-8 for each test interval in Table 9.2.3.2.5-2 as appropriate.

9.2.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.2.3.2.4.3-1: Common Exception messages for RSRQ FDD – FDD inter frequency relative accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.2-1 Table H.3.5-2 Table H.3.5-4

Table 9.2.3.2.4.3-2: *MeasuredResults*: Additional RSRQ FDD – FDD inter frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServing			
rsrpResult		Set according to specific tes	
rsrqResult		Set according to specific tes	
},			
neighbouringMeasResults CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.2.3.2.4.3-3: *MeasResultListEUTRA*: Additional RSRQ FDD – FDD inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physicalCellIdentity	PhysicalCellIdentity		
globalCellIdentity SEQUENCE {			
globalCellID-EUTRA	GlobalCellId-EUTRA		
tac-ID	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.2.3.2.5 Test requirement

Table 9.2.3.2.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRQ FDD – FDD inter frequency relative accuracy test shall meet the accuracy test requirements in Table 9.2.3.2.5-1.

The RSRQ FDD – FDD inter frequency relative accuracy test for the reported values shall meet the requirements in Table 9.2.3.2.5-3.

Table 9.2.3.2.5-1: RSRQ FDD – FDD inter frequency relative accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRQ is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	RSRQ is on Bands 2, 5, 7, 17	RSRQ is on Bands 3, 8, 12, 13, 14	RSRQ is on Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 3 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 4 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$

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.

Table 9.2.3.2.5-2: Cell Specific Test requirement Parameters for RSRQ FDD – FDD inter frequency relative accuracy

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.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.2.1			R.6 FDD		R.6 FDD		R.6 FDD	
OCNG Patterns defined in D.1.1 (OP.1 FDD) and D.1.2 (OP.2 FDD)			OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD	OP.1 FDD	OP.2 FDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note1 OCNG_RB Note1		dB	0	0	0	0	0	0
N_{oc} Note2	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-80 + TT	-80 + TT	-104 + TT	-104 + TT	-119 + TT	-119 + TT
	Bands 2, 5 and 7						-117 + TT	-117 + TT
	Bands 3, 8, 13, …						-116 + TT	-116 + TT
	Band 9						-118 + TT	-118 + TT
$\hat{E}_s/I_{ot}$		dB	-1.75 + TT	-1.75 + TT	-4.7 + TT	-4.7 + TT	-4.5 + TT	-4.5 + TT
RSRP Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/15 kHz	-81.75 + TT	-81.75 + TT	-108.70 + TT	-108.70 + TT	-123.50 + TT	-123.50 + TT
	Bands 2, 5 and 7						-121.50 + TT	-121.50 + TT
	Bands 3, 8, 13, …						-120.50 + TT	-120.50 + TT
	Band 9						-122.50 + TT	-122.50 + TT
RSRQ Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21 Bands 2, 5 and 7 Bands 3, 8, 13, … Band 9	dB	-14.76 + TT	-14.76 + TT	-16.76 + TT	-16.76 + TT	-16.61 + TT	-16.61 + TT
Io Note3	Bands 1, 4, 6, 10, 11, 18, 19 and 21	dBm/9 MHz	-50 + TT	-50 + TT	-74.95 + TT	-74.95 + TT	-89.90 + TT	-89.90 + TT
	Bands 2, 5 and 7						-87.90 + TT	-87.90 + TT
	Bands 3, 8, 13, …						-86.90 + TT	-86.90 + TT
	Band 9						-88.90 + TT	-88.90 + TT
$\hat{E}_s/N_{oc}$		dB	-1.75 + TT	-1.75 + TT	-4.7 + TT	-4.7 + TT	-4.5 + TT	-4.5 + TT
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 9.2.3.2.5-3: RSRQ FDD inter frequency relative accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRQ_(x – FFS)	RSRQ_(x - FFS)	RSRQ_(x - FFS)
Highest reported value (Cell 2)	RSRQ_(x + FFS)	RSRQ_(x + FFS)	RSRQ_(x + FFS)
Extreme Conditions			
Lowest reported value (Cell 2)	RSRQ_(x - FFS)	RSRQ_(x - FFS)	RSRQ_(x - FFS)
Highest reported value (Cell 2)	RSRQ_(x + FFS)	RSRQ_(x + FFS)	RSRQ_(x + FFS)
RSRQ_x is the reported value of Cell 1			

9.2.4 TDD - TDD Inter frequency RSRQ Accuracy

9.2.4.1 TDD – TDD Inter Frequency Absolute RSRQ Accuracy

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.2.4.1.1 Test purpose

To verify that the TDD i– TDD nter frequency absolute RSRQ measurement accuracy is within the specified limit for all bands.

9.2.4.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

9.2.4.1.3 Minimum conformance requirements

The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell that has different carrier frequency from the serving cell.

The accuracy requirements in table 9.2.4.1.3-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in TS 36.101 [2] clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm≥ -127 dBm for Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40,

RSRP|dBm≥ -126 dBm for Bands 9,

$RSRP|_{dBm}$≥ -125 dBm for Bands 2, 5, 7, 17

$RSRP|_{dBm}$≥ -124 dBm for Bands 3, 8, 12, 13, 14

Table 9.2.3.1.3-1: RSRQ TDD – TDD inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	Bands 2, 5, 7, 17	Bands 3, 8, 12, 13, 14	Bands 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5	± 4	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

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 9.2.2.1.3-2.

The normative reference for this requirement is TS 36.133 [4] clause 9.1.6.1 and A.9.2.4.

9.2.4.1.4 Test description

9.2.4.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
2. Propagation conditions are set according to Annex B clause B.0.
3. Message contents are defined in clause 9.2.4.1.4.3.
4. There are two E-UTRA TDD carriers and one cell on each carrier specified in each test. Cell 1 is the cell used for call setup with the power level set according to clause C.0 and C.1 for this test.

9.2.4.1.4.2 Test procedure

The three tests consist of Cell 1, serving cell and Cell 2, target cell. The absolute accuracy of RSRQ is defined as the RSRQ measured from a cell that has different carrier frequency from the serving cell, Cell 1. The Gap pattern configuration is with id#0 as defined in TS 36.133 clause 8.1.2.1.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A.
2. Set the parameters according to Table 9.2.4.1.5-2 for the test interval as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
3. SS shall transmit an RRCConnectionReconfiguration message.
4. The UE shall transmit RRCConnectionReconfigurationComplete message.
5. UE shall transmit periodically MeasurementReport messages.

6. SS shall check the RSRQ value in MeasurementReport messages.The SS shall calculate the actual RSRQ power value of Cell 2 as defined in TS 36.214 [12] clause 5.1.3 which is compared to the reported RSRQ value from the same Cell 2 for each MeasurementReport message according to Table 9.2.4.1.5-3.

7. The SS shall check MeasurementReport messages transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

Repeat step 1-7 for each test interval in Table 9.2.4.1.5-2 as appropriate.

9.2.4.1.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.2.4.1.4.3-1: Common Exception messages for RSRQ TDD – TDD inter frequency absolute accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-2 Table H.3.5-4

Table 9.2.4.1.4.3-2: *MeasuResults*: Additional RSRQ TDD – TDD inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	[1]		
measResultSerCell			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.2.4.1.4.3-3: *MeasResultListEUTRA*: Additional RSRQ TDD – TDD inter frequency absolute accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysicalCellIdentity		
cgi-Info SEQUENCE {			
cellGlobalId	GlobalCellId-EUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.2.4.1.5 Test requirement

Table 9.2.4.1.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRQ TDD inter frequency absolute accuracy test shall meet the accuracy test requirements in Table 9.2.4.1.5-1.

The RSRQ TDD inter frequency absolute accuracy test for the reported values shall meet the requirements in Table 9.2.4.2.5-3.

Table 9.2.4.1.5-1: RSRQ TDD – TDD inter frequency absolute accuracy, test requirements

Parameter	**Unit**	**Accuracy [dB]**		**Conditions[1]**			
		Normal condition	**Extreme condition**	**Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40**	**Bands 2, 5, 7, 17**	**Bands 3, 8, 12, 13, 14**	**Bands 9**
				Io	**Io**	**Io**	**Io**
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 2.5 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 3.5 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
Note: Io is assumed to have constant EPRE across the bandwidth.							

Table 9.2.4.1.5-2: Cell Specific Test requirement Parameters for RSRQ TDD – TDD inter frequency absolute accuracy

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
E-UTRA RF Channel Number			1	2	1	2	1	2
$BW_{channel}$		MHz	10	10	10	10	10	10
Gap Pattern Id			0	-	0	-	0	-
Special subframe configuration Note1			6		6		6	
Uplink-downlink configuration Note1			1		1		1	
Measurement bandwidth		n_{PRB}	22—27		22—27		22—27	
PDSCH Reference measurement channel defined in A.3.1.1.2			R.0 TDD	-	R.0 TDD	-	R.0 TDD	-
PDSCH allocation		n_{PRB}	13—36	-	13—36	-	13—36	-
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2			R.6 TDD		R.6 TDD		R.6 TDD	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and A.3.2.2.2 (OP.2 TDD)			OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD	OP.1 TDD	OP.2 TDD
PBCH_RA PBCH_RB PSS_RA SSS_RA PCFICH_RB PHICH_RA PHICH_RB PDCCH_RA PDCCH_RB PDSCH_RA PDSCH_RB OCNG_RA Note2 OCNG_RB Note2		dB	0	0	0	0	0	0
N_{oc} Note3	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-80+ TT	-80+ TT	-104+ TT	-104+ TT	-119+ TT	-119+ TT
Ês/Iot		dB	-1.75+ TT	-1.75+ TT	-4.7+ TT	-4.7+ TT	-4.5+ TT	-4.5+ TT
RSRP Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-81.75+ TT	-81.75+ TT	-108.70+ TT	-108.70+ TT	-123.50+ TT	-123.50+ TT
RSRQ Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dB	-14.76+ TT	-14.76+ TT	-16.76+ TT	-16.76+ TT	-16.61+ TT	-16.61+ TT
Io Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-50+ TT	-50+ TT	-74.95+ TT	-74.95+ TT	-89.90+ TT	-89.90+ TT
$\hat{E}_s/N_{oc}$		dB	-1.75+TT	-1.75+TT	-4.7+TT	-4.7+TT	-4.5+TT	-4.5+TT
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP 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.

Table 9.2.4.1.5-3: RSRQ TDD – TDD inter frequency absolute accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Highest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Extreme Conditions			
Lowest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS
Highest reported value (Cell 2)	RSRQ_FFS	RSRQ_FFS	RSRQ_FFS

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

9.2.4.2 TDD – TDD Inter Frequency Relative Accuracy of RSRQ

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- *The Test system uncertainties applicable to this test are undefined*
- *The Test tolerances applicable to this test are undefined*

9.2.4.2.1 Test purpose

To verify that the TDD – TDDinter frequency relative accuracy measurement of RSRQ is within the specified limit for all bands.

9.2.4.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

9.2.4.2.3 Minimum conformance requirements

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 9.2.4.2.3-1 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 [2] clause 7.3 for reference sensitivity are fulfilled.

$RSRP1|_{dBm} \geq$ -127 dBm if RSRP1 is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP1|_{dBm} \geq$ -126 dBm if RSRP1 is on Band 9,

$RSRP1|_{dBm} \geq$ -125 dBm if RSRP1 is on Bands 2, 5, 7, 17,

$RSRP1|_{dBm} \geq$ -124 dBm if RSRP1 is on Bands 3, 8, 12, 13, 14,

$RSRP2|_{dBm} \geq$ -127 dBm if RSRP2 is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40,

$RSRP2|_{dBm} \geq$ -126 dBm if RSRP2 is on Band 9,

$RSRP2|_{dBm} \geq$ -125 dBm if RSRP2 is on Bands 2, 5, 7, 17,

$RSRP2|_{dBm} \geq$ -125 dBm if RSRP2 is on Bands 3, 8, 12, 13, 14.

$$\left| RSRP1|_{dBm} - RSRP2|_{dBm} \right| \leq [27] dB$$

| Channel 1_Io -Channel 2_Io | ≤ [20] dB

Table 9.2.3.2.3-1: RSRQ TDD – TDD Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRQ is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	RSRQ is on Bands 2, 5, 7, 17	RSRQ is on Bands 3, 8, 12, 13, 14	RSRQ is on Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 3	± 4	-121dBm/15kHz … -50dBm	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 4	± 4	-121dBm/15kHz … -50dBm	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

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 9.2.2.1.3-2.

The normative reference for this requirement is TS 36.133 [4] clause 9.1.6.2 and A.9.2.4.

9.2.4.2.4 Test description

9.2.4.2.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.2.

1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.

2. Propagation conditions are set according to Annex B clause B.0.

3. Message contents are defined in clause 9.2.4.2.4.3.

4. There are two E-UTRA TDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for call setup with the power level set according to clause C.0 and C.1 for this test.

9.2.4.2.4.2 Test procedure

The three tests consist of Cell 1, serving cell and Cell 2, target cell. The relative accuracy of RSRQ is defined as the RSRQ measured from one cell compared to the RSRQ measured from another cell on a different frequency. The Gap pattern configuration is with id#0 as defined in TS 36.133 clause 8.1.2.1.

1. Ensure the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A .

2. Set the parameters according to Table 9.2.4.2.5-2 for the test interval as appropriate. Propagation conditions are set according to Annex B clause B.1.1.

3. SS shall transmit an RRCConnectionReconfiguration message.

4. The UE shall transmit RRCConnectionReconfigurationComplete message.

5. UE shall transmit periodically MeasurementReport messages.

6. SS shall check the RSRQ value of Cell 1 and Cell 2 in MeasurementReport messages. The SS shall calculate the actual RSRQ power as defined in TS 36.214 [12] clause 5.1.3 of Cell 1 and Cell 2. The reported RSRQ value for Cell 1 is compared to the reported RSRQ value for Cell 2 for each MeasurementReport message according to Table 9.2.4.2.5-3.

7. The result from the power level difference of the RSRQ value reported from Cell 1 compared to Cell 2 in step 6) is compared to the actual power level difference of RSRQ for Cell 1 and Cell 2..

8. The SS shall check MeasurementReport messages transmitted by the UE until the confidence level according to Tables G.2.3-1 in Annex G.2 is achieved.

9. Repeat step 1-8 for each test interval in Table 9.2.4.1.5-2 as appropriate.

9.2.4.2.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 9.2.4.2.4.3-1: Common Exception messages for RSRQ TDD – TDD inter frequency relative accuracy test requirement

Default Message Contents	
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.5-2 Table H.3.5-4

Table 9.2.4.1.4.3-2: *MeasResults*: Additional RSRQ TDD – TDD inter frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResults ::= SEQUENCE {			
measId	[1]		
measResultServCell			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
},			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
…			
}			
…			
}			

Table 9.2.4.1.4.3-3: *MeasResultListEUTRA*: Additional RSRQ TDD – TDD inter frequency relative accuracy test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasResultListEUTRA ::= SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {			
physCellId	PhysicalCellIdentity		
cgi-Info SEQUENCE {			
cellGlobalId	GlobalCellId-EUTRA		
trackingAreaCode	TrackingAreaCode		
plmn-IdentityList	Not present		
}			
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
…			
}			
}			

9.2.4.2.5 Test requirement

Table 9.2.4.2.5-2 defines the primary level settings including test tolerances for all tests.

Each RSRQ TDD inter frequency relative accuracy test shall meet the accuracy test requirements in Table 9.2.4.2.5-1.

The RSRQ TDD inter frequency relative accuracy test for the reported values shall meet the requirements in Table 9.2.4.2.5-3.

Table 9.2.4.2.5-1: RSRQ TDD – TDD inter frequency relative accuracy, test requirements

Parameter	Unit	Accuracy [dB]		Conditions[1]			
		Normal condition	Extreme condition	RSRQ is on Bands 1, 4, 6, 10, 11, 18, 19, 21, 33, 34, 35, 36, 37, 38, 39, 40	RSRQ is on Bands 2, 5, 7, 17	RSRQ is on Bands 3, 8, 12, 13, 14	RSRQ is on Band 9
				Io	Io	Io	Io
RSRQ when RSRP Ês/Iot > -3 dB	dBm	± 3 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
RSRQ when RSRP Ês/Iot ≥ -6 dB	dBm	± 4 + TT	± 4 + TT	-121dBm/15kHz … -50dBm/ $BW_{Channel}$	-119dBm/15kHz … -50dBm/ $BW_{Channel}$	-118dBm/15kHz … -50dBm/ $BW_{Channel}$	-120dBm/15kHz … -50dBm/ $BW_{Channel}$
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.							

