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**Universal Mobile Telecommunications System (UMTS);  
Requirements for support of  
radio resource management (FDD)  
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# Foreword

This Technical Specification (TS) has been produced by the 3<sup>rd</sup> Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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- x the first digit:
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

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# 1 Scope

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

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# 2 References

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

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

- [1] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode".
- [2] 3GPP TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".
- [3] 3GPP TS 25.101: "UE Radio transmission and reception (FDD)".
- [4] 3GPP TS 25.104: "BTS Radio transmission and reception (FDD)".
- [5] 3GPP TS 25.102: "UE Radio transmission and reception (TDD)".
- [6] 3GPP TS 25.105: "BTS Radio transmission and reception (TDD)".
- [7] 3GPP TS 25.212: "Multiplexing and channel coding (FDD)".
- [8] 3GPP TS 25.141: "Base station conformance testing (FDD)".
- [9] 3GPP TS 25.142: "Base station conformance testing (TDD)".
- [10] 3GPP TS 25.113: "Base station EMC".
- [11] 3GPP TR 25.942: "RF System scenarios".
- [12] 3GPP TR 25.922: "RRM Strategies".
- [13] 3GPP TS 25.215: "Physical Layer Measurements (FDD)".
- [14] 3GPP TS 25.225: "Physical Layer Measurements (TDD)".
- [15] 3GPP TS 25.302: "Services provided by Physical Layer".
- [16] 3GPP TS 25.331: "RRC Protocol Specification".
- [17] ETSI ETR 273-1-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement of radiated methods of measurement (using test sites) and evaluation of the corresponding measurement uncertainties; Part 1: Uncertainties in the measurement of mobile radio equipment characteristics; Sub-part 2: Examples and annexes".
- [18] 3GPP TS 25.214: "Physical layer procedures (FDD)".
- [19] 3GPP TS 25.321: "MAC protocol specification".
- [20] 3GPP TS 25.303: "Interlayer Procedures in Connected Mode".

- [21] 3GPP TS 45.008: "Radio subsystem link control".
- [22] 3GPP TS 45.005: "Radio transmission and reception".
- [23] 3GPP TS 26.103: "Speech Codec List for GSM and UMTS".
- [24] 3GPP TS 36.133: "Requirements for support of radio resource management".
- [25] 3GPP TS 36.304: "User Equipment (UE) procedures in idle mode".
- [26] 3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2"
- [27] 3GPP TS 36.331: "Radio Resource Control(RRC)".
- [28] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception".
- [29] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation ".
- [30] IEEE 802.11: "Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".
- [31] 3GPP TS 25.306: "UE Radio Access Capabilities".
- [32] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

The main general definitions strictly related to the Transmission and Reception characteristics but important also for the present document can be found in [3] for UE FDD, in [4] for BS FDD, in [5] for UE TDD, in [6] for BS TDD.

**Note B:** A logical node responsible for radio transmission / reception in one or more cells to/from the User Equipment. Terminates the Iub interface towards the RNC

**Power Spectral Density:** The units of Power Spectral Density (PSD) are extensively used in this document. PSD is a function of power versus frequency and when integrated across a given bandwidth, the function represents the mean power in such a bandwidth. When the mean power is normalised to (divided by) the chip-rate it represents the mean energy per chip. Some signals are directly defined in terms of energy per chip, (DPCH<sub>E<sub>c</sub></sub>, E<sub>c</sub>, OCNS<sub>E<sub>c</sub></sub> and S-CCPCH<sub>E<sub>c</sub></sub>) and others defined in terms of PSD (I<sub>o</sub>, I<sub>oc</sub>, I<sub>or</sub> and  $\hat{I}_{or}$ ). There also exist quantities that are a ratio of energy per chip to PSD (DPCH<sub>E<sub>c</sub></sub>/I<sub>or</sub>, E<sub>c</sub>/I<sub>or</sub> etc.). This is the common practice of relating energy magnitudes in communication systems.

It can be seen that if both energy magnitudes in the ratio are divided by time, the ratio is converted from an energy ratio to a power ratio, which is more useful from a measurement point of view. It follows that an energy per chip of X dBm/3,84 MHz can be expressed as a mean power per chip of X dBm. Similarly, a signal PSD of Y dBm/3,84 MHz can be expressed as a signal power of Y dBm.

**MBSFN cluster:** Set of cells operating in MBSFN mode providing only MBMS service in PtM mode and seen as one cell by a UE.

**Adjacent Frequency:** A downlink frequency in the inter-frequency cell info list that is within 5 MHz from the intra frequency. It is explicitly indicated by UTRAN to UE via upper layer signaling.

**Primary uplink frequency:** If a single uplink frequency is configured for the UE, then it is the primary uplink frequency. In case more than one uplink frequency is configured for the UE, then the primary uplink frequency is the

frequency on which the E-DCH corresponding to the serving E-DCH cell associated with the serving HS-DSCH cell is transmitted. The association between a pair of uplink and downlink frequencies is indicated by higher layers.

**Secondary uplink frequency:** A secondary uplink frequency is a frequency on which an E-DCH corresponding to a serving E-DCH cell associated with a secondary serving HS-DSCH cell is transmitted. The association between a pair of uplink and downlink frequencies is indicated by higher layers.

**Activated Uplink Frequency:** For a specific UE, an uplink frequency is said to be activated if the UE is allowed to transmit on that frequency. The primary uplink frequency is always activated when configured while a secondary uplink frequency has to be activated by means of an HS-SCCH order in order to become activated.

**Normal Performance Group:** For UE which supports Increased UE carrier monitoring UTRA or E-UTRA, the group of inter-frequency carriers or inter-RAT carriers is divided into two groups. The group which has a better delay performance compared to the other group is referred to as the normal performance group.

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

**eDRX cycles:** eDRX cycles and associated parameters are defined in TS 24.008 [32].

## 3.2 Symbols

For the purposes of the present document, the following symbol applies:

[...]	Values included in square bracket must be considered for further studies, because it means that a decision about that value was not taken.
CPICH_Ec	Average energy per PN chip for the CPICH
CPICH_Ec/Ior	The ratio of the transmit energy per PN chip of the CPICH to the total transmit power spectral density at the Node B antenna connector.
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. For a UE that is able to simultaneously receive signals from more than 1 carrier, CPICH_Ec/Io is defined for each carrier individually.
DPCH_Ec/Ior	The ratio of the transmit energy per PN chip of the DPCH to the total transmit power spectral density at the Node B antenna connector.
Ec	Average energy per PN chip.
eDRX_IDLE	eDRX cycles used in idle mode.
$\hat{E}_s$	Received energy per resource element (power normalized to the subcarrier spacing) during the useful part of the symbol, i.e. excluding the cyclic prefix, at the UE antenna connector and applicable to E-UTRA signals only.
Io	The total received power density, including signal and interference, as measured at the UE antenna connector. For a UE that is able to simultaneously receive signals from more than 1 carrier, Io is defined for each carrier individually.
Iob	The total received power density, including signal and interference, as measured at the BS 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. For a UE that is able to simultaneously receive signals from more than 1 carrier, Ioc is defined for each carrier individually.
Ior	The total transmit power spectral density (integrated in a bandwidth of $(1+\alpha)$ times the chip rate and normalized to the chip rate) of the downlink signal at the Node B antenna connector.
$\hat{I}_{or}$	The received power spectral density (integrated in a bandwidth of $(1+\alpha)$ times the chip rate and normalized to the chip rate) of the downlink signal as measured at the UE antenna connector. For a UE that is able to simultaneously receive signals from more than 1 carrier, $\hat{I}_{or}$ is defined for each carrier individually.
Iot	The received power spectral density of the total noise and interference for a certain resource element (power integrated over the RE and normalized to the subcarrier spacing) as measured at the UE antenna connector and applicable to E-UTRA signals only.

OCNS_Ec/Ior	The ratio of the transmit energy per PN chip of the OCNS to the total transmit power spectral density at the Node B antenna connector.
PCCPCH_Ec/Ior	The ratio of the transmit energy per PN chip of the PCCPCH to the total transmit power spectral density at the Node B antenna connector.
PENALTY_TIME	Defined in TS 25.304, subclause 5.2.6.1.5
PICH_Ec/Ior	The ratio of the transmit energy per PN chip of the PICH to the total transmit power spectral density at the Node B antenna connector.
Qhyst	Defined in TS 25.304, subclause 5.2.6.1.5
Qoffset <sub>s,n</sub>	Defined in TS 25.304, subclause 5.2.6.1.5
Qqualmin	Defined in TS 25.304, subclause 5.2.6.1.5
Qrxlevmin	Defined in TS 25.304, subclause 5.2.6.1.5
SCH_Ec/Ior	The ratio of the transmit energy per PN chip of the SCH to the total transmit power spectral density at the 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 and applicable to E-UTRA signals only.
Sintersearch	Defined in TS 25.304, subclause 5.2.6.1.5
Sintrasearch	Defined in TS 25.304, subclause 5.2.6.1.5
SsearchRAT	Defined in TS 25.304, subclause 5.2.6.1.5
T1	Time period 1
T2	Time period 2
TEMP_OFFSET	Defined in TS 25.304, subclause 5.2.6.1.5
Thresh <sub>serving_high</sub>	Defined in TS 25.304, subclause 5.2.6.1.5
Thresh <sub>serving_low</sub>	Defined in TS 25.304, subclause 5.2.6.1.5
Thresh <sub>x_high</sub>	Defined in TS 25.304, subclause 5.2.6.1.5
Thresh <sub>x_low</sub>	Defined in TS 25.304, subclause 5.2.6.1.5
T <sub>RE-ESTABLISH-REQ</sub>	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
TS	Basic time unit, defined in TS 36.211, clause 4
UE_TXPWR_MAX_RACH	Defined in TS 25.304, subclause 5.2.3.1.2.

### 3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply

AWGN	Additive White Gaussian Noise
BCH	Broadcast Channel
BER	Bit Error Ratio
BLER	Block Error Ratio
BS	Base Station
CFN	Connection Frame Number
CLTD	Closed Loop Transmit Diversity
CPICH	Common Pilot Channel
CSG	Closed Subscriber Group
CGI	Cell Global Identifier
DC-HSDPA	Dual Cell HSDPA
DC-HSDPA-MIMO	DC-HSDPA with MIMO
DC-HSUPA	Dual Cell HSUPA
DL	Down link (forward link)
DPCCH	Dedicated Physical Control Channel
DPCH	Dedicated Physical Channel
DPDCH	Dedicated Physical Data Channel
DRX	Discontinuous Reception
eNB	E-UTRAN NodeB
eDRX	Extended DRX cycles.
E-DCH	Enhanced Dedicated Channel
E-DPCCH	E-DCH Dedicated Physical Control Channel
E-DPDCH	E-DCH Dedicated Physical Data Channel
E-UTRA	Enhanced Universal Terrestrial Radio Access
E-UTRAN	Enhanced Universal Terrestrial Radio Access Network

FDD	Frequency Division Duplex
F-DPCH	Fractional Dedicated Physical Channel
GERAN	GSM EDGE Radio Access Network
GSM	Global System for Mobile communication
HO	Handover
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
HS-DPCCH	Dedicated Physical Control Channel (uplink) for HS-DSCH
HS-DPCCH <sub>2</sub>	Secondary Dedicated Physical Control Channel (uplink) for HS-DSCH, when Secondary_Cell_Enabled is greater than 3
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	Shared Control Physical Channel for HS-DSCH
IEEE	Institute of Electrical and Electronics Engineers
MBSFN	MBMS over a Single Frequency Network
MIB	Master Information Block
MDT	Minimization of Drive Tests
MIMO	Multiple Input Multiple Output
OCNS	Orthogonal Channel Noise Simulator, a mechanism used to simulate the users or control signals on the other orthogonal channels of a downlink.
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
PBCH	Physical Broadcast Channel
PCCPCH	Primary Common Control Physical Channel
PICH	Paging Indicator Channel
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PTW	Paging Timing Window
QAM	Quadrature Amplitude Modulation
RAT	Radio Access Technology
RNC	Radio Network Controller
RSC	Received Signal Code Power
RRC	Radio Resource Control
RRM	Radio Resource Management
RSRP	Reference Signal Received Power
RSRQ	Reference Signal Received Quality
RSSI	Received Signal Strength Indicator
SCH	Synchronisation Channel, power of SCH shall be divided equally between Primary and Secondary Synchronous channels.
S-DPCCH	Secondary Dedicated Physical Control Channel
S-E-DPCCH	Secondary Dedicated Physical Control Channel for E-DCH
S-E-DPDCH	Secondary Dedicated Physical Data Channel for E-DCH
SFN	System Frame Number
SIB	System Information Block
SIR	Signal to Interference ratio
TDD	Time Division Duplex
TFC	Transport Format Combination
TPC	Transmit Power Control
TTI	Transmission Time Interval
UTRA	Universal Terrestrial Radio Access
UTRAN	Universal Terrestrial Radio Access Network
UE	User Equipment
UL	Up link (reverse link)
USIM	Universal Subscriber Identity Module
UTRA	Universal Terrestrial Radio Access
UTRAN	Universal Terrestrial Radio Access Network
WB-RSRQ	Wide Bandwidth RSRQ

### 3.4 Test tolerances

The requirements given in the present document make no allowance for measurement uncertainty. The test specification 34.121 and 25.141 define test tolerances. These test tolerances are individually calculated for each test. The test



tolerances are then added to the limits in this specification to create test limits. The measurement results are compared against the test limits as defined by the shared risk principle.

Shared Risk is defined in ETR 273 Part 1 sub-part 2 section 6.5.

## 3.5 Additional notation

### 3.5.1 Groups of E-UTRA bands

The intention with the band grouping below is to increase the readability of the specification and to reduce impact on the specification if new E-UTRA bands are introduced.

**Table 3.5.1-1: E-UTRA band groups**

Group	E-UTRA FDD		E-UTRA TDD	
	Band group notation	Operating bands	Band group notation	Operating bands
A	FDD_A	1, 4, 6, 10, 11, 18, 19, 21, 23, 24, 32 <sup>Note 4</sup> , 67 <sup>Note 6</sup> , 69 <sup>Note 7</sup> , 70 <sup>Note 8</sup>	TDD_A	33, 34, 35, 36, 37, 38, 39, 40, 45, 50, 51, 53
B	FDD_B1	65, 66 <sup>Note 5</sup>	TDD_B	-
	FDD_B2	74 <sup>Note 9</sup>		
C	FDD_C	9, 30	TDD_C	42, 43, 48, 52
D	FDD_D	28, 68	TDD_D	-
E	FDD_E	2, 5, 7, 27	TDD_E	41, 44
F	FDD_F	26 <sup>Note 3</sup>	TDD_F	-
G	FDD_G	3, 8, 12, 13, 14, 17, 20, 22, 29 <sup>Note 2</sup> , 71, 85	TDD_G	-
H	FDD_H	25	TDD_H	-
I	FDD_I	-	TDD_I	-
J	FDD_J	-	TDD_J	-
K	FDD_K	-	TDD_K	-
L	FDD_L	-	TDD_L	-
M	FDD_M	-	TDD_M	-
N	FDD_N	31, 72, 73	TDD_N	-

NOTE 1: The bands within the same group have the same lo conditions in a corresponding requirement in this specification.

NOTE 2: Band 29 is used only for E-UTRA carrier aggregation with other E-UTRA bands.

NOTE 3: The minimum lo condition for Band 26 is reduced by 0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE 4: Band 32 is used only for E-UTRA carrier aggregation with other E-UTRA bands.

NOTE 5: The 2180 - 2200 MHz part of Band 66 is used only for E-UTRA carrier aggregation with other E-UTRA bands.

NOTE 6: Band 67 is used only for E-UTRA carrier aggregation with other E-UTRA bands.

NOTE 7: Band 69 is used only for E-UTRA carrier aggregation with other E-UTRA bands.

NOTE 8: The range 2010-2020 MHz of the DL operating band is restricted to E-UTRA operation when carrier aggregation is configured and TX-RX separation is 300 MHz. The range 2005-2020 MHz of the DL operating band is restricted to E-UTRA operation when carrier aggregation is configured and TX-RX separation is 295 MHz.

NOTE 9: The minimum lo condition for Band 74 is reduced by 0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 1475.9-1510.9 MHz.

## 4 Idle Mode Tasks

### 4.1 Cell Selection

#### 4.1.1 Introduction

After a UE has switched on and a PLMN has been selected, the Cell selection process takes place, as described in TS25.304. This process allows the UE to select a suitable cell where to camp on in order to access available services. In this process the UE can use stored information (*Stored information cell selection*) or not (*Initial cell selection*).

### 4.2 Cell Re-selection

#### 4.2.1 Introduction

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

When the UE is in either *Camped Normally* state or *Camped on Any Cell* state on a FDD cell, the UE shall attempt to detect, synchronise, and monitor intra-frequency, inter-frequency and inter-RAT cells indicated in the measurement control system information of the serving cell. UE measurement activity is also controlled by measurement rules defined in TS25.304, allowing the UE to limit its measurement activity if certain conditions are fulfilled.

#### 4.2.2 Requirements

In the following sections,  $T_{\text{higher\_priority\_search}}$  is defined as  $(60 * N_{\text{layers}})$  seconds when eDRX\_IDLE is not configured, and as  $\text{MAX}(\text{one eDRX\_IDLE cycle}, 60 * N_{\text{layers}})$  when eDRX\_IDLE is configured, where  $N_{\text{layers}}$  is the total number of configured higher priority E-UTRA, UTRA FDD and UTRA TDD carrier frequencies and is additionally increased by one if one or more groups of GSM frequencies is configured as a higher priority.

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

$N_{\text{carrier-1}}$ : Total number of FDD interfrequency carriers in the interfrequency neighbour cell info list

$N_{\text{norm,inter}} = (N_{\text{carrier-1}} - N_{\text{reduced,inter}})$ : Number of FDD interfrequency carriers to be monitored with normal performance

$N_{\text{reduced,inter}}$ : Number of FDD interfrequency carriers to be monitored with reduced performance

$K_{\text{carrier}}$ : Total number of configured E-UTRA carriers in the neighbour cell list

$K_{\text{norm,E-UTRA}} = (K_{\text{carrier}} - K_{\text{reduced,E-UTRA}})$ : Number of E-UTRA carriers to be monitored with normal performance

$K_{\text{norm,E-UTRA,FDD}}$ : number of configured FDD E-UTRA carriers in the neighbour cell list to be monitored with normal performance

$K_{\text{norm,E-UTRA,TDD}}$ : number of configured TDD E-UTRA carriers in the neighbour cell list to be monitored with normal performance

$K_{\text{reduced,E-UTRA}}$ : Number of E-UTRA carriers to be monitored with reduced performance

The minimum performance requirements for a UE which supports Increased UE carrier monitoring UTRA [16, 31] are calculated as defined in sections 4.2.2.3 provided that  $N_{\text{norm,inter}} \leq 2$  for FDD and  $N_{\text{norm,inter}} \leq 3$  for TDD and the minimum performance requirements for a UE which supports Increased UE carrier monitoring E-UTRA [16, 31] are calculated as defined in sections 4.2.2.5a provided that  $K_{\text{norm,E-UTRA}} \leq 4$  for a UE capable of either FDD E-UTRA carrier monitoring or TDD E-UTRA carrier monitoring or  $K_{\text{norm,E-UTRA}} \leq 8$  for a UE capable of both FDD and TDD E-UTRA carrier monitoring provided  $K_{\text{norm,E-UTRA,FDD}} \leq 4$  and  $K_{\text{norm,E-UTRA,TDD}} \leq 4$ . In case the limits for the number of normal performance carriers is exceeded, considering the broadcast neighbour cell list and the bands supported by the UE, the UE which supports Increased UE carrier monitoring UTRA shall measure the first-listed 2 UTRA FDD carriers in the

*Inter-frequency cell info list* with normal performance and the UE capable of either FDD or TDD carrier monitoring which supports Increased UE carrier monitoring E-UTRA shall measure the first-listed 4 E-UTRA carriers, and a UE capable of both FDD/TDD carrier monitoring the first-listed 4 FDD E-UTRA carriers and first-listed 4 TDD E-UTRA carriers in the *Inter-RAT cell info list*, with normal performance. Additionally, reduced performance requirements shall be met for carriers for which the *Reduced measurement performance* IE is indicated, up to the UE measurement capability in section 4.2.2.8a.

The minimum performance requirements for a UE which does not support Increased UE carrier monitoring UTRA [16,31] are calculated assuming all UTRA carriers required to be monitored for such UE, are having normal performance, i.e.  $N_{\text{norm,inter}} = N_{\text{carrier}} - 1$  and  $N_{\text{reduced,inter}} = 0$ . The minimum performance requirements for a UE which does not support Increased UE carrier monitoring E-UTRA [16,31] are calculated assuming all E-UTRA carriers required to be monitored for such UE, are having normal performance, i.e.  $K_{\text{norm,E-UTRA}} = K_{\text{carrier}}$ , and  $K_{\text{reduced,E-UTRA}} = 0$ . Capabilities for number of carriers to monitor for a UE which does not support Increased carrier monitoring E-UTRA or Increased carrier monitoring UTRA are specified in section 4.2.2.8.

#### 4.2.2.1 Measurement and evaluation of cell selection criteria S of serving cell

The UE shall, when eDRX\_IDLE is not configured or when eDRX\_IDLE cycle is configured and eDRX\_IDLE cycle is below or equal to 20.48s, measure the CPICH Ec/Io and CPICH RSCP level of the serving cell and evaluate the cell selection criterion S defined in [1] for the serving cell at least every DRX cycle. The UE shall filter the CPICH Ec/Io and CPICH RSCP measurements of the serving cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by, at least  $T_{\text{measureFDD}}/2$  (see table 4.1).

The UE shall, when eDRX\_IDLE is configured and eDRX\_IDLE cycle is longer than 20.48s, measure the CPICH Ec/Io and CPICH RSCP level of the serving cell and evaluate the cell selection criterion S defined in [1] for the serving cell at least every DRX cycle within the PTW of each eDRX\_IDLE cycle. The UE shall filter the CPICH Ec/Io and CPICH RSCP measurements within the PTW of the serving cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by, at least half of the DRX cycle length.

If the UE, when eDRX\_IDLE is not configured or when eDRX\_IDLE cycle is configured and eDRX\_IDLE cycle is below or equal to 20.48s, has evaluated in  $N_{\text{serv}}$  consecutive measured DRX cycles that the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated in the measurement control system information, regardless of the measurement rules currently limiting UE measurement activities.

If the UE when eDRX\_IDLE is configured and eDRX\_IDLE cycle is longer than 20.48s, has evaluated in  $\text{MIN}(N_{\text{serv}}, \lceil \text{PTW} / \text{DRX\_cycle\_length} \rceil)$  consecutive measured DRX cycles that the serving cell does not fulfil the cell selection criterion S, the UE shall initiate the measurements of all neighbour cells indicated in the measurement control system information, regardless of the measurement rules currently limiting UE measurement activities. If the UE, independent on if eDRX\_IDLE is configured or not, has not found any new suitable cell based on searches and measurements of the neighbour cells indicated in the measurement control system information for 12 s, the UE shall initiate cell selection procedures for the selected PLMN as defined in [1].

After this 12 s period a UE in Cell:PCH or URA\_PCH is considered to be "out of service area" and shall perform actions according to 25.331.

On transition from CELL\_DCH to CELL\_PCH/URA\_PCH, if a UE cannot find a suitable UTRA cell, then it is considered to be "out of service area" and shall perform actions according to [16].

If the S criterion of the serving cell is no longer fulfilled, the UE may suspend MBMS reception if necessary to improve the UE's ability to find a suitable cell.

If the S criterion of the serving cell is fulfilled, the measurement requirements when a MBMS reception is active are specified in sections 4.2.2.2 and 4.2.2.9.

#### 4.2.2.2 Measurements of intra-frequency cells

The UE shall, when eDRX\_IDLE is not configured or when eDRX\_IDLE cycle is configured and eDRX\_IDLE cycle is below or equal to 20.48s, measure CPICH Ec/Io and CPICH RSCP at least every  $T_{\text{measureFDD}}$  (see table 4.1) for intra-frequency cells that are identified and measured according to the measurement rules.  $T_{\text{measureFDD}}$  is defined in Table 4.1. The UE shall filter CPICH Ec/Io and CPICH RSCP 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  $T_{\text{measureFDD}}/2$ .

The filtering shall in this case be such that the UE shall be capable of evaluating that an intra-frequency cell has become better ranked than the serving cell within  $T_{\text{evaluateFDD}}$  (see table 4.1), from the moment the intra-frequency cell became at least 3 dB better ranked than the current serving cell, provided that Treselection timer is set to zero and either CPICH Ec/Io or CPICH RSCP is used as measurement quantity for cell reselection. The UE shall when eDRX\_IDLE is configured and eDRX\_IDLE cycle is longer than 20.48s, measure CPICH Ec/Io and CPICH RSCP at least 2 times during the PTW every eDRX\_IDLE cycle for intra-frequency cells that are identified and measured according to the measurement rules. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured intra-frequency cell using at least 2 measurements from the same PTW. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the DRX cycle.

The filtering shall in this case be such that the UE shall be capable of evaluating that an intra-frequency cell has become better ranked than the serving cell within one eDRX\_IDLE cycle from the moment the intra-frequency cell became at least 3 dB better ranked than the current serving cell, provided that Treselection timer is set to zero and either CPICH Ec/Io or CPICH RSCP is used as measurement quantity for cell reselection.

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 reselect that cell.

If the UE is receiving the MTCH, the UE shall be able to identify new intra-frequency cells and take them into use for MTCH combining purposes as defined in section 8.4.2.2.1

#### 4.2.2.3 Measurements of inter-frequency FDD cells

If priority information for UTRA FDD carrier frequencies is provided in the measurement control systems information and  $S_{\text{rxlevServingCell}} > S_{\text{prioritysearch1}}$  and  $S_{\text{qualServingCell}} > S_{\text{prioritysearch2}}$  then the UE shall search for any higher priority UTRA inter-frequency cells at least every  $T_{\text{higher\_priority\_search}}$  where  $T_{\text{higher\_priority\_search}}$  is described in section 4.2.2. If the UE is not in CELL\_PCH, URA\_PCH or IDLE state then the UE shall search for UTRA FDD layers of higher priority within  $T_{\text{higher\_layer\_start}}$  upon entering into any of these states. If 1 second has not elapsed since the UE camped on the current serving cell when the UE enters into any of these states,  $T_{\text{higher\_layer\_start}}$  is one DRX cycle plus 1 second; otherwise  $T_{\text{higher\_layer\_start}}$  is one DRX cycle. If higher priority UTRA cells are found by the higher priority search, they shall be measured when eDRX\_IDLE is not configured or is configured with a eDRX\_IDLE cycle less than or equal 20.48s at least every  $(N_{\text{carrier}}-1) * T_{\text{measureFDD}}$ . When eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s they shall be measured at least with two measurements during the PTW in each eDRX\_IDLE cycle. 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. If priority information for UTRA FDD carrier frequencies is provided in the measurement control systems information and  $S_{\text{rxlevServingCell}} \leq S_{\text{prioritysearch1}}$  or  $S_{\text{qualServingCell}} \leq S_{\text{prioritysearch2}}$ , the rules defined below apply irrespective of the priority of the inter-frequency layer.

The UE shall, when eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s, measure CPICH Ec/Io and CPICH RSCP at least every  $N_{\text{norm, inter}} * T_{\text{measureFDD}}$  (see table 4.1) for the normal performance group carriers and  $N_{\text{reduced, inter}} * 6 * T_{\text{measureFDD}}$  for the reduced performance group carriers for inter-frequency cells that are identified and measured according to the measurement rules. The parameter  $N_{\text{norm, inter}}$  is the number of carriers in the normal performance group and  $N_{\text{reduced, inter}}$  is the number of carriers in the reduced performance group used for FDD cells as defined in section 4.2.2. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured 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  $T_{\text{measureFDD}}/2$ .

If CPICH Ec/Io is used as measurement quantity for cell reselection and eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s, the filtering shall be such that the UE shall be capable of evaluating that an already identified inter-frequency cell has met the reselection criteria in [1] within  $N_{\text{norm, inter}} * T_{\text{evaluateFDD}}$  (see table 4.1) for the normal performance group carriers and  $N_{\text{reduced, inter}} * 6 * T_{\text{evaluateFDD}}$  for the reduced performance group carriers from the moment the inter-frequency cell met the reselection criteria by at least 3 dB provided that Treselection timer is set to zero. For non-identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell belonging to the normal performance group has met the reselection criteria in [1] within 30 s and inter-frequency cell belonging to the reduced performance group has met the reselection criteria in [1] within 180 s from the moment the inter-frequency cell met the reselection criteria by at least 3 dB provided that Treselection timer is set to zero.

If CPICH RSCP is used as measurement quantity for cell reselection and eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s, the filtering shall be such that the UE shall be capable of evaluating that an already identified inter-frequency cell has met the reselection criteria in [1] within  $N_{\text{norm, inter}} * T_{\text{evaluateFDD}}$  for the normal performance group carriers and  $N_{\text{reduced, inter}} * 6 * T_{\text{evaluateFDD}}$  for the reduced performance group carriers from the moment the inter-frequency cell met the reselection criteria by at least 5 dB for reselection based on ranking, or [6]dB for reselection based on absolute priorities provided that Treselection timer is set to zero. For non-identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell belonging to the normal performance group has met the reselection criteria in [1] within 30 s and inter-frequency cell belonging to the reduced performance group has met the reselection criteria in [1] within 180 s from the moment the inter-frequency cell met the reselection criteria by at least 5 dB for reselection based on ranking, or [6]dB for reselection based on absolute priorities provided that Treselection timer is set to zero.

The UE shall when eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s measure CPICH Ec/Io and CPICH RSCP at least two times during the PTW period in every eDRX\_IDLE cycle length for the normal performance group carriers for inter-frequency cells that are identified and measured according to the measurement rules. For the reduced performance group the UE shall, when  $S_{\text{rxlev}} < 3$  dB or  $S_{\text{qual}} < 3$  dB measure CPICH Ec/Io and CPICH RSCP at least two times during the PTW cycle in every DRX cycle length. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured inter-frequency cell using at least 2 measurements from the same PTW. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the DRX cycle length.

If CPICH Ec/Io is used as measurement quantity for cell reselection and eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s, the filtering shall be such that the UE shall be capable of evaluating that an already identified inter-frequency cell has met the reselection criteria in [1] within one eDRX\_IDLE cycle length for the normal performance group carriers and if  $S_{\text{rxlev}} < 3$  dB or  $S_{\text{qual}} < 3$  dB one eDRX\_IDLE cycle for the reduced performance group carriers from the moment the inter-frequency cell met the reselection criteria by at least 3 dB provided that Treselection timer is set to zero. For non-identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell belonging to the normal performance group has met the reselection criteria in [1] within the  $\text{MAX}(30\text{s}, 2 * \text{eDRX\_IDLE cycle length})$  and inter-frequency cell belonging to the reduced performance group when  $S_{\text{rxlev}} < 3$  dB or  $S_{\text{qual}} < 3$  dB has met the reselection criteria in [1] within  $\text{MAX}(180\text{s}, 2 * \text{eDRX\_IDLE cycle length})$  from the moment the inter-frequency cell met the reselection criteria by at least 3 dB provided that Treselection timer is set to zero.

If CPICH RSCP is used as measurement quantity for cell reselection and eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s, the filtering shall be such that the UE shall be capable of evaluating that an already identified inter-frequency cell has met the reselection criteria in [1] within one eDRX\_IDLE cycle length for the normal performance group carriers and if  $S_{\text{rxlev}} < 3$  dB or  $S_{\text{qual}} < 3$  dB one eDRX\_IDLE cycle for the reduced performance group carriers from the moment the inter-frequency cell met the reselection criteria by at least 5 dB for reselection based on ranking, or 6 dB for reselection based on absolute priorities provided that Treselection timer is set to zero. For non-identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell belonging to the normal performance group has met the reselection criteria in [1] within the  $\text{MAX}(30\text{s}, 2 * \text{eDRX\_IDLE cycle length})$  and inter-frequency cell belonging to the reduced performance group and  $S_{\text{rxlev}} < 3$  dB or  $S_{\text{qual}} < 3$  dB has met the reselection criteria in [1] within  $\text{MAX}(180\text{s}, 2 * \text{eDRX\_IDLE cycle length})$  from the moment the inter-frequency cell met the reselection criteria by at least 5 dB for reselection based on ranking, or [6]dB for reselection based on absolute priorities provided that Treselection timer is set to zero.

If Treselection timer has a non zero value and the inter-frequency cell meets the reselection criteria in [1], the UE shall evaluate this inter-frequency cell for the Treselection time. If this cell fulfils the reselection criteria within this duration, then the UE shall reselect that cell.

#### 4.2.2.4 Measurements of inter-frequency TDD cells

The requirements in this section shall apply to UE supporting FDD and TDD.

The UE shall, when eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s, measure P-CCPCH RSCP at least every  $N_{\text{carrierTDD}} * T_{\text{measureTDD}}$  (see table 4.1) for inter-frequency TDD cells that are identified and measured according to the measurement rules. The parameter  $N_{\text{carrierTDD}}$  is the number of carriers used for inter-frequency TDD cells. The UE shall filter P-CCPCH RSCP measurements of each measured inter-frequency 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  $T_{\text{measureTDD}}/2$ .

The filtering of PCCPCH RSCP shall, when eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s, be such that the UE shall be capable of evaluating that an already identified inter-frequency TDD cell has become better ranked than the serving cell within  $N_{\text{carrierTDD}} * T_{\text{evaluateTDD}}$  from

the moment the inter-frequency TDD cell became at least 5 dB better ranked than the current serving cell provided that Treselection timer is set to zero. For non-identified inter-frequency TDD cells, the filtering shall be such that the UE shall be capable of evaluating that an inter-frequency TDD cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency TDD cell became at least 5 dB better ranked than the current serving cell provided that Treselection timer is set to zero.

The UE shall, when eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s, measure P-CCPCH RSCP at least two times during the PTW in every eDRX\_IDLE cycle length for inter-frequency TDD cells that are identified and measured according to the measurement rules. The UE shall filter P-CCPCH RSCP measurements of each measured inter-frequency TDD cell using at least 2 measurements from the same PTW. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the DRX cycle length.

The filtering of PCCPCH RSCP shall when eDRX\_IDLE is configured with a eDRX cycle longer than 20.48s be such that the UE shall be capable of evaluating that an already identified inter-frequency TDD cell has become better ranked than the serving cell within one eDRX\_IDLE cycle length from the moment the inter-frequency TDD cell became at least 5 dB better ranked than the current serving cell provided that Treselection timer is set to zero. For non-identified inter-frequency TDD cells, the filtering shall be such that the UE shall be capable of evaluating that an inter-frequency TDD cell has become better ranked than the serving cell within the minimum of 30s and two times the eDRX\_IDLE cycle length from the moment the inter-frequency TDD cell became at least 5 dB better ranked than the current serving cell provided that Treselection timer is set to zero.

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

#### 4.2.2.5 Measurements of inter-RAT GSM cells

##### 4.2.2.5.1 Cell reselection based on cell ranking

The requirements in this subclause shall apply if the UE uses the cell ranking algorithm for inter-RAT cell reselection [1].

The UE shall, when eDRX\_IDLE is not configured or eDRX is configured with a eDRX\_IDLE cycle less than or equal 20.48s, measure the signal level of the GSM BCCH carrier of each GSM neighbour cell indicated in the measurement control system information of the serving cell, according to the measurement rules defined in [1], at least every  $T_{\text{measureGSM}}$  (see table 4.1). 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.

The UE shall, when eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s, measure the signal level of the GSM BCCH carrier of each GSM neighbour cell indicated in the measurement control system information of the serving cell, according to the measurement rules defined in [1], at least two times every eDRX\_IDLE cycle length. The UE shall in the PTW in every eDRX\_IDLE cycle calculate an average of 4 measurement samples for each GSM BCCH carrier. The measurement samples for each cell shall as far as possible be uniformly distributed over the averaging period.

If GSM measurements are required by the measurement rules in [1], the UE shall attempt to verify the BSIC at least every MAX(30 seconds, eDRX\_IDLE cycle length) for each of the 4 strongest GSM BCCH carriers and rank the verified GSM BCCH cells according to the cell reselection criteria defined in [1]. 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 a BSIC, which is not indicated in the measurement control system information, the UE shall not consider that GSM BCCH carrier in cell reselection. The UE also shall not consider the GSM BCCH carrier in cell reselection, if the UE cannot demodulate the BSIC of that GSM BCCH carrier.

If Treselection timer has a non zero value and the inter-RAT GSM cell is better ranked than the serving cell, the UE shall evaluate this inter-RAT GSM cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

##### 4.2.2.5.2 Cell reselection based on priority information

The requirements in this subclause shall apply if the UE uses the absolute priorities based algorithm for inter-RAT cell reselection [1].

If  $S_{rxlev}^{ServingCell} > S_{prioritysearch1}$  and  $S_{qual}^{ServingCell} > S_{prioritysearch2}$  then 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.

When the measurement rules defined in [1] indicate that inter-RAT cells are to be measured then the UE shall measure, the signal level of the GSM BCCH carriers if the GSM BCCH carriers are indicated in the measurement control system information of the serving cell. GSM BCCH carriers of lower priority than the serving cell shall when eDRX\_IDLE\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s be measured at least every  $T_{measure,GSM}$  (see table 4.1). When eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s serving cell shall be measured at least 4 times during the PTW within every eDRX\_IDLE cycle length.

If  $S_{rxlev}^{ServingCell} > S_{prioritysearch1}$  and  $S_{qual}^{ServingCell} > S_{prioritysearch2}$  then the UE shall search for GSM BCCH carrier at least every  $T_{higher\_priority\_search}$  where  $T_{higher\_priority\_search}$  is described in section 4.2.2. If the UE is not in CELL\_PCH, URA\_PCH or IDLE state then the UE shall search for GSM layers of higher priority within  $T_{higher\_layer\_start}$  upon entering into any of these states. If 1 second has not elapsed since the UE camped on the current serving cell when the UE enters into any of these states,  $T_{higher\_layer\_start}$  is one DRX cycle plus 1 second; otherwise  $T_{higher\_layer\_start}$  is one DRX cycle. When higher priority GSM BCCH carriers are found by the higher priority search when eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s, they shall be measured at least every  $T_{measure,GSM}$ , and the UE shall decode the BSIC of the GSM BCCH carrier. When eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s, they shall be measured at least 4 times during the PTW in every eDRX\_IDLE cycle length, and the UE shall decode the BSIC of the GSM BCCH carrier.

If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection to continuously verify the BSIC of the GSM BCCH carrier every  $\text{MIN}(30s, \text{eDRX\_IDLE cycle length})$ . 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  $S_{rxlev}^{ServingCell} \leq S_{prioritysearch1}$  or  $S_{qual}^{ServingCell} \leq S_{prioritysearch2}$ , the rules defined below apply irrespective of the priority of the GSM layer.

The UE shall when eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s 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. The UE shall when eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s every eDRX\_IDLE cycle length measure and average of 4 measurements for each GSM BCCH carrier. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

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

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

#### 4.2.2.5a Measurements of inter-RAT E-UTRA cells

The UE shall be able to identify new E-UTRA cells and perform RSRP and RSRQ measurements of identified E-UTRA 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  $S_{rxlev}^{ServingCell} > S_{prioritysearch1}$  and  $S_{qual}^{ServingCell} > S_{prioritysearch2}$  then the UE shall search for E-UTRA layers of higher priority at least every  $T_{higher\_priority\_search}$  where  $T_{higher\_priority\_search}$  is described in section 4.2.2. If the UE is not in CELL\_PCH, URA\_PCH or IDLE state then the UE shall search for E-UTRA layers of higher priority within  $T_{higher\_layer\_start}$  upon entering into any of these states. If 1 second has not elapsed since the UE camped on the current serving cell when the UE enters into any of these states,  $T_{higher\_layer\_start}$  is one DRX cycle plus 1 second; otherwise  $T_{higher\_layer\_start}$  is one DRX cycle. 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  $S_{rxlev}^{ServingCell} \leq S_{prioritysearch1}$  or  $S_{qual}^{ServingCell} \leq S_{prioritysearch2}$  then the UE shall search for and measure E-UTRA frequency layers of higher or lower priority in preparation for possible reselection. In this scenario, the minimum rate at

which the UE is required to search for and measure higher priority layers shall be the same as that defined below for a lower priority layers.

The UE shall, when eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s, be able to evaluate whether a new detectable lower priority inter-RAT E-UTRA cell meets the reselection criteria defined in [1] within  $K_{\text{norm, EUTRA}} * T_{\text{detectE-UTRA}}$  for the normal performance group and  $K_{\text{reduced, EUTRA}} * 6 * T_{\text{detectE-UTRA}}$  for the reduced performance group, where  $T_{\text{detectE-UTRA}}$  is given in Table 4.2, if E-UTRA carrier frequency information is provided in the inter-RAT measurement control system information when  $T_{\text{reselection}}=0$  provided that the reselection criteria is met by at least 6dB for RSRP reselections or 4dB for RSRQ reselections. The parameter  $K_{\text{norm, EUTRA}}$  is the number of E-UTRA carrier frequencies in the normal performance group and the parameter  $K_{\text{reduced, EUTRA}}$  is the number of E-UTRA carrier frequencies in the reduced performance group indicated in the inter-RAT measurement control system information as defined in section 4.2.2. An inter RAT E-UTRAN cell is considered to be detectable if:

- RSRP<sub>dBm</sub> according to Annex B.1.1 for a corresponding Band

The UE shall measure RSRP and RSRQ at least every  $K_{\text{norm, EUTRA}} * T_{\text{measureE-UTRA}}$  for normal performance group and  $K_{\text{reduced, EUTRA}} * 6 * T_{\text{measureE-UTRA}}$  for reduced performance group as defined in table 4.2 for identified E-UTRA cells.

The UE shall when eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s for the normal performance group and if  $S_{\text{rxlev}} < 3$  dB or  $S_{\text{qual}} < 3$  dB for the reduced performance group be able to evaluate whether a new detectable lower priority inter-RAT E-UTRA cell meets the reselection criteria defined in [1] within the PTW in every eDRX\_IDLE cycle length if E-UTRA carrier frequency information is provided in the inter-RAT measurement control system information when  $T_{\text{reselection}}=0$  provided that the reselection criteria is met by at least 6dB for RSRP reselections or 4dB for RSRQ reselections. An inter RAT E-UTRAN cell is considered to be detectable when eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s if:

- RSRP<sub>dBm</sub> according to Annex B.1.1 for a corresponding Band

The UE shall measure RSRP and RSRQ at least 2 times every eDRX\_IDLE cycle time for normal performance group and if  $S_{\text{rxlev}} < 3$  dB or  $S_{\text{qual}} < 3$  dB for reduced performance group.

When higher priority cells are found by the higher priority search when eDRX\_IDLE is not configured or eDRX is configured with a eDRX\_IDLE cycle less than or equal 20.48s, they shall be measured at least every  $T_{\text{measureE-UTRA}}$ . When higher priority cells are found by the higher priority search when eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s, they shall be measured at least two times during the PTW in every eDRX\_IDLE cycle time. 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. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP and RSRQ measurements of each measured E-UTRA cell using at least 2 measurements. Within the set of measurements used for the filtering when eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s, at least two measurements shall be spaced by at least  $T_{\text{measureE-UTRA}}/2$ . When eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s the UE shall filter RSRP and RSRQ measurements of each measured E-UTRA cell using at least 2 measurements from the PTW within a eDRX\_IDLE cycle length. Within this set of measurements used for the filtering, at least two measurements shall be spaced by at least half the DRX cycle.

RSRP and RSRQ measurements of E-UTRA cells shall not be filtered over a longer period than that specified in Table 4.2.

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

For an inter-RAT E-UTRA cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall when eDRX\_IDLE is not configured or eDRX\_IDLE is configured with a eDRX\_IDLE cycle less than or equal 20.48s be capable of evaluating that the E-UTRA cell has met reselection criterion defined TS 36.304 within  $K_{\text{norm, EUTRA}} * T_{\text{evaluateEUTRA}}$  for normal performance group and  $K_{\text{reduced, EUTRA}} * 6 * T_{\text{evaluateE-UTRA}}$  for reduced



performance group as specified in table 4.2 provided that the reselection criteria is met by at least 6dB for RSRP reselections or 4dB for RSRQ reselections and the Treselection timer is set to zero. When eDRX\_IDLE is configured with a eDRX\_IDLE cycle longer than 20.48s the filtering shall be such that the UE shall be capable of evaluating that the E-UTRA cell has met reselection criterion defined TS 36.304 within one eDRX\_IDLE cycle length for normal performance group and for reduced performance group when  $Srxlev < 3$  dB or  $Squal < 3$  dB provided that the reselection criteria is met by at least 6dB for RSRP reselections or 4dB for RSRQ reselections and the Treselection timer is set to zero.

#### 4.2.2.6 Evaluation of cell re-selection criteria

The UE shall evaluate the cell re-selection criteria defined in TS 25.304 for the cells, which have new measurement results available, at least every DRX cycle.

UE shall perform cell reselection immediately after the reselection criteria have been met (e.g. the UE has found a higher ranked suitable cell or the UE has found a suitable cell on a higher priority RAT), unless less than 1 second has elapsed from the moment the UE started camping on the serving cell. The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.

#### 4.2.2.7 Maximum interruption in paging reception

UE shall perform the cell re-selection with minimum interruption in monitoring downlink channels for paging reception.

At intra-frequency 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 50 ms.

At inter-frequency and 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 inter-frequency cell re-selection the interruption time must not exceed  $T_{SI} + 50$  ms. For inter-RAT cell re-selection the interruption time must not exceed  $T_{BCCH} + 50$  ms for GSM or  $T_{SI-EUTRA} + [50 \text{ ms}]$  for E-UTRA.

$T_{SI}$  is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell.

$T_{BCCH}$  is the maximum time allowed to read BCCH data from a GSM cell [21].

$T_{SI-EUTRA}$  is the maximum time allowed to read system information from a E-UTRA cell [24].

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

**Table 4.1:  $T_{\text{measureFDD}}$ ,  $T_{\text{evaluateFDD}}$ ,  $T_{\text{measureTDD}}$ ,  $T_{\text{evaluateTDD}}$ , and  $T_{\text{measureGSM}}$**

DRX cycle length [s]	$N_{\text{serv}}$ [number of DRX cycles]	$T_{\text{measureFDD}}$ [s] (number of DRX cycles)	$T_{\text{evaluateFDD}}$ [s] (number of DRX cycles)	$T_{\text{measureTDD}}$ [s] (number of DRX cycles)	$T_{\text{evaluateTDD}}$ [s] (number of DRX cycles)	$T_{\text{measureGSM}}$ [s] (number of DRX cycles)
0.08	4	0.64 (8 DRX cycles)	2.56 (32 DRX cycles)	0.64 (8 DRX cycles)	2.56 (32 DRX cycles)	2.56 (32 DRX cycles)
0.16	4	0.64 (4)	2.56 (16)	0.64 (4)	2.56 (16)	2.56 (16)
0.32	4	1.28 (4)	5.12 (16)	1.28 (4)	5.12 (16)	5.12 (16)
0.64	4	1.28 (2)	5.12 (8)	1.28 (2)	5.12 (8)	5.12 (8)
1.28	2	1.28 (1)	6.4 (5)	1.28 (1)	6.4 (5)	6.4 (5)
2.56	2	2.56 (1)	7.68 (3)	2.56 (1)	7.68 (3)	7.68 (3)
5.12	1	5.12 (1)	10.24 (2)	5.12 (1)	10.24 (2)	10.24 (2)

**Table 4.2:  $T_{\text{detectE-UTRA}}$ ,  $T_{\text{measureE-UTRA}}$  and  $T_{\text{evaluateEUTRA}}$** 

DRX cycle length [s]	$T_{\text{detectE-UTRA}}$ [s]	$T_{\text{measureE-UTRA}}$ [s] (number of DRX cycles)	$T_{\text{evaluateEUTRA}}$ [s] (number of DRX cycles)
0.08	30	2.56 (32)	7.68 (96)
0.16		2.56 (16)	7.68 (48)
0.32		5.12 (16)	15.36 (48)
0.64		5.12 (8)	15.36 (24)
1.28		6.4 (5)	19.2 (15)
2.56	60	7.68 (3)	23.04 (9)
5.12		10.24 (2)	30.72 (6)

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

In idle mode, UE shall support DRX cycles lengths 0.64, 1.28, 2.56 and 5.12 s, according to [16] and UE shall, if it supports eDRX\_IDLE, support eDRX\_IDLE cycle lengths 10.24, 20.48, 40.96, 81.92, 163.84, 327.68, 655.36, 1310.72, 1966.08 and 2621.44 seconds, according to TS 24.008 [32].

#### 4.2.2.8 Number of cells in cell lists

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

- 32 intra-frequency cells (including serving cell), and
- 32 inter-frequency cells, including
  - FDD cells on maximum 2 additional carriers, and
  - Depending on UE capability, TDD cells distributed on up to 3 TDD carriers, and
- Depending on UE capability, 32 GSM cells distributed on up to 32 GSM carriers, and
- Depending on UE capability, up to 4 E-UTRA FDD carriers, and
- Depending on UE capability up to 4 E-UTRA TDD carriers

as indicated in cell information lists sent in system information (BCCH).

In addition to the requirements defined above, a UE supporting E-UTRA measurements in RRC\_IDLE state shall be capable of monitoring a minimum total of at least 8 carrier frequency layers, including the intra-frequency serving layer and comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 cells).

##### 4.2.2.8a Number of cells in cell lists (Increased UE carrier monitoring)

UE which supports Increased UE carrier monitoring UTRA according to capabilities in [16,31] shall be capable of monitoring at least

80 inter-frequency cells, including

- 5 FDD UTRA inter-frequency carriers with up to 32 cells per carrier.

UE which supports increased UE carrier monitoring E-UTRA according to capabilities in [16,31] shall be capable of monitoring at least

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

In addition to the requirements defined above, a UE supporting E-UTRA measurements in RRC\_IDLE state and supporting Increased UE carrier monitoring UTRA or increased UE carrier monitoring E-UTRA according to capabilities in [16,31] shall be capable of monitoring a total of at least 13 carrier frequency layers, which includes

-serving layer, comprising of any above defined combination of of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 cells).

#### 4.2.2.9 Additional requirements for measurement of inter-frequency and inter-RAT cells when MBMS reception is active

If an MBMS service is being received then the following requirements additionally apply:

When the UE is receiving MTCH and the UE evaluates that the cell re-selection measurement rules in 25.304 indicate that inter-frequency or inter-RAT measurements are not required to be made, the UE shall not perform the corresponding inter-frequency or inter-RAT measurements.

When the UE is receiving MTCH and the UE evaluates that the cell re-selection measurement rules in 25.304 indicate that inter-frequency or inter-RAT measurements are required to be made, and the UE needs to interrupt MTCH reception to make inter-frequency or inter-RAT measurements, an individual interruption of MTCH reception shall not exceed 12.5% of an MTCH TTI from a single arbitrary cell from which the MTCH is received.

The total interruption time to the MTCH reception due to inter-frequency measurements shall not exceed a total of

- 20 ms every  $T_{\text{measure}}$ , FDD for measuring known FDD inter-frequency neighbours, and
- 300 ms every 30 seconds for searching for new FDD inter-frequency cells for each inter-frequency carrier frequency

There are no corresponding limitations on the total interruption time to the MTCH reception due to inter-RAT measurements

The UE shall ensure that inter-frequency measurement or inter-RAT measurement interruptions do not overlap constantly with the periodic MCCH transmissions.

#### 4.2.2.10 MTCH Interruption time

The MTCH interruption time is the time between the end of the last MTCH TTI on which UE receives MTCH from the serving cell and the beginning of the first MTCH TTI on which UE starts receiving MTCH from the target cell.

The MTCH interruption time due to intra-frequency cell reselection without soft combining during an MBMS session shall be less than  $T_{\text{MTCH\_interrupt}}$

$$T_{\text{MTCH\_interrupt}} = T_{\text{IU}} + 20 + T_{\text{MCCH}} + T_{\text{MTCH}} \text{ ms}$$

Where

- T<sub>MCCH</sub>:** is the time required to read the relevant MCCH information of the target cell according to the MBMS specific procedures defined in TS 25.331.
- T<sub>MTCH</sub>:** is the uncertainty when reading the MTCH of the serving and target cells while performing cell reselection; T<sub>MCCH</sub> can be up to 2 MTCH TTI.

The MTCH interruption time ( $T_{\text{MTCH\_interrupt}}$ ) shall be applicable when UE is receiving MBMS in idle mode, CELL\_PCH state and URA\_PCH state.

#### 4.2.2.11 Reselection to CSG cells

- Note:** Requirements in this section are minimum requirements defined to ensure the testability of autonomous CSG search.

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

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

#### 4.2.2.11.1 Reselection from a non CSG to an inter-frequency CSG cell

The UE shall perform search and reselection to an allowed inter-frequency CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 4.2.2.11.1-1. There is no need for statistical testing of this requirement.

**Table 4.2.2.11.1-1: Parameters for CSG inter-frequency reselection**

Parameter	Unit	Cell 1	Cell 2
UARFCN <sup>Note1</sup>		Channel 1	Channel 2
CSG indicator		False	True
Primary scrambling code <sup>Note1</sup>		Scrambling code 1	Scrambling code 2
CSG identity		Not sent	Sent (Already stored in UE whitelist from previous visit)
Propagation conditions		Static, non multipath	
CSG cell previously visited by UE		Yes	
CPICH_RSCP <sup>Note2</sup>	dBm	-100	-100
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCCPCH_Ec/Ior	dB	-12	-12
AICH_Ec/Ior	dB	-15	-15
SCH_Ec/Ior	dB	-15	-15
PICH_Ec/Ior	dB	-15	-15
$I_{oc}$	dBm/3.84 MHz	Off	Off

Note 1:	For this requirement to be applicable, the UARFCN and scrambling code for cell 1 and cell 2 shall be unchanged from when the CSG cell was visited previously.
Note 2:	Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE.

#### 4.2.2.11.2 Reselection from a non CSG to an inter-RAT E-UTRA CSG cell

The UE shall perform search and reselection to an allowed inter-RAT E-UTRA CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 4.2.2.11.2-1. There is no need for statistical testing of this requirement.

Table 4.2.2.11.2-1: Parameters for CSG inter-RAT E-UTRA reselection

Parameter	Unit	Cell 1	Cell 2	
UARFCN <sup>Note1</sup>		Channel 1	N/A	
EARFCN <sup>Note1</sup>		N/A	Channel 2	
CSG indicator		False	True	
Primary scrambling code <sup>Note1</sup>		Scrambling code 1	N/A	
Physical cell identity <sup>Note1</sup>		N/A	2	
CSG identity		Not sent	Sent (Already stored in UE whitelist from previous visit)	
Propagation conditions		Static, non multipath		
CSG cell previously visited by UE		Yes		
CPICH_RSCP <sup>Note2</sup>	dBm	-100	N/A	
CPICH_Ec/lor	dB	-10		
PCCPCH_Ec/lor	dB	-12		
SCCPCH_Ec/lor	dB	-12		
AICH_Ec/lor	dB	-15		
SCH_Ec/lor	dB	-15		
PICH_Ec/lor	dB	-15		
$I_{oc}$	dBm/3.84 MHz	Off		
PBCH_RA	dB	N/A	0	
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
Qrxlevmin	dBm			-140
$N_{oc}$	dBm/15 kHz			Off
RSRP <sup>Note2</sup>	dBm/15 KHz			-110

Note 1: For this requirement to be applicable, the UARFCN and scrambling code for cell 1 and the EARFCN and physical cell identity for cell 2 shall be unchanged from when the CSG cell was visited previously

Note 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE

## 4.3 MBSFN cluster selection

### 4.3.1 Introduction

MBSFN allows the UE to select a suitable MBSFN cluster where to camp on in order to access available services.