Table 9.2.4.2.5-2: Cell Specific Test requirement Parameters for RSRQ TDD – TDD inter frequency relative accuracy

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		dB	0	0	0	0	0	0
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB								
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA Note2								
OCNG_RB Note2								
N_{oc} Note3	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-80+TT	-80+TT	-104+TT	-104+TT	-119+TT	-119+TT
Ês/Iot		dB	-1.75+TT	-1.75+TT	-4.7+TT	-4.7+TT	-4.5+TT	-4.5+TT
RSRP Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/15 kHz	-81.75+TT	-81.75+TT	-108.70+TT	-108.70+TT	-123.50+TT	-123.50+TT
RSRQ Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dB	-14.76+TT	-14.76+TT	-16.76+TT	-16.76+TT	-16.61+TT	-16.61+TT
Io Note4	Bands 33, 34, 35, 36, 37, 38, 39 and 40	dBm/9 MHz	-50+TT	-50+TT	-74.95+TT	-74.95+TT	-89.90+TT	-89.90+TT
$\hat{E}_s/N_{oc}$		dB	-1.75+TT	-1.75+TT	-4.7+TT	-4.7+TT	-4.5+TT	-4.5+TT
Propagation condition		-	AWGN		AWGN		AWGN	

Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP 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.

Table 9.2.4.2.5-3: RSRQ TDD – TDD inter frequency relative accuracy requirements for the reported values

	Test 1	Test 2	Test 3
Normal Conditions			
Lowest reported value (Cell 2)	RSRQ_(x - FFS)	RSRQ_(x - FFS)	RSRQ_(x - FFS)
Highest reported value (Cell 2)	RSRQ_(x + FFS)	RSRQ_(x + FFS)	RSRQ_(x + FFS)
Extreme Conditions			
Lowest reported value (Cell 2)	RSRQ_(x - FFS)	RSRQ_(x - FFS)	RSRQ_(x - FFS)
Highest reported value (Cell 2)	RSRQ_(x + FFS)	RSRQ_(x + FFS)	RSRQ_(x + FFS)
RSRQ_x is the reported value of Cell 1			

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

Annex A (normative): Measurement Channels

A.1 PDSCH

A.1.1 FDD

Table A.1.1-1: PDSCH Reference Measurement Channels for FDD

Parameter	Unit	Value					
Reference channel		[R.2 FDD]			[R.0 FDD]	[R.1 FDD]	
Channel bandwidth	MHz	1.4	3	5	10	10	20
Number of transmitter antennas		1			1	2	
Allocated resource blocks (Note 4)		2			24	24	
Allocated subframes per Radio Frame		10			10	10	
Modulation		QPSK			QPSK	QPSK	
Target Coding Rate		1/3			1/3	1/3	
Information Bit Payload							
For Sub-Frames 4, 9	Bits	120			2088	2088	
For Sub-Frame 5	Bits	104			2088	1736	
For Sub-Frame 0	Bits	32			1736	1736	
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0			0	0	
Number of Code Blocks per Sub-Frame (Note 5)							
For Sub-Frames 4, 9		1			1	1	
For Sub-Frame 5		1			1	1	
For Sub-Frame 0		1			1	1	
For Sub-Frame 1, 2, 3, 6, 7, 8		0			0	0	
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4, 9	Bits	456			6624	6336	
For Sub-Frame 5	Bits	360			6336	6048	
For Sub-Frame 0	Bits	176			5784	5520	
For Sub-Frame 1, 2, 3, 6, 7, 8	Bits	0			0	0	
Max. Throughput averaged over 1 frame	kbps	37.6			800	765	

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 [9].
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 [8].
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)

A.1.2 TDD

Table A.1.2-1: PDSCH Reference Measurement Channels for TDD

Parameter	Unit	Value					
Reference channel		[R.2 TDD]			[R.0 TDD]	[R.1 TDD]	
Channel bandwidth	MHz	1.4	3	5	10	10	20
Number of transmitter antennas		1			1	2	
Allocated resource blocks (Note 4)		2			24	24	
Uplink-Downlink Configuration (Note 5)		1			1	1	
Special Subframe Configuration (Note 6)		6			6	6	
Allocated subframes per Radio Frame		6			6	6	
Modulation		QPSK			QPSK	QPSK	
Target Coding Rate		1/3			1/3	1/3	
Information Bit Payload							
For Sub-Frames 4,9	Bits	120			2088	2088	
For Sub-Frame 5	Bits	104			2088	2088	
For Sub-Frame 0	Bits	56			2088	1736	
For Sub-Frame 1, 6 (DwPTS)	Bits	56			1032	1032	
Number of Code Blocks per Sub-Frame (Note 7)							
For Sub-Frames 4,9		1			1	1	
For Sub-Frame 5		1			1	1	
For Sub-Frame 0		1			1	1	
For Sub-Frame 1, 6 (DwPTS)		1			1	1	
Binary Channel Bits Per Sub-Frame							
For Sub-Frames 4,9	Bits	456			6624	6336	
For Sub-Frame 5	Bits	408			6480	6192	
For Sub-Frame 0	Bits	224			5928	5664	
For Sub-Frame 1, 6 (DwPTS)	Bits	272			3696	3504	
Max. Throughput averaged over 1 frame	Mbps	0.05612			1.0416	1.0064	

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 3GPP TS 36.211 [9].4 symbols allocated to PDCCH for 1.4 MHz channel BW

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 [8].Reference signal, synchronization signals and PBCH allocated as defined in 3GPP TS 36.211 [9].

Note 4: Allocation is located in the middle of bandwidth.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 [8].

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: f 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).

A.2 PCFICH/PDCCH/PHICH

A.2.1 FDD

Table A.2.1-1: PCFICH/PDCCH/PHICH Reference Channel for FDD

Parameter	Unit	Value					
Reference channel		[R.8 FDD]			[R.6 FDD]	[R.7 FDD]	
Channel bandwidth	MHz	1.4			10	10	
Number of transmitter antennas		1			1	2	
Control region OFDM symbolsNote1	symbols	4			2	2	
Aggregation level	CCE	4			8	8	
DCI Format		Note 3			Note 3	Note 3	
Cell ID		Note 4			Note 4	Note 4	
Payload (without CRC)	Bits	Note 5			Note 5	Note 5	
Note 1: The control region consists of PCFICH, PHICH and PDCCH. Note 2: DCI formats are defined in 3GPP TS 36.212. Note 3: DCI format shall depend upon the test configuration. Note 4: Cell ID shall depend upon the test configuration. Note 5: Payload size shall depend upon the test configuration.							

A.2.2 TDD

Table A.2.2-1: PCFICH/PDCCH/PHICH Reference Channel for TDD

Parameter	Unit	Value					
Reference channel		[R.8 TDD]			[R.6 TDD]	[R.7 TDD]	
Channel bandwidth	MHz	1.4			10	10	
Number of transmitter antennas		1			1	2	
Control region OFDM symbols[Note1]	symbols	4			2	2	
Aggregation level	CCE	4			8	8	
DCI Format		Note 3			Note 3	Note 3	
Cell ID		Note 4			Note 4	Note 4	
Payload (without CRC)	Bits	Note 5			Note 5	Note 5	
Note 1: The control region consists of PCFICH, PHICH and PDCCH. Note 2: DCI formats are defined in 3GPP TS 36.212. Note 3: DCI format shall depend upon the test configuration. Note 4: Cell ID shall depend upon the test configuration. Note 5: Payload size shall depend upon the test configuration.							

Annex B (normative): Propagation Conditions

See TS 36.521-1[10] Annex B.

Annex C (normative): Downlink Physical Channels

C.0 Downlink signal

See TS 36.521-1[10] Annex C.0, C1, and C2.

Annex D (normative): OFDMA Channel Noise Generator (OCNG)

D.1 OCNG Patterns for FDD

The following OCNG patterns are used for modelling allocations to virtual UEs (which are not under test) and/or allocations used for MBSFN. The OCNG pattern for each sub frame specifies the allocations that shall be filled with OCNG, and furthermore, the relative power level of each such allocation.

In each test case the OCNG is expressed by parameters OCNG_RA and OCNG_RB which together with a relative power level (γ) specifies the PDSCH EPRE-to-RS EPRE ratios in OFDM symbols with and without reference symbols, respectively. The relative power, which is used for modelling boosting per virtual UE allocation, is expressed by:

$$\gamma_i = PDSCH_i\_RA / OCNG\_RA = PDSCH_i\_RB / OCNG\_RB,$$

where γ_i denotes the relative power level of the *i:th* virtual UE. The parameter settings of OCNG_RA, OCNG_RB, and the set of relative power levels γ are chosen such that when also taking allocations to the UE under test into account, as given by a PDSCH reference channel, a constant transmitted power spectral density that is constant on an OFDM symbol basis is targeted.

Moreover the OCNG pattern is accompanied by a PCFICH/PDCCH/PHICH reference channel which specifies the control region. For any aggregation and PHICH allocation, the PDCCH is padded with resource element groups with a power level given by PDCCH_RA and PDCCH_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.

D.1.1 OCNG FDD pattern 1: outer resource blocks allocation in 10 MHz

Table D.1.1-1: OP.1 FDD: OCNG FDD Pattern 1

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]											PDSCH Data	PMCH Data
	Subframe												
	0			5			4,9			1-3, 6-8			
	Control region OFDM symbols[Note 2]												
	1	2	3	1	2	3	1	2	3	1	2		

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	0	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas and according to the antenna transmission mode 2. The transmit power shall be equally split between all the transmit antennas used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

N/A: Not Applicable

D.1.2 OCNG FDD pattern 2: full bandwidth allocation in 10 MHz

Table D.1.2-1: OP.2 FDD: OCNG FDD Pattern 2

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]											PDSCH Data	PMCH Data
	Subframe												
	0			5			4, 9			1 – 3, 6 – 8			
	Control region OFDM symbols[Note 2]												
	1	2	3	1	2	3	1	2	3	1	2		
0 – 49	0			0			0			N/A		Note 1	N/A
0 – 49	N/A			N/A			N/A			0		N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas and according to the antenna transmission mode 2. The transmit power shall be equally split between all the transmit antennas used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

N/A: Not Applicable

D.1.3 OCNG FDD pattern 3: outer resource blocks allocation in 1.4 MHz

Table A.3.2.1.3-1: OP.3 FDD: OCNG FDD Pattern 3

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**											**PDSCH Data**	**PMCH Data**
	Subframe												
	0			5			4,9			1-3, 6-8			
	Control region OFDM symbols[Note 2]												
	1	2	3	1	2	3	1	2	3	1	2		
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			0		N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH symbols shall not contain cell-specific Reference Signals. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas and according to the antenna transmission mode 2. The transmit power shall be equally split between all the transmit antennas used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

N/A: Not Applicable

D.1.4 OCNG FDD pattern 4: full bandwidth allocation in 1.4 MHz

Table A.3.2.1.4-1: OP.4 FDD: OCNG FDD Pattern 4

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**											**PDSCH Data**	**PMCH Data**
	Subframe												
	0			5			4, 9			1 – 3, 6 – 8			
	Control region OFDM symbols[Note 2]												
	1	2	3	1	2	3	1	2	3	1	2		

0 – 5	0	0	0	N/A	Note 1	N/A
0 – 5	N/A	N/A	N/A	0	N/A	Note 2

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Each physical resource block (PRB) is assigned to MBSFN transmission. The data in each PRB shall be uncorrelated with data in other PRBs over the period of any measurement. The MBSFN data shall be QPSK modulated. PMCH subframes shall contain cell-specific Reference Signals only in the first symbol of the first time slot. The parameter γ_{PRB} is used to scale the power of PMCH.

Note 3: If two or more transmit antennas are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas and according to the antenna transmission mode used for the UE under test. The transmit power shall be equally split between all the transmit antennas used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

N/A: Not Applicable

D.2 OCNG Patterns for TDD

The following OCNG patterns are used for modelling allocations to virtual UEs (which are not under test). The OCNG pattern for each sub frame specifies the allocations that shall be filled with OCNG, and furthermore, the relative power level of each such allocation.

In each test case the OCNG is expressed by parameters OCNG_RA and OCNG_RB which together with a relative power level (γ) specifies the PDSCH EPRE-to-RS EPRE ratios in OFDM symbols with and without reference symbols, respectively. The relative power, which is used for modelling boosting per virtual UE allocation, is expressed by:

$$\gamma_i = PDSCH_i\_RA / OCNG\_RA = PDSCH_i\_RB / OCNG\_RB,$$

where γ_i denotes the relative power level of the *i:th* virtual UE. The parameter settings of OCNG_RA, OCNG_RB, and the set of relative power levels γ are chosen such that when also taking allocations to the UE under test into account, as given by a PDSCH reference channel, a transmitted power spectral density that is constant on an OFDM symbol basis is targeted.

Moreover the OCNG pattern is accompanied by a PCFICH/PDCCH/PHICH reference channel which specifies the control region. For any aggregation and PHICH allocation, the PDCCH is padded with resource element groups with a power level given by PDCCH_RA and PDCCH_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.

D.2.1 OCNG TDD pattern 1: outer resource blocks allocation in 10 MHz

Table D.2.1-1: OP.1 TDD: OCNG TDD Pattern 1 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**											**PDSCH Data**
	Subframe											
	0			5			3, 4, 8, 9[Note 2]			1, 6		
	Control region OFDM symbols[Note 3]											
	1	2	3	1	2	3	1	2	3	1	2	
0 – 12	0			0			0			0		Note 1
37 – 49	0			0			0			0		

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in 3GPP TS 36.211 [9]. The control region consists of PCFICH, PHICH and PDCCH. Number of OFDM symbols belonging to the control region may vary between subframes.

Note 3: If two or more transmit antennas are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas and according to the antenna transmission mode 2. The transmit power shall be equally split between all the transmit antennas used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table D.2.1-2: OP.1 TDD: OCNG TDD Pattern 1 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	CP length	Relative power level γ_{PRB} [dB]								
		Special subframe configuration								
		0	1	2	3	4	5	6	7	8
		Control region OFDM symbols								
		1 / 2	1 / 2	1 / 2	1 / 2	1 / 2	1 / 2	1 / 2	1 / 2	1 / 2
0 – 12	N	0	0	0	0	0	0	0	0	0
37 – 49	N	0	0	0	0	0	0	0	0	0
Note: Special subframe configurations are defined in Table 4.2-1 in TS 36.211 [9].										

D.2.2 OCNG TDD pattern 2: full bandwidth allocation in 10 MHz

Table D.2.2-1: OP.2 TDD: OCNG TDD Pattern 2 for 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	**Relative power level γ_{PRB} [dB]**											**PDSCH Data**
	Subframe											
	0			5			3 , 4, 8, 9 Note 2			1, 6		
	Control region OFDM symbols Note 3											
	1	2	3	1	2	3	1	2	3	1	2	
0 – 49	0			0			0			0		Note 1

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated. The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in 3GPP TS 36.211[9]. The control region consists of PCFICH, PHICH and PDCCH. Number of OFDM symbols belonging to the control region may vary between subframes.

Note 3: If two or more transmit antennas are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas and according to the antenna transmission mode 2. The transmit power shall be equally split between all the transmit antennas used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table D.2.2-2: OP.2 TDD: OCNG TDD Pattern 2 for special subframe configuration with 5ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	CP length	Relative power level γ_{PRB} [dB]																	
		Special subframe configuration																	
		0		1		2		3		4		5		6		7		8	
		Control region OFDM symbols																	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 49	N	0		0		0		0		0		0		0		0		0	
Note: Special subframe configurations are defined in Table 4.2-1 in 3GPP TS 36.211 [9].																			

D.2.3 OCNG TDD pattern 3: outer resource blocks allocation in 1.4 MHz

Table D.2.3-1: OP.3 TDD: OCNG TDD Pattern 3 for 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	Relative power level γ_{PRB} [dB]											PDSCH Data
	Subframe											
	0			5			3 , 4, 8, 9 Note 2			1, 6		
	Control region OFDM symbols Note 3											
	1	2	3	1	2	3	1	2	3	1	2	
0 – 1	0			0			0			0		Note 1
4 – 5	0			0			0			0		

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Subframes available for DL transmission depends on the Uplink-Downlink configuration defined in Table 4.2-2 in 3GPP TS 36.211 [9].

Note 4: If two or more transmit antennas are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas and according to the antenna transmission mode 2. The transmit power shall be equally split between all the transmit antennas used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table D.2.3-2: OP.1 TDD: OCNG TDD Pattern 1 for special subframe configuration with 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	CP length	Relative power level γ_{PRB} [dB]																	
		Special subframe configuration																	
		0		1		2		3		4		5		6		7		8	
		Control region OFDM symbols																	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 1	N	0		0		0		0		0		0		0		0		0	
4 – 5	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 [9].																			