## 4.4 MBSFN cluster reselection

### 4.4.1 Introduction

There are no requirements specified for MBSFN cluster reselection.

## 4.5 Minimization of Drive Tests (MDT)

UE supporting minimisation of drive tests shall be capable of, 3GPP TS 25.331 [16]:

- logging measurements in RRC\_IDLE, CELL\_PCH, and URA\_PCH states, reporting the logged measurements and meeting requirements in this section.
- logging of RRC connection establishment failure, reporting the logged failure and meeting requirements in this section.

### 4.5.1 Introduction

The logged MDT requirements consist of measurement requirements as specified in section 4.5.2 and relative time stamp accuracy requirements as specified in section 4.5.3. Both sets of requirements are applicable for intra-frequency, inter-frequency and inter-RAT cases in idle, CELL\_PCH and URA\_PCH states. The MDT procedures are described in 3GPP TS 37.320 [26].

For RRC connection establishment failure logging and reporting, the MDT requirements consist of requirements for measurements performed and logged in IDLE, CELL\_PCH, and URA\_PCH states specified in Section 4.5.2 and relative time stamp accuracy requirement for RRC connection establishment failure log reporting as specified in Section 4.5.4.

### 4.5.2 Measurements

The requirements specified in this section apply for the measurements (GSM carrier RSSI, UTRA CPICH RSCP, UTRA CPICH Ec/Io, P-CCPCH RSCP for UTRA 1.28 TDD, E-UTRA RSRP and E-UTRA RSRQ) performed and logged by the UE for MDT in IDLE, CELL\_PCH and URA\_PCH states. The requirements apply for the measurements included in logged MDT reports and RRC connection establishment failure reports.

#### 4.5.2.1 Requirements

The measurement values that are used to meet serving cell and reselection requirements as specified in sections 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4, 4.2.2.5 and 4.2.2.5a shall also apply to the values logged for MDT measurements in idle state.

The measurement values that are used to meet serving cell and reselection requirements as specified in section 5.6 shall also apply to the values logged for MDT measurements in CELL\_PCH state.

The measurement values that are used to meet serving cell and reselection requirements as specified in section 5.7 shall also apply for the values logged for MDT measurements in URA\_PCH state.

### 4.5.3 Relative Time Stamp Accuracy

The relative time stamp for a logged measurement is defined as the time from the moment the MDT configuration was received at the UE until the measurement was logged, see [16].

#### 4.5.3.1 Requirements

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

### 4.5.4 Relative Time Stamp Accuracy for RRC Connection Establishment Failure Log Reporting

Relative time stamp for RRC connection establishment failure log reporting is defined as the time elapsed from the last RRC connection establishment failure to the time when the log is included in the report [16]. The UE shall report the RRC connection establishment failure log, while meeting the accuracy requirement specified in Section 4.5.4.1.

#### 4.5.4.1 Requirements

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

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

NOTE: This requirement does not need to be tested.

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## 5 UTRAN Connected mode mobility

This section contains the requirements on the mobility procedures in UTRAN connected mode such as handover and cell re-selection.

Requirements related to the measurements in support of the execution of the UTRAN connected mode mobility procedures are specified, currently not necessarily for all UTRAN connected mode states, in section 8 .

The radio links the UE shall use are controlled by UTRAN with RRC signalling.

UE behaviour in response to UTRAN RRC messages is described in TS25.331.

The purpose of Cell reselection in CELL\_FACH, CELL\_PCH and URA\_PCH states is that the UE shall select a better cell according to the cell reselection criteria in TS 25.304. CELL\_FACH, CELL\_PCH and URA\_PCH states are described in TS 25.331.

### 5.1 FDD/FDD Soft Handover

#### 5.1.1 Introduction

Soft handover is a function in which the UE is connected to several UTRAN access points at the same time. Addition and/or release of radio links are controlled by the ACTIVE SET UPDATE procedure.

The soft handover function includes a measurement phase, a decision algorithm in UTRAN and the ACTIVE SET UPDATE procedure.

#### 5.1.2 Requirements

##### 5.1.2.1 Active set dimension

When the UE is configured with a single uplink carrier frequency, the UE shall be capable of supporting at least 6 radio links in the active set. For E-DCH the UE shall be capable of supporting a sub-set of the 6 radio links in the active set. The subset shall consist of the Serving E-DCH radio link and up to 3 additional E-DCH radio links. The 3 additional radio links can either be from the Serving E-DCH radio link set or can be Non-Serving radio links. The Serving E-DCH radio link, the Serving E-DCH radio link set and Non-Serving E-DCH radio links are defined in [15].

When the UE is configured with dual uplink carrier frequencies, the UE shall be capable of supporting at least 4 radio links per uplink carrier frequency. For E-DCH the UE shall be capable of supporting a sub-set of the 4 radio links in the active set per uplink carrier frequency. The subset shall consist of the Serving E-DCH radio link and up to 3 additional E-DCH radio links per uplink carrier frequency. The 3 additional radio links can either be from the Serving E-DCH radio link set or can be Non-Serving radio links on the same uplink carrier frequency.

##### 5.1.2.2 Active set update delay

The active set update delay is defined as the time from when the UE has received the ACTIVE SET UPDATE message from UTRAN, or at the time stated through the activation time when to perform the active set update, to the time when the UE successfully uses the set of radio links stated in that message for power control.

The active set update delay is depending on the number of known cells referred to in the ACTIVE SET UPDATE message. A cell is known if it has been measured by the UE during the last 5 seconds and the SFN of the cell has been decoded by the UE.

And the phase reference is the primary CPICH.

The active set update delay shall be less than  $50+10*KC+100*OC$  ms, where

KC: is the number of known cells in the active set update message;

OC: is the number of cells that are not known in the active set update message.

If the UE have radio links in the active set that it can not use for data detection (due to low signal level), the UE shall at least every 150 ms search for the radio link

### 5.1.2.3 Interruption Time

The UE shall not interrupt the data flow when adding, changing or removing radio links to the active set.

## 5.2 FDD/FDD Hard Handover

### 5.2.1 Introduction

The hard handover procedure is initiated from UTRAN with a RRC message that implies a hard handover, see TS 25.331 section 8.3.5.

### 5.2.2 Requirements

#### 5.2.2.1 Hard handover delay

Procedure delay for all procedures, that can command a hard handover, are specified in TS25.331 section 13.5.2.

When the UE receives a RRC message implying hard 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 within  $D_{handover}$  seconds 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 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 defined in TS25.331 Section 13.5.2 plus the interruption time stated in section 5.2.2.2.

#### 5.2.2.2 Interruption time

The interruption time, i.e. the time between the last TTI containing a transport block on the old DPCH and the time the UE starts transmission of the new uplink DPCH, is depending on whether the target cell is known for the UE or not.

If intra-frequency hard handover is commanded or inter-frequency hard handover is commanded when the UE does not need compressed mode to perform inter-frequency measurements, and if higher layers do not indicate that the UE shall not perform any synchronisation procedure for timing maintained intra- or inter-frequency hard handover, the interruption time shall be less than  $T_{interrupt1}$

$$T_{interrupt1} = T_{IU} + T_{sync} + 20 * KC + 150 * OC + 10 * F_{max} \text{ ms}$$

where



$T_{IU}$	is the interruption uncertainty when changing the timing from the old to the new cell. $T_{IU}$ can be up to one frame (10 ms).
KC	is the number of known target cells in the message, and
OC	is the number of target cells that are not known in the message.
$F_{max}$	denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.
$T_{sync}$	is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 section 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.

In the interruption requirement  $T_{interrupt1}$  a cell is known if it has been measured by the UE during the last 5 seconds and the SFN of the cell has been decoded by the UE.

If inter-frequency hard handover is commanded and the UE needs compressed mode to perform inter-frequency measurements and if higher layers do not indicate that the UE shall not perform any synchronisation procedure for timing maintained intra- or inter-frequency hard handover, the interruption time shall be less than  $T_{interrupt2}$

$$T_{interrupt2} = T_{IU} + T_{sync} + 50 * KC + 150 * OC + 10 * F_{max} \text{ ms}$$

In the interruption requirement  $T_{interrupt2}$  a cell is known if the cell has been measured by the UE during the last 5 seconds.

If intra-frequency hard handover is commanded or if inter-frequency hard handover is commanded when the UE does not need compressed mode to perform inter-frequency measurements, and if higher layers do indicate that the UE shall not perform any synchronisation procedure for timing maintained intra- or inter-frequency hard handover, the interruption time shall be less than  $T_{interrupt3}$

$$T_{interrupt3} = 20 * KC + 150 * OC + 10 * F_{max} \text{ ms}$$

In the interruption requirement  $T_{interrupt3}$  a cell is known if the cell has been measured by the UE during the last 5 seconds or the timing of the cell is signalled from higher layers by the signal "Reference time difference to cell" in [16], with the signalled accuracy lower than or equal to 40 chips.

If inter-frequency hard handover is commanded and if higher layers do indicate that the UE shall not perform any synchronisation procedure for timing maintained intra- or inter-frequency hard handover, the interruption time shall be less than  $T_{interrupt4}$

$$T_{interrupt4} = 50 * KC + 150 * OC + 10 * F_{max} \text{ ms}$$

In the interruption requirement  $T_{interrupt4}$  a cell is known if the cell has been measured by the UE during the last 5 seconds or the timing of the cell is signalled from higher layers by the signal "Reference time difference to cell" in [16], with the signalled accuracy lower than or equal to 40 chips.

The phase reference is the primary CPICH.

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

## 5.3 FDD/TDD Handover

### 5.3.1 Introduction

The purpose of FDD/TDD handover is to change the radio access mode from FDD to TDD. The FDD/TDD handover procedure is initiated from UTRAN with a RRC message that implies a hard handover as described in [16].

## 5.3.2 Requirements

The requirements in this section shall apply to UE supporting FDD and TDD.

### 5.3.2.1 FDD/TDD handover delay

RRC procedure performance values for all RRC procedures, that can command a hard handover, are specified in [16].

When the UE receives a RRC message implying FDD/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 within  $D_{\text{handover}}$  seconds 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 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:

- $D_{\text{handover}}$  equals the RRC procedure performance value as defined in [16] plus the interruption time stated in section 5.3.2.2.

### 5.3.2.2 Interruption time

The interruption time, i.e. the time between the end of the last TTI containing a transport block on the old DPDCH and the time the UE starts transmission of the new uplink DPCH, is dependent on whether the target cell is known for the UE or not.

If FDD/TDD handover is commanded, the interruption time shall be less than,

$$T_{\text{interrupt}} = T_{\text{offset}} + T_{\text{UL}} + 30 * F_{\text{SFN}} + 20 * \text{KC} + 180 * \text{UC} + 10 * F_{\text{max}} \text{ ms}$$

where,

$T_{\text{offset}}$	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
$T_{\text{UL}}$	Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell
$F_{\text{SFN}}$	Equal to 1 if SFN decoding is required and equal to 0 otherwise
KC	Equal to 1 if a known target cell is indicated in the RRC message implying FDD/TDD handover and equal to 0 otherwise
UC	Equal to 1 if an unknown target cell is indicated in the RRC message implying FDD/TDD handover and equal to 0 otherwise
$F_{\text{max}}$	denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

An inter-frequency TDD target cell shall be considered known by the UE, if the target cell has been measured by the UE during the last 5 seconds.

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

## 5.4 FDD/GSM Handover

### 5.4.1 Introduction

The purpose of inter-RAT handover from UTRAN FDD to GSM is to transfer a connection between the UE and UTRAN FDD to GSM. The handover procedure is initiated from UTRAN with a RRC message (HANDOVER FROM UTRAN COMMAND). The procedure is described in TS25.331 section 8.3.7.

Compressed mode according to the UE Capability may be used to be able to make measurements on GSM.

### 5.4.2 Requirements

The requirements in this section shall apply to UE supporting FDD and GSM.

The requirements given below in Tables 5.2 and 5.3 for the case where the UE has not synchronised to the GSM cell before receiving the HANDOVER FROM UTRAN 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. If after 800 ms the UE has not synchronised to the GSM cell it shall follow the handover failure procedure specified in [16].

#### 5.4.2.1 Handover delay

When the UE receives a RRC HANDOVER FROM UTRAN 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 TS 45.010) on the channel of the new RAT within the value in table 5.2 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 TS 45.010) on the channel of the new RAT at the designated activation time + interruption time.

The UE shall process the RRC procedures for the RRC HANDOVER FROM UTRAN COMMAND within 50 ms, which is noted as RRC procedure delay. If the activation time is used, it corresponds to the CFN of the UTRAN channel.

**Table 5.2: FDD/GSM handover -handover delay**

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	90
The UE has not synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	190

#### 5.4.2.2 Interruption time

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 in table 5.3.

**Table 5.3: FDD/GSM handover - interruption time**

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	40
The UE has not synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	140

## 5.4a FDD to E-UTRAN FDD Handover

### 5.4a.1 Introduction

The purpose of inter-RAT handover from UTRAN FDD to E-UTRAN FDD is to transfer a connection between the UE and UTRAN FDD to E-UTRAN FDD. The handover procedure is initiated from UTRAN with a RRC message (HANDOVER FROM UTRAN COMMAND). The procedure is described in TS 25.331.

Compressed mode according to the UE Capability may be used to be able to make measurements on E-UTRAN.

### 5.4a.2 Requirements

The requirements in this section shall apply to UE supporting FDD and E-UTRAN FDD.

#### 5.4a.2.1 Handover delay

When the UE receives a RRC HANDOVER FROM UTRAN COMMAND message, the UE shall be ready to start the transmission of the new uplink PRACH channel within  $D_{\text{handover}}$  seconds from the end of the last TTI containing the RRC command, where:

- $D_{\text{handover}}$  equals the maximum RRC procedure delay defined plus the interruption time stated in section 5.4a.2.2.

The UE shall process the RRC procedures for the RRC HANDOVER FROM UTRAN COMMAND within 50 ms, which is noted as RRC procedure delay.

#### 5.4a.2.2 Interruption time

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

When inter-RAT handover to E-UTRAN is commanded, the interruption time shall be less than  $T_{\text{interrupt}}$ :

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

Where:

$T_{\text{search}}$  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  $T_{\text{search}} = 0$  ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then  $T_{\text{search}} = 80$  ms.

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

NOTE: The actual value of  $T_{\text{IU}}$  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 requirements during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in [24].

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

## 5.4b FDD to E-UTRAN TDD Handover

### 5.4b.1 Introduction

The purpose of inter-RAT handover from UTRAN FDD to E-UTRAN TDD is to transfer a connection between the UE from UTRAN FDD to E-UTRAN TDD. The handover procedure is initiated from UTRAN with a RRC message (HANDOVER FROM UTRAN COMMAND). The procedure is described in TS 25.331 section 8.3.7.

Compressed mode according to the UE Capability may be used to be able to make measurements on E-UTRAN.

### 5.4b.2 Requirements

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

#### 5.4b.2.1 Handover delay

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

Where:

$D_{\text{handover}}$  equals the maximum RRC procedure delay defined plus the interruption time stated in section 5.4b.2.2.

The UE shall process the RRC procedures for the RRC HANDOVER FROM UTRAN COMMAND within 50 ms, which is noted as RRC procedure delay.

#### 5.4b.2.2 Interruption time

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

When inter-RAT handover to E-UTRAN is commanded, the interruption time shall be less than  $T_{\text{interrupt}}$

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

Where:

$T_{\text{search}}$  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  $T_{\text{search}} = 0$  ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then  $T_{\text{search}} = 80$  ms.

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

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

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in [24].

## 5.5 Cell Re-selection in CELL\_FACH

### 5.5.1 Introduction

The UE shall evaluate the cell re-selection criteria specified in TS 25.304, based on radio measurements, and if a better cell is found that cell is selected.

## 5.5.2 Requirements

The Cell reselection delays specified below are applicable when the RRC parameter  $T_{\text{reselection}}$  is set to 0. Otherwise the Cell reselection delay is increased  $T_{\text{reselection}} S$ .

The measurements CPICH Ec/Io and CPICH RSCP shall be used for cell reselection in Cell-FACH state to another FDD cell, P-CCPCH RSCP shall be used for cell re-selection to a TDD cell, GSM carrier RSSI shall be used for cell re-selection to a GSM cell and E-UTRA RSRP and RSRQ shall be used for cell re-selection to a E-UTRAN cell. The accuracies of the measurements used for a cell-reselection in an AWGN environment shall comply with the requirements in section 9. The measurements used for S-criteria and cell re-selection evaluation in CELL\_FACH shall be performed according to section 8.4.

### 5.5.2.1 Cell re-selection delay

For UTRA FDD the cell re-selection delay is defined as the time between the occurrence of an event which will trigger Cell Reselection process and the moment in time when the UE starts sending the the preambles on the PRACH for sending RRC CELL UPDATE message to the UTRAN.

For UTRA TDD, the cell re-selection delay is defined as the time between the occurrence of an event which will trigger the cell re-selection process and the moment in time when the UE starts sending the RRC CELL UPDATE message to the UTRAN on the RACH.

For GSM and E-UTRAN, the cell re-selection delay is defined as the time between the occurrence of an event which will trigger Cell Reselection process and the moment in time when the UE starts sending the random access in the target cell of the new RAT.

#### 5.5.2.1.1 Intra frequency cell reselection

The cell re-selection delay in CELL\_FACH state to a cell in the same frequency shall be less than

$$T_{\text{reselection, intra}} = T_{\text{identify, intra}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms}$$

where

$T_{\text{identify, intra}}$  is specified in 8.4.2.2.1.

$T_{\text{IU}}$  is the interruption uncertainty when changing the timing from the old to the new cell.  $T_{\text{IU}}$  can be up to one frame (10 ms).

$T_{\text{SI}}$  = The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell..

$T_{\text{RA}}$  = The additional delay caused by the random access procedure.

If a cell has been detectable at least  $T_{\text{identify, intra}}$ , the cell reselection delay in CELL\_FACH state to a cell in the same frequency shall be less than

$$T_{\text{reselection, intra}} = T_{\text{Measurement_Period Intra}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms}$$

where

$T_{\text{Measurement,Period Intra}}$  = Specified in 8.4.2.2.2.

These requirements assume radio conditions to be sufficient, so reading of system information can be done without errors.

#### 5.5.2.1.2 Inter frequency cell reselection

The cell re-selection delay in CELL\_FACH state to a FDD cell on a different frequency shall be less than

$$T_{\text{reselection, inter}} = T_{\text{identify, inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms}$$

.where

$T_{\text{identify, inter}}$  is specified in 8.4.2.3.1.

$T_{\text{IU}}$  is the interruption uncertainty when changing the timing from the old to the new cell.  $T_{\text{IU}}$  can be up to one frame (10 ms).

$T_{\text{SI}}$  = The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell..

$T_{\text{RA}}$  = The additional delay caused by the random access procedure.

If a cell has been detectable at least  $T_{\text{identify, inter}}$ , the cell reselection delay in CELL\_FACH state to a FDD cell on a different frequency shall be less than

$$T_{\text{reselection, inter}} = T_{\text{Measurement, inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms}$$

where

$T_{\text{Measurement, inter}}$  = Specified in 8.4.2.3.2.

These requirements assume radio conditions to be sufficient, so that reading of system information can be done without errors.

### 5.5.2.1.3 FDD-TDD cell reselection

The requirements in this section shall apply to UE supporting FDD and TDD.

The cell re-selection delay in CELL\_FACH state in FDD to an inter frequency TDD cell shall be less than

$$T_{\text{reselection, TDD}} = T_{\text{identifyTDDinter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms}$$

where

$T_{\text{identify, TDD inter}}$  is specified in 8.4.2.4.1.

$T_{\text{IU}}$  is the interruption uncertainty when changing the timing from the old to the new cell.  $T_{\text{IU}}$  can be up to one frame (10 ms).

$T_{\text{SI}}$  is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in [16] for a UTRAN cell.

$T_{\text{RA}}$  is the additional delay caused by the random access procedure.

If a cell has been detectable at least  $T_{\text{identify TDD inter}}$ , the cell re-selection delay in CELL\_FACH state to an inter-frequency TDD cell shall be less than,

$$T_{\text{reselection, TDD}} = T_{\text{Measurement TDD inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms}$$

where

$T_{\text{Measurement TDD inter}}$  is specified in 8.4.2.4.1.

These requirements assume radio conditions to be sufficient, so that reading of system information can be done without errors.

### 5.5.2.1.4 FDD-GSM Cell Reselection

The cell re-selection delay in CELL\_FACH state to a GSM cell shall be less than

$$T_{\text{reselection, GSM}} = T_{\text{identify, GSM}} + T_{\text{measurement, GSM}} + 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

$T_{\text{BCCH}}$  = the maximum time allowed to read BCCH data from GSM cell [21].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure.

where

a) For UE requiring measurement occasions.

$T_{\text{identify, GSM}}$  is specified in 8.4.2.5.2.1

$$T_{\text{measurement, GSM}} = \text{Max} \left\{ 8 \cdot \frac{N_{\text{carriers}}}{N_{\text{GSM carrier RSSI}}} \cdot T_{\text{meas}}, 4 * T_{\text{meas}}, 480\text{ms} \right\}$$

where:

$N_{\text{carriers}}$  is the number of GSM carriers in the Inter-RAT cell info list

$N_{\text{GSM carrier RSSI}}$  is specified in 8.4.2.5.1.

b) For UE not requiring measurement occasions

$T_{\text{identify, GSM}} = 150 \text{ ms}$

$T_{\text{measurement, GSM}} = 480 \text{ ms}$

#### 5.5.2.1.5 FDD-E-UTRAN Cell Reselection

The cell re-selection delay in CELL\_FACH state to a E-UTRAN cell shall be less than

$$T_{\text{reselection, E-UTRAN}} = T_{\text{identify, E-UTRAN}} + 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

$T_{\text{BCCH}}$  = the maximum time allowed to read BCCH data from a E-UTRAN cell [24].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure.

If a cell has been detectable for at least  $T_{\text{identify, E-UTRAN}}$ , the cell reselection delay in CELL\_FACH state to a E-UTRAN cell on shall be less than

$$T_{\text{reselection, E-UTRAN}} = T_{\text{measurement, E-UTRAN}} + 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

where

a) For UE requiring measurement occasions.

$T_{\text{identify, E-UTRAN}}$  and  $T_{\text{measurement, E-UTRAN}}$  are specified in 8.4.2.6.2

b) For UE not requiring measurement occasions

$T_{\text{identify, E-UTRAN}} = 480 \text{ ms}$

$T_{\text{measurement, E-UTRAN}} = 60 \text{ ms}$

#### 5.5.2.1.6 Void

#### 5.5.2.1A Cell reselection delay to CSG cells

NOTE: The requirements in this section are minimum requirements defined to ensure the testability of autonomous CSG search, and are only applicable when the 2<sup>nd</sup> DRX cycle is configured, with a DRX cycle length of equal to or greater than 1280msec.

Reselection from non CSG to CSG cells may be performed using UE autonomous search as defined in [1] when at least one CSG ID is included in the UE's CSG whitelist. The requirements in this section are valid for reselection to CSG



cells previously visited by the UE when the radio configuration parameters, including the carrier frequency and physical cell identity of the CSG cell, non CSG cell and other neighbour cells are unchanged from the most recent previous visit.

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

#### 5.5.2.1A.1 Reselection from a non CSG FDD to an inter-frequency FDD CSG cell

The UE shall perform search and reselection to an allowed inter-frequency FDD CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 5.3A. There is no need for statistical testing of this requirement. When performing autonomous CSG search or reselection to the CSG cell, the UE shall also meet the existing cell reselection requirements defined in section 5.5.2.1.1-5.5.2.1.5. Where applicable, the interruption time requirement of section 5.5.2.2 shall apply. This requirement is not applicable if the SIB3 repetition period in the CSG cell is the same length as the 2<sup>nd</sup> DRX cycle in the serving cell and SIB3 transmissions partially or wholly overlap periods in which the UE is expected to receive HS-SCCH in the serving cell.

**Table 5.3A: Parameters for CSG inter-frequency FDD reselection**

Parameter	Unit	Cell 1	Cell 2
UARFCN <sup>Note1</sup>		Channel 1	Channel 2
CSG indicator		False	True
Primary scrambling code <sup>Note1</sup>		Scrambling code 1	Scrambling code 2
CSG identity		Not sent	Sent (Already stored in UE whitelist from previous visit)
Propagation conditions		Static, non multipath	
CSG cell previously visited by UE		Yes	
CPICH_RSCP <sup>Note2</sup>	dBm	-100	-100
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCCPCH_Ec/Ior	dB	-12	-12
AICH_Ec/Ior	dB	-15	-15
SCH_Ec/Ior	dB	-15	-15
PICH_Ec/Ior	dB	-15	-15
$I_{oc}$	dBm/3.84 MHz	Off	Off

Note 1: For this requirement to be applicable, the UARFCN and scrambling code for cell 1 and cell 2 shall be unchanged from when the CSG cell was visited previously.

Note 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE.

#### 5.5.2.1A.2 Reselection from a non CSG FDD to an inter-RAT E-UTRA CSG cell

The UE shall perform search and reselection to an allowed inter-RAT E-UTRA CSG cell that has met CSG reselection criterion defined in [1] and that is in its whitelist, within 6 minutes in the conditions shown in table 5.3B. There is no need for statistical testing of this requirement. When performing autonomous CSG search or reselection to the CSG cell, the UE shall also meet the existing cell reselection requirements defined in section 5.5.2.1.1-5.5.2.1.5. Where applicable, the interruption time requirement of section 5.5.2.2 shall apply.

Table 5.3B: Parameters for CSG inter-RAT E-UTRA reselection

Parameter	Unit	Cell 1	Cell 2	
UARFCN <sup>Note1</sup>		Channel 1	N/A	
EARFCN <sup>Note1</sup>		N/A	Channel 2	
CSG indicator		False	True	
Primary scrambling code <sup>Note1</sup>		Scrambling code 1	N/A	
Physical cell identity <sup>Note1</sup>		N/A	2	
CSG identity		Not sent	Sent (Already stored in UE whitelist from previous visit)	
Propagation conditions		Static, non multipath		
CSG cell previously visited by UE		Yes		
CPICH_RSCP <sup>Note2</sup>	dBm	-100	N/A	
CPICH_Ec/lor	dB	-10		
PCCPCH_Ec/lor	dB	-12		
SCCPCH_Ec/lor	dB	-12		
AICH_Ec/lor	dB	-15		
SCH_Ec/lor	dB	-15		
PICH_Ec/lor	dB	-15		
$I_{oc}$	dBm/3.84 MHz	Off		
PBCH_RA	dB	N/A	0	
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
Qrxlevmin	dBm			-140
$N_{oc}$	dBm/15 kHz			Off
RSRP <sup>Note2</sup>	dBm/15 KHz			-110

Note 1: For this requirement to be applicable, the UARFCN and scrambling code for cell 1 and the EARFCN and physical cell identity for cell 2 shall be unchanged from when the CSG cell was visited previously

Note 2: Chosen to ensure that CSG autonomous search has a high probability of success on every attempt made by UE

### 5.5.2.2 Interruption time

The requirements on interruption time below are valid when the signal quality of the serving cell is good enough to allow decoding of the FACH channel during the cell reselection.

#### 5.5.2.2.1 FDD-FDD cell reselection

The interruption time, i.e. the time between the last TTI the UE monitors the FACH channel on the serving cell and the time the UE starts transmit the preambles on the PRACH for sending the RRC CELL UPDATE message in the target cell.

When intra-frequency cell reselection, or inter-frequency cell reselection when the UE does not need measurement occasion to perform inter-frequency measurements occurs, the interruption time shall be less than  $T_{interrupt1}$

$$T_{\text{interrupt1}} = T_{\text{IU}} + 20 + T_{\text{RA}} \text{ ms}$$

where

- $T_{\text{IU}}$  is the interruption uncertainty when changing the timing from the old to the new cell.  $T_{\text{IU}}$  can be up to one frame (10 ms).  
 $T_{\text{RA}}$  The additional delay caused by the random access procedure.