D.2.4 OCNG TDD pattern 4: full bandwidth allocation in 1.4 MHz

Table D.2.4-1: OP.4 TDD: OCNG TDD Pattern 4 for 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	**Relative power level** γ_{PRB} **[dB]**											PDSCH Data
	Subframe											
	0			5			3 , 4, 8, 9 Note 2			1, 6		
	Control region OFDM symbols Note 3											
	1	2	3	1	2	3	1	2	3	1	2	
0 – 5	0			0			0			0		Note 1

Note 1: These physical resource blocks are assigned to an arbitrary number of virtual UEs with one PDSCH per virtual UE; the data transmitted over the OCNG PDSCHs shall be uncorrelated pseudo random data, which is QPSK modulated.The parameter γ_{PRB} is used to scale the power of PDSCH.

Note 2: Subframes available for DL transmission depends on the Uplink-Downlink configuration in Table 4.2-2 in 3GPP TS 36.211 [9].

Note 3: If two or more transmit antennas are used in the test, the OCNG shall be transmitted to the virtual users by all the transmit antennas and according to the antenna transmission mode 2. The transmit power shall be equally split between all the transmit antennas used in the test. The antenna transmission modes are specified in section 7.1 in 3GPP TS 36.213.

Table D.2.4-2: OP.2 TDD: OCNG TDD Pattern 2 for special subframe configuration with 5 ms downlink-to-uplink switch-point periodicity

Allocation n_{PRB}	**CP length**	**Relative power level** γ_{PRB} **[dB]**																	
		Special subframe configuration																	
		0		1		2		3		4		5		6		7		8	
		Control region OFDM symbols																	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0 – 5	N	0		0		0		0		0		0		0		0		0	

Note 1: Special subframe configurations are defined in Table 4.2-1 in 3GPP TS 36.211 [9].

Annex E (normative): Cell configuration mapping

The cells used in TS 36.521-3 do not correspond to the cells defined in TS 36.508 [7] section 4.4.2. Table E-1 describes the mapping between cells described in TS 36.521-3 and those defined in TS 36.508 [7]. For each test case the cells as defined in TS 36.508 [7] section 4.4.2 are listed in one row. The test case shall apply the RF parameters as defined in TS 36.521-3 according to the column heading.

NOTE: For example if the second cell in a test case is an inter-frequency cell then Cell3 from TS 36.508 [7] section 4.4.2 is used with the radio parameters as defined for Cell2 in TS 36.521-3.

Table E-1: Cell configuration mapping for RRM testing

Test Case	Description	36.521-3 Cell1	36.521-3 Cell2		
4.2.1	RRC IDLE / E-UTRAN Cell Reselection / FDD – FDD cell re-selection intra frequency case	Cell1	Cell11		
4.2.2	RRC IDLE / E-UTRAN Cell Reselection / TDD – TDD cell re-selection intra frequency case	Cell1	Cell11		
4.2.3	RRC IDLE / E-UTRAN Cell Reselection / FDD – FDD cell re-selection inter frequency case	Cell1	Cell23		
4.2.4	RRC IDLE / E-UTRAN Cell Reselection / FDD – TDD cell re-selection inter frequency case	Cell1	Cell23		
4.2.5	RRC IDLE / E-UTRAN Cell Reselection / TDD – FDD cell re-selection inter frequency case	Cell1	Cell23		
4.2.6	RRC IDLE / E-UTRAN Cell Reselection / TDD – TDD cell re-selection inter frequency case	Cell1	Cell23		
4.3.1.1	RRC IDLE / E-UTRAN to UTRAN Cell re-selection / E-UTRAN FDD – UTRAN FDD cell re-selection: UTRA is of higher priority	Cell1	Cell5		
4.3.1.2	RRC IDLE / E-UTRAN to UTRAN Cell re-selection / E-UTRAN FDD – UTRAN FDD cell re-selection: UTRA is of lower priority	Cell1	Cell5		
4.3.1.3	RRC IDLE / E-UTRAN to UTRAN Cell re-selection / E-UTRAN FDD – UTRAN FDD cell re-selection in fading propagation conditions: UTRA FDD is of lower priority	Cell1	Cell5		
4.3.2	RRC IDLE / E-UTRAN to UTRAN Cell re-selection / E-UTRAN FDD – UTRAN TDD cell re-selection	Cell1	Cell5		
4.3.3	RRC IDLE / E-UTRAN to UTRAN Cell re-selection / E-UTRAN TDD – UTRAN FDD cell re-selection	Cell1	Cell5		
4.3.4.1	RRC IDLE / E-UTRAN to UTRAN Cell re-selection / E-UTRAN TDD – UTRAN TDD cell re-selection: UTRA is of higher priority	Cell1	Cell5		
4.3.4.2	RRC IDLE / E-UTRAN to UTRAN Cell re-selection / E-UTRAN TDD – UTRAN TDD cell re-selection: UTRA is of lower priority	Cell1	Cell5		
4.4.1	RRC IDLE / E-UTRAN to GSM Cell re-selection / E-UTRAN FDD – GSM cell re-selection	Cell1	Cell26		
4.4.2	RRC IDLE / E-UTRAN to GSM Cell re-selection / E-UTRAN TDD – GSM cell re-selection	Cell1	Cell26		
4.5.1.1	RRC IDLE / E-UTRAN to HRPD Cell re-selection / E-UTRAN FDD – HRPD cell re-selection: HRPD is of lower priority	Cell1	[Cell15]		
4.6.1.1	RRC IDLE / E-UTRAN to cdma2000 1xRTT Cell re-selection / E-UTRAN FDD – cdma2000 1xRTT cell re-selection: cdma2000 1x is of lower priority	Cell1	[Cell19]		
5.1.1	RRC CONNECTED / E-UTRAN Handover / FDD – FDD / Intra frequency case	Cell1	Cell2		
5.1.2	RRC CONNECTED / E-UTRAN Handover / TDD – TDD / Intra frequency case	Cell1	Cell2		
5.1.3	RRC CONNECTED / E-UTRAN Handover / FDD – FDD / Inter frequency case	Cell1	Cell3		
5.1.4	RRC CONNECTED / E-UTRAN Handover / TDD – TDD / Inter frequency case	Cell1	Cell3		
5.1.5	RRC CONNECTED / E-UTRAN Handover / FDD – FDD / Inter frequency case: unknown target cell	Cell1	Cell3		
5.1.6	RRC CONNECTED / E-UTRAN Handover / TDD – TDD / Inter frequency case: unknown target cell	Cell1	Cell3		
5.2.1	RRC CONNECTED / Handover from E-UTRAN to other RATs / From E-UTRAN to UTRAN / E-UTRAN FDD – UTRAN FDD handover	Cell1	Cell5		
5.2.2	RRC CONNECTED / Handover from E-UTRAN to other RATs / From E-UTRAN to UTRAN / E-UTRAN TDD – UTRAN FDD handover	Cell1	Cell5		
5.2.3	RRC CONNECTED / Handover from E-UTRAN to other RATs / From E-UTRAN to GSM / E-UTRAN FDD – GSM handover	Cell1	Cell26		
5.2.4	RRC CONNECTED / Handover from E-UTRAN to other RATs / From E-UTRAN to UTRAN / E-UTRAN TDD – UTRAN TDD handover	Cell1	Cell5		
5.2.5	RRC CONNECTED / Handover from E-UTRAN to other RATs / From E-UTRAN to UTRAN / E-UTRAN FDD – UTRAN TDD	Cell1	Cell5		

	handover				
5.2.6	RRC CONNECTED / Handover from E-UTRAN to other RATs / From E-UTRAN to GSM / E-UTRA TDD – GSM handover	Cell1	Cell26		
5.2.7	RRC CONNECTED / Handover from E-UTRAN to other RATs / E-UTRAN FDD – UTRAN FDD handover: unknown target cell	Cell1	Cell5		
5.2.8	RRC CONNECTED / Handover from E-UTRAN to other RATs / E-UTRAN FDD – GSM handover: unknown target cell	Cell1	Cell26		
5.2.9	RRC CONNECTED / Handover from E-UTRAN to other RATs / E-UTRAN TDD - GSM Handover: unknown target cell	Cell1	Cell26		
5.2.10	RRC CONNECTED / Handover from E-UTRAN to other RATs / E-UTRAN TDD - UTRAN TDD HO test: unknown target cell	Cell1	Cell5		
5.3.1	RRC CONNECTED / Handover from E-UTRAN to non-3GPP RATs / E-UTRAN FDD – HRPD handover	Cell1	[Cell15]		
5.3.2	RRC CONNECTED / Handover from E-UTRAN to non-3GPP RATs / E-UTRAN FDD – cdma2000 1xRTT handover	Cell1	[Cell19]		
6.1.1	RRC Connection Mobility Control / E-UTRAN FDD Intra-frequency RRC Re-establishment	Cell1	Cell2		
6.1.2	RRC Connection Mobility Control / E-UTRAN FDD Inter-frequency RRC Re-establishment	Cell1	Cell3		
6.1.3	RRC Connection Mobility Control / E-UTRAN TDD Intra-frequency RRC Re-establishment	Cell1	Cell2		
6.1.4	RRC Connection Mobility Control / E-UTRAN TDD Inter-frequency RRC Re-establishment	Cell1	Cell3		
6.2.1	RRC Connection Mobility Control / Random Access / E-UTRAN FDD – Contention Based Random Access	Cell1			
6.2.2	RRC Connection Mobility Control / Random Access / E-UTRAN FDD – Non-Contention Based Random Access	Cell1			
6.2.3	RRC Connection Mobility Control / Random Access / E-UTRAN TDD – Contention Based Random Access	Cell1			
6.2.4	RRC Connection Mobility Control / Random Access / E-UTRAN TDD – Non-Contention Based Random Access	Cell1			
7.1.1	E-UTRAN FDD-UE Transmit Timing Accuracy	Cell1			
7.1.2	E-UTRAN TDD-UE Transmit Timing Accuracy	Cell1			
7.2.1	E-UTRAN FDD-UE Timing Advance Adjustment Accuracy	Cell1			
7.2.2	E-UTRAN TDD-UE Timing Advance Adjustment Accuracy	Cell1			
7.3.1	E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync	Cell1			
7.3.2	E-UTRAN FDD Radio Link Monitoring Test for In-sync	Cell1			
7.3.3	E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync	Cell1			
7.3.4	E-UTRAN TDD Radio Link Monitoring Test for In-sync	Cell1			
7.3.5	E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX	Cell1			
7.3.6	E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX	Cell1			
7.3.7	E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX	Cell1			
7.3.8	E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX	Cell1			
8.1.1	UE Measurement Procedures / E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in asynchronous cells	Cell1	Cell2		
8.1.2	UE Measurement Procedures / E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells	Cell1	Cell2		
8.1.3	UE Measurement Procedures / E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX	Cell1	Cell2		
8.1.4	Void				
8.2.1	UE Measurement Procedures / E-UTRAN TDD-TDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells	Cell1	Cell2		
8.2.2	UE Measurement Procedures / E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX	Cell1	Cell2		
8.3.1	UE Measurement Procedures / E-UTRAN FDD-FDD inter frequency event triggered reporting under fading propagation conditions in asynchronous cells	Cell1	Cell3		
8.3.2	UE Measurement Procedures / E-UTRAN FDD-FDD inter frequency event triggered reporting when DRX is used under fading propagation conditions in asynchronous cells	Cell1	Cell3		

8.4.1	UE Measurement Procedures / E-UTRAN TDD-TDD inter-frequency event triggered reporting under fading propagation conditions in synchronous cells	Cell1	Cell3		
8.4.2	UE Measurement Procedures / E-UTRAN TDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in synchronous cells	Cell1	Cell3		
8.5.1	UE Measurement Procedures / E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions	Cell1	Cell5		
8.5.2	UE Measurement Procedures / E-UTRAN FDD – UTRAN FDD SON ANR cell search reporting under AWGN propagation conditions	Cell 1	Cell5		
8.5.3	UE Measurement Procedures / E-UTRAN FDD – UTRAN FDD event triggered reporting when DRX is used under fading propagation conditions	Cell1	Cell5		
8.6.1	UE Measurement Procedures / E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions	Cell1	Cell5		
8.7.1	UE Measurement Procedures / E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions	Cell1	Cell5		
8.7.2	UE Measurement Procedures / E-UTRAN TDD – UTRAN TDD cell search when DRX is used under fading propagation conditions	Cell1	Cell5		
8.8.1	UE Measurement Procedures / E-UTRAN FDD – GSM event triggered reporting in AWGN	Cell6	Cell26		
8.8.2	UE Measurement Procedures / E-UTRAN FDD – GSM event triggered reporting when DRX is used in AWGN	Cell6	Cell26		
8.9.1	UE Measurement Procedures / E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions	Cell1	Cell5		
8.10.1	UE Measurement Procedures / E-UTRAN TDD – GSM event triggered reporting in AWGN	Cell6	Cell26		
8.10.2	UE Measurement Procedures / E-UTRAN TDD – GSM event triggered reporting when DRX is used in AWGN	Cell6	Cell26		
8.11.2	UE Measurement Procedures / Monitoring of multiple layers / E-UTRAN TDD – E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions	Cell1	Cell3	Cell6	
8.11.4	UE Measurement Procedures / Monitoring of multiple layers / InterRAT E-UTRA TDD to E-UTRA TDD and UTRA TDD cell search	Cell1	Cell3	Cell5	
9.1.1.1	Measurement Performance Requirements / E-UTRAN / FDD Intra frequency RSRP Accuracy / Absolute	Cell1	Cell2		
9.1.1.2	Measurement Performance Requirements / E-UTRAN / FDD Intra frequency RSRP Accuracy / Relative	Cell1	Cell2		
9.1.2.1	Measurement Performance Requirements / E-UTRAN / TDD Intra Frequency RSRP Accuracy / Absolute	Cell1	Cell2		
9.1.2.2	Measurement Performance Requirements / E-UTRAN / TDD Intra Frequency RSRP Accuracy / Relative	Cell1	Cell2		
9.1.3.1	Measurement Performance Requirements / E-UTRAN / FDD Inter frequency RSRP Accuracy / Absolute	Cell1	Cell3		
9.1.3.2	Measurement Performance Requirements / E-UTRAN / FDD Inter frequency RSRP Accuracy / Relative	Cell1	Cell3		
9.1.4.1	Measurement Performance Requirements / E-UTRAN / TDD Inter Frequency RSRP Accuracy / Absolute	Cell1	Cell3		
9.1.4.2	Measurement Performance Requirements / E-UTRAN / TDD Inter Frequency RSRP Accuracy / Relative	Cell1	Cell3		
9.2.1.1	Measurement Performance Requirements / E-UTRAN / FDD Intra frequency RSRQ Accuracy / Absolute	Cell1	Cell2		
9.2.2.1	Measurement Performance Requirements / E-UTRAN / TDD Intra Frequency RSRQ Accuracy / Absolute	Cell1	Cell2		
9.2.3.1	Measurement Performance Requirements / E-UTRAN / FDD Inter frequency RSRQ Accuracy / Absolute	Cell1	Cell3		
9.2.3.2	Measurement Performance Requirements / E-UTRAN / FDD Inter frequency RSRQ Accuracy / Relative	Cell1	Cell3		
9.2.4.1	Measurement Performance Requirements / E-UTRAN / TDD - TDD Inter Frequency RSRQ Accuracy / Absolute	Cell1	Cell3		
9.2.4.2	Measurement Performance Requirements / E-UTRAN / TDD - TDD Inter Frequency RSRQ Accuracy / Relative	Cell1	Cell3		

Annex F: Measurement uncertainties and Test Tolerances

Editor's note: Annex is incomplete. The following aspects are either missing or not yet determined:

- *In Annex F.1 the Acceptable uncertainty of Test System has not yet been defined for all tests*
- *In Annex F.3 the Derivation of Test Requirements has not yet been defined for all test*
- *The references to other specifications need to be formalised*

The requirements of this clause apply to all applicable tests in the present document.

F.1 Acceptable uncertainty of Test System (normative)

See TS 36.521-1[10] Annex F1.

F.1.1 Measurement of test environments

See TS 36.521-1[10] Annex F1.1.