When inter-frequency cell reselection occurs and the UE needs measurement occasions to perform inter-frequency measurements, the interruption time shall be less than  $T_{\text{interrupt2}}$

$$T_{\text{interrupt2}} = T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms}$$

where

- $T_{\text{SI}}$  the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331.

In CELL\_FACH state the MTCH interruption time due to intra-frequency cell reselection without soft combining during an MBMS session shall be less than  $T_{\text{MTCH\_interrupt}}$  as specified in section 4.2.2.10.

#### 5.5.2.2.2 FDD-TDD cell reselection

The requirements in this section shall apply to UE supporting FDD and TDD.

The interruption time, is defined as the time period between the last TTI the UE monitors the FACH on the serving cell and the time instant the UE starts to transmit the RRC CELL UPDATE message in the target inter-frequency TDD cell on the RACH.

In case of inter-frequency cell reselection to a TDD cell and when the UE needs measurement occasions to perform inter-frequency TDD measurements, the interruption time shall be less than

$$T_{\text{interrupt1, TDD}} = T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms}$$

In case of inter-frequency cell reselection to a TDD cell and when the UE does not need measurement occasions to perform inter-frequency TDD measurements, the interruption time shall be less than

$$T_{\text{interrupt2, TDD}} = T_{\text{IU}} + 20 + T_{\text{RA}} \text{ ms}$$

where

- $T_{\text{IU}}$  is the interruption uncertainty when changing the timing from the old to the new cell.  $T_{\text{IU}}$  can be up to one frame (10 ms).  
 $T_{\text{SI}}$  is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in [16].  
 $T_{\text{RA}}$  is the additional delay caused by the random access procedure.

#### 5.5.2.2.3 FDD-GSM cell reselection

The interruption time, i.e. the time between the last TTI the UE monitors the FACH channel and the time the UE starts transmit a RACH in the target GSM cell.

When FDD-GSM cell reselection occurs the interruption time shall be less than  $T_{\text{interrupt, GSM}}$

$$T_{\text{interrupt, GSM}} = 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

where

- $T_{\text{BCCH}}$  = the maximum time allowed to read BCCH data from the GSM cell [21].  
 $T_{\text{RA}}$  = The additional delay caused by the random access procedure.

### 5.5.2.3 Measurement and evaluation of cell selection criteria S of serving cell

The S-criteria detection delay is defined as the time between the occurrence of an event which leads to that the cell selection criteria S for serving cell is not fulfilled and the moment in time when the UE detects that the cell selection criteria S for serving cell is not fulfilled.

The UE shall filter the CPICH Ec/Io and CPICH RSCP measurements used for cell selection criteria S evaluation of the serving cell over at least 3 measurement periods  $T_{\text{Measurement\_Period Intra}}$ .

The S-criteria detection delay in CELL\_FACH state shall be less than:

$$T_{\text{S-criteria}} = 5 \times T_{\text{Measurement\_Period Intra}} \text{ ms}$$

where

$$T_{\text{Measurement\_Period Intra}} = \text{Specified in 8.4.2.2.2.}$$

The UE is "out of service area" if the UE has evaluated for 4 s that that the serving cell does not fulfil the cell selection criterion S and if the UE has not found any new suitable cell based on searches and measurements of the neighbour cells indicated in the measurement control system information during these 4 s. When the UE is "out of service area" it shall initiate cell selection procedures for the selected PLMN as defined in [1].

On transition from CELL\_DCH to CELL\_FACH, if a UE cannot find a suitable UTRA cell, then it is considered to be "out of service area" and shall perform actions according to [16].

If the S criterion of the serving cell is no longer fulfilled, the UE may suspend MBMS reception if necessary to improve the UE's ability to find a suitable cell.

If the S criterion of the serving cell is fulfilled, the measurement requirements when a MBMS reception is active are specified in section 8.4.

#### 5.5.2.2.4 FDD-E-UTRA Cell Reselection

The interruption time, i.e. the time between the last TTI the UE monitors the FACH channel and the time the UE starts transmit a RACH in the target E-UTRAN cell.

When FDD-E-UTRAN cell reselection occurs the interruption time shall be less than  $T_{\text{interrupt, E-UTRAN}}$ .

$$T_{\text{interrupt, E-UTRAN}} = 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

where

$T_{\text{BCCH}}$  = The maximum time allowed to read BCCH data from the E-UTRAN cell [24].

$T_{\text{RA}}$  = The additional delay caused by the random access procedure.

## 5.6 Cell Re-selection in CELL\_PCH

### 5.6.1 Introduction

The UE shall evaluate the cell re-selection criteria specified in TS 25.304, based on radio measurements, and if a better cell is found that cell is selected.

### 5.6.2 Requirements

Requirements for cell re-selection in CELL\_PCH are the same as for cell re-selection in idle mode, see section 4.2. UE shall support all DRX cycle lengths in table 4.1 and table 4.2, according to [16].

## 5.7 Cell Re-selection in URA\_PCH

### 5.7.1 Introduction

The UE shall evaluate the cell re-selection criteria specified in TS 25.304, based on radio measurements, and if a better cell is found that cell is selected.

### 5.7.2 Requirements

Requirements for cell re-selection in URA\_PCH are the same as for cell re-selection in idle mode, see section 4.2. UE shall support all DRX cycle lengths in table 4.1 and table 4.2, according to [16].

## 5.8 RACH reporting

### 5.8.1 Introduction

The network may request the UE to report on RACH cell CPICH levels for the serving cell and up to 6 strongest monitored set cells and SFN-SFN observed time difference between the serving cell and up to 6 different monitored set cells.

### 5.8.2 Requirements

If all of the following conditions are true, the UE is allowed to have an additional delay of  $N_{\text{RACH}} * 50$  ms in RACH transmission compared to the normal RACH transmission delay:

- SFN-SFN observed time difference measurement results are required to be reported on RACH;
- The set of cells on which the SFN-SFN observed time difference measurement is to be reported has changed since the previous RACH measurement report;
- The UE has not measured the SFN-SFN observed time differences for the cells to be reported on RACH in the CELL\_FACH state according to the requirements defined in Section 8.4.2.2.

If at least one of the previous conditions is false, the UE shall be able to report the requested measurement results on RACH within a normal RACH transmission delay.

$N_{\text{RACH}}$  is the number of cells requiring SFN decoding prior to the reporting of SFN-SFN observed time difference measurement results on RACH.

## 5.9 Inter-RAT cell change order from UTRAN in CELL\_DCH and CELL\_FACH

### 5.9.1 Introduction

The purpose of inter-RAT cell change order from UTRAN FDD to GSM is to transfer a connection between the UE and UTRAN FDD to GSM. This procedure may be used in CELL\_DCH and CELL\_FACH state. The cell change order procedure is initiated from UTRAN with a RRC message (CELL CHANGE ORDER FROM UTRAN). The procedure is described in TS25.331 section 8.3.11.

NOTE: No procedure is defined for Inter-RAT cell change order from UTRAN to E-UTRAN.

## 5.9.2 Requirements

The requirements in this section shall apply to UE supporting FDD and GSM.

### 5.9.2.1 Delay

When the UE receives a RRC CELL CHANGE ORDER FROM UTRAN COMMAND with the activation time "now" or earlier than the value in table 5.4 from the end of the last TTI containing the RRC command, the UE shall start transmit the random access in the target cell of the new RAT within the value in table 5.4 from the end of the last TTI containing the RRC command.

If the access is delayed to an indicated activation time later than the value in table 5.4 from the end of the last TTI containing the RRC command, the UE shall start transmit the random access in the target cell of the new RAT at the designated activation time.

The UE shall process the RRC procedures for the RRC CELL CHANGE ORDER FROM UTRAN COMMAND within 50 ms. If the activation time is used, it corresponds to the CFN of the UTRAN channel.

**Table 5.4: Inter-RAT cell change order from UTRAN - delay**

UE synchronisation status	delay [ms]
The UE has synchronised to the GSM cell before the CELL CHANGE ORDER FROM UTRAN COMMAND is received	$90 + T_{BCCH} + T_{RA}$
The UE has not synchronised to the GSM cell before the CELL CHANGE ORDER FROM UTRAN COMMAND is received	$190 + T_{BCCH} + T_{RA}$

where

$T_{BCCH}$  = the maximum time allowed to read BCCH data from the GSM cell [21];  
 $T_{RA}$  = the additional delay caused by the random access procedure.

### 5.9.2.2 Interruption time

The requirements on interruption time below is valid when the signal quality of the serving cell is good enough to allow decoding of the old channel during the inter-RAT cell change order from UTRAN delay.

The interruption time, i.e. the time between the end of the last TTI containing a transport block that the UE is able to receive on the old channel and the time the UE starts transmit the random access in the target cell, shall be less than the value in table 5.5. The requirement in table 5.5 for the case, that UE is not synchronised to the GSM cell before the CELL CHANGE ORDER FROM UTRAN COMMAND is received, is valid when the signal quality of the GSM cell is good enough for successful synchronisation with one attempt.

**Table 5.5: Inter-RAT cell change order from UTRAN - interruption time**

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the CELL CHANGE ORDER FROM UTRAN COMMAND is received	$40 + T_{BCCH} + T_{RA}$
The UE has not synchronised to the GSM cell before the CELL CHANGE ORDER FROM UTRAN COMMAND is received	$140 + T_{BCCH} + T_{RA}$

where

$T_{BCCH}$  = the maximum time allowed to read BCCH data from the GSM cell [21].  
 $T_{RA}$  = the additional delay caused by the random access procedure

## 5.10 Serving HS-DSCH cell change

### 5.10.3 Introduction

The serving HS-DSCH procedure is initiated from UTRAN with a RRC message that implies a change of the serving HS-DSCH cell, see TS 25.331 section 8.2.2

### 5.10.2 Requirements

#### 5.10.2.1 Serving HS-DSCH cell change delay

Procedure delay for all procedures, that can command a HS-DSCH cell change are specified in TS25.331 section 13.5.2.

When the UE receives a RRC message implying HS-DSCH cell change 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 receive the HS-SCCH channel from the new cell within  $D_{\text{cell\_change}}$  seconds 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 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 HS-DPCCH at the designated activation time + interruption time.

where:

$D_{\text{cell\_change}}$  equals the RRC procedure delay defined in TS25.331 Section 13.5.2 plus the interruption time of receiving HS-DSCH data stated in section 5.10.2.2.

#### 5.10.2.2 Interruption time

The HS-DSCH interruption time is the time between the last received TTI that can contain a transport block on the old HS-PDSCH and the time when the UE is ready to transmit CQI reports based on the quality of the new cell and the UE have started to receive the HS-SCCH of the new cell. The interruption time is depending on whether the target cell is known for the UE or not.

If serving HS-DSCH cell change is commanded to a cell in the active set the HS-DSCH interruption time shall be less than  $T_{\text{interrupt1}}$

$$T_{\text{interrupt1}} = T_{\text{IU}} + 22 \text{ ms}$$

If an active set update, which includes a cell into the active set where the cell is known, and serving HS-DSCH cell change is simultaneously commanded to the same cell the HS-DSCH interruption time shall be less than  $T_{\text{interrupt2}}$

$$T_{\text{interrupt2}} = T_{\text{IU}} + 42 \text{ ms}$$

where  $T_{\text{IU}}$  is the interruption uncertainty when changing the timing from the old to the new cell.  $T_{\text{IU}}$  can be up to one subframe (2 ms).

The phase reference is the primary CPICH.

## 5.11 Enhanced Serving HS-DSCH cell change

### 5.11.1 Introduction

The enhanced serving HS-DSCH cell change procedure is initiated from UTRAN either with a RRC message that implies a change of the serving HS-DSCH cell or through an HS-SCCH order sent on the target cell (target cell is the cell which becomes the serving cell after the enhanced serving HS-DSCH cell change procedure).

## 5.11.2 Requirements

When the UE receives a RRC message implying enhanced HS-DSCH cell change, the serving cell change delay and interruption time requirements are as defined in Section 5.10.

When the UE receives an HS-SCCH order from the target cell that implies enhanced HS-DSCH serving cell change:

- if the activation time is not equal to “now”, the UE shall be ready to receive the full configured HS-SCCH set from the target cell within  $\text{MAX}\{40 \text{ ms, activation time} - \text{the end of the TTI containing the HS-SCCH order}\}$  from the end of the TTI containing the HS-SCCH order.
- if the activation time is set to “now”, the UE shall be ready to receive the full configured HS-SCCH set within 40 ms from the end of the TTI containing the HS-SCCH order.

## 5.12 Interruption on Primary Uplink Frequency in DC-HSUPA

### 5.12.1 Introduction

When the UE is configured with dual uplink carrier frequencies, the transmission interruption on the primary uplink frequency can occur due to the activation or deactivation of the secondary serving HS-DSCH cell or of the serving E-DCH cell on the secondary uplink frequency.

The activation or deactivation procedure for the secondary serving HS-DSCH cell or the serving E-DCH cell on the secondary uplink frequency, is initiated from UTRAN with an HS-SCCH order [18], which implies activation or deactivation of the secondary serving HS-DSCH cell or the serving E-DCH cell on the secondary uplink frequency.

### 5.12.2 Requirements

The interruption time on the primary uplink frequency,  $T_{\text{interrupt}}$ , starts from the end of the last DPCCCH slot which overlaps with the HS-DPCCCH subframe containing the ACK corresponding to the HS-SCCH order for the activation or deactivation of the secondary serving HS-DSCH cell or the serving E-DCH cell on the secondary uplink frequency. The UE shall be ready to resume transmission of each physical channel on the primary uplink frequency at the next slot, subframe or frame after  $T_{\text{interrupt}} = 4 \text{ ms}$ , depending on the channel timing relationship defined in [2] (next slot for DPCCCH and next subframe for HS-DPCCCH/2ms TTI E-DCH). This requirement applies when the UE is configured with dual uplink carrier frequencies.

## 5.13 System information acquisition for CSG cell

### 5.13.1 Introduction

The requirements in this section apply to a UE which supports system information acquisition of a CSG cell in preparation for handover. Both intra frequency and inter frequency system information reading can be configured, for the inter frequency case the UE may make autonomous gaps in both downlink reception and uplink transmission. For intrafrequency system information acquisition, interruption in downlink reception or uplink transmission shall not be performed to acquire system information.

### 5.13.2 CSG SI acquisition delay

The CSG SI acquisition delay is defined as the time between any occurrences that will trigger a SI decoding until the UE starts to transmit over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. The measurement reporting delay also excludes any RRC procedure delay which is defined in [16] when SI reading is initiated by a measurement control message.

For intra frequency CSG cells, CSG SI decoding is typically triggered when a cell with primary scrambling code in a preconfigured range meets the criteria for measurement reporting. For inter frequency CSG cells, CSG SI decoding is explicitly requested by RRC signalling.

The CSG SI reporting delay shall not be more than  $T_{\text{CSG-SI-Report}}$  where  $T_{\text{CSG-SI-Report}}$  in ms is given by



$$T_{\text{CSG-SI-Report}} = 630 + 40 \cdot \text{SIB3\_REP}$$

SIB3\_REP is the repetition period at which the CSG cell schedules SIB3 blocks in units of frames

This requirement is applicable for CSG target cell configurations where the information required to make the SI report can be determined from the MIB and SIB3 alone, and SIB3 is not segmented into multiple TTI. Additionally, for the requirement to be applicable, the reception conditions shall be such that the system frame number of the target CSG cell, the MIB and SIB3 can each be successfully decoded in no more than four attempts. According to the reception conditions:

A cell shall be considered detectable when:

- CPICH  $E_c/I_o \geq -20$  dB if DL\_DRX\_Active = 0, or CPICH  $E_c/I_o \geq -17$  dB if DL\_DRX\_Active=1,
- SCH  $E_c/I_o \geq -20$  dB if DL\_DRX\_Active = 0, or SCH  $E_c/I_o \geq -17$  dB if DL\_DRX\_Active=1, for at least one channel tap and SCH  $E_c/I_o$  is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

The system frame number, the MIB and SIB3 of the target CSG cell shall be considered decodable provided the BCH demodulation requirements are met according to [3].

### 5.13.3 Interfrequency CSG decoding interruption

When inter frequency CSG SI decoding of a neighbour cell is requested by UTRAN, the UE may interrupt ongoing downlink reception, and uplink transmission to perform the decoding on another frequency. The total of the gaps in reception and the total of the gaps in transmission during the period  $T_{\text{CSG-SI-Report}}$  shall not exceed  $T_{\text{CSG-SI-Interruption}}$  where  $T_{\text{CSG-SI-Interruption}} = 600$ ms. This requirement is applicable for CSG target cell configurations where the information required to make the SI report can be determined from the MIB and SIB3 alone, and SIB3 is not segmented into multiple TTI. Additionally, for the requirement to be applicable, the reception conditions shall be such that the system frame number of the target CSG cell, the MIB and SIB3 can each be successfully decoded in no more than four attempts. According to the reception conditions:

A cell shall be considered detectable when:

- CPICH  $E_c/I_o > -20$  dB,
- SCH  $E_c/I_o > -17$  dB for at least one channel tap and SCH  $E_c/I_o$  is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

The system frame number, the MIB and SIB3 of the target CSG cell shall be considered decodable provided the BCH demodulation requirements are met according to [3].

### 5.13.4 CSG reporting delay

Reporting delay results from delay uncertainty when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH.

## 5.14 System information acquisition for inter-RAT E-UTRA cell

### 5.14.1 Identification of a new CGI of inter-RAT E-UTRA FDD cell with autonomous gaps

The UE shall identify and report the CGI when requested by the UTRAN for the purpose of SI reading. To perform SI reading, the UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message of E-UTRAN cell [27] when the IE "E-UTRA SI Acquisition" is received by the UE [16]. If the autonomous gaps are used for the measurement with the purpose of SI reading, the UE shall be able to identify a new CGI of inter-RAT E-UTRA cell within:

$$T_{\text{identify\_CGI, E-UTRAN}} = T_{\text{basic\_identify\_CGI, E-UTRAN}} \quad \text{ms}$$

Where

$T_{\text{basic\_identify\_CGI, E-UTRAN}} = [300]$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined.

A E-UTRAN cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Section 9.1 of [24] are fulfilled for a corresponding Band,
- $SCH\_RP$  and  $SCH \hat{E}s/Iot$  according to Annex B.4.1 for a corresponding Band.

The MIB of an inter-RAT E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [28].

## 5.14.2 Identification of a new CGI of inter-RAT E-UTRA TDD cell with autonomous gaps

The UE shall identify and report the CGI when requested by the UTRAN for the purpose of SI reading. To perform SI reading, the UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message [27] when the IE "E-UTRA SI Acquisition" is received by the UE [16]. If the autonomous gaps are used for the measurement with the purpose of SI reading, the UE shall be able to identify a new CGI of inter-RAT E-UTRA cell within:

$$T_{\text{identify\_CGI, E-UTRAN}} = T_{\text{basic\_identify\_CGI, E-UTRAN}} \quad ms$$

Where

$T_{\text{basic\_identify\_CGI, E-UTRAN}} = [300]$  ms. This is the time period used in the above equation where the maximum allowed time for the UE to identify a new CGI of E-UTRA cell is defined.

A cell shall be considered identifiable following conditions are fulfilled:

- RSRP related side conditions given in Section 9.1 of [24] are fulfilled for a corresponding Band,
- $SCH\_RP$  and  $SCH \hat{E}s/Iot$  according to Annex B.4.1 for a corresponding Band.

The MIB of an inter-RAT E-UTRA cell whose CGI is identified shall be considered decodable by the UE provided the PBCH demodulation requirements are met according to [28].

## 5.14.3 ECGI reporting delay

Reporting delay results from delay uncertainty when inserting the measurement report to the TTI of the uplink DCCH and the RRC procedure delay. The delay uncertainty is twice the TTI of the uplink DCCH.

# 5.15 Packet Loss Rate on Serving HS-DSCH Cells in Multi-Carrier HSDPA

## 5.15.1 Introduction

A UE according to its measurement capability in the IE, "Inter-frequency measurements on configured carriers without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16] may reconfigure its receiver bandwidth when performing measurements on configured carrier frequencies corresponding to secondary serving HS-DSCH cells. This may cause loss of HS-DSCH reception from those primary and secondary serving HS-DSCH cells whose carrier frequencies belong to the same frequency band as that of the measured configured secondary carrier frequency.

## 5.15.2 Requirements

The probability of not sending ACK/NACK corresponding to HS-DSCH transmitted to a UE by its primary or secondary serving HS-DSCH cell shall not exceed 4% when the UE measures cells on any configured secondary carrier frequency which belongs to the same frequency band as that of the primary or secondary serving HS-DSCH cell.

## 6 RRC Connection Control

### 6.1 RRC Re-establishment

#### 6.1.1 Introduction

RRC connection re-establishment is needed, when a UE in state *CELL\_DCH* loses radio connection due to radio link failure. The procedure when a radio link failure occurs in *CELL\_DCH* is specified in TS 25.331.

#### 6.1.2 Requirements

The requirements in this section are applicable when the UE performs a RRC Re-establishment to a cell belonging to any of the frequencies present in the previous (old) monitored set.

The UE *moves from CELL\_DCH to CELL\_FACH state and* shall be capable of sending a CELL UPDATE message using the cause "radio link failure" within  $T_{RE-ESTABLISH}$  seconds from when the radio link failure occurred.

$T_{RE-ESTABLISH}$  equals the RRC procedure delay ( $T_{RRC-RE-ESTABLISH}$ ) according to TS25.331 plus the UE Re-establishment delay ( $T_{UE-RE-ESTABLISH-REQ}$ ), specified in 6.1.2.1.

$$T_{RE-ESTABLISH} = T_{RRC-RE-ESTABLISH} + T_{UE-RE-ESTABLISH-REQ}$$

##### 6.1.2.1 UE Re-establishment delay requirement

The UE Re-establishment delay requirement ( $T_{UE-RE-ESTABLISH-REQ}$ ) is defined as the time between the moment when radio link failure is considered by the UE, to when the UE starts to send preambles on the PRACH.

$T_{UE-RE-ESTABLISH-REQ}$  is depending on whether the target cell is known by the UE or not. A cell is known if either or both of the following conditions are true:

- the UE has had radio links connected to the cell in the previous (old) active set;
- the cell has been measured by the UE during the last 5 seconds.

And the phase reference is the primary CPICH.

The UE Re-establishment delay requirement  $T_{UE-RE-ESTABLISH-REQ}$  shall be less than

$$T_{UE-RE-ESTABLISH-REQ-KNOWN} = 50\text{ms} + T_{\text{search}} + T_{SI} + T_{RA}$$

in case that the target cell is known, and

$$T_{UE-RE-ESTABLISH-REQ-UNKNOWN} = 50\text{ms} + T_{\text{search}} * NF + T_{SI} + T_{RA}$$

in case that the target cell is not known by the UE.

where

$T_{\text{search}}$  is the time it takes for the UE to search the cell.

$T_{\text{search}} = 100$  ms if the target cell is known by the UE, and

$T_{\text{search}} = 800$  ms if the target cell is not known by the UE.

$T_{SI}$  is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell (ms).

$T_{RA}$  = The additional delay caused by the random access procedure.

NF is the number of different frequencies in the monitored set.

This requirement assumes radio conditions to be sufficient, so that reading of system information can be done without errors.

## 6.2 (void)

## 6.3 Random Access

### 6.3.1 Introduction

The random access procedure is used when establishing the layer 1 communication between the UE and UTRAN. The random access shall provide a fast access but without disturbing ongoing connections. The random access is specified in section 6 of TS 25.214 and the control of the RACH transmission is specified in section 11.2 of TS 25.321. A random access transmit sequence is described in section 6.7.2 of TS 25.303. The UE procedure for selecting 2 or 10 msec TTI when operating Enhanced Uplink in CELL\_FACH is specified in 3GPP TS 25.321 [19].

### 6.3.2 Requirements

The UE shall have capability to calculate initial power according to the open loop algorithm and apply this power level at the first preamble and increase the power on additional preambles. The UE shall stop transmit preambles upon a ACK/NACK on the AICH has been received or if the maximum number of preambles within on cycle has been reached. Upon an ACK has been received the UE shall transmit a message otherwise the ramping procedure shall be repeated.

#### 6.3.2.1 Correct behaviour when receiving an ACK

The UE shall stop transmitting preambles upon a ACK on the AICH has been received and then transmit a message..

The absolute power applied to the first preamble shall have an accuracy as specified in table 6.3 of TS 25.101 [3]. The relative power applied to additional preambles shall have an accuracy as specified in section 6.5.2.1 of 25.101 [3].

#### 6.3.2.2 Correct behaviour when receiving an NACK

The UE shall stop transmitting preambles upon a NACK on the AICH has been received and then repeat the ramping procedure when the back off timer  $T_{B01}$  expires.

#### 6.3.2.3 Correct behaviour at Time-out

The UE shall stop transmit preambles when reaching the maximum number of preambles allowed in a cycle. The UE shall then repeat the ramping procedure until the maximum number of preamble ramping cycles are reached.

#### 6.3.2.4 Correct behaviour when reaching maximum transmit power

The UE shall not exceed the maximum allowed UL TX power configured by the UTRAN.

The absolute power of any preamble shall not exceed the maximum allowed UL TX power with more than specified in section 6.5.

#### 6.3.2.5 Correct behaviour when selecting 2 or 10msec TTI length for Enhanced Uplink in CELL\_FACH state and idle mode

A UE that is capable of 2/10msec TTI selection shall select a preamble signature assigned to 2msec TTI when the TX power headroom based on the TX power on the current preamble according to the method specified in [19] is greater than the threshold value configured by UTRAN plus an accuracy value of 6 dB. The UE shall select a preamble assigned to the 10msec TTI when the TX power headroom based on the TX power calculated on the current preamble according to the method specified in [19] is lower than the threshold value configured by UTRA minus the accuracy value 6 dB. Otherwise, the UE may select a preamble signature assigned to either 2msec or 10msec TTI.

## 6.4 Transport format combination selection in UE

### 6.4.1 Introduction

When the UE estimates that a certain TFC and E-TFC would require more power than the maximum transmit power, it shall limit the usage of transport format combinations for the assigned transport format set, according to the functionality specified in section 11.4 in TS25.321. This is in order to make it possible for the network operator to maximise the coverage. Transport format combination selection is described in section 11.4 of TS 25.321.

When the UE has more than one Activated Uplink Frequency, the UE estimates the power which may be allocated for all Activated Uplink Frequencies. The E-TFC selection when the UE has more than one Activated Uplink Frequency is described in section 11.8.1.4 of TS25.321

### 6.4.2 Requirements

The UE shall continuously evaluate based on the *Elimination*, *Recovery* and *Blocking* criteria defined below, how TFCs on an uplink DPDCH can be used for the purpose of TFC selection. The evaluation shall be performed for every TFC in the TFCS using the estimated UE transmit power.

The UE transmit power estimation for a given TFC, when HS-DPCCH and S-DPCCH are not transmitted during the measurement period, shall be calculated using the DPDCH and DPCCH gain factors of the corresponding TFC and reference transmit power. The reference transmit power is the transmit power of DPCCH and DPDCH of a given TFC during the measurement period for which UE transmit power estimation is made. If a single HS-DPCCH is transmitted either partially or totally within the given measurement period the UE transmit power estimation for a given TFC shall be calculated using DPDCH and DPCCH gain factors, the maximum value of the HS-DPCCH gain factor that is used during the measurement period, and the reference transmit power. If two HS-DPCCHs are transmitted either partially or totally within the given measurement period then a maximum combined transmit power over both of the HS-DPCCHs should be considered in the TFC calculation. Rules for calculating the HS-DPCCH gain factors from the most recent signalled  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI}$  according to the specific multicarrier and MIMO configuration and activation status of the secondary HS-DSCH serving cells are defined in subclause 5.1.2.5A in [18]. The timing of the measurement period, which is defined in 9.1.6.1 as one slot, is the same as the timing of the DPCH slot. If S-DPCCH is transmitted within the given measurement period, the UE transmit power for a given TFC shall be calculated using the DPDCH and DPCCH gain factors, the HS-DPCCH power as described above if one or two HS-DPCCH(s) are present, the S-DPCCH gain factor, and the reference transmit power.