F.1.2 Measurement of RRM requirements

Table F.1.2-1: Maximum Test System Uncertainty for RRM Requirements

Subclause	Maximum Test System Uncertainty[1]	Derivation of Test System Uncertainty
4.2.1 E-UTRA FDD – FDD cell re-selection intra frequency	N_{oc} ±1.0 dB averaged over BW_{Config} $\hat{E}s_1 / N_{oc}$ ±0.3 dB averaged over BW_{Config} $\hat{E}s_2 / N_{oc}$ ±0.3 dB averaged over BW_{Config}	Note: $\hat{E}s_1 / N_{oc}$ is the ratio of cell 1 signal / AWGN $\hat{E}s_2 / N_{oc}$ is the ratio of cell 2 signal / AWGN
4.2.2 E-UTRA TDD – TDD cell re-selection intra frequency	Same as 4.2.1	
4.2.3 E-UTRA FDD – FDD cell re-selection inter frequency	N_{oc1} ±0.7 dB averaged over BW_{Config} $\hat{E}s_1 / N_{oc1}$ ±0.3 dB averaged over BW_{Config} N_{oc2} ±0.7 dB averaged over BW_{Config} $\hat{E}s_2 / N_{oc2}$ ±0.3 dB averaged over BW_{Config}	Note: N_{oc1} is the AWGN on cell 1 frequency $\hat{E}s_1 / N_{oc1}$ is the ratio of cell 1 signal / AWGN N_{oc2} is the AWGN on cell 2 frequency $\hat{E}s_2 / N_{oc2}$ is the ratio of cell 2 signal / AWGN
4.2.6 E-UTRA TDD – TDD cell re-selection inter frequency	Same as 4.2.3	
[TBD]	[TBD]	[TBD]
9.1.1.1 FDD Intra Frequency Absolute RSRP Accuracy	N_{oc} ±0.7 dB averaged over BW_{Config} N_{oc} ±1.0 dB for PRBs #22-27 $\hat{E}s_1 / N_{oc}$ and $\hat{E}s_2 / N_{oc}$ each ±0.3 dB averaged over BW_{Config} $\hat{E}s_1 / N_{oc}$ and $\hat{E}s_2 / N_{oc}$ each ±0.8 dB for PRBs #22-27	Note: $\hat{E}s_1 / N_{oc}$ is the ratio of cell 1 signal / AWGN $\hat{E}s_2 / N_{oc}$ is the ratio of cell 2 signal / AWGN
In addition, the following Test System uncertainties and related constraints apply. Any additional constraints are defined in the specific tests.		
AWGN Bandwidth		≥ 1.08MHz, 2.7MHz, 4.5MHz, 9MHz, 13.5MHz, 18MHz; N_{RB} x 180kHz according to BW_{Config}
AWGN absolute power uncertainty		Test-specific
AWGN flatness and signal flatness, max deviation for any Resource Block, relative to average over BW_{Config}		±2 dB
AWGN peak to average ratio		≥10 dB @0.001%
Signal-to noise ratio uncertainty		Test-specific
Fading profile power uncertainty		±0.5 dB
Fading profile delay uncertainty, relative to frame timing		±5 ns (excludes absolute errors related to baseband timing)

F.2 Interpretation of measurement results (normative)

See TS 36.521-1[10] Annex F2.

F.3 Test Tolerance and Derivation of Test Requirements (informative)

See TS 36.521-1[10] Annex F3.

F.3.1 Measurement of test environments

See TS 36.521-1[10] Annex F3.1.

F.3.2 Measurement of RRM requirements

Table F.3.2-1: Derivation of Test Requirements (RRM tests)

Test	Minimum Requirement in TS 36.133	Test Tolerance (TT)	Test Requirement in TS 36.521-3
4.2.1 E-UTRA FDD – FDD cell re-selection intra frequency	During T1: N_{oc}: -98dBm/15kHz $\hat{E}s_1 / N_{oc}$: +16.00dB $\hat{E}s_2 / N_{oc}$: -infinity During T2: N_{oc}: -98dBm/15kHz $\hat{E}s_1 / N_{oc}$: +13.00dB $\hat{E}s_2 / N_{oc}$: +16.00dB During T3: N_{oc}: -98dBm /15kHz $\hat{E}s_1 / N_{oc}$: +16.00dB $\hat{E}s_2 / N_{oc}$: +13.00dB	During T1: 0dB 0dB 0dB During T2: 0dB 0dB +0.45dB During T3: 0dB +0.45dB 0dB	During T1: N_{oc}: -98dBm/15kHz $\hat{E}s_1 / N_{oc}$: +16.00dB $\hat{E}s_2 / N_{oc}$: -infinity During T2: N_{oc}: -98dBm/15kHz $\hat{E}s_1 / N_{oc}$: +13.00dB $\hat{E}s_2 / N_{oc}$: +16.45dB During T3: N_{oc}: -98dBm /15kHz $\hat{E}s_1 / N_{oc}$: +16.45dB $\hat{E}s_2 / N_{oc}$: +13.00dB
4.2.2 E-UTRA TDD – TDD cell re-selection intra frequency	Same as 4.2.1	Same as 4.2.1	Same as 4.2.1
4.2.3 E-UTRA FDD – FDD cell re-selection inter frequency	During T1: N_{oc1}: -98dBm/15kHz $\hat{E}s_1 / N_{oc1}$: +14.00dB N_{oc2}: -98dBm/15kHz $\hat{E}s_2 / N_{oc2}$: -4.00dB During T2: N_{oc1}: -98dBm/15kHz $\hat{E}s_1 / N_{oc1}$: +14.00dB N_{oc2}: -98dBm/15kHz $\hat{E}s_2 / N_{oc2}$: -infinity During T3: N_{oc1}: -98dBm /15kHz $\hat{E}s_1 / N_{oc1}$: +14.00dB N_{oc2}: -98dBm/15kHz $\hat{E}s_2 / N_{oc2}$: +12.00dB	During T1: -1.1dB +1.9dB -1.1dB +0.3dB During T2: -1.1dB +1.9dB -1.1dB 0dB During T3: -1.1dB +1.9dB -1.1dB +1.9dB	During T1: N_{oc1}: -99.1dBm/15kHz $\hat{E}s_1 / N_{oc1}$: +15.90dB N_{oc2}: -99.1dBm/15kHz $\hat{E}s_2 / N_{oc2}$: -3.70dB During T2: N_{oc1}: -99.1dBm/15kHz $\hat{E}s_1 / N_{oc1}$: +15.90dB N_{oc2}: -99.1dBm/15kHz $\hat{E}s_2 / N_{oc2}$: -infinity During T3: N_{oc1}: -99.1dBm /15kHz $\hat{E}s_1 / N_{oc1}$: +15.90dB N_{oc2}: -99.1dBm/15kHz $\hat{E}s_2 / N_{oc2}$: +13.90dB
4.2.6 E-UTRA TDD – TDD cell re-selection inter frequency	Same as 4.2.3	Same as 4.2.3	Same as 4.2.3

9.1.1.1 FDD Intra Frequency Absolute RSRP Accuracy	Test 1: N_{oc}: -106dBm/15kHz $\hat{E}s_1$ / N_{oc}: +6.0dB $\hat{E}s_2$ / N_{oc}: +1.0dB Reported RSRP values: ±6dB Test 2: N_{oc}: -88dBm/15kHz $\hat{E}s_1$ / N_{oc}: +6.0dB $\hat{E}s_2$ / N_{oc}: +1.0dB Reported RSRP values: ±8dB Test 3: N_{oc}: -116dBm or -114dBm or -113dBm or -115dBm /15kHz depending on operating band $\hat{E}s_1$ / N_{oc}: +3.0dB $\hat{E}s_2$ / N_{oc}: -1.0dB Reported RSRP values: ±6dB	Test 1: -0.7dB 0dB +1.0dB Via mapping Test 2: 0dB 0dB +1.0dB Via mapping Test 3: 0dB 0dB +0.8dB Via mapping	Test 1: N_{oc}: -106.7dBm/15kHz $\hat{E}s_1$ / N_{oc}: +6.0dB $\hat{E}s_2$ / N_{oc}: +2.0dB RSRP_29 to RSRP_43 Test 2: N_{oc}: -88dBm/15kHz $\hat{E}s_1$ / N_{oc}: +6.0dB $\hat{E}s_2$ / N_{oc}: +2.0dB RSRP_45 to RSRP_64 Test 3: N_{oc}: -116dBm or -114dBm or -113dBm or -115dBm /15kHz depending on operating band $\hat{E}s_1$ / N_{oc}: +3.0dB $\hat{E}s_2$ / N_{oc}: -0.2dB RSRP_17 to RSRP_32 RSRP_19 to RSRP_34 RSRP_20 to RSRP_35 RSRP_18 to RSRP_33 depending on operating band
	The derivation of the RSRP values takes into account the uncertainty in Cell 2 RSRP from N_{oc} and $\hat{E}s_2$ / N_{oc}, the allowed UE reporting accuracy, and the UE mapping function. The RSRP values given above are for normal conditions. In all cases the RSRP values are 3dB wider at each end for extreme conditions.		
[TBD]	[TBD]	[TBD]	[TBD]

Annex G (normative): Statistical Testing

G.1 General

FSS

G.2 Statistical testing of delay and UE measurement performance in RRM tests

G.2.1 General

The RRM tests are either of deterministic or of statistical nature. The pass fail limits in tests of statistical nature are expressed as a limit (e.g. delay limit) and a success ratio applicable for the limit. The success ratio is 90% uniform (the complement is the error ratio ER = 10%).

Among the statistical tests there are tests performed in fading conditions while others are performed in static conditions. In addition to the statistical considerations, the fading conditions require the definition of a minimum test time.

G.2.2 Design of the test

The test is defined by the following design principles (see TS 36.521-1 clause G.x, Theory….):

1) The early decision concept is applied.

2) A second limit is introduced: bad DUT factor M>1

3) To decide the test pass:

Supplier risk is applied based on the bad DUT quality

To decide the test fail

Cusomer risk is applied based on the specified DUT quality

The test is defined by the following parameters:

1) Limit ER = 0.1 (success ratio = 90%)

2) Bad DUT factor M=1.5 (selectivity)

3) Confidence level CL = 95% (for specified DUT and bad DUT-quality)

G.2.3 Numerical definition of the pass fail limits

Table G.2.3-1: pass fail limits

ne	ns_p	ns_f	ne	ns_p	ns_f	ne	ns_p	ns_f	ne	ns_p	ns_f
0	33	NA	43	408	283	86	737	644	**129**	**1056**	**1021**
1	46	NA	44	416	291	87	745	653	**130**	**1064**	**1030**
2	58	2	45	424	299	88	752	661	**131**	**1071**	**1039**
3	69	5	46	432	307	89	760	670	**132**	**1078**	**1048**
4	79	8	47	440	315	90	767	679	**133**	**1086**	**1057**
5	89	12	48	447	324	91	775	687	**134**	**1093**	**1066**
6	99	17	49	455	332	92	782	696	**135**	**1100**	**1074**
7	109	22	50	463	340	93	790	705	**136**	**1108**	**1083**
8	118	27	51	471	348	94	797	713	**137**	**1115**	**1092**
9	127	33	52	478	356	95	804	722	**138**	**1122**	**1101**
10	136	39	53	486	365	96	812	731	**139**	**1130**	**1110**
11	145	45	54	494	373	97	819	739	**140**	**1137**	**1119**
12	154	51	55	502	381	98	827	748	**141**	**1144**	**1128**
13	163	58	56	509	389	99	834	757	142	1152	1137
14	172	64	57	517	398	100	842	766	143	1159	1147
15	180	71	58	525	406	101	849	774	144	1166	1155
16	189	78	59	532	414	102	857	783	145	1174	1164
17	197	85	60	540	423	103	864	792	146	1181	1173
18	206	92	61	548	431	104	871	801	147	NA	1182
19	214	99	62	555	440	105	879	809	148		
20	223	106	63	563	448	106	886	818	149		
21	231	113	64	571	456	107	894	827	150		
22	239	120	65	578	465	108	901	836	151		
23	248	128	66	586	473	109	909	844	152		
24	256	135	67	594	482	110	916	853	153		
25	264	142	68	601	490	111	923	862	154		
26	272	150	69	609	499	112	931	871	155		
27	281	157	70	616	507	113	938	880	156		
28	289	165	71	624	516	114	946	888	157		
29	297	173	72	632	524	115	953	897	158		
30	305	180	73	639	533	116	960	906	159		
31	313	188	74	647	541	117	968	915	160		
32	321	196	75	654	550	118	975	924	161		
33	329	204	76	662	558	119	983	933	162		
34	337	211	77	669	567	120	990	941	163		
35	345	219	78	677	575	121	997	950	164		
36	353	227	79	684	584	122	1005	959	165		
37	361	235	80	692	592	123	1012	968	166		
38	369	243	81	700	601	124	1019	977	167		
39	377	251	82	707	610	125	1027	986	168		
40	385	259	83	715	618	126	1034	994	169		
41	393	267	84	722	627	127	1042	1003			
42	400	275	85	730	635	128	1049	1012			

The first column is the number of errors (ne = number of exceeded delays or number of wrong reports)

The second column is the number of samples for the pass limit (ns_p , ns=Number of samples= number of successes + number of exceedings or number of reports)

The third column is the number of samples for the fail limit (ns_f)

G.2.4 Pass fail decision rules

The pass fail decision rules apply for a single test, comprising one component in the test vector. The over all Pass /Fail conditions are defined in clause G.2.6

Having observed 0 errors, pass the test at 33+ samples, otherwise continue

Having observed 1 error, pass the test at 46+ samples, otherwise continue

Having observed 2 errors, pass the test at 58+ samples, fail the test at 2 samples, otherwise continue

Having observed 146 errors, pass the test at 1181+ samples, fail the test at 1173- samples, otherwise continue

Having observed 147 errors, fail the test at 1182- samples,

Where x+ means: x or more, x- means x or less

NOTE 1: an ideal DUT passes after 33 samples. The maximum test time is 1181 samples.

G.2.5 Minimum Test time

The minimum test time applies for tests under fading conditions. If a pass fail decision in G.2.4 can be achieved earlier than the minimum test time, then the test shall not be decided, but continued until the minimum test time is elapsed. For tests under static conditions, the pass fail decision in G.2.4 is not restricted.

Table G.2.5-1: Minimum Test time

Δf doppler max	**Minimum test time in sec (note1)**						
BW	SPR	1.4 MHz	3MHz	5MHz	10MHz	15 MHz	20 MHz
5 Hz	Tbd	tbd	tbd	[198]	tbd	tbd	tbd
70 Hz	Tbd	tbd	tbd	[14.1]	tbd	tbd	tbd
300 Hz	Tbd	tbd	tbd	[3.3]	tbd	tbd	tbd
Note: The minimum test time is the net test time. Time periods consumed in between test repetitions are not considerd as test time.							

G.2.6 Test conditions for delay tests and UE measurement performance

Table G.2.6-1: test conditions

Test	Statistical independence	Number of components in the test vector, as specified in the test requirements and initial conditions of the applicable test		Over all Pass/Fail condition
4.2.1 EUTRAN FDD-FDD cell re-selection intra frequency case	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
4.2.2 E-UTRAN TDD – TDD cell re-selection intra frequency case	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
4.2.3 E-UTRAN FDD – FDD cell re-selection inter frequency case	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
4.2.4 E-UTRAN FDD – TDD cell re-selection inter frequency case				
4.2.5 E-UTRAN TDD – FDD cell re-selection inter frequency case				
4.2.6 E-UTRAN TDD – TDD cell re-selection inter frequency case	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
4.3.1 E-UTRAN FDD – UTRAN FDD cell re-selection				
4.3.2 E-UTRAN FDD – UTRAN TDD cell re-selection				
4.3.3 E-UTRAN TDD – UTRAN FDD cell re-selection				

4.3.4 E-UTRAN TDD – UTRAN TDD cell re-selection				
4.4.1 E-UTRAN FDD – GSM cell re-selection	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
4.4.2 E-UTRAN TDD – GSM cell re-selection				
4.5.1 E-UTRAN FDD – HRPD Cell re-selection				
4.6.1 E-UTRAN FDD – cdma2000 1xRTT Cell re-selection				
5.1.1 E-UTRAN FDD-FDD Handover intra frequency case	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
5.1.2 E-UTRAN TDD-TDD Handover intra frequency case	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
5.1.3 E-UTRAN FDD-FDD Handover inter frequency case	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
5.1.4 E-UTRAN TDD-TDD Handover inter frequency case	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
5.2.1 E-UTRAN FDD – UTRAN FDD handover	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
5.2.2 E-UTRAN FDD – UTRAN TDD handover	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
5.2.3 E-UTRAN FDD – GSM handover	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test vector must pass
5.2.4 E-UTRAN TDD	Test procedure ensures independency	1 per operating band	NA	To pass the test, all components in the test

– UTRAN TDD handover				vector must pass
5.3.1 Inter-RAT Handover from E-UTRAN to HRPD				
5.3.2 Inter-RAT Handover from E-UTRAN to cdma2000 1xRTT				
6.1.1 RRC Re-establishment to E-UTRAN				
8.1.1 E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in asynchronous cells	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass
8.1.2 E-UTRAN FDD-FDD intra frequency event triggered reporting under fading propagation conditions in synchronous cells	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass
8.2.1 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass
8.3.1 E-UTRAN FDD-FDD Inter-frequency event triggered reporting under fading propagation conditions in asynchronous cells	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass

8.4.1 E-UTRAN TDD-TDD Inter-frequency event triggered reporting under fading propagation conditions in synchronous cells	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass
8.5.1 E-UTRAN FDD – UTRAN FDD event triggered reporting under fading propagation conditions	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass
8.6.1 E-UTRAN TDD – UTRAN FDD event triggered reporting under fading propagation conditions	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass
8.7.1 E-UTRAN TDD – UTRAN TDD event triggered reporting under fading propagation conditions	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass
8.8				
8.9.1 E-UTRAN FDD – UTRAN TDD event triggered reporting under fading propagation conditions	Test procedure ensures independency	1 per operating band	Table G.5.2 applies	To pass the test, all components in the test vector must pass
9.1.1.1 FDD Intra Frequency Absolute RSRP Accuracy	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.1.1.2 FDD Intra Frequency Relative Accuracy of RSRP	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.1.2.1 TDD Intra Frequency Absolute RSRP Accuracy	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.1.2.2 TDD Intra	Independency is assumed, although Layer 1 filtering is	Full set of environmental	NA	To pass the test, all components in the test

Frequency Relative Accuracy of RSRP	applied to the reported results	conditions (5) per operating band		vector must pass
9.1.3.1 FDD -FDD Inter Frequency Absolute RSRP Accuracy	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.1.3.2 FDD -FDD Inter Frequency Relative Accuracy of RSRP	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.1.4.1 TDD -TDD Inter Frequency Absolute RSRP Accuracy	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.1.4.2 TDD -TDD Inter Frequency Relative Accuracy of RSRP	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.2.1.1 FDD Intra Frequency Absolute RSRQ Accuracy	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.2.2.1 TDD Intra Frequency Absolute RSRQ Accuracy	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.2.3.1 FDD -FDD Inter Frequency Absolute RSRQ Accuracy	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.2.3.2 FDD -FDD Inter Frequency Relative Accuracy of RSRQ	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.2.4.1 TDD Inter Frequency Absolute RSRQ Accuracy	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass
9.2.4.2 TDD Inter Frequency Relative Accuracy of RSRQ	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	NA	To pass the test, all components in the test vector must pass

G.X Theory to derive the numbers in Table G.2.3-1 (Informative)

TS 36.521-1 Annex G.X applies

Annex H (normative): Default Message Contents

This annex contains the default values of common messages specific to RRM, other than those described in TS 36.508 [7]. The message contents shall apply to test cases accordingly and unless indicated otherwise in specific test cases, shall be transmitted and checked by the system simulator. The default message contents can be defined for FDD Mode, or TDD Mode or both FDD/TDD Modes. All the messages are listed in alphabetical order based on conformance tests.

NOTE: For example, test case 8.1.1 has an exception for RRCConnectionReconfiguration message and therefore uses message contents according to TS 36.508 [7] with the exception of the RRCConnectionReconfiguration message specified in Annex H.

H.1 Common contents of system information messages exceptions

This clause contains the default values of common system information messages, other than those described in TS 36.508 [7].

H.2 Common contents of system information blocks exceptions

This clause contains the default values of common system information blocks, other than those described in TS 36.508 [7].

H.2.1 System information blocks message contents exceptions for E-UTRAN intra frequency cell re-selection

SystemInformationBlockType3: (FDD/TDD) for E-UTRAN intra-frequency cell re-selection

Table H.2.1-1: *SystemInformationBlockType3*: E-UTRAN intra frequency cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	Value/remark	Comment	Condition
cellReselectionInfoCommon SEQUENCE {			
q-Hyst	dB0 (0 dB)	0 is actual value in dB (0 * 2 dB)	

SystemInformationBlockType4: (FDD/TDD) for E-UTRAN intra-frequency cell re-selection

Table H.2.1-2: *SystemInformationBlockType4*: E-UTRAN intra frequency cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-3 SystemInformationBlockType4			
Information Element	Value/remark	Comment	Condition
intraFreqNeighCellList SEQUENCE (SIZE (1..maxCellIntra)) OF SEQUENCE {			
IntraFreqNeighCellInfo ::= SEQUENCE {			
q-OffsetCell	dB0 (0 dB)	0 is actual value in dB (0 * 2 dB)	

H.2.2 System information blocks message contents exceptions for E-UTRAN inter frequency cell re-selection

SystemInformationBlockType3: (FDD/TDD) for E-UTRAN inter-frequency cell re-selection

Table H.2.2-1: *SystemInformationBlockType3*: E-UTRAN inter frequency cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	Value/remark	Comment	Condition
cellReselectionServingFreqInfo SEQUENCE {			
s-NonIntraSearch	25 (50 dB)	50 is actual value in dB (25 * 2 dB); for Cell 1	
threshServingLow	22 (44 dB)	44 is actual value in dB (22 * 2 dB)	
cellReselectionPriority	4 for cell 1 5 for cell 2		

SystemInformationBlockType5: (FDD/TDD) for E-UTRAN inter-frequency cell re-selection case

Table H.2.2-2: *SystemInformationBlockType5*: E-UTRAN inter frequency cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-4 SystemInformationBlockType5			
Information Element	Value/remark	Comment	Condition
interFreqCarrierFreqList SEQUENCE (SIZE (1..maxFreq)) OF SEQUENCE {			
q-Rxlevmin	-70 (-140 dBm)	-140 is actual value in dBm (-70 * 2 dBm)	
threshX-High	24 (48 dB)	48 is actual value in dB (24 * 2 dB)	
threshX-Low	25 (50 dB)	50 is actual value in dB (25 * 2 dB)	
cellReselectionPriority[*n*]	4 for cell 2 5 for cell 1		

H.2.3 System information blocks message contents exceptions for E-UTRAN inter-RAT cell re-selection

SystemInformationBlockType3: for inter-RAT EUTRAN FDD - UTRA FDD is of higher priority cell re-selection

Table H.2.3-1: *SystemInformationBlockType3*: Inter-RAT E-UTRAN FDD – UTRA FDD is of higher priority cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	Value/remark	Comment	Condition
cellReselectionServingFreqInfo SEQUENCE {			
s-NonIntraSearch	25 (50 dB)	50 is actual value in dB (25 * 2 dB); for Cell 1 (E-UTRA)	
threshServingLow	18 (36 dB)	36 is actual value in dB (18* 2 dB)	

SystemInformationBlockType6: for inter-RAT EUTRAN FDD - UTRA FDD is of higher priority cell re-selection

Table H.2.3-2: *SystemInformationBlockType6*: Inter-RAT E-UTRAN FDD – UTRA FDD is of higher priority cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-5 SystemInformationBlockType6			
Information Element	Value/remark	Comment	Condition
CarrierFreqListUTRA-FDD ::= SEQUENCE (SIZE (1..maxUTRA-FDD-Carrier)) OF SEQUENCE {			UTRA-FDD
…			
threshX-High	20 (40 dB)	40 is actual value in dB (20 * 2 dB)	
q-RxLevMin	-58 (-115 dBm)	-115 is actual value in dBm (-58 * 2 + 1 dBm)	
p-MaxUTRA	21 (21 dBm)		
q-QualMin	-20 (-20 dB)		
cellReselectionPriority[*n*]	5	UTRA is of higher priority than E-UTRAN	
}			

SystemInformationBlockType3: for inter-RAT EUTRAN TDD - UTRA TDD is of higher priority cell re-selection

Table H.2.3-3: *SystemInformationBlockType3*: Inter-RAT E-UTRAN TDD – UTRA TDD is of higher priority cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	Value/remark	Comment	Condition
cellReselectionServingFreqInfo SEQUENCE {			
s-NonIntraSearch	25 (50 dB)	50 is actual value in dB (25 * 2 dB); for Cell 1 (E-UTRA)	
threshServingLow	12 (24 dB)	24 is actual value in dB (12* 2 dB)	

SystemInformationBlockType6: for inter-RAT EUTRAN TDD - UTRA TDD is of higher priority cell re-selection

Table H.2.3-4: *SystemInformationBlockType6*: Inter-RAT E-UTRAN TDD – UTRA TDD is of higher priority cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-5 SystemInformationBlockType6			
Information Element	Value/remark	Comment	Condition
CarrierFreqListUTRA-TDD ::= SEQUENCE (SIZE (1..maxUTRA-TDD-Carrier)) OF SEQUENCE {			UTRA-TDD
……			
threshX-High	12 (24 dB)	24 is actual value in dB (12 * 2 dB)	
q-RxLevMin	-52 (-103 dBm)	-103 is actual value in dBm (-52 * 2 + 1 dBm)	
p-MaxUTRA	21 (21 dBm)		
cellReselectionPriority[*n*]	5	UTRA is of higher priority than E-UTRAN	
}			

SystemInformationBlockType3: for inter-RAT EUTRAN FDD/TDD - UTRA FDD is of lower priority cell re-selection

Table H.2.3-5: *SystemInformationBlockType3*: Inter-RAT E-UTRAN FDD/TDD – UTRA FDD is of lower priority cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	Value/remark	Comment	Condition
cellReselectionServingFreqInfo SEQUENCE {			
threshServingLow	22 (44 dB)	44 is actual value in dB (22 * 2 dB)	

SystemInformationBlockType6: for inter-RAT EUTRAN FDD/TDD - UTRA FDD is of lower priority cell re-selection

Table H.2.3-6: *SystemInformationBlockType6*: Inter-RAT E-UTRAN FDD/TDD – UTRA FDD is of lower priority cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-5 SystemInformationBlockType6			
Information Element	Value/remark	Comment	Condition
CarrierFreqListUTRA-FDD ::= SEQUENCE (SIZE (1..maxUTRA-FDD-Carrier)) OF SEQUENCE {			UTRA-FDD
…			
threshX-Low	21 (42 dB)	42 is actual value in dB (21 * 2 dB)	
q-RxLevMin	-58 (-115 dBm)	-115 is actual value in dBm (-58 * 2 + 1 dBm)	
p-MaxUTRA	21 (21 dBm)		
q-QualMin	-20 (-20 dB)		
}			

SystemInformationBlockType3: for inter-RAT EUTRAN FDD/TDD - UTRA TDD is of lower priority cell re-selection

Table H.2.3-7: *SystemInformationBlockType3*: Inter-RAT E-UTRAN FDD/TDD – UTRA TDD is of lower priority cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	Value/remark	Comment	Condition
cellReselectionServingFreqInfo SEQUENCE {			
threshServingLow	23 (46 dB)	46 is actual value in dB (23 * 2 dB)	

SystemInformationBlockType6: for inter-RAT EUTRAN FDD/TDD - UTRA TDD is of lower priority cell re-selection

Table H.2.3-8: *SystemInformationBlockType6*: Inter-RAT E-UTRAN FDD/TDD – UTRA TDD is of lower priority cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-5 SystemInformationBlockType6			
Information Element	Value/remark	Comment	Condition
CarrierFreqListUTRA-TDD ::= SEQUENCE (SIZE (1..maxUTRA-TDD-Carrier)) OF SEQUENCE {			UTRA-TDD
…			
threshX-Low	12 (24 dB)	24 is actual value in dB (12 * 2 dB)	
q-RxLevMin	-52 (-103 dBm)	-103 is actual value in dBm (-52 * 2 + 1 dBm)	
p-MaxUTRA	21 (21 dBm)		
}			

SystemInformationBlockType3: (FDD/TDD) for inter-RAT E-UTRAN - GSM cell re-selection

Table H.2.3-9: *SystemInformationBlockType3*: Inter-RAT E-UTRAN – GSM cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3			
Information Element	Value/remark	Comment	Condition
cellReselectionServingFreqInfo SEQUENCE {			
s-NonIntraSearch	Not sent		
threshServingLow	22 (44 dB)	44 is actual value in dB (22 * 2 dB)	
cellReselectionPriority	4		

SystemInformationBlockType7: (FDD/TDD) for inter-RAT E-UTRAN - GSM cell re-selection

Table H.2.3-10: *SystemInformationBlockType7*: Inter-RAT E-UTRAN – GSM cell re-selection

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-3 SystemInformationBlockType7			
Information Element	Value/remark	Comment	Condition
commonInfo SEQUENCE {			
cellReselectionPriority	0		
ncc-Permitted	'11111111'B		
q-RxLevMin	-70 (-140 dBm)	-140 is actual value in dBm (-70 * 2 dBm)	
threshX-High	12 (24 dB)	24 is actual value in dB (12 * 2 dB)	
threshX-Low	12 (24 dB)	24 is actual value in dB (12 * 2 dB)	

H.2.4 System information blocks message contents exceptions for E-UTRAN radio link monitoring (RLM)

SystemInformationBlockType2: (FDD/TDD) for E-UTRAN Radio Link Monitoring test for out-of-sync

Table H.2.4-1: *SystemInformationBlockType2*: E-UTRAN Radio Link Monitoring test for out-of-sync

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType 2 ::= SEQUENCE {			
ue-TimersAndConstants {			
t300	ms1000		
t301	ms1000		
t310	ms0		
n310	n1		
t311	ms1000		
n311	n1		

SystemInformationBlockType2: (FDD/TDD) for E-UTRAN Radio Link Monitoring test for in-sync

Table H.2.4-2: *SystemInformationBlockType2*: E-UTRAN Radio Link Monitoring test for in-sync

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType 2 ::= SEQUENCE {			
ue-TimersAndConstants {			
t300	ms1000		
t301	ms1000		
t310	[ms2000]		
n310	n1		
t311	ms1000		
n311	n1		

H.2.5 System information blocks message contents exceptions for RRC Re-establishment

SystemInformationBlockType2: (FDD) for E-UTRAN FDD Intra-frequency RRC Re-establishment

Table H.2.5-1: *SystemInformationBlockType2*: E-UTRAN FDD Intra-frequency RRC Re-establishment

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1 SystemInformationBlockType2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType 2 ::= SEQUENCE {			
ue-TimersAndConstants {			
t310	ms0		
t311	ms3000		
n310	n1		
n311	n1		

SystemInformationBlockType2: (FDD) for E-UTRAN FDD Inter-frequency RRC Re-establishment

Table H.2.5-2: *SystemInformationBlockType2*: E-UTRAN FDD Inter-frequency RRC Re-establishment

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1 SystemInformationBlockType2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType 2 ::= SEQUENCE {			
ue-TimersAndConstants {			
t310	ms0		
t311	Ms5000		
n310	n1		
n311	n1		

H.3 Default RRC messages and information elements contents exceptions

This clause contains the default values of common sRRC messages and information elements, other than those described in TS 36.508 [7].