E-TFC selection is allowed only in CELL\_DCH state, CELL\_FACH state, and Idle mode. E-TFC selection is based on the estimated power leftover from TFC selection if the DPDCH is present and from the HS-DPCCH.

When the UE has one Activated Uplink Frequency, the UE shall estimate the normalised remaining power margin available for E-TFC selection based on the following equations for E-TFC candidate  $j$

$$NRPM_j = (P_{Max_j} - P_{DPCCCH,target} - P_{S-DPCCH} - P_{DPDCH} - P_{HS-DPCCH} - P_{E-DPCCH,j}) / P_{DPCCCH,target} \quad (1),$$

$$NRPM_j = 0.5 * (P_{Max_j} - P_{DPCCCH,target} - P_{S-DPCCH} - P_{HS-DPCCH} - P_{E-DPCCH,j} - P_{S-E-DPCCH,j}) / P_{DPCCCH,target} \quad (2),$$

where

Equation (2) is used when estimating the candidate E-TFCs for potential rank-2 transmissions for UL MIMO, and equation (1) is used in all other cases.

$P_{Max_j}$  = Maximum UE transmitter power for E-TFC- $j$  as defined in section 6.5

$P_{DPCCCH}(t)$  represents a slotwise estimate of the current UE DPCCH power at time  $t$ . If at time  $t$ , the UE is transmitting a compressed mode frame then  $P_{DPCCCH,comp}(t) = P_{DPCCCH}(t) \times (N_{pilot,c} / N_{pilot,N})$  else  $P_{DPCCCH,comp}(t) = P_{DPCCCH}(t)$ . If the UE is not transmitting uplink DPCCH during the slot at time  $t$ , either due to compressed mode gaps or when discontinuous uplink DPCCH transmission operation is enabled then the power shall not contribute to the filtered result. Samples of  $P_{DPCCCH,comp}(t)$  shall be filtered using a filter period of 3 slotwise estimates of  $P_{DPCCCH,comp}(t)$  when the E-DCH TTI is 2ms or 15 slotwise estimates of  $P_{DPCCCH,comp}(t)$  when the E-DCH TTI is 10ms to give  $P_{DPCCCH,filtered}$ . The accuracy of the  $P_{DPCCCH}$  estimate shall be at least that specified in table 6.0A

If the target E-DCH TTI for which  $NRPM_j$  evaluated does not correspond to a compressed mode frame then  $P_{DPCCCH,target} = P_{DPCCCH,filtered}$ .

If the target E-DCH TTI for which  $NRPM_j$  is being evaluated corresponds to a compressed mode frame then  $P_{DPCCH,target} = P_{DPCCH,filtered} \times (N_{pilot,N} / N_{pilot,C}) \cdot N_{pilot,N}$  and  $N_{pilot,N}$  and  $N_{pilot,C}$  are numbers of pilot symbols as defined in [18].

$P_{DPDCH}$  = estimated DPDCH transmit power, based on  $P_{DPCCH,target}$  and the gain factors from the TFC selection that has already been made. If the target E-DCH TTI for which  $NRPM_j$  is being evaluated corresponds to a compressed mode frame then the modification to the gain factors which occur due to compressed mode shall be included in the estimate of  $P_{DPDCH}$ .

$P_{HS-DPCCH}$  = estimated HS-DPCCH transmit power based on the maximum HS-DPCCH gain factor and  $P_{DPCCH,target}$ . If two HS-DPCCHs are transmitted,  $P_{HS-DPCCH}$  is the maximum combined estimated transmit power over both HS-DPCCHs. Rules for calculating the HS-DPCCH gain factors from the most recent signalled  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI}$  according to the specific multicarrier and MIMO configuration and activation status of the secondary HS-DSCH serving cells are defined in subclause 5.1.2.5A in [18]. If the target E-DCH TTI for which  $NRPM_j$  is being evaluated corresponds to a compressed mode frame then the modification to the gain factors which occur due to compressed mode shall be included in the estimate of  $P_{HS-DPCCH}$ .

$P_{E-DPCCH,j}$  = estimated E-DPCCH transmit power for E-TFCl<sub>j</sub>, as follows:

- For estimating the remaining power margin for a single transport block in an E-DCH TTI (UL MIMO not configured, or rank1 with UL MIMO configured); If E-TFCl<sub>j</sub> is smaller than or equal to  $E-TFCl_{ec,boost}$  the estimate is based on  $P_{DPCCH,target}$  and the E-DPCCH gain factor calculated using the most recent signalled value of  $\Delta_{E-DPCCH}$ . If E-TFCl<sub>j</sub> is greater than  $E-TFCl_{ec,boost}$  the estimate is based on the E-DPCCH gain factor,  $\beta_{ec,j}$ , which is calculated for E-TFCl<sub>j</sub> using the procedure in [18]. If the target E-DCH TTI for which  $NRPM_j$  is being evaluated corresponds to a compressed mode frame then the modification to the gain factors which occur due to compressed mode shall be included in the estimate of  $P_{E-DPCCH}$
- For estimating the remaining power margin for transmission of two transport blocks in an E-DCH TTI (Rank2 UL MIMO); The estimate is based on the E-DPCCH gain factor,  $\beta_{ec,j}$ , which is calculated for E-TFCl<sub>j</sub> using the procedure in [18] assuming  $E-TFCl_{ec,boost} = -1$ .

$P_{S-E-DPCCH,j}$  = estimated S-E-DPCCH transmit power for E-TFCl<sub>j</sub>. The estimate is based on the S-E-DPCCH gain factor,  $\beta_{ec,j}$ , which is calculated for E-TFCl<sub>j</sub> as defined in [18].

$P_{S-DPCCH}$  = estimated S-DPCCH transmit power, based on  $P_{DPCCH,target}$  and the S-DPCCH gain factor. In case neither the uplink CLTD operation nor uplink MIMO operation is configured or one of the two is configured with CLTD activation state 2 or 3,  $P_{S-DPCCH}$  is considered as zero.

NOTE:  $P_{DPCCH}(t)$ ,  $P_{Max,j}$ ,  $P_{DPCCH,target}$ ,  $P_{DPCCH,filtered}$ ,  $P_{DPCCH,comp}(t)$ ,  $P_{DPDCH}$ ,  $P_{HS-DPCCH}$ ,  $P_{S-DPCCH}$ ,  $P_{E-DPCCH}$  and  $P_{S-E-DPCCH}$  are expressed in linear power units

In CELL\_FACH state and Idle mode, if less than 3 E-DCH TTIs of DPCCH transmission for 2ms TTI and less than 2 E-DCH TTIs of DPCCH transmission for 10ms TTI is configured prior to the start of the E-DCH transmissions, an estimate of  $P_{DPCCH,target} = P_{preamble} + P_{p-e}$  shall be used for initial E-TFC restriction.  $P_{preamble}$  is the code power of the last transmitted PRACH preamble, and  $P_{p-e}$  is the power offset between the power of the last transmitted preamble and the initial DPCCH transmission power.

The UE shall consider the *Elimination* criterion for a given TFC to be detected if the estimated UE transmit power needed for this TFC is greater than the Maximum UE transmitter power for at least X out of the last Y successive measurement periods immediately preceding evaluation. The MAC in the UE shall consider that the TFC is in Excess-Power state for the purpose of TFC selection.

MAC in the UE shall indicate the available bit rate for each logical channel to upper layers within  $T_{notify}$  from the moment the *Elimination* criterion was detected.

The UE shall consider the *Recovery* criterion for a given TFC to be detected if the estimated UE transmit power needed for this TFC has not been greater than the Maximum UE transmitter power for the last Z successive measurement periods immediately preceding evaluation. The MAC in the UE shall consider that the TFC is in Supported state for the purpose of TFC selection.

MAC in the UE shall indicate the available bit rate for each logical channel to upper layers within  $T_{notify}$  from the moment the *Recovery* criterion was detected.

The evaluation of the *Elimination* criterion and the *Recovery* criterion shall be performed at least once per radio frame.

The definitions of the parameters X,Y and Z which shall be used when evaluating the *Elimination* and the *Recovery* criteria when no compressed mode patterns are activated are given in Table 6.0.

**Table 6.0: X, Y, Z parameters for TFC selection**

X	Y	Z
15	30	30

The UE shall consider the *Blocking* criterion for a given TFC to be fulfilled at the latest at the start of the longest uplink TTI after the moment at which the TFC will have been in Excess-Power state for a duration of:

$$(T_{\text{notify}} + T_{\text{modify}} + T_{\text{L1\_proc}})$$

where:

$T_{\text{notify}}$  equals 15 ms, and

$T_{\text{modify}}$  equals  $\text{MAX}(T_{\text{adapt\_max}}, T_{\text{TTI}})$ , and

$T_{\text{L1\_proc}}$  equals 15 ms, and

$T_{\text{adapt\_max}}$  equals  $\text{MAX}(T_{\text{adapt\_1}}, T_{\text{adapt\_2}}, \dots, T_{\text{adapt\_N}})$ , and

N equals the number of logical channels that need to change rate, and

$T_{\text{adapt\_n}}$  equals the time it takes for higher layers to provide data to MAC in a new supported bitrate, for logical channel n. For services where no codec is used  $T_{\text{adapt}}$  shall be considered to be equal to 0 ms. For services where either UMTS\_AMR2 or UMTS\_AMR\_WB is used,  $T_{\text{adapt}}$  shall be considered to be equal to the time required to switch from the current codec mode to a new supported codec mode. In that case  $T_{\text{adapt}}$  equals 20 ms + 40 ms per codec mode switch. E.g.  $T_{\text{adapt}}$  equals 60ms if one codec mode switch is necessary and  $T_{\text{adapt}}$  equals 140ms if 3 codec mode switches are necessary.

$T_{\text{TTI}}$  equals the longest uplink TTI of the selected TFC (ms).

When the UE has one Activated Uplink Frequency, the UE shall be able to update the normalised remaining power estimate of each E-TFC at least every E-DCH TTI. The UE shall use the latest available estimate of  $\text{NRPM}_j$  at the time when all absolute and relative grants relating to the E-DCH TTI under consideration have been received. Using the estimates of  $\text{NRPM}_j$  the UE shall evaluate for each E-TFC which configured MAC-d flows are supported and which are unsupported as follows:

In the case that the target E-DCH TTI for which E-TFC restriction is being considered does not belong to a compressed mode frame then if  $\text{NRPM}_j \geq \sum (\beta_{\text{ed},j} / \beta_c)^2$  then E-TFC<sub>j</sub> can be supported, otherwise it cannot be supported

In the case that the target E-DCH TTI for which E-TFC restriction is being considered belongs to a compressed mode frame then if  $\text{NRPM}_j \geq \sum (\beta_{\text{ed},j} / \beta_{\text{c},C})^2$  then E-TFC<sub>j</sub> can be supported, otherwise it cannot be supported

$\beta_{\text{ed},j} / \beta_c$  and  $\beta_{\text{ed},j} / \beta_{\text{c},C}$  is the quantized amplitude ratio.

If the UE is allowed to reduce its maximum transmit power for certain TFCs and E-TFCs, the UE shall use the reduced maximum transmit power in the evaluation of the TFC and E-TFC selection criteria for those TFCs.

When the UE has more than one Activated Uplink Frequency, if the TTIs configured on the uplink carrier frequencies are at a common TTI boundary, the UE shall estimate the remaining power which is available to be allocated to scheduled E-DCH transmissions on all Activated Uplink Frequencies. The total available power for scheduled E-DCH transmissions is defined by:

$$P_{\text{remaining},s} = \max(P_{\text{Max}} - \sum_i P_{\text{DPCCH,target},i} - P_{\text{HS-DPCCH}} - P_{\text{DPDCH}} - P_{\text{non-SG}}, 0)$$

If the TTIs configured on the uplink carrier frequencies are not at a common TTI boundary and Activated Uplink Frequency k is configured with 10ms TTI, the total available power for scheduled E-DCH transmissions is defined by:

$$P_{\text{remaining},s} = \max(P_{\text{Max}} - \sum_i P_{\text{DPCCH,target},i} - P_{\text{HS-DPCCH}} - P_{\text{DPDCH}} - P_{\text{non-SG}} - P_k, 0)$$

The power  $P_k$  is the power of activated uplink frequency k, estimated by using the current filtered power of the DPCCH and the power offset for the E-TFC of the transmission for the carrier

where

$P_{Max}$  represents the Maximum UE Transmitter power, as defined in Section 6.5.

- $P_{DPCCH,i}(t)$  represents a slotwise estimate of the current UE DPCCH power for carrier with index  $i$  ( $i=0,1$ ) at time  $t$ . If at time  $t$ , the UE is transmitting a compressed mode frame then  $P_{DPCCH,comp,i}(t) = P_{DPCCH,i}(t) \times (N_{pilot,C}/N_{pilot,N})$  else  $P_{DPCCH,comp,i}(t) = P_{DPCCH,i}(t)$ . If the UE is not transmitting uplink DPCCH on the Activated Uplink Frequency  $i$  during the slot at time  $t$ , either due to compressed mode gaps or when discontinuous uplink DPCCH transmission operation is enabled then the power shall not contribute to the filtered result. Samples of  $P_{DPCCH,comp,i}(t)$  shall be filtered using a filter period of 3 slotwise estimates of  $P_{DPCCH,comp,i}(t)$  if a 2ms TTI is in use on carrier  $i$ , or a filter period of 15 slotwise estimates of  $P_{DPCCH,comp,i}(t)$  if a 10ms TTI is in use on carrier  $i$ . The accuracy of the  $P_{DPCCH,i}$  estimate shall be at least that specified in table 6.0A

If the target E-DCH TTI for which RPM is being evaluated does not correspond to a compressed mode frame then  $P_{DPCCH,target,i} = P_{DPCCH,filtered,i}$ .

If the target E-DCH TTI for which RPM is being evaluated corresponds to a compressed mode frame then  $P_{DPCCH,target,i} = P_{DPCCH,filtered,i} \times (N_{pilot,N}/N_{pilot,C})$ .  $N_{pilot,N}$  and  $N_{pilot,C}$  are numbers of pilot symbols as defined in [18].

- $P_{HS-DPCCH}$  represents the estimated HS-DPCCH transmit power and shall be calculated based on the estimated Primary Activated Frequency DPCCH power, and the greatest HS-DPCCH gain factor and assuming the maximum possible activity of HS-DPCCH over a 10ms period if a 10ms TTI is in use. If two HS-DPCCHs are transmitted,  $P_{HS-DPCCH}$  is the maximum combined estimated transmit power from both HS-DPCCHs. Rules for calculating the HS-DPCCH gain factors from the most recent signalled  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI}$  according to the specific multicarrier and MIMO configuration and activation status of the secondary HS-DSCH serving cells are defined in subclause 5.1.2.5A in [18].
- $P_{DPDCH}$  represents estimated DPDCH transmit power on Primary Activated Frequency based on  $P_{DPDCH,target}$  and the gain factors from the TFC selection that has already been made. If the target E-DCH TTI for which NRPM<sub>j</sub> is being evaluated corresponds to a compressed mode frame then the modification to the gain factors which occur due to compressed mode shall be included in the estimate of  $P_{DPDCH}$ .
- $P_{non-SG}$  represents the power pre-allocated for non-scheduled transmissions for Primary Uplink Frequency, as defined by [19]. An estimate of the E-DPCCH power required for non-scheduled transmissions may be included in  $P_{non-SG}$ .

When the UE has more than one Activated Uplink Frequency and no retransmission is required, or when the UE has more than one Activated Uplink Frequency and two retransmissions are required, the UE shall estimate the normalised remaining power margin available for E-TFC selection using the power allocated to the Primary Uplink Frequency  $P_{allocated,1}$  and the power allocated to the Secondary Uplink Frequency  $P_{allocated,2}$  defined by:

$$P_{allocated,1} = P_1 + P_{non-SG},$$

$$P_{allocated,2} = P_2$$

where

$P_i$  represents the maximum remaining allowed power for scheduled transmissions for the Activated Uplink Frequency  $i = 1,2$ , where index 1 and index 2 correspond to the index of the Primary Uplink Frequency and the index of the Secondary Uplink Frequency as defined by [19]

When the UE has more than one Activated Uplink Frequency and one retransmission is required in one Activated Uplink Frequency, the UE shall estimate the normalised remaining power margin available for E-TFC selection using the power allocated to the Activated Uplink Frequency for which a retransmission is required  $P_{allocated,x}$  and on the power allocated to the Activated Uplink Frequency for which no retransmission is required  $P_{allocated,y}$  defined by:

$$P_{allocated,y} = P_{Max} - P_{HS-DPCCH} - \sum_i P_{DPCCH,target,i} - P_{DPDCH} - P_{E-DPCCH,x} - P_{E-DPDCH,x}$$

$$P_{allocated,x} = P_{E-DPCCH,x} + P_{E-DPDCH,x}$$

where

$P_{E-DPDCH,x}$  represents the estimated E-DPDCH transmit power for the Uplink Frequency for which a retransmission is required. The estimate is based on  $P_{DPCCH,target,x}$  where  $x$  is denoting the index of the Activated Uplink Frequency on which a retransmission required and the E-DPDCH gain factor which will be used for the retransmission.



$P_{E-DPCCH,x}$  represents the estimated E-DPCCH transmit power for the Uplink Frequency for which a retransmission is required. The estimate is based on  $P_{DPCCH,target,x}$  where  $x$  is denoting the index of the Activated Uplink Frequency on which a retransmission is required and the E-DPCCH gain factor which will be used for the retransmission.

When the UE has more than one Activated Uplink Frequency, the UE shall estimate the normalised remaining power margin available for E-TFC selection for the Activated Uplink Frequency  $i$  based on the following equation for E-TFC candidate  $j$ :

$$NRPM_{i,j} = (P_{allocated,i} - P_{E-DPCCH,i}) / P_{DPCCH,target,i}$$

where

$P_{E-DPCCH,j,i}$  represents the estimated E-DPCCH transmit power for E-TFC $_j$  on the Activated Uplink Frequency  $i$ . If E-TFC $_j$  is smaller than or equal to  $E-TFCI_{ec,boost}$  the estimate is based on  $P_{DPCCH,target,i}$  and the E-DPCCH gain factor calculated using the most recent signalled value of  $\Delta_{E-DPCCH}$ . If E-TFC $_j$  is greater than  $E-TFCI_{ec,boost}$  the estimate is based on the E-DPCCH gain factor,  $\beta_{ec,j}$ , which is calculated for E-TFC $_j$  using the procedure in [18]. If the target E-DCH TTI for which  $NRPM_{j,i}$  is being evaluated corresponds to a compressed mode frame then the modification to the gain factors which occur due to compressed mode shall be included in the estimation.

In the case that the target E-DCH TTI for which E-TFC restriction is being considered does not belong to a compressed mode frame then if  $NRPM_{j,i} \geq \sum(\beta_{ed,j}/\beta_c)^2$  then E-TFC $_j$  can be supported on the Activated Uplink Frequency  $i$ , otherwise it cannot be supported on that Activated Uplink Frequency.

In the case that the target E-DCH TTI for which E-TFC restriction is being considered belongs to a compressed mode frame then if  $NRPM_{j,i} \geq \sum(\beta_{ed,c,j}/\beta_{c,c})^2$  then E-TFC $_j$  can be supported on the Activated Uplink Frequency  $i$ , otherwise it cannot be supported on that Activated Uplink Frequency.

$\beta_{ed,j}/\beta_c$  and  $\beta_{ed,c,j}/\beta_{c,c}$  is the quantized amplitude ratio.

**Table 6.0A : Accuracy requirements for the estimate of  $P_{DPCCH}$  used in E-TFC restriction**

Total UE output power value (dBm)	$P_{DPCCH}$ accuracy(dB) (note 1)
25<= total output power <34	note 2
24<= total output power <25	±2.0
23<= total output power <24	±2.0
22<= total output power <23	±2.0
21<= total output power <22	±2.0
20<= total output power <21	±2.5
19<= total output power <20	±3.0
18<= total output power <19	±3.5
17<= total output power <18	±4.0
16<= total output power <17	±4.0
15<= total output power <16	±4.0
14<= total output power <15	±4.0
13<= total output power <14	±4.0 (power class 4) ±6.0 (power class 3)
12<= total output power <13	±4.0 (power class 4) ±6.0 (power class 3)
11<= total output power <12	±4.0 (power class 4) ±6.0 (power class 3)
-50<= total output power <11	±6.0
NOTE 1: $P_{DPCCH}$ accuracy is the difference between the estimate of $P_{DPCCH}$ used by the UE for the purposes of E-TFC selection and the actual power of the DPCCH being transmitted	
NOTE 2: No tolerance is specified.	

## 6.5 Maximum allowed UL TX Power

The Maximum UE transmitter power is defined as follows

$$\text{Maximum UE transmitter power} = \text{MIN} \{ \text{Maximum allowed UL TX Power}, P_{MAX} \}$$

Where

- Maximum allowed UL TX Power is set by UTRAN and defined in [16], and
- $P_{MAX}$  is the UE nominal maximum transmit power is defined by the UE power class, and specified in table 6.1 of [3]

For DB-DC-HSUPA, the UE transmit power is considered to be the sum of the transmit powers on both bands.

The UE shall not exceed the Maximum allowed UL TX Power, as set by the UTRAN with the tolerances as defined for the UE transmitted power (section 9.1.6). For UE output powers that are outside the range covered by the UE transmitted power measurement the UE output power shall not exceed the Maximum allowed UL TX Power with more than the tolerances specified for the Open loop power control in TS 25.101 section 6.4.1.

For TFC selection the UE is allowed to reduce  $P_{MAX}$  when HS-DPCCH is transmitted by the TFC-MPR values specified in table 6.1

**Table 6.1: TFC-MPR used for TFC selection**

Inputs for TFC selection		TFC-MPR (dB)
Case	Ratio of $\beta_c$ to $\beta_d$ for all values of $\beta_{hs}$	
1	$1/15 \leq \beta_c/\beta_d \leq 12/15$	0
2	$13/15 \leq \beta_c/\beta_d \leq 15/8$	1
3	$15/7 \leq \beta_c/\beta_d \leq 15/0$	2

When the UE has one Activated Uplink Frequency for E-TFC selection the UE is allowed to reduce  $P_{MAX}$  by the realistic E-TFC MPR values specified in Table 6.2

**Table 6.2: E-TFC-MPR used for E-TFC selection for one Activated Uplink Frequency**

Case	Inputs for E-TFC selection					E-DPDCH		E-TFC-MPR (dB)
	$\beta_c$	$\beta_{hs}$	$\beta_d$	$\beta_{ec}$	$\beta_{ed}$	SFmin	Ncodes	
	1	>0	0	0	>0	>0	$\geq 4$	
2	>0	$\geq 0$	0	>0	>0	2	4	0.50
3	>0	0	>0	>0	>0	$\geq 4$	1	0.75
4	>0	>0	>0	>0	>0	$\geq 4$	1	1.50
5	>0	$\geq 0$	>0	>0	>0	4	2	0.75
6	>0	$\geq 0$	>0	>0	>0	2	2	0.50
NOTE: For inputs $\{\beta_c, \beta_{hs}, \beta_d, \beta_{ec}, \beta_{ed}, SFmin, Ncodes\}$ not specified above the E-TFC-MPR (dB) = 0								

For E-TFC selection, when the UE has more than one Activated Uplink Frequency in DC-HSUPA and DB-DC-HSUPA, the UE is allowed to account for maximum power reduction at any point in the procedure described in Section 6.4.2. The total E-TFC MPR applied across the Activated Uplink Frequencies shall not exceed the maximum value specified in [3].

## 6.6 (void)

# 6.7 CSG Proximity Indication for E-UTRAN and UTRAN

## 6.7.1 Introduction

The requirements defined in this section are applicable to a UE supporting and configured with CSG proximity indication and are valid when a UE is entering the proximity of one or more CSG member cell(s) or leaving the proximity of all CSG member cell(s) on a UTRA or E-UTRA frequency as specified in [16].

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

## 6.7.2 Requirements

The UE shall initiate transmission of the *ProximityIndication* message with "entering" according to [16] within [6] minutes after entering the proximity of one or more CSG member cell(s) on a UTRA or E-UTRA frequency.

The UE shall initiate transmission of the *ProximityIndication* message with "leaving" according to [16] within [6] minutes after leaving the proximity of all CSG member cell(s) on a UTRA or E-UTRA frequency.

There is no need for statistical testing of this requirement.

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

# 6.8 10ms Mode/20ms Mode switching in DCH

## 6.8.1 Introduction

When DL\_DCH\_FET\_Config [7] is configured by higher layers, the UE shall continuously evaluate based on the *Restrict* and *Revive* criteria defined below, what transmission mode can be used for each TFC on an uplink DPDCH. The evaluation shall be performed for every TFC in the TFCS using the estimated UE transmit power using 10ms Mode  $\beta_c$  and  $\beta_d$  gain factors, if signalled by higher layers.

## 6.8.2 Requirements

The UE shall estimate the transmit power for a TFC in 10ms Mode, following the procedure in Subclause 6.4 using  $\beta_c$  and  $\beta_d$  gain factors corresponding to 10ms Mode.

The UE shall consider the *Restrict* criterion for a given TFC transmission mode to be detected if the estimated UE transmit power needed for this TFC using the 10ms Mode is greater than the Maximum UE transmitter power for at least K out of the last M successive measurement periods immediately preceding evaluation.

The UE shall consider the *Revive* criterion for a given TFC to be detected if the estimated UE transmit power needed for this TFC using the 10ms Mode has not been greater than the Maximum UE transmitter power for the last L successive measurement periods immediately preceding evaluation.

The evaluation of the *Restrict* criterion and the *Revive* criterion shall be performed at least once per radio frame, except if UL DPCCH is DTXed according to Subclause 6C.2 of [18] in all slots in one radio frame.

The parameters K, L and M are signalled by the higher layers.

## 7 Timing and Signalling characteristics

### 7.1 UE Transmit Timing

#### 7.1.1 Introduction

The UE shall have capability to follow the frame timing change of the connected Node B. The uplink DPCCH/DPDCH frame transmission takes place approximately  $T_0$  chips after the reception of the first detected path (in time) of the corresponding downlink DPCCH/DPDCH or F-DPCH frame, from the reference cell.  $T_0$  is defined in [2]. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements.

#### 7.1.2 Requirements

The UE initial transmission timing error shall be less than or equal to  $\pm 1.5$  Chips. This requirement applies at the first transmission on the DPCCH/DPDCH. The reference point for the UE initial transmit timing control requirement shall be the time when the first detected path (in time) of the corresponding downlink DPCCH/DPDCH or F-DPCH frame is received from the reference cell plus  $T_0$  chips.  $T_0$  is defined in [2].

When the UE is not in soft handover, the reference cell shall be the one the UE has in the active set. **In case the UE is initially allocated in soft handover, the reference cell shall be the same cell as used for calculating the initial CFN as defined in [16].**

The cell, which is selected as a reference cell, shall remain as a reference cell even if other cells are added to the active set. In case that the reference cell is removed from the active set the UE shall start adjusting its transmit timing no later than the time when the whole active set update message is available at the UE taking the RRC procedure delay into account.

When the UE has performed a timing-maintained intra- or inter-frequency hard handover and higher layers has indicated that the UE shall not perform any synchronisation procedure for timing maintained intra- or inter-frequency hard handover, or when the UE attempts to re-establish all dedicated physical channel(s) after an inter-RAT, intra- or inter-frequency hard-handover failure [18], it shall resume UL transmission with the same transmit timing as used immediately before the handover attempt. After resuming transmission, transmit timing adjustment requirements defined in the remainder of this clause apply.

The UE shall be capable of changing the transmission timing according to the received downlink DPCCH/DPDCH or F-DPCH frame. When the transmission timing error between the UE and the reference cell exceeds  $\pm 1.5$  chips the UE is required to adjust its timing to within  $\pm 1.5$  chips.

All adjustments made to the UE timing shall follow these rules:

- 1) The maximum amount of the timing change in one adjustment shall be  $\frac{1}{4}$  Chip.
- 2) The minimum adjustment rate shall be 233ns per second.
- 3) The maximum adjustment rate shall be  $\frac{1}{4}$  chip per 200ms.