H.3.1 RRC messages and information elements contents exceptions for E-UTRAN measurement configuration

RRCConnectionReconfiguration: (FDD/TDD) to setup E-UTRAN Measurement Configuration

Table H.3.1-1: *RRCConnectionReconfiguration*: E-UTRAN Measurement Configuration

Derivation Path: TS 36.508 [7] clause 4.6.1, Table 4.6.1-8 RRCConnectionReconfiguration			
Information Element	Value/remark	Comment	Condition
RRCConnectionReconfiguration ::= SEQUENCE {			
Rrc-TransactionIdentifier	RRC-TransactionIdentifier-DL		
criticalExtensions CHOICE {			
C1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
measConfig			
	MeasConfig -DEFAULT		MEAS

MeasConfig-DEFAULT (FDD/TDD) E-UTRAN measurment configuration for intra frequency measurment

Table H.3.1-2: *MeasConfig-DEFAULT*: E-UTRAN intra frequency measurement configuration

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 *MeasConfig-DEFAULT*:			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
oAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-GENERIC(f1)		

}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModList SEQUENCE (SIZE (1..maxReportConfigId))OF SEQUENCE {			
reportConfigId	idReportConfig-A3		
reportConfig	ReportConfigEUTRA-A3		
}			
measIdToRemoveList	Not present		
measIdToAddModList SEQUENCE (SIZE (1..maxMeasId)) of SEQUENCE {			
measId	1		
measObjectId	IdMeasObject-f1		
reportConfigId	idReportConfig-A3		
}			
quantityConfig	Not present		
measGapConfig	Not present		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

MeasConfig-DEFAULT (FDD/TDD) E-UTRAN measurment configuration for inter frequency measurment

Table H.3.1-3: *MeasConfig-DEFAULT*: E-UTRAN inter frequency measurement configuration

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 *MeasConfig-DEFAULT*:			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f2		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-GENERIC(f2)	inter frequency	
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModList SEQUENCE (SIZE (1..maxReportConfigId))OF SEQUENCE {			
reportConfigId	idReportConfig-A3		
reportConfig	ReportConfigEUTRA-A3		
}			
measIdToRemoveList	Not present		
measIdToAddModList SEQUENCE (SIZE (1..maxMeasId)) of SEQUENCE {			
measId	1		
measObjectId	IdMeasObject-f2		
reportConfigId	idReportConfig-A3		
}			
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

MeasConfig-DEFAULT (FDD/TDD) E-UTRAN measurment configuration for E-UTRAN to UTRAN cell search

Table H.3.1-4: *MeasConfig-DEFAULT*: interRAT UTRAN measurement configuration for E-UTRAN to UTRAN cell search

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 *MeasConfig-DEFAULT*:			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f8		
measObject CHOICE {			
measObjectUTRA	MeasObjectUTRA-GENERIC(f8)	UTRA Cell	
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModList SEQUENCE (SIZE (1..maxReportConfigId))OF SEQUENCE {			
reportConfigId	idReportConfig-B1		
reportConfig	ReportConfigInterRAT-B1-UTRA		
}			
measIdToRemoveList	Not present		
measIdToAddModList SEQUENCE (SIZE (1..maxMeasId)) of SEQUENCE {			
measId	1		
measObjectId	IdMeasObject-f8		
reportConfigId	idReportConfig-B1		
}			
quantityConfig	QuantityConfig-DEFAULT		
measGapConfig	MeasGapConfig-GP2		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

MeasConfig-DEFAULT (FDD/TDD) E-UTRAN measurment configuration for E-UTRAN to UTRAN handover

Table H.3.1-5: *MeasConfig-DEFAULT*: interRAT UTRAN measurement configuration for E-UTRAN to UTRAN handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 *MeasConfig-DEFAULT*:			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f8		
measObject CHOICE {			
measObjectUTRA	MeasObjectUTRA-GENERIC(f8)	UTRA Cell	
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModList	ReportConfigInterRAT-B2-UTRA		
measIdToRemoveList	Not present		
measIdToAddModList	Not present		
quantityConfig	QuantityConfig-DEFAULT		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

MeasConfig-DEFAULT (FDD/TDD) E-UTRAN measurment configuration for E-UTRAN to GSM cell search

Table H.3.1-6: *MeasConfig-DEFAULT*: interRAT GSM measurement configuration for E-UTRAN to GSM cell search

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 *MeasConfig-DEFAULT*:			
Information Element	**Value/remark**	**Comment**	**Condition**
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f13		
measObject CHOICE {			
measObjectGERAN	MeasObjectGERAN-GENERIC(f13)	GERAN Cell	
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModList SEQUENCE (SIZE (1..maxReportConfigId))OF SEQUENCE {			
reportConfigId	idReportConfig-B1		
reportConfig	ReportConfigInterRAT-B1-GERAN		
}			
measIdToRemoveList	Not present		
measIdToAddModList SEQUENCE (SIZE (1..maxMeasId)) of SEQUENCE {			
measId	1		
measObjectId	IdMeasObject-f13		
reportConfigId	idReportConfig-B1		
}			
quantityConfig	QuantityConfig-DEFAULT		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
mbsfn-NeighbourCellConfig	Not present		
speedDependentParameters	Not present		
}			

H.3.2 RRC messages and information elements contents exceptions for E-UTRAN cell re-selection and handover

PRACH-ConfCommonDEFAULT: (FDD) for cell re-selection and handover

Table H.3.2-1: *PRACH-ConfCommonDEFAULT*: E-UTRAN FDD cell re-selection and handover

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-7 PRACH-ConfCommonDEFAULT			
Information Element	Value/remark	Comment	Condition
PRACH-ConfigInfo SEQUENCE {			
prach-ConfigIndex	4		

PRACH-ConfCommonDEFAULT: (TDD) for cell re-selection and intra frequency / inter frequency handover

Table H.3.2-2: *PRACH-ConfCommonDEFAULT*: E-UTRAN TDD cell re-selection and handover

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-7 PRACH-ConfCommonDEFAULT			
Information Element	Value/remark	Comment	Condition
PRACH-ConfigInfo SEQUENCE {			
prach-ConfigIndex	53		

RRCConnectionReconfiguration: (FDD/TDD) to setup E-UTRAN intra frequency and inter frequency handover

Table H.3.2-3: *RRCConnectionReconfiguration*: E-UTRAN handover

Derivation Path: TS 36.508 [7] clause 4.6.1, Table 4.6.1-8 RRCConnectionReconfiguration			
Information Element	Value/remark	Comment	Condition
RRCConnectionReconfiguration ::= SEQUENCE {			
rrc-TransactionIdentifier	RRC-TransactionIdentifier-DL		
criticalExtensions CHOICE {			
C1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
mobilityControlInfo	Present		
	MobilityControlInfo-HO		HO

H.3.3 RRC messages and information elements contents exceptions for E-UTRAN inter-RAT handover

Handover: (FDD/TDD) to perform Inter-RAT E-UTRAN – UTRAN handover

Table H.3.3-1: *Handover*: Inter-RAT E-UTRAN – UTRAN handover

Derivation Path: 36.331 clause 6.2.2			
Information Element	Value/remark	Comment	Condition
Handover ::= SEQUENCE {			
targetRAT-Type	utra	ENUMERATED {utra, geran, cdma2000-1XTT, cdma2000-HRPD, spare4, spare3, spare2, spare1, …}	

Handover: (FDD/TDD) to perform Inter-RAT E-UTRAN – GSM handover

Table H.3.3-2: *Handover*: Inter-RAT E-UTRAN – GSM handover

Derivation Path: 36.331 clause 6.2.2			
Information Element	Value/remark	Comment	Condition
Handover ::= SEQUENCE {			
targetRAT-Type	geran	ENUMERATED {utran, geran, cdma2000-1XTT, cdma2000-HRPD, spare4, spare3, spare2, spare1, …}	

MobilityFromEUTRACommand: (FDD/TDD) to setup Inter-RAT E-UTRAN handover

Table H.3.3-3: *MobilityFromEUTRACommand*: Inter-RAT E-UTRAN handover

Derivation Path: TS 36.508 [7] clause 4.6.1, Table 4.6.1-6 MobilityFromEUTRACommand			
Information Element	Value/remark	Comment	Condition
MobilityFromEUTRACommand ::= SEQUENCE {			
rrc-TransactionIdentifier	RRC-TransactionIdentifier-DL		
criticalExtensions CHOICE {			
c1 CHOICE {			
mobilityFromEUTRACommand-r8 SEQUENCE {			
csFallbackIndicator	Not present		
purpose CHOICE {			
Handover	Handover		
}			
nonCriticalExtension SEQUENCE {}	Not present		
}			
}			
}			
}			

H.3.4 RRC messages and information elements exceptions for E-UTRAN UE transmit timing accuracy and UE timing advance adjustment accuracy

RRCConnectionReconfiguration: (FDD/TDD) to establish E-UTRAN Radio Resource Configuration

Table H.3.4-1: *RRCConnectionReconfiguration*: E-UTRAN Radio Resource Configuration

Derivation Path: TS 36.508 [7] clause 4.6.1, Table 4.6.1-8 RRCConnectionReconfiguration			
Information Element	Value/remark	Comment	Condition
RRCConnectionReconfiguration ::= SEQUENCE {			
Rrc-TransactionIdentifier	RRC-TransactionIdentifier-DL		
criticalExtensions CHOICE {			
C1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
…			
radioResourceConfigDedicated			
	RadioResourceConfigDedicated-SRB1-SRB2-DRB(n, m)		SRB1-SRB2-DRB(n,m)

PhysicalConfigDedicated-DEFAULT: (FDD/TDD) for E-UTRAN Physical Configuration

Table H.3.4-2: *PhysicalConfigDedicated-DEFAULT*: E-UTRAN Physical Configuration

Derivation Path: TS 36.508 [7] clause 4.8.21.6, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
soundingRS-UL-ConfigDedicated			SRB1
	SoundingRS-UL-ConfigDedicated-DEFAULT		RBC
antennaInformation CHOICE {			
defaultValue	NULL		
}			
schedulingRequestConfig	Not present		SRB1

H.3.5 RRC messages and information elements contents exceptions for E-UTRAN RSRP and RSRQ Accuracy

MeasConfig: (FDD/TDD) to perform Measurement Configuration for E-UTRAN intra frequency RSRP and RSRQ accuracy

Table H.3.5-1: *MeasConfig-DEFAULT*: E-UTRAN intra frequency RSRP and RSRQ Accuracy

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	Value/remark	Comment	Condition
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f1	f 1 is the frequency of the serving cell	
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-GENERIC(f1)		
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModList SEQUENCE (SIZE (1..maxReportConfigId))OF SEQUENCE {			
reportConfigId	idReportConfig-P		
reportConfig	ReportConfigEUTRA-PERIODICAL		
}			
measIdToRemoveList	Not present		
measIdToAddModList SEQUENCE (SIZE (1..maxMeasId)) of SEQUENCE {			
measId	1		
measObjectId	IdMeasObject-f1		
reportConfigId	idReportConfig-P		
}			
quantityConfig	Not present		
measGapConfig	Not present		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
}			

MeasConfig: (FDD/TDD) perform Measurement Configuration for E-UTRAN inter frequency RSRP and RSRQ accuracy

Table H.3.5-2: *MeasConfig-DEFAULT*: E-UTRAN inter frequency RSRP and RSRQ Accuracy

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-1 MeasConfig-DEFAULT			
Information Element	Value/remark	Comment	Condition
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f2	f 2 is the frequency of the neigbouring cell	
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-GENERIC(f2)		
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModList SEQUENCE (SIZE (1..maxReportConfigId))OF SEQUENCE {			
reportConfigId	idReportConfig-P		
reportConfig	ReportConfigEUTRA-PERIODICAL		
}			
measIdToRemoveList	Not present		
measIdToAddModList SEQUENCE (SIZE (1..maxMeasId)) of SEQUENCE {			
measId	1		
measObjectId	IdMeasObject-f2		
reportConfigId	idReportConfig-P		
}			
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
}			

ReportConfigEUTRA-PEROIDICAL: (FDD/TDD) for periodical configuration reporting of E-UTRAN RSRP accuracy

Table H.3.5-3: *ReportConfigEUTRA-PERIODICAL*: E-UTRAN RSRP Accuracy

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7 ReportConfigEUTRA-PERIODICAL			
Information Element	Value/remark	Comment	Condition
ReportConfigEUTRA-PERIODICAL ::= SEQUENCE {			
triggerType CHOICE {			
periodical SEQUENCE {			
purpose CHOICE {			
reportStrongestCells	NULL		
}			
}			
}			
triggerQuantity	Rsrp		
reportQuantity	sameAsTriggerQuantity		
maxReportCells	1		
reportInterval	ms1024 (1024 ms)		
reportAmount	Infinity		
}			

ReportConfigEUTRA-PEROIDICAL: (FDD/TDD) for periodical configuration reporting of E-UTRAN RSRQ accuracy

Table H.3.5-4: *ReportConfigEUTRA-PERIODICAL*: E-UTRAN RSRQ Accuracy

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7 ReportConfigEUTRA-PERIODICAL			
Information Element	Value/remark	Comment	Condition
ReportConfigEUTRA-PERIODICAL ::= SEQUENCE {			
triggerType CHOICE {			
periodical SEQUENCE {			
purpose CHOICE {			
reportStrongestCells	NULL		
}			
}			
}			
triggerQuantity	Rsrq		
reportQuantity	sameAsTriggerQuantity		
maxReportCells	1		
reportInterval	ms1024 (1024 ms)		
reportAmount	Infinity		
}			

H.3.6 RRC messages and information elements contents exceptions for E-UTRAN inter frequency handover and E-UTRAN intra frequency cell search

MAC-MainConfig-RBC: (FDD/TDD) to perform DRX Configuration for E-UTRAN – inter-frequency handover and E-UTRAN intra-frequency cell search with DRX_S

Table H.3.6-1: *MAC-MainConfig-RBC*: E-UTRAN inter frequency handover and E-UTRAN intra frequency cell search with DRX_S

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
setup SEQUENCE {			
onDurationTimer	psf2		
drx-InactivityTimer	psf100		
drx-RetransmissionTimer	sf16		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for best-effort services.	
sf40	0		
}			
shortDRX	Not present		
}			
}			

MAC-MainConfig-RBC: (FDD/TDD) to perform DRX Configuration for E-UTRAN – inter-frequency handover and E-UTRAN intra-frequency cell search with DRX_L

Table H.3.6-2: *MAC-MainConfig-RBC*: E-UTRAN inter frequency handover and E-UTRAN intra frequency cell search with DRX_L

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_L
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	psf6		
drx-InactivityTimer	psf1920		
drx-RetransmissionTimer	sf16		
longDRX-CycleStartOffset CHOICE {		sf1280 typical value in real network for best-effort services.	
sf1280	0		
}			
shortDRX	Not present		
}			
}			

H.3.7 RRC messages and information elements contents exceptions for E-UTRAN inter frequency and E-UTRAN inter-RAT cell search when DRX is used

MAC-MainConfig-RBC: (FDD/TDD) to perform DRX Configuration for E-UTRAN – inter-frequency and E-UTRAN inter-RAT cell search when DRX = 40 ms

Table H.3.7-1: *MAC-MainConfig-RBC*: E-UTRAN inter frequency cell search and E-UTRAN intra frequency cell search when DRX = 40 ms

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	sf1		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
sf40	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	sf500		

MAC-MainConfig-RBC: (FDD/TDD) to perform DRX Configuration for E-UTRAN – inter-frequency and E-UTRAN inter-RAT cell search when DRX = 1280 ms

Table H.3.7-2: *MAC-MainConfig-RBC*: E-UTRAN inter frequency and E-UTRAN inter-RAT cell search when DRX = 1280 ms

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC			
Information Element	**Value/remark**	**Comment**	**Condition**
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_L
Release	NULL		
Setup SEQUENCE {			
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	sf1		
longDRX-CycleStartOffset CHOICE {		sf1280 typical value in real network for best-effort services.	
sf1280	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	sf500		

PhysicalConfigDedicated-DEFAULT: (FDD/TDD) to perform DRX Configuration for E-UTRAN – inter-frequency and E-UTRAN inter-RAT cell search

Table H.3.7-3: *PhysicalConfigDedicated-DEFAULT*: E-UTRAN inter frequency and E-UTRAN inter-RAT cell search

Derivation Path: TS 36.508 [7] clause 4.8.2.1.6, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
…			
schedulingRequestConfig	SchedulingRequest-Config-DEFAULT		
}			

Annex I: Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2008-06	RAN5#39bis	R5-082129			R5-082129: Restructure of TS 36.521-1 and RRM proposal (Split of RRM from 36.521-1 v0.2.0 in its own specification 36.521-3 v0.1.0)		0.1.0
2008-06	*RAN5#39bis*	*R5-082174*			Following approved TPs have been included: R5-082129: Restructure of TS 36.521-1 and RRM proposal (Split of RRM from 36.521-1 v0.2.0 in its own specification 36.521-3 v0.1.0) R5-082160: Cover for LTE E-UTRAN RRC_IDLE State Mobility text proposal R5-082161: Cover for LTE E-UTRAN RRC_CONNECTED State Mobility text proposal R5-082162: Update of 36.521-1: Introduction of HRPD and CDMA2000 in RRM test cases R5-082163: Cover for LTE UE Transmit Timing Requirements text proposal Editorial changes for Annexes	*0.1.0*	*0.2.0*
2008-08	RAN5#40	R5-083164			Following approved TPs have been included: R5-083051: LTE E-UTRAN RRC_IDLE State Mobility text proposal R5-083052: LTE E-UTRAN RRC_CONNECTED State Mobility text proposal R5-083053: LTE UE Transmit Timing Requirements text proposal R5-083054: LTE UE Measurement Procedures text proposal R5-083813: LTE UE Measurement Performance Requirements text proposal R5-083138: Text proposal for LTE E-UTRAN Cell Re-selection to HRPD or to cdma2000 1xRTT in TS 36.521-3 R5-083056: RRC Connection Mobility Control text proposal R5-083164: LTE-RF 36-521-3 after RAN5#40 Editorial restructuring to section 4	0.2.0	0.3.0
2008-10	RAN5#40Bis	R5-084073			Following approved TPs have been included: R5-084073: TS 36.521-3 after RAN5#40Bis R5-084079: LTE Cell Re-Selection text proposal R5-084322: LTE FDD/FDD Handover for intra/inter frequency text proposal	0.3.0	0.4.0
2008-11	RAN5#41	R5-085084			Following approved TPs have been included: R5-085084 LTE-RF: TS 36.521-3 after RAN5#41 R5-085718 LTE RRM Cell Re-Selection text proposal R5-085719 LTE RRM FDD/FDD Handover for intra/inter frequency text proposal R5-085720 E-UTRAN FDD intra-frequency measurements text proposal R5-085740 RSRQ Accuracy Measurement Performance Requirements text proposal R5-085722 Text Proposal for Cell Configuration mapping annex in 36.521-3 Editor’s cleanup	0.4.0	0.5.0
2009-01	RAN5#41Bis	R5-086067			Following approved TPs have been included: R5-086067 LTE-RF: TS 36.521-3 after RAN5#41Bis R5-086149 References to connection diagrams R5-086418 LTE RRM Cell Re-Selection text proposal R5-086095 Cell configuration reference correction for RRM tests in 36.521-3 section 3A.3 R5-086419 LTE RRM FDD/FDD Handover for intra/inter frequency text proposal R5-086420 E-UTRAN FDD intra-frequency measurements text proposal R5-086431 RSRQ Accuracy Measurement Performance Requirements text proposal R5-086082 LTE UE Transmit Timing Requirements text proposal R5-086422 Text proposal for RSRP measurement accuracy test cases R5-086432 E-UTRAN FDD- FDD Inter-Frequency Measurements text proposal	0.5.0	0.6.0

					R5-086142 Measurement Reference Channels and OCNG for RRM testing R5-086150 Statistical testing in RRM tests Editor's cleanup		
2009-03	RAN5#42	R5-090191			Following approved TPs have been included: R5-091026 TDD Intra frequency RSRQ Accuracy R5-091085 TDD Inter frequency RSRQ Accuracy R5-091035 LTE RRM FDD/FDD Handover for intra/inter frequency text proposal R5-091047 E-UTRAN FDD intra-frequency measurements text proposal R5-091029 RSTQ Accuracy Measurement Performance Requirements text proposal R5-091041 LTE RRM E-UTRA FDD to GSM Cell Re-Selection text proposal R5-091040 LTE RRM E-UTRA FDD to GSM Handover text proposal R5-090182 LTE UE Measurement Procedures Structure text proposal R5-091048 LTE RRM E-UTRA FDD to UTRA FDD Cell Search text proposal R5-090184 LTE UE inter-RAT Handover Structure text proposal R5-091039 LTE RRM E-UTRA FDD to UTRA FDD Handover text proposal R5-091053 LTE UE Transmit Timing Requirements text proposal R5-090191 LTE-RF: TS 36.521-3 after RAN5#42 R5-091091 Intra-frequency cell search TDD R5-091088 Intra-frequency Absolute RSRP measruement accuracy TDD R5-091090 Intra-frequency Relative RSRP measruement accuracy TDD R5-091089 Inter-frequency RSRP absolute accuracy TDD R5-091087 Inter-frequency RSRP relative accuracy TDD R5-091028 Text Proposal for RSRP Measurement Accuracy test cases R5-091076 Text Proposal for Annex C of TS 36.521-3 R5-091051 TP of E-UTRAN TDD & GSM cell re-selection test case R5-091043 TP of E-UTRAN TDD & TDD inter frequency cell re-selection test case R5-091036 TP of E-UTRAN TDD & TDD inter frequency handover test case R5-091044 TP of E-UTRAN TDD - TDD intra frequency cell re-selection test case R5-091038 TP of E-UTRAN TDD & TDD intra frequency handover test case R5-091045 TP of E-UTRAN TDD & UTRAN TDD cell re-selection test case R5-091049 E-UTRAN FDD- FDD Inter-Frequency Measurements text proposal R5-091050 E-UTRAN TDD- TDD Inter-Frequency Measurements text proposal R5-091052 LTE-RF: Update to 36.521-3 Annex E Cell Configuration mapping R5-091064 Correction to frequencies to be tested in RRM test cases R5-091042 LTE RRM Cell Re-Selection text proposal Editor's cleanup	0.6.0	1.0.0
2009-03	RAN5#42Bis				R5-091263 LTE-RRM Cell Re-Selection text proposal R5-091922 LTE-RRM E-UTRA FDD to GSM Cell Re-Selection text proposal R5-091923 LTE-RRM E-UTRA FDD - UTRA TDD Cell Re-Selection text proposal R5-091924 TP of E-UTRA TDD – GSM cell reselection R5-091945 TP of E-UTRA TDD-UTRAN TDD cell re-selection : UTRA is of higher priority R5-091926 TP of E-UTRA TDD – UTRA TDD cell reselection: UTRA is of lower priority test case R5-091264 LTE-RRM FDD/FDD Handover for intra/inter frequency text proposal R5-091931 LTE-RRM E-UTRA FDD to GSM Handover text proposal R5-091928 LTE-RRM E-UTRA FDD to UTRA FDD Handover text proposal	1.0.0	1.1.0

					R5-091946 LTE-RRM: E-UTRA TDD to UTRA FDD Handover text proposal R5-091947 LTE-RRM: Handover test proposal R5-091930 TP of E-UTRA TDD to UTRA TDD handover test case R5-091265 LTE-RRM E-UTRAN FDD intra-frequency measurements text proposal R5-091266 LTE-RRM RSRQ Accuracy Measurement Performance Requirements text proposal R5-091932 LTE-RRM E-UTRA FDD to UTRA FDD Cell Search (fading) text proposal R5-091933 LTE-RRM E-UTRAN FDD & UE Transmit Timing Accuracy text proposal R5-091276 LTE-RRM E-UTRAN FDD & UE Timing Advance Adjustment Accuracy text proposal R5-091934 LTE-RRM: E-UTRA TDD to UTRA FDD Cell Search (fading) text proposal R5-091935 LTE-RRM E-UTRAN TDD & UE Transmit Timing Accuracy text proposal R5-091936 LTE-RRM E-UTRAN TDD & UE Timing Advance Adjustment Accuracy text proposal R5-091937 LTE-RRM E-UTRA FDD to UTRA TDD Cell Search (fading) text proposal R5-091381 EUTRAN TDD to UTRAN TDD cell search (fading) R5-091386 LTE RRM TDD Inter Frequency RSRP Accuracy text proposal R5-091398 Text Proposal for RSRP Measurement Accuracy test cases R5-091948 LTE-RRM: Measurements test proposal R5-091431 RRM-EUTRAN FDD RLM test for out-of-sync R5-091434 RRM-EUTRAN TDD RLM test for out-of-sync R5-091435 RRM-EUTRAN FDD RLM test for In-sync R5-091436 RRM-EUTRAN TDD RLM test for In-sync R5-091468 RRM E-UTRAN FDD-FDD Inter-frequency Measurements R5-091469 RRM E-UTRAN TDD-TDD Inter-frequency Measurements R5-091939 LTE-RRM cell configuration mapping updates R5-091407 Update of statistical requirements to 36.521-3 Editor's cleanup		
2009-05	RAN5#43	R5-092156			R5-092156 LTE-RF: TS 36.521-3 after RAN5#43 R5-092066 E-UTRAN FDD- FDD Inter-Frequency Measurements text proposal R5-092617 RRM E-UTRAN TDD-TDD Inter-frequency Measurement R5-092068 RRM-EUTRAN FDD RLM test for out-of-sync and in-synch R5-092069 RRM-EUTRAN TDD RLM test for out-of-sync and in-synch R5-092071 Reference measurement Channels for Radio Link Monitoring Tests with 2 Antennas R5-092127 Update of statistical requirements to 36.521-3 R5-092630 LTE RRM: 1→2 RX antenna R5-092618 Text Proposal for E-UTRAN FDD-UTRAN FDD cell re-selection test cases R5-092651 Text Proposal for E-UTRAN FDD – GSM Measurements test case R5-092620 LTE-RRM E-UTRA TDD to GSM event triggered reporting in AWGN text proposal R5-092360 LTE RRM TDD Inter Frequency RSRP Accuracy text proposal R5-092621 LTE-RRM Default Message Contents for support of RRM text proposal R5-092384 LTE-RRM Update of Message Contents for E-UTRAN FDD RRM tests to align with support of RRM text proposal R5-092622 LTE-RRM E-UTRAN FDD Cell Re-Selection text proposal R5-092386 LTE-RRM FDD Inter Frequency RSRQ Accuracy Measurement Performance Requirements text proposal R5-092387 LTE-RRM E-UTRA FDD to GSM Cell Re-Selection text proposal R5-092623 LTE-RRM E-UTRAN FDD intra frequency cell search (fading) in long DRX text proposal R5-092624 LTE-RRM E-UTRAN FDD intra frequency cell search (fading) in short DRX text proposal R5-092390 LTE-RRM E-UTRAN FDD - UE Transmit Timing	1.1.0	2.0.0

					Accuracy text proposal R5-092626 LTE-RRM E-UTRAN FDD random access: contention based scenario text proposal R5-092627 LTE-RRM E-UTRAN FDD random access: non-contention based scenario text proposal R5-092628 LTE-RRM E-UTRA FDD to HRPD Handover text proposal R5-092629 LTE-RRM E-UTRA FDD to cdma2000 1xRTT Handover text proposal R5-092443 Addition of band 18 and 19 to LTE RRM test cases Editor's cleanup		
2009-05	RAN#44	-	-		Updated to v8.0.0 after RAN#44 with no technical change.	2.0.0	8.0.0
2009-06	-	-	-		Editorial clean up	8.0.0	8.0.1
2009-09	RAN#45	R5-094036	0001	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN (FDD) cell re-selection tests	8.0.1	8.1.0
2009-09	RAN#45	R5-094037	0002	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - FDD Inter Frequency Handover test	8.0.1	8.1.0
2009-09	RAN#45	R5-094038	0003	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - FDD Intra Frequency Cell Search test	8.0.1	8.1.0
2009-09	RAN#45	R5-094039	0004	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - UE transmit timing accuracy test	8.0.1	8.1.0
2009-09	RAN#45	R5-094040	0005	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - GSM cell re-selection test	8.0.1	8.1.0
2009-09	RAN#45	R5-094041	0006	-	Correction CR to 36.521-3: Update of Requirements conditions for E-UTRAN FDD - UE timing advance adjustment accuracy test	8.0.1	8.1.0
2009-09	RAN#45	R5-094042	0007	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - GSM Handover test	8.0.1	8.1.0
2009-09	RAN#45	R5-094043	0008	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - UTRAN FDD Handover test	8.0.1	8.1.0
2009-09	RAN#45	R5-094045	0009	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - GSM Cell Search test	8.0.1	8.1.0
2009-09	RAN#45	R5-094047	0010	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - Contention Based Random Access test	8.0.1	8.1.0
2009-09	RAN#45	R5-094048	0011	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - Non-Contention Based Random Access test	8.0.1	8.1.0
2009-09	RAN#45	R5-094049	0012	-	Addition of test scenario CR to 36.521-3: E-UTRAN FDD-FDD Inter-frequency cell search when DRX is used under fading propagation conditions	8.0.1	8.1.0
2009-09	RAN#45	R5-094050	0013	-	Correction CR to 36.521-3: Update of E-UTRAN FDD-FDD Intra-frequency cell search when DRX is used under fading propagation conditions	8.0.1	8.1.0
2009-09	RAN#45	R5-094051	0014	-	Correction CR to 36.521-3: Update of Annex H Default Message Contents for support of RRM	8.0.1	8.1.0
2009-09	RAN#45	R5-094217	0015	-	Update for E-UTRA FDD - UTRA TDD cell reselection	8.0.1	8.1.0
2009-09	RAN#45	R5-094218	0016	-	Test proposal for E-UTRA FDD - UTRA TDD HO	8.0.1	8.1.0
2009-09	RAN#45	R5-094219	0017	-	Test proposal for E-UTRA TDD random access: contention based scenario	8.0.1	8.1.0
2009-09	RAN#45	R5-094220	0018	-	Test proposal for E-UTRA TDD random access: non-contention based scenario	8.0.1	8.1.0
2009-09	RAN#45	R5-094221	0019	-	Update for TDD Intra-frequency RSRQ measurement accuracy	8.0.1	8.1.0
2009-09	RAN#45	R5-094222	0020	-	Update for TDD Inter-frequency RSRQ measurement accuracy	8.0.1	8.1.0
2009-09	RAN#45	R5-094223	0021	-	Update for E-UTRAN TDD Transmit timing accuracy	8.0.1	8.1.0
2009-09	RAN#45	R5-094225	0022	-	Update for E-UTRA FDD - UTRA TDD cell search(fading)	8.0.1	8.1.0
2009-09	RAN#45	R5-094253	0023	-	CR to 36.521-3: Addition of E-UTRAN FDD Intra-frequency RRC Re-establishment	8.0.1	8.1.0
2009-09	RAN#45	R5-094254	0024	-	CR to 36.521-3: Addition of E-UTRAN FDD Inter-frequency RRC Re-establishment	8.0.1	8.1.0
2009-09	RAN#45	R5-094285	0025	-	LTE-RRM: Introduction of Common Exception messages table for E-UTRAN TDD-UTRAN FDD handover and E-UTRAN TDD-UTRAN FDD measurements	8.0.1	8.1.0
2009-09	RAN#45	R5-094358	0026	-	Correction to RSRP measurement accuracy test cases	8.0.1	8.1.0
2009-09	RAN#45	R5-094442	0027	-	CR to 36.521-3: Update of E-UTRA FDD to HRPD Handover and E-UTRA FDD to cdma2000 1xRTT Handover test cases	8.0.1	8.1.0
2009-09	RAN#45	R5-094709	0028	-	LTE RRM: Correction to test cases 4.4.1 and 4.4.2	8.0.1	8.1.0
2009-09	RAN#45	R5-094713	0029	-	Resubmission - Update to E-UTRAN to HRPD Cell Re-Selection (HRPD is of lower priority) test case	8.0.1	8.1.0
2009-09	RAN#45	R5-094720	0030	-	Resubmission - Update to E-UTRAN to CDMA2000 1xRTT Cell Re-Selection (CDMA2000 1xRTT is of lower priority) test case	8.0.1	8.1.0
2009-09	RAN#45	R5-094743	0031	-	RRM TCs in test mode	8.0.1	8.1.0
2009-09	RAN#45	R5-094927	0032	-	Correction CR to 36.521-3: Update of inter-frequency E-UTRAN TDD-TDD cell re-selection 4.2.6	8.0.1	8.1.0
2009-09	RAN#45	R5-094928	0033	-	Correction CR to 36.521-3: Update of E-UTRAN TDD -	8.0.1	8.1.0