In particular, within any given  $800 \cdot d$  ms period, the UE transmit timing shall not change in excess of  $\pm d$  chip from the timing at the beginning of this  $800 \cdot d$  ms period, where  $0 \leq d \leq 1/4$ .

### 7.2 UE Receive - Transmit Time Difference

#### 7.2.1 Introduction

The UE shall have the capability to be in soft handover with more than one cell. The downlink DPCH frame timing or the downlink F-DPCH frame timing shall take place approximately  $T_0$  chips before the transmission of the uplink DPDCH/DPCCH. The adjustment requirements for the uplink DPDCH/DPCCH timing are specified in 7.1.1. The valid range of the Receive to Transmit time difference at the UE is defined in the following requirements.

## 7.2.2 Requirements

A UE shall support reception, demodulation and combining of signals of a downlink DPCH, or a downlink F-DPCH, when the receive timing is within a window of  $T_0 \pm 148$  chip before the transmit timing where  $T_0$  is defined in [2].

For downlink DPCH a UE is only required to react to TPC commands with a transmit power adjustment in the immediate next slot if the downlink receive timing of all cells in the active set is within a window of  $T_0 \pm 148$  chip before the uplink transmit timing.

For downlink F-DPCH, a UE is only required to react to TPC commands with a transmit power adjustment in the immediate next slot after the end of the TPC command combining period as defined in [18] if the downlink receive timing of all cells in the active set is within a window of  $T_0 \pm 148$  chip before the uplink transmit timing.

If the downlink receive timing of one or more cells in the active set is outside the window of  $T_0 \pm 148$  chip, the UE may also react with a power adjustment one slot later. The receive timing is defined as the first detected path in time.

## 7.3 UE timer accuracy

### 7.3.1 Introduction

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

### 7.3.2 Requirements

For UE timers  $T_{3xx}$ ,  $T_{\text{barred}}$ ,  $T_{\text{reselection}}$ ,  $T_{\text{penalty\_time}}$ ,  $T_{\text{CRmax}}$ ,  $T_{\text{CRmaxHyst}}$  [16], UE shall comply with the timer accuracies according to Table 7.1.

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

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

**Table 7.1**

Timer value [s]	Accuracy
timer value <4	$\pm 0.1$ s
timer value $\geq 4$	$\pm 2.5$ %

## 7.4 PRACH Burst timing accuracy

### 7.4.1 Introduction

The UE shall have capability to transmit the PRACH burst according to the timing of the received access slot [18]. The PRACH burst timing accuracy is defined in the following requirement.

### 7.4.2 Requirements

The UE PRACH burst timing error shall be less than or equal to  $\pm 3.5$  Chips. The reference point shall be the expected timing calculated from the UE's reference detected path of the P-CCPCH.

## 8 UE Measurements Procedures

### 8.1 General Measurement Requirements in CELL\_DCH State

#### 8.1.1 Introduction

This section contains requirements on the UE regarding measurement reporting in CELL\_DCH state. The requirements are split in FDD intra frequency, FDD inter frequency, TDD, GSM and E-UTRAN measurements. These measurements may be used by the UTRAN, e.g. for handover decisions. The measurements are defined in TS 25.215, the measurement model is defined in TS 25.302 and measurement accuracies are specified in section 9. Control of measurement reporting is specified in TS 25.331 and parallel measurements are specified in section 8.2. Compressed mode is specified in TS 25.215.

If UE indicates support for increased UE carrier monitoring UTRA or increased carrier monitoring E-UTRA, the measurement performance for different carriers may be configured by higher layers to be either normal or reduced. A measurement scaling factor [16] defining the relaxation to be applied to the requirements for carriers measured with reduced measurement performance is signalled by higher layers and has the possible settings shown in table 8.0a.

**Table 8.0a: Measurement scaling factor Configurations supported by the UE**

	Measurement scaling factor information element setting	$K_n$	$K_r$
SF_UTRA_CF1	8	8/7	8
SF_UTRA_CF2	16	16/15	16

If no reduced performance group carrier is configured, the UE shall consider all carriers to have normal performance. If no measurement scaling factor is configured, a UE indicating support for increased carrier monitoring UTRA or increased carrier monitoring E-UTRA shall monitor at least the number of carriers specified in section 8.1.2.1 and 8.4.2.1 and is not required to monitor the increased number of carriers specified in section 8.1.2.1a and 8.4.2.1a.

The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring UTRA [16, 31] are calculated as defined in section 8.1.2.3 provided that  $N_{\text{freq},n} \leq 2$  or if all FDD interfrequency carriers are indicated to have normal performance. The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring E-UTRA [16, 31] are calculated as defined in section 8.1.2.6 provided that  $N_{\text{freq},E\text{-UTRA},n} \leq 4$  for a UE capable of either FDD E-UTRA carriers or TDD E-UTRA carrier monitoring or  $N_{\text{freq},E\text{-UTRA},n} \leq 8$  for a UE capable of both FDD and TDD E-UTRA carrier monitoring provided  $N_{\text{freq},E\text{-UTRA},n,\text{FDD}} \leq 4$  and  $N_{\text{freq},E\text{-UTRA},n,\text{TDD}} \leq 4$  or if all E-UTRA carriers are indicated to have normal performance.

Capabilities for number of carriers to monitor for UE which indicates support for Increased UE carrier monitoring UTRA or E-UTRA are specified in section 8.1.2.1a.

#### 8.1.2 Requirements

##### 8.1.2.1 UE Measurement Capability

In CELL\_DCH state, when a single uplink carrier frequency is configured, the UE shall be able to monitor up to

- 32 intra frequency FDD cells (including active set); and
- 32 inter frequency cells, including
  - FDD cells distributed on up to 2 additional FDD carriers; and
  - Depending on UE Capability, TDD cells, distributed on up to 3 TDD carriers; and

- Depending on UE capability, 32 GSM cells distributed on up to 32 GSM carriers; and
- Depending on UE capability, 4 E-UTRA FDD cells per E-UTRA FDD carrier for up to 4 E-UTRA FDD carriers; and
- Depending on UE capability, 4 E-UTRA TDD cells per E-UTRA TDD carrier for up to 4 E-UTRA TDD carriers; and
- Depending on UE capability, the UE shall be able to monitor up to 16 intra frequency cells during IPDL gaps.

In addition to the requirements defined above, a UE supporting E-UTRA measurements shall be capable of monitoring a minimum total of at least 8 carrier frequency layers, including the intra-frequency serving layer and comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 cells).

In CELL\_DCH state, when dual uplink carrier frequencies are configured, the UE shall be able to monitor up to

- 32 intra frequency FDD cells (including active set) per intra frequency carrier, and
- 32 inter frequency cells, including
  - FDD cells distributed on up to 2 additional FDD carriers and
  - Depending on UE Capability, TDD cells, distributed on up to 3 TDD carriers and
- Depending on UE capability, 32 GSM cells distributed on up to 32 GSM carriers and
- Depending on UE capability, 4 E-UTRA FDD cells per E-UTRA FDD carrier for up to 4 E-UTRA FDD carriers and
- Depending on UE capability, 4 E-UTRA TDD cells per E-UTRA TDD carrier for distributed on up to 4 E-UTRA TDD carriers and
- Depending on UE capability, the UE shall be able to monitor up to 16 intra frequency cells during IPDL gaps.

In addition to the requirements defined above, a UE supporting E-UTRA measurements shall be capable of monitoring a minimum total of at least 9 carrier frequency layers, including the two intra-frequency carriers and comprising of any above defined combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 cells).

If the UE utilises compressed mode for inter-frequency and/or inter-RAT measurements, in order for the requirements in the following subsections to apply the UTRAN must:

- provide transmission gap pattern sequences with  $TGPL1 > 1$ , and
- ensure that with the activation of one or more transmission gap pattern sequences, no more than two frames contain a transmission gap within any window of three consecutive frames, and
- ensure that there is a minimum of 8 slots between the end of the first transmission gap and the beginning of the second transmission gap in case of two successive compressed frames.

Performance requirements for different types of transmission gap pattern sequences and different number of cells is defined in the following sections.

The requirements in section 9 are applicable for a UE performing measurements according to this section.

The received CPICH  $E_c/I_o$  is defined as

$$\left( \frac{CPICH - E_c}{I_o} \right) \Big|_{in \text{ dB}} = \left( \frac{CPICH - E_c}{I_{or}} \right) \Big|_{in \text{ dB}} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in \text{ dB}}$$

and the received SCH  $E_c/I_o$  is defined as

$$\left( \frac{SCH - E_c}{I_o} \right) \Big|_{in \text{ dB}} = \left( \frac{SCH - E_c}{I_{or}} \right) \Big|_{in \text{ dB}} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in \text{ dB}}$$

### 8.1.2.1a UE Measurement Capability (Increased UE carrier monitoring)

UE which indicates support for Increased UE carrier monitoring UTRA according to capabilities in [16,31] shall additionally be capable of monitoring at least

80 inter-frequency cells, including

- 5 FDD UTRA inter-frequency carriers with up to 32 cells per carrier.

UE which indicates support for increased UE carrier monitoring E-UTRA according to capabilities in [16,31] shall be capable of monitoring at least

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

In addition to the requirements defined above, a UE supporting E-UTRA measurements and supporting Increased UE carrier monitoring UTRA or increased UE carrier monitoring E-UTRA according to capabilities in [16,31] shall be capable of monitoring a total of at least 13 carrier frequency layers, which includes serving layer, comprising of any above defined combination of of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD and GSM layers (one GSM layer corresponds to 32 cells).

### 8.1.2.2 FDD intra frequency measurements

During the CELL\_DCH state the UE shall continuously measure identified intra frequency cells and search for new intra frequency cells in the monitoring set. In case the network requests the UE to report detected set cells, the UE shall also search for intra frequency cells outside the monitored and active set. Cells, which are neither included in the active set nor in the monitored set, and are identified by the UE belong to the detected set according to TS 25.331. If compressed mode pattern sequences are activated, intra frequency measurements can be performed between the transmission gaps simultaneously for data reception from the active set cell/s. If DL\_DRX\_Active=1, and the UE is performing DRX, intra frequency measurements can be performed when the receiver is active, simultaneously to data reception from the active set cell/s.

The performance of intra frequency measurements when IPDL is active has not been studied.

#### 8.1.2.2.1 Identification of a new cell

If DL\_DRX\_Active = 0, the UE shall be able to identify and decode the SFN of a new detectable cell belonging to the monitored set within

$$T_{\text{identify intra}} = \text{Max} \left\{ 800, T_{\text{basic identify FDD, intra}} \cdot \frac{T_{\text{Measurement Period, Intra}}}{T_{\text{Intra}}} \right\} ms$$

If DL\_DRX\_Active = 1, the UE shall be able to identify and decode the SFN of a new detectable cell belonging to the monitored set according to the figures in Table 8.0b.

**Table 8.0b: Cell identification times for intra-frequency measurements when DL DRX is active**

DRX cycle length (subframes)	$T_{\text{identify intra}}$ (s)
DRX-cycle length <10	0.8
$10 \leq$ DRX-cycle length $\leq$ 80	1.5 Note 1
Note1: The requirements for DRX cycle lengths of greater than 20 subframes are only applicable for UEs that support DRX cycle 2 according to its capability in IE "Enhanced Downlink DRX" defined in section 10.3.3.25 of TS 25.331 [16].	



A cell shall be considered detectable when

- CPICH Ec/Io  $\geq$  -20 dB if DL\_DRX\_Active = 0, or CPICH Ec/Io  $\geq$  -17dB if DL\_DRX\_Active=1,
- SCH\_Ec/Io  $\geq$  -20 dB if DL\_DRX\_Active = 0, or SCH Ec/Io  $\geq$  -17dB if DL\_DRX\_Active=1, 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.

In case of conflict when a compressed gap sequence is activated the UE may choose to prioritise the SFN decoding

The UE shall be able to identify a new detectable cell not belonging to the monitored set within

$$T_{\text{identify detectedset}} = 30s$$

when CPICH Ec/Io  $\geq$  -20 dB, SCH\_Ec/Io  $\geq$  -17 dB and SCH\_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

#### 8.1.2.2.1.1 Identification of a new cell using IPDL gaps

When the UE is supporting IPDL measurements and when idle periods with a length of 1 slot are scheduled the UE physical layer shall be capable to identify a new cell and report SFN-SFN observed time difference type 2 measurement within

$$T_{\text{identify,IPDL}} = \text{Max}\{T_{\text{Measurement_Period Intra}}, T_{\text{IPDL}}\} \text{ ms}$$

where

$T_{\text{Measurement_Period Intra}}$  = The measurement period for Intra frequency CPICH measurements defined in Section 8.1.2.2.2.

and

$T_{\text{IPDL}}$  depends on the Search Window Size given in UE positioning OTDOA neighbour cell info as given in Table 8.0

**Table 8.0:  $T_{\text{IPDL}}$**

Search Window Size	$T_{\text{IPDL}}$
less than or equal to +/- 40 chips	Time over which 4 consecutive IPDL gaps occur
+/- 80 chips	Time over which 8 consecutive IPDL gaps occur

#### 8.1.2.2.2 UE CPICH measurement capability

In the CELL\_DCH state the measurement period for intra frequency measurements is 200 ms. When no transmission gap pattern sequence is activated and DL\_DRX\_Active=0, the UE shall be capable of performing CPICH measurements for 8 identified-intra-frequency cells of the monitored set and/or the active set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When one or more transmission gap pattern sequences are activated, and/or DL\_DRX\_Active=1, the UE shall be capable of performing CPICH measurements for at least  $Y_{\text{measurement intra}}$  cells, where  $Y_{\text{measurement intra}}$  is defined in the following equation. The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement intra}} = \text{Floor} \left\{ X_{\text{basic measurement FDD}} \cdot \frac{T_{\text{Intra}}}{T_{\text{Measurement_Period, Intra}}} \right\} \text{ cells}$$

where

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

$T_{\text{Measurement_Period Intra}} = 200$  ms. The measurement period for Intra frequency CPICH measurements.

$T_{\text{Intra}}$  : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. If  $DL\_DRX\_Active=1$ , and the UE is performing DRX, intra frequency measurements are assumed only to be performed when the receiver is guaranteed to be active, and simultaneously to data reception from the active set cell/s.

$T_{\text{basic\_identify\_FDD, intra}} = 800$  ms. This is the time period used in the intra frequency equation where the maximum allowed time for the UE to identify a new FDD cell is defined.

The UE shall furthermore be capable of performing CPICH measurements for at least 1 detected intra-frequency cell, in the detected set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 10 s. The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2.

#### 8.1.2.2.2.1 Capabilities for measurements during IPDL gaps

When idle periods with a length of 1 slot are scheduled, the UE physical layer shall be capable of reporting SFN-SFN observed time difference type 2 measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.8.2.2 with measurement period given by

$$T_{\text{measurement IPDL}} = \text{Max}\{T_{\text{Measurement\_Period Intra}}, T_{4\text{IPDLs}}\} \text{ms}$$

where

$T_{\text{Measurement\_Period Intra}}$  = The measurement period for Intra frequency CPICH measurements defined in Section 8.1.2.2.2.

$T_{4\text{IPDLs}}$  = Time period over which 4 consecutive idle periods occur.

#### 8.1.2.2.3 Periodic Reporting

Reported measurements contained in periodically triggered measurement reports shall meet the requirements in section 9.

#### 8.1.2.2.4 Event-triggered Periodic Reporting

Reported measurements contained in event triggered periodic measurement reports shall meet the requirements in section 9.

The first report in event triggered periodic measurement reporting shall meet the requirements specified in section 8.1.2.2.3 Event Triggered Reporting.

#### 8.1.2.2.5 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are 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 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.

The event triggered measurement reporting delay, on cells belonging to monitored set, measured without L3 filtering, shall be less than the above defined  $T_{\text{identify intra}}$  defined in Section 8.1.2.2.1

If a cell, belonging to monitored set, which the UE has identified and measured at least once over the measurement period, becomes undetectable for a period  $\leq 5$  seconds and then the cell becomes detectable again and triggers an event, the measurement reporting delay shall be less than  $T_{\text{Measurement\_Period Intra}}$  ms provided the timing to that cell has not changed more than  $\pm 32$  chips, the UE CPICH measurement capabilities of section 8.1.2.2.2 are valid and L3 filtering has not been used. When L3 filtering is used an additional delay can be expected.

If a cell belonging to monitored set has been detectable at least for the time period  $T_{\text{identify\_intra}}$  and then triggers the measurement report as per TS 25.331, section 14 [16], the event triggered measurement reporting delay shall be less than  $T_{\text{Measurement\_Period Intra}}$  when the L3 filter has not been used and the UE CPICH measurement capabilities of Section 8.1.2.2.2 are valid.

The event triggered measurement reporting delay on cells not belonging to monitored set, measured without L3 filtering, shall be less than the above defined  $T_{\text{identify detected set}}$  defined in Section 8.1.2.2.1.

### 8.1.2.3 FDD inter frequency measurements

In the CELL\_DCH state when a transmission gap pattern sequence with the "FDD measurements" purpose is provided by the network the UE shall continuously measure identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.

In order for the requirements in the following subsections to apply the UTRAN must provide a transmission gap pattern sequence with measurement purpose FDD measurement using the following combinations for TGL1, TGL2, TGD and Max TGPL:

**Table 8.1**

TGL1 [slots]	TGL2 [slots]	TGD [slots]	Max TGPL [frames]
7	-	undefined	18
14	-	undefined	36
10	-	undefined	24
7	7	15...269	18 + ceil(TGD/15)
14	14	45...269	36 + ceil(TGD/15)

#### 8.1.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify, inter}} = T_{\text{basic identify FDD,inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot K_n \cdot N_{\text{freq,n}} \quad \text{ms (normal performance) and}$$

$$T_{\text{identify, inter}} = T_{\text{basic identify FDD,inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot K_r \cdot N_{\text{freq,r}} \quad \text{ms (reduced performance)}$$

and UE that supports inter frequency detected set CPICH measurements shall also be able to identify a new detectable cell belonging to the detected set within  $T_{\text{identify inter detected set}} = 30 \cdot K_n \cdot N_{\text{freq,n}}$  s (normal performance) and  $30 \cdot K_r \cdot N_{\text{freq,r}}$  s (reduced performance).

If the UE does not need compressed mode to measure cells on a frequency adjacent to the intra-frequency (irrespective of the number of serving cells configured in the UE) according to its measurement capability in the IE "Adjacent Frequency measurements without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16], and if the Adjacent Frequency Index [16] is configured, the UE shall be able to identify a new detectable cell on the indicated adjacent frequency belonging to the monitored set within  $T_{\text{identify,inter,optional}}$  and UE that supports inter frequency detected set CPICH measurements shall be able to identify a new detectable cell on the indicated adjacent frequency within  $T_{\text{identify,inter detected set}} = 30$ s.

If the UE does not need compressed mode to measure cells on a frequency in a band jointly supported with the band of intra-frequency according to its measurement capability in the IE "Inter-band Frequency measurements without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16], the UE shall be able to identify a new detectable cell on that frequency belonging to the monitored set within  $T_{\text{identify,inter,optional}}$  and UE that supports inter frequency detected set CPICH measurements shall be able to identify a new detectable cell on that frequency within  $T_{\text{identify,inter detected set}} = 30$ s.

If the UE is able to search enhanced inter-frequency measurements without compressed mode according to its measurement capability in the IE "Enhanced inter-frequency measurements without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16],

- when a single uplink frequency is configured, the UE shall be able to identify a new detectable cell each of the 2 indicated frequencies belonging to the monitored set within  $T_{\text{identify,inter,optional}}$ ; OR
- when dual uplink frequencies are configured, the UE shall be able to identify a new detectable cell on the indicated frequency belong to the monitored set within  $T_{\text{identify,inter,optional}}$ ,

where the indicated frequenc(ies) together with intra-frequenc(ies) shall be within UE RF capability as per Band Combination and Supported Carrier Combination List in [16] and UE that supports inter frequency detected set CPICH measurements shall be able to identify a new detectable cell on the indicated frequenc(ies) within  $T_{\text{identify,inter detected set}} = 30\text{s}$ .

If  $DL\_DRX\_Active = 0$ ,

$$T_{\text{identify,inter,optional}} = \text{Max} \left\{ 800, T_{\text{basic identify FDD, intra}} \cdot \frac{T_{\text{Measurement Period, Intra}}}{T_{\text{Intra}}} \right\} \text{ms} .$$

If  $DL\_DRX\_Active = 1$ , the UE shall be able to identify and decode the SFN of a new detectable cell belonging to the monitored set according to the figures in Table 8.1a.

**Table 8.1a: Cell identification times, inter-frequency measurements, Enhanced IF measurements, No CM, DL DRX active**

DRX cycle length (subframes)	$T_{\text{identify,inter,optional}}$ (s)
DRX-cycle length <10	0.8
$10 \leq$ DRX-cycle length $\leq 20$	1.5 Note 1
$20 <$ DRX-cycle length $\leq 80$	3.0 Note 1
Note1: The requirements for DRX cycle lengths of greater than 20 subframes are only applicable for UEs that support DRX cycle 2 according to its capability in IE "Enhanced Downlink DRX" defined in section 10.3.3.25 of TS 25.331 [16].	

If the UE does not need compressed mode to measure cells on configured carrier frequencies corresponding to secondary serving HS-DSCH cells according to its measurement capability in the IE, "Inter-frequency measurements on configured carriers without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16], the UE shall be able to identify a new detectable cell on the configured carrier frequency belonging to the monitored set within  $T_{\text{identify,inter,optional}}$  where:

If  $DL\_DRX\_Active = 0$ ,  $T_{\text{identify,inter,optional}} = 2.2 \cdot K_n \cdot N_{\text{freq,n}}$  seconds (normal performance) and  $2.2 \cdot K_r \cdot N_{\text{freq,r}}$  (reduced performance).

If  $DL\_DRX\_Active = 1$ , the value of  $T_{\text{identify,inter,optional}}$  is according to the figures in Table 8.1b.

**Table 8.1b: Cell identification times, inter-frequency measurements, IF measurements on configured carriers, No CM, DL DRX active**

DRX cycle length (subframes)	$T_{\text{identify,inter,optional}}$ (s) (normal performance)	$T_{\text{identify,inter,optional}}$ (s) (reduced performance)
DRX-cycle length <10	$2.2 \cdot K_n \cdot N_{\text{freq,n}}$	$2.2 \cdot K_r \cdot N_{\text{freq,r}}$
$10 \leq$ DRX-cycle length $\leq 20$	$4.4 \cdot K_n \cdot N_{\text{freq,n}}$ Note 1	$4.4 \cdot K_r \cdot N_{\text{freq,r}}$
$20 <$ DRX-cycle length $\leq 80$	$6.6 \cdot K_n \cdot N_{\text{freq,n}}$ Note 1	$6.6 \cdot K_r \cdot N_{\text{freq,r}}$
Note1: The requirements for DRX cycle lengths of greater than 20 subframes are only applicable for UEs that support DRX cycle 2 according to its capability in IE "Enhanced Downlink DRX" defined in section 10.3.3.25 of TS 25.331 [16].		

A cell shall be considered detectable when

- CPICH  $E_c/I_0 \geq -20$  dB,

- $SCH\_Ec/Io \geq -17$  dB for at least one channel tap and  $SCH\_Ec/Ior$  is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

### 8.1.2.3.2 UE CPICH measurement capability

When transmission gaps are scheduled for FDD inter frequency measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement period given by

$$T_{\text{measurement\_inter}} = \text{Max} \left\{ T_{\text{Measurement\_Period\_Inter}}, T_{\text{basic\_measurement\_FDD\_inter}} \cdot \frac{T_{\text{Measurement\_Period\_Inter}}}{T_{\text{Inter}}} \cdot K_n \cdot N_{\text{freq},n} \right\} \text{ms (normal performance) and}$$

$$T_{\text{measurement\_inter}} = \text{Max} \left\{ T_{\text{Measurement\_Period\_Inter}}, T_{\text{basic\_measurement\_FDD\_inter}} \cdot \frac{T_{\text{Measurement\_Period\_Inter}}}{T_{\text{Inter}}} \cdot K_r \cdot N_{\text{freq},r} \right\} \text{ms (reduced performance)}$$

If the UE does not need compressed mode to perform inter-frequency measurements, the measurement period for inter frequency measurements is 480 ms.

The UE shall be capable of performing CPICH measurements for  $X_{\text{basic\_measurement\_FDD\_inter}}$  inter-frequency cells per FDD frequency of the monitored set or the virtual active set, or the detected set for UE that supports inter frequency detected set measurements, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement\_Inter}}$ . If the UE has identified more than  $X_{\text{basic\_measurement\_FDD\_inter}}$  cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$X_{\text{basic\_measurement\_FDD\_inter}} = 6$$

$T_{\text{Measurement\_Period\_Inter}} = 480$  ms. The period used for calculating the measurement period  $T_{\text{measurement\_inter}}$  for inter frequency CPICH measurements.

$T_{\text{Inter}}$ : This is the minimum time that is available for inter frequency measurements, during the period  $T_{\text{Measurement\_Period\_inter}}$  with an arbitrarily chosen timing. The minimum time per transmission gap is calculated by using the actual idle length within the transmission gap as given in the table 11 of Annex B in TS 25.212 and by assuming  $2 \cdot 0.5$  ms for implementation margin and after that taking only full slots into account in the calculation.

$T_{\text{basic\_identify\_FDD,inter}} = 300$  ms. This is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new FDD cell is defined.

$T_{\text{basic\_measurement\_FDD\_inter}} = 50$  ms. This is the time period used in the equation for defining the measurement period for inter frequency CPICH measurements.

$N_{\text{Freq}}$ : Number of FDD frequencies indicated in the inter frequency measurement control information.

$N_{\text{freq},n}$ : Number of interfrequency carriers to be monitored with normal performance

$N_{\text{freq},r}$ : Number of interfrequency carriers to be monitored with reduced performance

If  $N_{\text{freq},r}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.0a. Otherwise  $K_n=1$  and all interfrequency layers have normal performance.

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring UTRA [16,31] are calculated assuming all UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e.  $N_{\text{freq},n} = N_{\text{Freq}}$  and  $N_{\text{freq},r} = 0$ .

For UE that supports inter frequency detected set CPICH measurements, out of the  $X_{\text{basic\_measurement\_FDD\_inter}}$  inter-frequency cells per FDD frequency for which the UE is capable of performing CPICH measurements, the UE shall be capable of measuring the CPICH of at least one detected set cell.