					UTRAN TDD cell re-selection 4.3.4		
2009-09	RAN#45	R5-094929	0034	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - UTRAN FDD cell re-selection test	8.0.1	8.1.0
2009-09	RAN#45	R5-094930	0035	-	LTE-RRM:Addition of common messages to Annex H	8.0.1	8.1.0
2009-09	RAN#45	R5-094931	0036	-	Test Proposal for E-UTRAN TDD Intra-frequency RRC Re-establishment	8.0.1	8.1.0
2009-09	RAN#45	R5-094932	0037	-	Test Proposal for E-UTRAN TDD Inter-frequency RRC Re-establishment	8.0.1	8.1.0
2009-09	RAN#45	R5-094933	0038	-	Update for E-UTRAN TDD Timing advanced adjustment accuracy	8.0.1	8.1.0
2009-09	RAN#45	R5-094934	0039	-	Correction CR to 36.521-3: Update of Requirements for E-UTRAN FDD - UTRAN FDD Cell Search test	8.0.1	8.1.0
2009-09	RAN#45	R5-094935	0040	-	E-UTRA TDD - TDD Intra frequency cell search with DRX	8.0.1	8.1.0
2009-09	RAN#45	R5-094936	0041	-	TDD - TDD RSRP measurement	8.0.1	8.1.0
2009-09	RAN#45	R5-094937	0042	-	Update 8.10.1 E-UTRAN TDD-GSM event triggered reporting in AWGN	8.0.1	8.1.0
2009-09	RAN#45	R5-094938	0043	-	Add new tc 8.10.2 EUTRAN TDD-GSM cell search with DRX	8.0.1	8.1.0
2009-09	RAN#45	R5-094939	0044	-	Add new tc 8.7.2 EUTRAN TDD - UTRAN TDD cell search with DRX	8.0.1	8.1.0
2009-09	RAN#45	R5-094940	0045	-	E-UTRA TDD - TDD Inter frequency cell search with DRX	8.0.1	8.1.0
2009-09	RAN#45	R5-094942	0046	-	Update to Annex E Cell Configuration Mapping	8.0.1	8.1.0
2009-09	RAN#45	R5-094967	0047	-	RRM Radio Link Monitoring FDD update	8.0.1	8.1.0
2009-09	RAN#45	R5-094968	0048	-	RRM Radio Link Monitoring TDD update	8.0.1	8.1.0
2009-09	RAN#45	R5-094969	0050	-	RRM: E-UTRAN FDD - UTRAN FDD SON ANR cell search reporting	8.0.1	8.1.0
2009-09	RAN#45	R5-094970	0051	-	CR to 36.521-3:Message updates for RSRP and RSRQ Accuracy measurement	8.0.1	8.1.0
2009-09	RAN#45	R5-094971	0052	-	RRM OCNG and RMC update	8.0.1	8.1.0
2009-09	RAN#45	R5-094972	0053	-	RRM:Update of Annex E for SON	8.0.1	8.1.0
2009-12	RAN#46	R5-095492	0054	-	Removal of test state 4 in RRM test cases	8.1.0	8.2.0
2009-12	RAN#46	R5-095493	0055	-	CR to 36.521-3 Annexs of E-UTRAN cell reselection test cases	8.1.0	8.2.0
2009-12	RAN#46	R5-095499	0056	-	CR for E-UTRAN FDD - UTRAN TDD handover	8.1.0	8.2.0
2009-12	RAN#46	R5-095501	0057	-	CR for E-UTRAN TDD - UE Transmit Timing Accuracy	8.1.0	8.2.0
2009-12	RAN#46	R5-095503	0058	-	CR for E-UTRAN FDD - UTRAN TDD event triggered reporting under fading propagation conditions	8.1.0	8.2.0
2009-12	RAN#46	R5-095504	0059	-	Correction to TDD RSRP and RSRQ measurement requirements	8.1.0	8.2.0
2009-12	RAN#46	R5-095527	0060	-	Correction CR to 36.521-3: E-UTRAN FDD - FDD cell re-selection intra frequency case and inter frequency case conformance minimum requirements updates	8.1.0	8.2.0
2009-12	RAN#46	R5-095528	0061	-	Correction CR to 36.521-3: E-UTRAN FDD - UTRAN FDD cell re-selection: UTRA FDD is of higher priority and UTRA FDD is of lower priority conformance minimum requirements	8.1.0	8.2.0
2009-12	RAN#46	R5-095529	0062	-	Correction CR to 36.521-3: E-UTRAN FDD - FDD Inter Frequency event triggered reporting under fading propagation conditions in asynchronous cells case	8.1.0	8.2.0
2009-12	RAN#46	R5-095530	0063	-	Correction CR to 36.521-3: E-UTRAN FDD - FDD Inter Frequency event triggered reporting when DRX is used under fading propagation conditions	8.1.0	8.2.0
2009-12	RAN#46	R5-095531	0064	-	Correction CR to 36.521-3: E-UTRAN FDD - FDD Intra Frequency event triggered reporting under fading propagation conditions	8.1.0	8.2.0
2009-12	RAN#46	R5-095537	0065	-	Correction CR to 36.521-3: E-UTRAN FDD - UE Transmit Timing Accuracy case	8.1.0	8.2.0
2009-12	RAN#46	R5-095538	0066	-	Correction CR to 36.521-3: E-UTRAN FDD - FDD inter frequency event triggered reporting when DRX is used	8.1.0	8.2.0
2009-12	RAN#46	R5-095557	0067	-	Correcton CR to 36.521-3: General RRM Updates	8.1.0	8.2.0
2009-12	RAN#46	R5-095572	0068	-	Update TC 8.7.2 E-UTRAN TDD - UTRAN TDD cell search when DRX is used under fading propagation conditions	8.1.0	8.2.0
2009-12	RAN#46	R5-095573	0069	-	Update TC 8.10.2 E-UTRAN TDD - GSM event triggered reporting when DRX is used in AWGN	8.1.0	8.2.0
2009-12	RAN#46	R5-095576	0070	-	Update TC 8.2.1 E-UTRAN TDD - TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells	8.1.0	8.2.0
2009-12	RAN#46	R5-095591	0071	-	update of Annex H.2.3 in 36.521-3	8.1.0	8.2.0
2009-12	RAN#46	R5-095741	0072	-	CR to the inconsistent expression in UE Measurements Procedures	8.1.0	8.2.0
2009-12	RAN#46	R5-095917	0073	-	Update: Radio Link Monitoring test cases: no DRX	8.1.0	8.2.0
2009-12	RAN#46	R5-096145	0074	-	Correction CR to 36.521-3: E-UTRAN FDD - FDD Inter Frequency Absolute RSRP Accuracy case	8.1.0	8.2.0
2009-12	RAN#46	R5-096243	0075	-	Update to RRM TC:E-UTRAN FDD - UTRAN TDD cell re-selection	8.1.0	8.2.0
2009-12	RAN#46	R5-096244	0104	1	Addition of new TC to 36.521-3: E-UTRAN TDD – UTRAN	8.1.0	8.2.0

					FDD cell re-selection test		
2009-12	RAN#46	R5-096246	0105	-	Modification of section 4.2.2 in 36.521-3	8.1.0	8.2.0
2009-12	RAN#46	R5-096247	0106	-	Modification of section 4.2.2 in 36.521-3	8.1.0	8.2.0
2009-12	RAN#46	R5-096255	0076	-	CR to the RA response window's name in Random Access conformance requirements	8.1.0	8.2.0
2009-12	RAN#46	R5-096257	0077	-	Addition of test scenario CR to 36.521-3: E-UTRAN FDD - UTRAN FDD cell re-selection in fading propagation conditions: UTRA FDD is of lower priority	8.1.0	8.2.0
2009-12	RAN#46	R5-096258	0078	1	Addtion of new TC to 36.521-3:E-UTRAN TDD - GSM Handover: Unknown Target Cell	8.1.0	8.2.0
2009-12	RAN#46	R5-096263	0079	1	Add new TC 5.1.6 E-UTRAN TDD - TDD inter frequency handover: unknown target cell	8.1.0	8.2.0
2009-12	RAN#46	R5-096265	0080	-	CR to 36.521-3: Update of E-UTRA FDD to HRPD Handover and E-UTRA FDD to cdma2000 1xRTT Handover test cases	8.1.0	8.2.0
2009-12	RAN#46	R5-096267	0081	-	Addition of test scenario CR to 36.521-3: E-UTRAN FDD - GSM Cell Search when DRX is used	8.1.0	8.2.0
2009-12	RAN#46	R5-096268	0082	-	Addition of test scenario CR to 36.521-3: E-UTRAN FDD - UTRAN FDD Cell Search when DRX is used	8.1.0	8.2.0
2009-12	RAN#46	R5-096269	0083	-	RRM:Update of test case 8.4.1 TDD inter-frequency event triggered reporting	8.1.0	8.2.0
2009-12	RAN#46	R5-096271	0084	-	LTE-RF: Update to Annex E Cell Configuration Mapping	8.1.0	8.2.0
2009-12	RAN#46	R5-096272	0085	-	Correction CR to 36.521-3: Addition of message contents exceptions for E-UTRAN inter frequency and inter-RAT Cell Search for when DRX is used	8.1.0	8.2.0
2009-12	RAN#46	R5-096273	0086	-	Correction CR to 36.521-3: E-UTRAN FDD - UTRA FDD Handover case	8.1.0	8.2.0
2009-12	RAN#46	R5-096274	0087	-	CR to 36.521-3: Update to FDD Intra-frequency RRC Re-establishment test case	8.1.0	8.2.0
2009-12	RAN#46	R5-096275	0088	-	CR to 36.521-3: Update to FDD Inter-frequency RRC Re-establishment test case	8.1.0	8.2.0
2009-12	RAN#46	R5-096276	0107	-	Test Case of E-UTRAN TDD to GSM Handover	8.1.0	8.2.0
2009-12	RAN#46	R5-096296	0089	-	Update TC 8.7.1 E-UTRAN TDD - UTRAN TDD event triggered reporting under fading propagation conditions	8.1.0	8.2.0
2009-12	RAN#46	R5-096302	0090	-	Correction CR to 36.521-3: E-UTRAN FDD - GSM event triggered reporting in AWGN case	8.1.0	8.2.0
2009-12	RAN#46	R5-096303	0091	-	Addition of new TC to 36.521-3: E-UTRAN TDD to E-UTRAN TDD and UTRA TDD cell search test case	8.1.0	8.2.0
2009-12	RAN#46	R5-096310	0092	-	Addition of test scenario CR to 36.521-3: E-UTRAN FDD - UTRAN FDD Handover: Unknown Target Cell	8.1.0	8.2.0
2009-12	RAN#46	R5-096324	0093	-	Addtion of new TC to 36.521-3 E-UTRAN TDD - UTRAN TDD HO test: unknown target cell	8.1.0	8.2.0
2009-12	RAN#46	R5-096325	0094	-	Addition of test scenario CR to 36.521-3: E-UTRAN FDD - FDD inter frequency Handover test cases: Unknown Target Cell	8.1.0	8.2.0
2009-12	RAN#46	R5-096326	0095	-	Addition of test scenario CR to 36.521-3: E-UTRAN FDD - GSM Handover: Unknown Target Cell	8.1.0	8.2.0
2009-12	RAN#46	R5-096327	0096	-	Addition of new TC to 36.521-3: E-UTRAN TDD - E-UTRAN TDD and E-UTRAN TDD Inter-frequency event triggered reporting under fading propagation conditions test case	8.1.0	8.2.0
2009-12	RAN#46	R5-096328	0097	-	E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX	8.1.0	8.2.0
2009-12	RAN#46	R5-096329	0098	-	E-UTRAN FDD Radio Link Monitoring test for in-sync in DRX	8.1.0	8.2.0
2009-12	RAN#46	R5-096330	0099	-	E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX	8.1.0	8.2.0
2009-12	RAN#46	R5-096331	0100	-	E-UTRAN TDD Radio Link Monitoring test for in-sync in DRX	8.1.0	8.2.0
2009-12	RAN#46	R5-096332	0101	-	RRM:Update of test case 8.3.1 FDD inter-frequency event triggered reporting	8.1.0	8.2.0
2009-12	RAN#46	R5-096337	0102	-	Correction CR to 36.521-3: E-UTRAN FDD - FDD Handover intra frequency and inter frequency case	8.1.0	8.2.0
2009-12	RAN#46	R5-096340	0103	-	Introduction of uncertainties for RRM test cases 4.2.1 and 4.2.2	8.1.0	8.2.0
2010-03	RAN#47	R5-100130	0108	-	Test Tolerances and alignment with 36.133 for cell re-selection intra frequency cases	8.2.0	8.3.0
2010-03	RAN#47	R5-100132	0109	-	Uncertainties and Test Tolerances for inter frequency cell re-selection	8.2.0	8.3.0
2010-03	RAN#47	R5-100135	0110	-	Clarification of Extreme conditions for RSRP test cases	8.2.0	8.3.0
2010-03	RAN#47	R5-100362	0113	-	CR about the Cell Search Requirements for LTE FDD-FDD/ TDD-TDD Handover to Unknown Target Cell	8.2.0	8.3.0
2010-03	RAN#47	R5-100365	0114	-	CR on updating the handover delay requriments for E-UTRAN TDD - TDD both intra-frequency and inter-frequency handovers	8.2.0	8.3.0
2010-03	RAN#47	R5-100367	0115	-	CR to correct the test requirements of reselection from E-UTRAN FDD/TDD to UTRAN TDD	8.2.0	8.3.0
2010-03	RAN#47	R5-100394	0116	-	Correction of Annex H about measurement performance	8.2.0	8.3.0

					messages		
2010-03	RAN#47	R5-100401	0117	-	RRM Inter frequency cell search updates, TC 8.3.1 and 8.4.1	8.2.0	8.3.0
2010-03	RAN#47	R5-100438	0118	-	Update TC 8.7.1, 8.9.1 and 8.11.4	8.2.0	8.3.0
2010-03	RAN#47	R5-100460	0119	-	Misc update on 521-3	8.2.0	8.3.0
2010-03	RAN#47	R5-100486	0120	-	CR to 36.521-3: Addition of E-UTRA FDD to HRPD Handover: Unknown Target Cell and E-UTRA FDD to cdma2000 1xRTT Handover: Unknown Target Cell test cases	8.2.0	8.3.0
2010-03	RAN#47	R5-100519	0121	-	Correction to RSRP Accuracy test cases	8.2.0	8.3.0
2010-03	RAN#47	R5-100546	0122	-	CR to 36.521-3: Update to E-UTRAN FDD RRC Re-establishment test cases	8.2.0	8.3.0
2010-03	RAN#47	R5-100562	0123	-	CR to 36.521-3: Update LTE RRM test cases with test requirements for extended LTE1500	8.2.0	8.3.0
2010-03	RAN#47	R5-100714	0124	-	Addition of missing Es/Noc parameters in RRM test cases	8.2.0	8.3.0
2010-03	RAN#47	R5-100715	0125	-	Correction to GSM measurement configuration in Annex H.3.1	8.2.0	8.3.0
2010-03	RAN#47	R5-100716	0126	-	Update on Annex C for 36.521-3	8.2.0	8.3.0
2010-03	RAN#47	R5-100849	0127	-	Text on exclusion of extra delay due to RRC retransmission	8.2.0	8.3.0
2010-03	RAN#47	R5-100850	0128	-	Correction to test iteration procedure in cell re-selection TCs	8.2.0	8.3.0
2010-03	RAN#47	R5-100852	0129	-	DL Mac Padding for RRM TCs	8.2.0	8.3.0
2010-03	RAN#47	R5-100853	0130	-	Update TC 5.1.6 E-UTRAN TDD-TDD inter frequency handover unknown target cell	8.2.0	8.3.0
2010-03	RAN#47	R5-100854	0131	-	New RRM test case, 8.7.3 E-UTRAN TDD SON ANR	8.2.0	8.3.0
2010-03	RAN#47	R5-100859	0132	-	Update TC 8.2.2 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells with DRX	8.2.0	8.3.0
2010-03	RAN#47	R5-100860	0133	-	Update TC 8.2.1 E-UTRAN TDD-TDD intra-frequency event triggered reporting under fading propagation conditions in synchronous cells	8.2.0	8.3.0
2010-03	RAN#47	R5-100861	0134	-	Update TC 8.4.2 E-UTRAN TDD-TDD Inter-frequency event triggered reporting when DRX is used under fading propagation conditions in synchronous cells	8.2.0	8.3.0
2010-03	RAN#47	R5-100862	0135	-	Misc update on test applicability	8.2.0	8.3.0
2010-03	RAN#47	R5-100865	0136	-	CR about corrections of PDSCH Reference Measurement Channels	8.2.0	8.3.0
2010-03	RAN#47	R5-100866	0137	-	CR about OFDMA Channel Noise Generator (OCNG)	8.2.0	8.3.0
2010-03	RAN#47	R5-100873	0138	-	CR to 36.521-3 Rel-8 Introduction of E-UTRAN FDD - FDD Intra Frequency Cell Search with DRX when L3 filtering is used	8.2.0	8.3.0
2010-03	RAN#47	R5-100890	0139	-	Update to RRM TC: TDD Intra frequency RSRP Accuracy	8.2.0	8.3.0
2010-03	RAN#47	R5-100896	0140	-	Clarification on Time offset between cells	8.2.0	8.3.0
2010-03	RAN#47	R5-100897	0141	-	Update to RRM TC:E-UTRAN TDD-TDD cell re-selection	8.2.0	8.3.0
2010-03	RAN#47	R5-100898	0142	-	Update to RRM TC: TDD Inter frequency RSRP Accuracy	8.2.0	8.3.0
2010-03	RAN#47	R5-100900	0143	-	Uncertainties and Test Tolerances for FDD Intra Frequency Absolute RSRP Accuracy	8.2.0	8.3.0
2010-03	RAN#47	R5-100901	0144	-	RRM TTIdcch and cell timing change, update of chapter 8	8.2.0	8.3.0

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