If the UE does not need compressed mode to measure cells on a frequency adjacent to the intra-frequency (irrespective of the number of serving cells configured in the UE) according to its measurement capability in the IE “Adjacent Frequency measurements without compressed mode” defined in section 10.3.3.21 of TS 25.331 [16], and if the Adjacent Frequency Index [16] is configured,

- when DL\_DRX\_Active=0, the UE shall be capable of performing CPICH measurements for 8 cells on the indicated adjacent frequency, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200ms. For UE that supports inter frequency detected set CPICH measurements, out of 8 cells on the indicated adjacent frequency, the UE shall be capable of measuring the CPICH of at least one detected set cell. If the UE has identified more than 8 cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased; or
- when DL\_DRX\_Active=1, the UE shall be capable of performing CPICH measurements for at least  $Y_{\text{measurement intra}}$  cells on the indicated adjacent frequency, where  $Y_{\text{measurement intra}}$  is defined in sub-clause 8.1.2.2.2. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased. For UE that supports inter frequency detected set CPICH measurements, out of  $Y_{\text{measurement intra}}$  cells on the indicated adjacent frequency, the UE shall be capable of measuring the CPICH of at least one detected set cell. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

If the UE does not need compressed mode to measure cells on a frequency in a band jointly supported with the band of intra-frequency according to its measurement capability in the IE “Inter-band Frequency measurements without compressed mode” defined in section 10.3.3.21 of TS 25.331 [16],

- when DL\_DRX\_Active=0, the UE shall be capable of performing CPICH measurements for 8 cells on that frequency, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200ms. For UE that supports inter frequency detected set CPICH measurements, out of 8 cells on that frequency, the UE shall be capable of measuring the CPICH of at least one detected set cell. If the UE has identified more than 8 cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased; or
- when DL\_DRX\_Active=1, the UE shall be capable of performing CPICH measurements for at least  $Y_{\text{measurement intra}}$  cells on that frequency. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, where  $Y_{\text{measurement intra}}$  is defined in sub-clause 8.1.2.2.2, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased. For UE that supports inter frequency detected set CPICH measurements, out of  $Y_{\text{measurement intra}}$  cells on that frequency, the UE shall be capable of measuring the CPICH of at least one detected set cell. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

If the UE is able to search enhanced inter-frequency measurements without compressed mode according to its measurement capability in the IE “Enhanced inter-frequency measurements without compressed mode” defined in section 10.3.3.21 of TS 25.331 [16], and DL\_DRX\_Active = 0,

- when a single uplink frequency is configured, the UE shall be capable of performing CPICH measurements for 8 cells each on 2 indicated frequencies, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200ms. For UE that supports inter frequency detected set CPICH measurements, out of 8 cells each on 2 indicated frequencies, the UE shall be capable of measuring the CPICH of at least one detected set cell each on 2 indicated frequencies. If the UE has identified more than 8 cells on each frequency, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased; or
- when dual uplink frequencies are configured, the UE shall be capable of performing CPICH measurements for 8 cells on the indicated frequency, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200ms. For UE that supports inter frequency detected set CPICH measurements, out of 8 cells on the indicated frequency, the UE shall be capable of measuring the CPICH of at least one detected set cell. If the UE has identified more than 8 cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

If the UE is able to search enhanced inter-frequency measurements without compressed mode according to its measurement capability in the IE “Enhanced inter-frequency measurements without compressed mode” defined in section 10.3.3.21 of TS 25.331 [16], and DL\_DRX\_Active = 1,

- when a single uplink frequency is configured, the UE shall be capable of performing CPICH measurements for at least  $Y_{\text{measurement intra}}$  cells each on 2 indicated frequencies, where  $Y_{\text{measurement intra}}$  is defined in sub-clause 8.1.2.2.2. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells on the indicated frequency, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased for that frequency. For UE that supports inter frequency detected set CPICH measurements, out of  $Y_{\text{measurement intra}}$  cells each on 2 indicated frequencies, the UE shall be capable of measuring the CPICH of at least one detected set cell each on 2 indicated frequencies. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells on each frequency, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased; or
- when dual uplink frequencies are configured, the UE shall be capable of performing CPICH measurements for at least  $Y_{\text{measurement intra}}$  cells on the indicated frequency, where  $Y_{\text{measurement intra}}$  is defined in sub-clause 8.1.2.2.2. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells on the indicated frequency, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased for that frequency. For UE that supports inter frequency detected set CPICH measurements, out of  $Y_{\text{measurement intra}}$  cells on the indicated frequency, the UE shall be capable of measuring the CPICH of at least one detected set cell. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

If the UE does not need compressed mode to measure cells on configured carrier frequencies corresponding to secondary serving HS-DSCH cells according to its measurement capability in the IE, “Inter-frequency measurements on configured carriers without compressed mode” defined in section 10.3.3.21 of TS 25.331 [16]:

- when DL\_DRX\_Active=0, the UE shall be capable of performing CPICH measurements for 6 cells per configured carrier frequency belonging to the monitored set or the virtual active set, or the detected set for UE that supports inter frequency detected set measurements on the configured carrier frequency, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $1000 * K_n * N_{\text{freq,n}}$  ms (normal performance) or  $1000 * K_r * N_{\text{freq,r}}$  ms. For UE that supports inter frequency detected set CPICH measurements, out of 6 cells per configured carrier frequency, the UE shall be capable of measuring the CPICH of at least one detected set cell. If the UE has identified more than 6 cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased; or
- when DL\_DRX\_Active=1, the UE shall be capable of performing CPICH measurements for at least 6 cells per configured carrier frequency belonging to the monitored set or the virtual active set, or the detected set for UE that supports inter frequency detected set measurements on the configured carrier frequency, and the UE physical layer shall be capable of reporting measurements to high layers with the measurement period according to Table 8.1c.. For UE that supports inter frequency detected set CPICH measurements, out of 6 cells per configured carrier frequency, the UE shall be capable of measuring the CPICH of at least one detected set cell. If the UE has identified more than 6 cells then the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

**Table 8.1c: Measurement period, DL DRX active, IF measurements on configured carriers, No CM, DL DRX active**

DRX cycle length (subframes)	Measurement Period (s), Normal performance	Measurement Period (s), Reduced performance
DRX-cycle length <10	$1.0 * K_n * N_{\text{freq,n}}$	$1.0 * K_r * N_{\text{freq,r}}$
$10 \leq \text{DRX-cycle length} \leq 20$	$2.0 * K_n * N_{\text{freq,n}}$ Note 1	$2.0 * K_r * N_{\text{freq,r}}$
$20 < \text{DRX-cycle length} \leq 80$	$3.0 * K_n * N_{\text{freq,n}}$ Note 1	$3.0 * K_r * N_{\text{freq,r}}$
Note1: The requirements for DRX cycle lengths of greater than 20 subframes are only applicable for UEs that support DRX cycle 2 according to its capability in IE “Enhanced Downlink DRX” defined in section 10.3.3.25 of TS 25.331 [16].		

The measurement accuracy for all measured cells shall be as inter frequency measurement accuracy specified in the sub-clause 9.1.1 and 9.1.2.

#### 8.1.2.3.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

#### 8.1.2.3.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as 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.

The event triggered measurement reporting delay of a cell belonging to the monitored set, measured without L3 filtering shall be less than  $T_{\text{identify\_inter}}$  defined in Section 8.1.2.3.1. When L3 filtering is used an additional delay can be expected.

The event triggered measurement reporting delay of a cell belonging to the detected set, measured without L3 filtering shall be less than  $T_{\text{identify\_inter\_detected\_set}}$  defined in Section 8.1.2.3.1. When L3 filtering is used an additional delay can be expected.

If a cell belonging to a monitored set has been detectable at least for the time period  $T_{\text{identify\_inter}}$  or a cell belonging to a detected set has been detectable at least for the time period  $T_{\text{identify\_inter\_detected\_set}}$  and then triggers the measurement report as per TS 25.331, section 14 [16], the event triggered measurement reporting delay shall be less than  $T_{\text{Measurement\_Period\_Inter}}$  provided the timing to that cell has not changed more than  $\pm 32$  chips while transmission gap has not been available and the L3 filter has not been used.

If one of the following conditions is met,

- 1) if the UE does not need compressed mode to measure cells on a frequency adjacent to the intra-frequency (irrespective of the number of serving cells configured in the UE) according to its measurement capability in the IE "Adjacent Frequency measurements without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16], and if the Adjacent Frequency Index [16] is configured; or
- 2) if the UE does not need compressed mode to measure cells on a frequency in a band jointly supported with the band of intra-frequency according to its measurement capability in the IE "Inter-band Frequency measurements without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16]; or
- 3) if the UE is able to search enhanced inter-frequency measurements without compressed mode according to its measurement capability in the IE "Enhanced inter-frequency measurements without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16]; or
- 4) if the UE does not need compressed mode to measure cells on configured carrier frequencies corresponding to secondary serving HS-DSCH cells according to its measurement capability in the IE, "Inter-frequency measurements on configured carriers without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16],

the event triggered measurement reporting delay of a cell belonging to the monitored set, measured without L3 filtering shall be less than  $T_{\text{identify\_inter\_optional}}$  defined in Section 8.1.2.3.1. When L3 filtering is used an additional delay can be expected. If a cell has been detectable at least for the time period  $T_{\text{identify\_inter\_optional}}$  and then triggers the measurement report as per TS 25.331, section 14 [16], the event triggered measurement reporting delay shall be less than  $T_{\text{Measurement\_Period\_Intra}}$  defined in Section 8.1.2.2.2 provided the timing to that cell has not changed more than  $\pm 32$  chips while transmission gap has not been available and the L3 filter has not been used.

#### 8.1.2.4 TDD measurements

The requirements in this section shall apply to UE supporting FDD and TDD.



In the CELL\_DCH state when a transmission gap pattern sequence with the "TDD measurements" purpose is provided by the network, the UE shall continuously measure identified inter frequency TDD cells and search for new inter frequency TDD cells indicated in the measurement control information.

In order for the requirements in the following subsections to apply, the Beacon timeslots of the inter-frequency TDD cells indicated in the measurement control information shall either be synchronised or non-overlapping in time such that the UE can measure an inter-frequency TDD cell at least once in every transmission gap pattern as given in [7] for the slot allocation case in use in this cell and by assuming 2\*0.5 ms implementation margin per transmission gap.

UTRAN shall provide a transmission gap pattern sequence with measurement purpose TDD measurement using the combinations for TGL1, TGL2 and TGD in Table 8.2:

**Table 8.2**

TGL1 [slots]	TGL2 [slots]	TGD [slots]
10	-	undefined
10	10	41...269
14	7	37...269

#### 8.1.2.4.1 Identification of a new cell

##### 8.1.2.4.1.1 3,84 Mcps TDD Option

When transmission gaps are scheduled for inter-frequency TDD measurements, the UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within

$$T_{\text{identify TDD inter}} = \text{Max} \left\{ 5000, N_{\text{basic identify TDD inter}} \cdot \frac{T_{\text{Measurement Period TDD inter}} \cdot N_{\text{Freq}}}{N_{\text{TDD inter}}} \right\} \text{ms}$$

If the UE does not need compressed mode to perform inter-frequency TDD measurements, the UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within 5000 ms.

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

An inter-frequency TDD cell shall be considered detectable when P-CCPCH  $E_c/I_o \geq -8$  dB and SCH\_  $E_c/I_o \geq -13$  dB.

The received P-CCPCH\_  $E_c/I_o$  is defined as

$$\left( \frac{P - CCPCH - E_c}{I_o} \right)_{\text{in dB}} = \left( \frac{P - CCPCH - E_c}{I_{or}} \right)_{\text{in dB}} - \left( \hat{I}_{or} \right)_{\text{in dB}}$$

and the received SCH\_  $E_c/I_o$  is defined as

$$\left( \frac{SCH - E_c}{I_o} \right)_{\text{in dB}} = \left( \frac{SCH - E_c}{I_{or}} \right)_{\text{in dB}} - \left( \hat{I}_{or} \right)_{\text{in dB}}$$

##### 8.1.2.4.1.2 1.28 Mcps TDD Option

When transmission gaps are scheduled for inter-frequency TDD measurements, the UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within

$$T_{\text{identify TDD inter}} = \text{Max} \left\{ 5000, N_{\text{basic identify TDD inter}} \cdot \frac{T_{\text{Measurement Period TDD inter}} \cdot N_{\text{Freq}}}{N_{\text{TDD inter}}} \right\} \text{ms}$$

If the UE does not need compressed mode to perform inter-frequency TDD measurements, the UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within 5000 ms.

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

A cell shall be considered detectable when P-CCPCH  $E_c/I_o \geq -8$  dB and DwPCH  $E_c/I_o \geq -5$  dB. When L3 filtering is used an additional delay can be expected.

The received P-CCPCH  $E_c/I_o$  is defined as

$$\left( \frac{P-CCPCH-E_c}{I_o} \right) \Big|_{in\ dB} = \left( \frac{P-CCPCH-E_c}{I_{or}} \right) \Big|_{in\ dB} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB}$$

The received DwPTS  $E_c/I_o$  is defined as

$$\left( \frac{DwPCH-E_c}{I_o} \right) \Big|_{in\ dB} = \left( \frac{DwPCH-E_c}{I_{or}} \right) \Big|_{in\ dB} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB}$$

#### 8.1.2.4.2 P-CCPCH RSCP measurement period

When transmission gaps are scheduled for inter frequency TDD measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.11 and with a measurement period as given by

$$T_{\text{measurement\_TDD\_inter}} = \text{Max} \left\{ T_{\text{Measurement\_Period\_TDD\_inter}}, N_{\text{basic\_measurement\_TDD\_inter}} \cdot \frac{T_{\text{Measurement\_Period\_TDD\_inter}}}{N_{\text{TDD\_inter}}} \cdot N_{\text{Freq}} \right\} \text{ms}$$

If the UE does not need compressed mode to perform inter-frequency TDD measurements, the measurement period for inter-frequency TDD measurements shall be 480 ms.

The UE shall be capable of performing P-CCPCH RSCP measurements for  $X_{\text{basic\_measurement\_TDD\_inter}}$  inter-frequency TDD cells per TDD frequency of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{measurement\_TDD\_inter}}$ .

$X_{\text{basic\_measurement\_TDD\_inter}} = 6$  (cells)

$T_{\text{Measurement\_Period\_TDD\_inter}} = 480$  ms. The time period used for calculating the measurement period  $T_{\text{measurement\_TDD\_inter}}$  for inter frequency P-CCPCH RSCP measurements.

$N_{\text{TDD\_inter}}$ : This is the smallest resulting integer number of transmission gap patterns in a transmission gap pattern sequence assigned to UE by UTRAN for inter frequency TDD measurements during the time period  $T_{\text{Measurement\_Period\_TDD\_inter}}$  with an arbitrarily chosen timing.

$N_{\text{basic\_identify\_TDD\_inter}} = 80$ . This is the number of transmission gap patterns in a transmission gap pattern sequence for inter-frequency TDD measurements during the time period used in the inter frequency TDD equation where the maximum allowed time for the UE to identify a new inter frequency TDD cell is defined.

$N_{\text{basic\_measurement\_TDD\_inter}} = 5$ . This is the number of transmission gap patterns in a transmission gap pattern sequence for inter-frequency TDD measurements during the time period  $T_{\text{Measurement\_Period\_TDD\_inter}}$  with an arbitrarily chosen timing that is used in the inter-frequency TDD equation where the measurement period for inter-frequency P-CCPCH RSCP measurements is defined.

$N_{\text{Freq}}$ : This is the number of TDD frequencies indicated in the inter frequency measurement control information.

#### 8.1.2.4.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

#### 8.1.2.4.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are 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 resulting when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{\text{identify TDD inter}}$  defined in Section 8.1.2.4.1 When L3 filtering is used an additional delay can be expected.

### 8.1.2.5 GSM measurements

The requirements in this section apply only to UE supporting FDD and GSM.

Measurements on GSM cells can be requested with BSIC verified or BSIC non-verified.

- 1) In CELL\_DCH state when a transmission gap pattern sequence is provided by the UTRAN the UE shall continuously measure GSM cells and search for new GSM cells given in the monitored set.
- 2) If the UE does not need compressed mode to perform GSM measurements:
  - the UE shall measure all GSM cells present in the monitored set
  - the relevant requirements for GSM dedicated mode when a TCH channel is assigned in TS 45.008 shall apply. This is further detailed in the following sub-sections.

#### 8.1.2.5.1 GSM carrier RSSI

- 1) For a UE requiring compressed mode

A UE supporting GSM measurements using compressed mode shall meet the minimum number of GSM RSSI carrier measurements specified in table 8.4. This measurement shall be based on a transmission gap pattern sequence with purpose "GSM carrier RSSI measurements"

In order for the requirements in this subsection to apply the UTRAN must provide a transmission gap pattern sequence with measurement purpose GSM carrier RSSI measurements using the following combinations for TGL1, TGL2 and TGD:

**Table 8.3**

TGL1 [slots]	TGL2 [slots]	TGD [slots]
3	-	undefined
4	-	undefined
5	-	undefined
7	-	undefined
10	-	undefined
14	-	undefined
3	3	15...269
4	4	15...269
5	5	15...269
7	7	15...269
10	10	41...269
14	14	45...269

In the CELL\_DCH state the measurement period,  $T_{\text{Measurement Period, GSM}}$ , for the GSM carrier RSSI measurement is 480 ms.

The UE shall meet the measurement accuracy requirements stated for RXLEV in TS45.008, 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.

Table 8.4

TGL	Number of GSM carrier RSSI samples in each gap.
3	1
4	2
5	3
7	6
10	10
14	15

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. This means that, in this particular case, the L1 reporting period to higher layers of a GSM neighbour can be a multiple of the measurement period.

2) For a UE not requiring compressed mode

The samples allocated to each carrier shall as far as possible be uniformly distributed over each measurement period. At least 3 received signal level measurement samples are required per RSSI value. The measurement period is 480 ms.

#### 8.1.2.5.2 BSIC verification

1) For a UE requiring compressed mode

In order for the requirements in the following subsections to apply the UTRAN must provide a transmission gap pattern sequence with measurement purpose GSM Initial BSIC identification or with measurement purpose GSM BSIC re-confirmation, using the following combinations for TGL1, TGL2 and TGD:

Table 8.5

TGL1 [slots]	TGL2 [slots]	TGD [slots]
5	-	undefined
7	-	undefined
10	-	undefined
14	-	undefined
5	5	15...269
7	7	15...269
10	10	41...269
14	14	45...269

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 FDD and GSM cell. The UE shall trigger the initial BSIC identification within the available transmission gap pattern sequence with purpose "GSM Initial BSIC identification". The requirements for Initial BSIC identification can be found in 8.1.2.5.2.1.

##### 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 transmission gap pattern sequence with purpose "GSM BSIC re-confirmation". The requirements for BSIC re-confirmation can be found in 8.1.2.5.2.2.

Measurements on a GSM cell can be requested with BSIC verified or BSIC non-verified. If GSM measurements are 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.

If the network requests measurements on a GSM cell with BSIC verified, the UE shall behave as follows:

- The UE shall perform GSM carrier RSSI measurements according to Section 8.1.2.5.1 when ever a transmission gap pattern sequence with the purposes "GSM carrier RSSI measurements" is provided and the UE shall perform measurement reporting as defined in Section 8.6.7.6 of [16].
- The UE shall perform BSIC identification according to Section 8.1.2.5.2.1 when a "GSM Initial BSIC identification" transmission gap pattern sequence is activated. The UE shall use the last 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 according to Section 8.1.2.5.2.2 when a "GSM BSIC re-confirmation" transmission gap pattern sequence is activated.
- If a "GSM BSIC re-confirmation" transmission gap pattern sequence is not activated in parallel to a "GSM Initial BSIC identification" transmission gap pattern sequence or within one frame from the deactivation of a "GSM Initial BSIC identification" transmission gap pattern sequence, the BSIC shall be considered to be non-verified after 10s has elapsed after the UE identified the BSIC of the cell..

The UE shall perform event evaluation for event-triggered reporting after the BSIC has been verified for a GSM cell. The UE shall use the last available GSM carrier RSSI measurement results in event evaluation and event-triggered reporting. Periodic reports shall be triggered according to Sections 8.6.7.5 and 8.6.7.6 of [16].

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) and from that moment the BSIC shall be re-confirmed at least once every  $T_{\text{re-confirm\_abort}}$  seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified". If a transmission gap pattern sequence with a purpose "GSM BSIC re-confirmation " is not activated by the network after BSIC identified or the "GSM BSIC re-confirmation " transmission gap pattern sequence is deactivated, the UE shall behave as described previously in this section.

The parameters  $N_{\text{identify\_abort}}$  and  $T_{\text{re-confirm\_abort}}$  are defined by higher layers and are signalled to the UE together with the transmission gap pattern sequence.  $N_{\text{identify\_abort}}$  indicates the maximum number of patterns that the UE shall use to attempt to decode the unknown BSIC of the GSM cell in the initial BSIC identification procedure.  $T_{\text{re-confirm\_abort}}$  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 transmission gap when the time difference between the middle of the received GSM synchronisation burst at the UE and the middle of the effective transmission gap is within the limits specified in table 8.6.

The effective transmission gap is calculated by assuming both UL and DL compressed mode and applying the worst-case values for UL/DL timing offset and pilot field length of last DL gap slot.

**Table 8.6: The gap length and maximum time difference for BSIC verification**

Gap length [slots]	Maximum time difference [ $\mu\text{s}$ ]
5	$\pm 500$
7	$\pm 1200$
10	$\pm 2200$
14	$\pm 3500$

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.

2) For a UE not requiring compressed mode

If a BSIC is decoded and matches the expected value, it is considered as "verified", else it 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.

### 8.1.2.5.2.1 Initial BSIC identification

This measurement shall be based on a transmission gap pattern sequence with the purpose "GSM Initial BSIC identification"

For GSM cells that are requested with BSIC verified the UE shall attempt to decode the SCH on the BCCH carrier of the 8 strongest BCCH carriers of the GSM cells indicated in the measurement control information. The UE shall give priority for BSIC decoding attempts in decreasing signal strength order to BSIC carriers with unknown BSIC. The strongest BCCH carrier is defined as the BCCH carrier having the highest measured GSM carrier RSSI value after layer 3 filtering. The GSM signal strength levels used in BSIC identification for arranging GSM cells in signal strength order shall be based on the latest GSM carrier RSSI measurement results available.

When the UE attempts to decode the BSIC of one GSM BCCH carrier with unknown BSIC, the UE shall use all available transmission gaps, within the transmission gap pattern sequence with the purpose "GSM Initial BSIC identification", to attempt to decode the BSIC from that GSM BCCH carrier.

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  $N_{\text{identify\_abort}}$  successive patterns, 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.

$N_{\text{identify\_abort}}$  values are given for a set of reference patterns in table 8.7.  $T_{\text{identify\_abort}}$  is the elapsed time during  $N_{\text{identify\_abort}}$  transmission gap patterns (informative). The figures given in table 8.7 represent the number of patterns required to guarantee at least two attempts to decode the BSIC for one GSM BCCH carrier.

**Table 8.7: The worst-case time for identification of one previously not identified GSM cell**

	TGL1 [slots]	TGL2 [slots]	TGD [slots]	TGPL1 [frames]	$T_{\text{identify\_abort}}$ [s]	$N_{\text{identify\_abort}}$ [patterns]
Pattern 1	7	-	undefined	3	1.56	<b>52</b>
Pattern 2	7	-	undefined	8	5.28	66
Pattern 3	7	7	47	8	2.88	36
Pattern 4	7	7	38	12	2.88	24
Pattern 5	14	-	undefined	8	1.84	<b>23</b>
Pattern 6	14	-	undefined	24	5.28	22
Pattern 7	14	14	45	12	1.44	12
Pattern 8	10	-	undefined	8	2.88	36
Pattern 9	10	10	75	12	2.88	24

### 8.1.2.5.2.2 BSIC re-confirmation

The requirements of this section are applicable for BSIC re-confirmation.

The UE shall maintain the timing information of 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 transmission gap of a transmission gap pattern sequence with the measurement purpose "GSM BSIC re-confirmation", the UE shall attempt to decode the BSIC falling within the effective gap duration. If more than one BSIC can be decoded within the same 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  $T_{\text{re-confirm\_abort}}$  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 8.1.2.5.2.1. The UE shall be able to make BSIC re-confirmation attempts for the 8 strongest GSM cells in the monitored list.

$N_{\text{re-confirm\_abort}}$  is the number of transmission gap patterns executed during  $T_{\text{re-confirm\_abort}}$  (informative).

**Table 8.8: The worst-case time for BSIC re-confirmation of one GSM cell**

	<b>TGL1 [slots]</b>	<b>TGL2 [slots]</b>	<b>TGD [slots]</b>	<b>TGPL1 [frames]</b>	<b>T<sub>re-confirm_abort</sub> [s]</b>	<b>N<sub>re-confirm_abort</sub> [patterns]</b>
Pattern 1	7	-	undefined	3	1.32	44
Pattern 2	7	-	undefined	8	5.04	63
Pattern 3	7	-	undefined	15	8.1	54
Pattern 4	7	7	69	23	10.12	44
Pattern 5	7	7	69	8	2.64	33
Pattern 6	14	-	undefined	8	1.6	20
Pattern 7	14	14	60	8	0.80	10
Pattern 8	10	-	undefined	8	2.64	33
Pattern 9	10	-	undefined	23	8.05	35
Pattern 10	7	7	47	8	2.64	33
Pattern 11	7	7	38	12	2.64	22
Pattern 12	14	-	undefined	24	5.04	21
Pattern 13	14	14	45	12	1.20	10
Pattern 14	10	-	undefined	13	4.94	38
Pattern 15	10	10	75	12	2.64	22

### 8.1.2.5.3 Periodic Reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

### 8.1.2.5.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as 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.

The event triggered reporting delay requirement is valid when the UE for each GSM carrier in the monitored set can take the required number of samples during the measurement period  $T_{\text{Measurement Period, GSM}}$  (see section 8.1.2.5.1).

The event triggered measurement reporting delay for a GSM cell with verified BSIC, measured without L3 filtering shall be less than  $2 \cdot T_{\text{Measurement Period, GSM}}$ , where  $T_{\text{Measurement Period, GSM}}$  is defined in Section 8.1.2.5.1. When L3 filtering is used an additional delay can be expected. For a GSM cell with non-verified BSIC an additional delay according to section 8.1.2.5.2.1 Initial BSIC identification can be expected.

### 8.1.2.6 E-UTRAN measurements

The requirements in this section apply only to UEs supporting UTRAN FDD and E-UTRAN FDD and TDD.

- 1) In CELL\_DCH state when a transmission gap pattern sequence is provided by the UTRAN the UE shall continuously measure previously detected E-UTRAN cells and search for new E-UTRAN cells.

In order for the requirements in the following subsections to apply the UTRAN must provide a transmission gap pattern sequence with measurement purpose "E-UTRAN measurement" using the following combinations for TGL1, TGL2, TGD and Max TGPL:

**Table 8.8a**

<b>TGL1 [slots]</b>	<b>TGL2 [slots]</b>	<b>TGD [slots]</b>	<b>Max TGPL [frames]</b>
≥10	-	undefined	12

- 2) If the UE does not need compressed mode to perform E-UTRAN measurements:

- the UE shall measure either all E-UTRAN cells present in the monitored set or, if only frequencies are provided in the neighbour cell list, the strongest cells present in the detected set, up to the monitoring capabilities of the UE.
- the relevant requirements for E-UTRAN RRC\_CONNECTED mode specified in 3GPP TS 36.133 [24] shall apply. This is further detailed in the following subclauses.

#### 8.1.2.6.1 Identification of a new cell

When compressed mode gaps are used for E-UTRAN measurements, the UE shall be able to identify a new detectable E-UTRAN cell within

$$T_{\text{Identify,E-UTRAN}} = K_n \cdot N_{\text{freq,E-UTRA},n} \cdot T_{\text{Basic\_Identify\_E-UTRAN}} \cdot \frac{480}{T_{\text{E-UTRAN}}} \quad \text{ms (normal performance) and}$$

$$T_{\text{Identify,E-UTRAN}} = K_r \cdot N_{\text{freq,E-UTRA},r} \cdot T_{\text{Basic\_Identify\_E-UTRAN}} \cdot \frac{480}{T_{\text{E-UTRAN}}} \quad \text{ms (reduced performance);}$$

If the UE does not need compressed mode to perform E-UTRAN measurements, the UE shall be able to identify a new detectable E-UTRAN cell within  $T_{\text{Basic\_Identify\_E-UTRAN}}$  ms.

Where:

$T_{\text{E-UTRAN}}$ : This is the minimum time that is available for E-UTRAN measurements during a 480ms period with an arbitrarily chosen timing. The minimum time per compressed mode gap is calculated by subtracting  $2 \cdot 0.5$  ms from the length of the gap.

$N_{\text{freq,E-UTRAN}}$ : This is the number of E-UTRAN carriers being monitored

$N_{\text{freq,E-UTRA},n}$ : Number of E-UTRAN carriers to be monitored with normal performance

$N_{\text{freq,E-UTRA},n,\text{FDD}}$ : Number of E-UTRAN FDD carriers to be monitored with normal performance

$N_{\text{freq,E-UTRA},n,\text{TDD}}$ : Number of E-UTRAN TDD carriers to be monitored with normal performance

$N_{\text{freq,E-UTRA},r}$ : Number of E-UTRAN carriers to be monitored with reduced performance.

If  $N_{\text{freq,E-UTRA},r}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.0a. Otherwise  $K_n=1$  and all E-UTRA layers have normal performance.

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring E-UTRA [16,31] are calculated assuming all E-UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e.  $N_{\text{freq,E-UTRA},n} = N_{\text{freq,E-UTRAN}}$  and  $N_{\text{freq,E-UTRA},r} = 0$ .

$$T_{\text{Basic\_Identify\_E-UTRAN}} = 480\text{ms}$$

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

An E-UTRAN cell shall be considered detectable when

- $\text{RSRP}_{\text{dBm}} \geq \text{RSRP}_{\text{dBm}}^{\text{min}}$  according to Annex B.2.1 for a corresponding Band
- other RSRP related side condition given in Section 9.1 of [24] are fulfilled,
- $\text{SCH\_RP}_{\text{dBm}}$  and  $\text{SCH\_RP}/\text{Iot}$  according to Annex B.2.1 for a corresponding Band

#### 8.1.2.6.2 E-UTRAN RSRP and RSRQ measurement period

When compressed mode gaps are scheduled for E-UTRAN measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.4a and 9.1.4b with measurement period of  $T_{\text{Measurement\_Period\_E-UTRAN}} = 480 \times K_n \times N_{\text{freq,E-UTRA},n}$  ms (normal performance) and



$T_{\text{Measurement\_Period\_E-UTRAN}} = 480 \times K_r \times N_{\text{freq,E-UTRA},r}$ , (reduced performance) where  $N_{\text{freq,E-UTRA},n}$  and  $N_{\text{freq,E-UTRA},r}$  are defined in section 8.1.2.6.

The UE shall be capable of performing RSRP and RSRQ measurements of at least 4 E-UTRAN cells per E-UTRAN frequency, according to its supported UE capabilities. Additionally, for a UE supporting E-UTRA measurements in Cell-DCH state, the UE shall be capable of monitoring a minimum total of at least 13 carrier frequency layers, including the intrafrequency serving layer and 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).

#### 8.1.2.6.3 Periodic reporting

Reported measurements in periodically triggered measurement reports shall meet the requirements in section 9.

#### 8.1.2.6.4 Void

#### 8.1.2.6.5 Event Triggered reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send any event triggered measurement reports, as long as 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.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than  $T_{\text{identify,E-UTRAN}}$  defined in Section 8.1.2.6.1. When L3 filtering is used an additional delay can be expected.

If a cell has been detectable at least for the time period than  $T_{\text{identify,E-UTRAN}}$  and then triggers the measurement report as per TS 25.331, section 14 [16], the event triggered measurement reporting delay shall be less than  $T_{\text{Measurement\_Period\_E-UTRAN}}$  provided the timing to that cell has not changed more than  $\pm 50 T_s$  while transmission gap has not been available and the L3 filter has not been used.

## 8.2 Measurements in CELL\_DCH State with special requirements

### 8.2.1 Introduction

This section contains specific requirements for certain measurements beyond those specified in section 8.1. The measurements are defined in TS 25.215, the measurement model is defined in TS 25.302 and measurement accuracies are specified in section 9. As long as the measurement configuration does not exceed the requirements stated in section 8.2.2, the UE shall meet the performance requirements defined in section 9.

Control of measurement reporting is specified in TS 25.331. Compressed mode is specified in TS 25.215.

### 8.2.2 Requirements

The UE shall be able to perform in parallel all physical layer measurements according to table 8.9. In this section one physical layer measurement corresponds to a measurement at the reference point B (i.e. measurement reported by layer 1 after layer 1 filtering) in the measurement model in TS 25.302 [15].

In addition to the requirements in table 8.9 the UE shall in parallel, in state CELL\_DCH, also be able to measure and report the quantities according to section 8.1.

**Table 8.9: Parallel physical layer measurement requirements**

Measurement quantity	Number of parallel physical layer measurements possible to request from the UE
Transport channel BLER	1 per Transport Channel
UE transmitted power	1
UE Rx-Tx time difference	1 including timing to all radio links in active set
SFN-SFN observed time difference type 2	∅
UE GPS Timing of Cell Frames for LCS	∅

Editors Note: The presence of the measurements for location services needs to be revised.

## 8.3 Capabilities for Support of Event Triggering and Reporting Criteria in CELL\_DCH state

### 8.3.1 Introduction

This section contains requirements on UE capabilities for support of event triggering and reporting criteria. As long as the measurement configuration does not exceed the requirements stated in section 8.3.2, the UE shall meet the performance requirements defined in section 9.

The UE can be requested to make measurements under different Measurement Identities [16]. Each Measurement Identity corresponds to either event based reporting, periodic reporting or no reporting. In case of event based reporting, each Measurement Identity is associated with one or more events, each identified with an Event Identity. In case of periodic reporting, a Measurement Identity is associated with one periodic reporting criterion. In case of no reporting, a Measurement Identity is associated with one no reporting criterion.

The purpose of this section is to set some limits on the number of different event, periodic and no reporting criteria the UE may be requested to track in parallel.

### 8.3.2 Requirements

In this section a reporting criterion corresponds to either one event (in the case of event based reporting), or one periodic reporting criterion (in case of periodic reporting), or one no reporting criterion (in case of no reporting). For event based reporting, each instance of event, with the same or different Event Identities, is counted as separate reporting criterion in Table 8.10.

The UE shall be able to support in parallel per category up to  $E_{cat}$  reporting criteria according to Table 8.10. If the UE is configured with a single uplink carrier frequency, for the measurement categories: Intra-frequency, Inter frequency, Inter frequency (virtual active set), and Inter-RAT the UE need not support more than 42 reporting criteria in total. If the UE is configured with dual uplink carrier frequencies, for the measurement categories: Intra-frequency, Inter frequency, Inter frequency (virtual active set), and Inter-RAT the UE need not support more than 55 reporting criteria in total. For the measurement categories: Traffic volume and Quality measurements the UE need not support more than 16 reporting criteria in total.

**Table 8.10: Requirements for reporting criteria per measurement category**

Measurement category	$E_{cat}$	Note
Intra-frequency	16	
Inter-frequency	16	
Inter-frequency, virtual active set	4	
Inter-RAT GERAN	4	Only applicable for UE with this capability
Inter-RAT E-UTRAN	48	Only applicable for UE with this capability
UE internal measurements	8	
Traffic volume measurements	2 + (2 per Transport Channel)	
Quality measurements	2 per Transport Channel	
UP measurements	2	Only applicable for UE with this capability.
UE Rx-Tx time difference measurement	1	
Note: When the UE is configured with dual uplink carrier frequencies, $E_{cat}$ for Intra-frequency is applied per intra-frequency.		

## 8.4 Measurements in CELL\_FACH State when HS-DSCH discontinuous reception is not ongoing

### 8.4.1 Introduction

This section contains requirements on the UE regarding cell reselection and measurement reporting in CELL\_FACH state when HS-DSCH discontinuous reception is not ongoing. The requirements for cell re-selection are split in FDD intra frequency, FDD inter frequency, TDD, GSM and E-UTRAN measurements. The measurements are defined in TS 25.215, the measurement model is defined in TS 25.302 and measurement accuracies are specified in section 9. Control of measurement reporting is specified in TS 25.331. Measurement occasions in CELL\_FACH state are described in TS 25.331.

If UE indicates support for Increased UE carrier monitoring UTRA or increased carrier monitoring E-UTRA the measurement performance for different carriers may be configured by higher layers to be either normal or reduced. A measurement scaling factor [16] defining the relaxation to be applied to the requirements for carriers measured with reduced measurement performance is signalled by higher layers and has the possible settings shown in table 8.0a. The same measurement scaling factor mapping is used in Cell FACH state as cell DCH state.

The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring UTRA [16, 31] are calculated as defined in section 8.4.2.3 provided that  $N_{freq, FDD, n} \leq 2$  or if all FDD interfrequency carriers are indicated to have normal performance. The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring E-UTRA [16, 31] are calculated as defined in section 8.4.2.6 provided that  $N_{E-UTRA, n} \leq 4$  for a UE capable of either FDD E-UTRA carrier monitoring or TDD E-UTRA carrier monitoring or  $N_{freq, E-UTRA, n} \leq 8$  for a UE capable of both FDD and TDD E-UTRA carrier monitoring provided  $N_{freq, E-UTRA, n, FDD} \leq 4$  and  $N_{freq, E-UTRA, n, TDD} \leq 4$  or if all E-UTRA carriers are indicated to have normal performance.

Capabilities for number of carriers to monitor for UE which indicates support for Increased UE carrier monitoring UTRA or E-UTRA are specified in section 8.4.2.1a.

### 8.4.2 Requirements

#### 8.4.2.1 UE Measurement Capability when HS-DSCH discontinuous reception is not ongoing

In CELL\_FACH state, the UE shall be able to monitor up to

- 32 intra frequency FDD cells and
- 32 inter frequency cells, including

- FDD cells distributed on up to 2 additional FDD carriers and
- Depending on UE Capability, TDD mode cells, distributed on up to 3 TDD carriers, and
- Depending on UE capability, 32 GSM cells distributed on up to 32 GSM carriers, and
- Depending on UE capability, up to 4 E-UTRA FDD carriers, and
- Depending on UE capability up to 4 E-UTRA TDD carriers, and
- Depending on UE capability, the UE shall be able to monitor up to 16 intra frequency cells during IPDL gaps.

The requirements in section 9 on CPICH Ec/Io and RSCP measurements are applicable for a UE performing measurements according to this section. For inter-frequency FDD, TDD, GSM and E-UTRAN cell re-selection, measurement occasions as specified in TS 25.331 are used to find and measure on other cells.

It is defined below how the measurements on different systems and modes are performed given the time allocated to that system. The requirements in this section are based on an assumption that the time during the measurement occasions that is allocated to each of the different modes and systems shall be equally shared by the modes which the UE has capability for and that are in the monitored set signalled by the network.

For this four parameters are defined:

- $N_{FDD}$  is 0 or 1. If there are inter-frequency FDD cells in the neighbour list and FDD measurements are required by higher layers,  $N_{FDD}=1$ , otherwise  $N_{FDD}=0$ .
- $N_{TDD}$  is 0 or 1. If the UE is capable of TDD and there are TDD cells in the neighbour list and TDD measurements are required by higher layers,  $N_{TDD}=1$  otherwise  $N_{TDD}=0$ .
- $N_{GSM}$  is 0 or 1. If the UE is capable of GSM and there are GSM cells in the neighbour list and GSM measurements are required by higher layers,  $N_{GSM}=1$ , otherwise  $N_{GSM}=0$ .
- $N_{E-UTRAN}$  is 0 or 1. If the UE is capable of E-UTRAN and there are E-UTRAN cells in the neighbour list and E-UTRAN measurements are required by higher layers,  $N_{E-UTRAN}=1$ , otherwise  $N_{E-UTRAN}=0$ .

The measurement time  $T_{meas}$  is then defined as

$$T_{meas} = \left[ (N_{FDD} + N_{TDD} + N_{GSM} + N_{E-UTRAN}) \cdot N_{TTI} \cdot M\_REP \cdot 10 \right]_{ms}$$

where

- M\_REP is the Measurement Occasion cycle length where K is given in Table 8.10A. K is the FACH measurement occasion length coefficient as specified in TS25.331
- The FACH Measurement Occasion of  $N_{TTI}$  frames will be repeated every  $N_{TTI} \cdot M\_REP$  frame.
- $N_{TTI}$  is the number of frames in each measurement occasion, equal to the length of the largest TTI on the SCCPCH monitored by the UE. FACHs that only carry MBMS logical channels (MTCH, MSCH, or MCCH) are excluded from measurement occasion calculations.
- A UE receiving MTCH shall use only that part of the Measurement Occasion of  $N_{TTI}$  frames which corresponds to 25% of the MTCH TTI length at the maximum.

For UEs receiving MTCH, the reduced measurement time, if applicable, needs to be considered when performance requirements are derived according to section 8. The repetition rate of  $N_{TTI} \cdot M\_REP$  frames remains unaffected

**Table 8.10A: K values for each  $N_{TTI}$  value**

$N_{TTI}$	K
1	3,4,5,6
2	2,3,4,5
4	2,3,4
8	1,2,3

The UE is assumed to measure periodically once every time period  $T_{\text{meas}}$  on each of the modes and systems, FDD inter frequency cells, TDD inter frequency cells, GSM and E-UTRA carriers for which the corresponding parameter  $N_{\text{FDD}}$ ,  $N_{\text{TDD}}$ ,  $N_{\text{GSM}}$  and  $N_{\text{E-UTRAN}}$  is set to 1.

#### 8.4.2.1a UE Measurement Capability when HS-DSCH discontinuous reception is not ongoing (Increased UE carrier monitoring)

UE which indicates support for Increased UE carrier monitoring UTRA according to capabilities in [16,31] shall additionally be capable of monitoring at least

80 inter-frequency cells, including

- 5 FDD UTRA inter-frequency carriers with up to 32 cells per carrier.

UE which indicates support for increased UE carrier monitoring E-UTRA according to capabilities in [16,31] shall be capable of monitoring at least

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

#### 8.4.2.2 FDD intra frequency measurements when HS-DSCH discontinuous reception is not ongoing

During the CELL\_FACH state the UE shall continuously measure identified intra frequency cells and search for new intra frequency cells in the monitoring set. If a measurement occasion is activated, intra frequency measurements can be performed between the measurement occasions.

The performance of intra frequency measurements when IPDL is active has not been studied.

##### 8.4.2.2.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify, intra}} = \text{Max} \left\{ 800, \text{Ceil} \left\{ \frac{T_{\text{basic identify FDD, intra}}}{N_{\text{TTI}} \cdot (M_{\text{REP}} - 1) \cdot 10} \right\} \cdot N_{\text{TTI}} \cdot M_{\text{REP}} \cdot 10 \right\} \text{ ms}$$

where

$T_{\text{basic identify FDD, intra}}$  is specified in section 8.1.2.2.2,

$N_{\text{TTI}}$  and  $M_{\text{REP}}$  is specified in section 8.4.2.1.

A cell shall be considered detectable when

- CPICH  $E_c/I_o \geq -20$  dB,
- SCH  $E_c/I_o \geq -20$  dB for at least one channel tap and SCH  $E_c/I_o$  is equally divided between primary synchronisation code and secondary synchronisation code.

In the case that MTCH is being received, the UE shall be able to take identified cells into use for MTCH combining purposes within one MTCH TTI after the completion of identification.

If more candidate cells are identified than the UE has combining capability, then the UE shall estimate MTCH reception quality of all candidate cells and determine a subset of the identified cells which best allow the UE to meet the required MTCH reception performance.

In case of conflict when a measurement occasion is activated the UE may choose to prioritise the SFN decoding

#### 8.4.2.2.1.1 Identification of a new cell using IPDL gaps

When the UE is supporting IPDL measurements and when idle periods with a length of 1 slot are scheduled the UE physical layer shall be capable to identify a new cell and report SFN-SFN observed time difference type 2 measurement within

$$T_{\text{identify,IPDL}} = \text{Max}\{T_{\text{Measurement\_Period Intra}}, T_{\text{IPDL}}\} \text{ ms}$$

where

$T_{\text{Measurement\_Period Intra}}$  = The measurement period for Intra frequency CPICH measurements defined in Section 8.1.2.2.2.

and

$T_{\text{IPDL}}$  depends on the Search Window Size given in UE positioning OTDOA neighbour cell info as given in Table 8.10B

**Table 8.10B:  $T_{\text{IPDL}}$**

Search Window Size	$T_{\text{IPDL}}$
less than or equal to +/- 40 chips	Time over which 4 consecutive IPDL gaps occur
+/- 80 chips	Time over which 8 consecutive IPDL gaps occur

#### 8.4.2.2.2 UE CPICH measurement capability

In the CELL\_FACH state the measurement period for intra frequency measurements is 200 ms. When no measurement occasion cycle is activated, the UE shall be capable of performing CPICH measurements for 8 identified intra-frequency cells of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When a measurement occasion cycle is activated, the UE shall be capable of performing CPICH measurements for the  $Y_{\text{measurement intra}}$  strongest cells, where  $Y_{\text{measurement intra}}$  is defined in the following equation. The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2. If the UE has identified more than  $Y_{\text{measurement intra}}$  cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement intra}} = \text{Floor} \left\{ X_{\text{basic measurement FDD}} \cdot \frac{T_{\text{Measurement\_Period Intra}} - \text{Ceil} \left\{ \frac{T_{\text{Measurement\_Period Intra}}}{N_{\text{TTI}} \cdot M_{\text{REP}} \cdot 10 \text{ ms}} \right\} \cdot N_{\text{TTI}} \cdot 10 \text{ ms}}{T_{\text{Measurement\_Period Intra}}} \right\} \text{ cells}$$

where

$X_{\text{basic measurement FDD}}$  is specified in section 8.1.2.2.2,

$T_{\text{Measurement\_Period Intra}}$  is specified in section 8.1.2.2.2,

$M_{\text{REP}}$  and  $N_{\text{TTI}}$  is specified in section 8.4.2.1.

#### 8.4.2.2.2.1 Capabilities for measurements during IPDL gaps.

When idle periods with a length of 1 slot are scheduled UE physical layer shall be capable of reporting SFN-SFN observed time difference type 2 measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.8.2.2 with measurement period given by

$$T_{\text{measurement IPDL}} = \text{Max}\{T_{\text{Measurement\_Period Intra}}, T_{4\text{IPDLs}}\} \text{ ms}$$

where

$T_{\text{Measurement\_Period Intra}}$  = The measurement period for Intra frequency CPICH measurements defined in Section 8.1.2.2.2.

and

$T_{4\text{IPDLs}}$  = Time period over which 4 consecutive idle periods occur.

#### 8.4.2.2.3 RACH reporting

Reporting measurements in the measurement reports sent on the RACH shall meet the requirements in section 9.

#### 8.4.2.3 FDD inter frequency measurements when HS-DSCH discontinuous reception is not ongoing

In the CELL\_FACH state when a measurement occasion cycle is provided by the network, and absolute priority based reselection is not used, the UE shall continuously measure identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information. When absolute priority based reselection is used, measurement rules defined in [1] apply (based on  $S_{\text{prioritysearch1}}$  and  $S_{\text{prioritysearch2}}$  thresholds).

If E-DCH resources are allocated to the UE or timer T321[16] is running, the UE is not required to perform interfrequency FDD cell identification or measurement.

##### 8.4.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify, inter}} = \text{Ceil} \left\{ \frac{T_{\text{basic identify FDD inter}}}{T_{\text{Inter FACH}}} \right\} \cdot T_{\text{meas}} \cdot K_n \cdot N_{\text{freq,FDD},n} \quad \text{ms (normal performance) and}$$

$$T_{\text{identify, inter}} = \text{Ceil} \left\{ \frac{T_{\text{basic identify FDD inter}}}{T_{\text{Inter FACH}}} \right\} \cdot T_{\text{meas}} \cdot K_r \cdot N_{\text{freq,FDD},r} \quad \text{ms (reduced performance)}$$

where

$T_{\text{basic\_identify\_FDD,inter}}$  is specified in 8.1.2.3.2.

$N_{\text{Freq,FDD}}$ : Number of FDD frequencies in the Inter-frequency cell info list

$T_{\text{Meas}}$  and  $M_{\text{REP}}$  are specified in 8.4.2.1.

$T_{\text{Inter FACH}} = (N_{\text{TTI}} \cdot 10 - 2) \cdot 0.5$  ms

A cell shall be considered detectable when

- CPICH  $E_c/I_0 \geq -20$  dB,
- SCH  $E_c/I_0 \geq -17$  dB for at least one channel tap and SCH  $E_c/I_0$  is equally divided between primary synchronisation code and secondary synchronisation code.

##### 8.4.2.3.2 UE CPICH measurement capability

When a measurement occasion cycle is 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 sub-clause 9.1.2 with measurement period is given by

$$T_{\text{measurement inter}} = \text{Max} \left\{ T_{\text{Measurement_Period Inter}}, 2 \cdot T_{\text{meas}}, \text{Ceil} \left\{ \frac{T_{\text{basic measurement FDD inter}}}{T_{\text{Inter FACH}}} \right\} \cdot T_{\text{meas}} \cdot K_n \cdot N_{\text{freq,FDD},n} \right\} \text{ms}$$

(normal performance) and

$$T_{\text{measurement\_inter}} = \text{Max} \left\{ T_{\text{Measurement\_Period\_Inter}}, 2 \cdot T_{\text{meas}}, \text{Ceil} \left\{ \frac{T_{\text{basic\_measurement\_FDD\_inter}}}{T_{\text{Inter\_FACH}}} \right\} \cdot T_{\text{meas}} \cdot K_r \cdot N_{\text{freq,FDD},r} \right\} \text{ms}$$

(reduced performance)

where

$T_{\text{basic\_measurement\_FDD,inter}}$  is specified in section 8.1.2.3.2.

$T_{\text{Measurement\_Period\_Inter}}$  is specified in section 8.1.2.3.2.

$T_{\text{Meas}}$  is specified in section 8.4.2.1.

$N_{\text{Freq,FDD}}$  and  $T_{\text{Inter\_FACH}}$  are specified in section 8.4.2.3.1

$N_{\text{freq,FDD},n}$ : Number of FDD interfrequency carriers to be monitored with normal performance

$N_{\text{freq,FDD},r}$ : Number of FDD interfrequency carriers to be monitored with reduced performance

If  $N_{\text{freq,FDD},r}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.0a. Otherwise  $K_n=1$  and all interfrequency layers have normal performance.

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring UTRA [16,31] are calculated assuming all UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e.  $N_{\text{freq,FDD},n} = N_{\text{Freq,FDD}}$  and  $N_{\text{freq,FDD},r}=0$ .

If the UE does not need measurement occasions to perform inter-frequency measurements, the measurement period for inter frequency measurements is 480 ms.

The UE shall be capable of performing CPICH measurements for  $X_{\text{basic\_measurement\_FDD\_inter}}$  inter-frequency cells per FDD frequency of the monitored set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement\_Inter}}$ .

$X_{\text{basic\_measurement\_FDDinter}}$  is defined in section 8.1.2.3.2

## 8.4.2.4 TDD measurements when HS-DSCH discontinuous reception is not ongoing

The requirements in this section shall apply to UE supporting FDD and TDD.

In the CELL\_FACH state when a measurement occasion cycle is provided by the network the UE shall continuously measure identified inter frequency TDD cells and search for new inter-frequency TDD cells indicated in the measurement control information. If E-DCH resources are allocated to the UE or timer T321[16] is running, the UE is not required to perform interfrequency TDD cell identification or measurement.

### 8.4.2.4.1 Identification of a new cell

#### 8.4.2.4.1.1 3,84 Mcps TDD Option

The UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within

$$T_{\text{identify\_TDD}} = \text{Max} \left\{ 5000, \text{Ceil} \left\{ \frac{T_{\text{basic\_identify\_TDD\_inter}}}{T_{\text{Inter\_FACH}}} \right\} \cdot T_{\text{meas}} \cdot N_{\text{Freq,TDD}} \right\} \text{ms}$$

where

$T_{\text{basic\_identify\_TDD,inter}} = 800\text{ms}$

$N_{\text{Freq,TDD}}$ : Number of TDD frequencies indicated in the Inter-frequency cell info list

$T_{\text{Meas}}$  is specified in section 8.4.2.1.

$T_{\text{Inter\_FACH}}$  is specified in section 8.4.2.3.1



If the UE does not need measurement occasions to perform inter-frequency TDD measurements, the UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within 5000 ms.

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

An inter-frequency TDD cell shall be considered detectable when  $P\text{-CCPCH}_{Ec}/I_o \geq -8$  dB and  $SCH_{Ec}/I_o \geq -13$  dB.

The received  $P\text{-CCPCH}_{Ec}/I_o$  is defined as

$$\left( \frac{P\text{-CCPCH}_{Ec}}{I_o} \right) \Big|_{in\ dB} = \left( \frac{P\text{-CCPCH}_{Ec}}{I_{or}} \right) \Big|_{in\ dB} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB}$$

and the received  $SCH_{Ec}/I_o$  is defined as

$$\left( \frac{SCH_{Ec}}{I_o} \right) \Big|_{in\ dB} = \left( \frac{SCH_{Ec}}{I_{or}} \right) \Big|_{in\ dB} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB}$$

#### 8.4.2.4.1.2 1.28 Mcps TDD Option

The UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within

$$T_{\text{identify, TDD}} = \text{Max} \left\{ 5000, \text{Ceil} \left\{ \frac{T_{\text{basic identify TDD inter}}}{T_{\text{Inter FACH}}} \right\} \cdot T_{\text{meas}} \cdot N_{\text{Freq, TDD}} \right\} \text{ ms}$$

where

$T_{\text{basic\_identify\_TDD,inter}} = 800\text{ms}$

$N_{\text{Freq, TDD}}$ : Number of TDD frequencies indicated in the inter-frequency cell info list

$T_{\text{Meas}}$  is specified in section 8.4.2.1.

$T_{\text{Inter FACH}}$  is specified in section 8.4.2.3.1

If the UE does not need measurement occasions to perform inter-frequency TDD measurements, the UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within 5000 ms.

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

A cell shall be considered detectable when  $P\text{-CCPCH}_{Ec}/I_o \geq -8$  dB and  $DwPCH_{Ec}/I_o \geq -5$  dB.

The received  $P\text{-CCPCH}_{Ec}/I_o$  is defined as

$$\left( \frac{P\text{-CCPCH}_{Ec}}{I_o} \right) \Big|_{in\ dB} = \left( \frac{P\text{-CCPCH}_{Ec}}{I_{or}} \right) \Big|_{in\ dB} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB}$$

The received  $DwPTS_{Ec}/I_o$  is defined as

$$\left( \frac{DwPCH_{Ec}}{I_o} \right) \Big|_{in\ dB} = \left( \frac{DwPCH_{Ec}}{I_{or}} \right) \Big|_{in\ dB} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB}$$

#### 8.4.2.4.2 P-CCPCH RSCP measurement period

When a measurement occasion cycle as previously described is scheduled for inter frequency TDD measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.11 and with a measurement period as given by

$$T_{\text{measurement TDD}} = \text{Max} \left\{ T_{\text{Measurement_Period TDD inter}}, 2 \cdot T_{\text{meas}}, \text{Ceil} \left\{ \frac{T_{\text{basic measurement TDD inter}}}{T_{\text{Inter FACH}}} \right\} \cdot T_{\text{meas}} \cdot N_{\text{Freq,TDD}} \right\}$$

where

$T_{\text{basic\_measurement\_TDD inter}} = 50$  ms.

$T_{\text{Measurement\_Period TDD inter}}$  is specified in section 8.1.2.4.2.

$T_{\text{Meas}}$  is specified in section 8.4.2.1.

$T_{\text{Inter FACH}}$  is specified in section 8.4.2.3.1

$N_{\text{Freq,TDD}}$ : This is the number of TDD frequencies indicated in the inter-frequency cell info list

If the UE does not need measurement occasions to perform inter-frequency TDD measurements, the measurement period for inter frequency TDD measurements is 480 ms.

The UE shall be capable of performing P-CCPCH RSCP measurements for  $X_{\text{basic measurement TDD inter}}$  inter-frequency TDD cells per TDD frequency of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement TDD}}$ .

$X_{\text{basic measurement TDD inter}}$  is defined in section 8.1.2.4.2

#### 8.4.2.5 GSM measurements when HS-DSCH discontinuous reception is not ongoing

The requirements in this section apply only to UE supporting FDD and GSM. If E-DCH resources are allocated to the UE or timer T321[16] is running, the UE is not required to perform GSM BSIC identification or RSSI measurement.

To support cell reselection the UE shall always perform BSIC verification in Cell FACH state.

1) In CELL\_FACH state when measurement occasions are provided by the UTRAN the UE shall continuously measure GSM cells and search for new GSM cells given in the monitored set.

In section 8.4.2.1 the split of measurements between different modes and systems is defined. Every second measurement occasion scheduled for GSM measurements, as given by 8.4.2.1 shall be allocated for GSM initial BSIC identification.

The remaining measurements occasions scheduled for GSM measurements shall be used as follows. 3 occasions out of 4 shall be allocated for GSM carrier RSSI measurements and 1 out of 4 shall be allocated for GSM BSIC reconfirmation. The scheduling of measurement occasions between GSM carrier RSSI measurements and GSM BSIC reconfirmation is up to the UE.

2) If the UE does not need measurement occasions to perform GSM measurements:

- the UE shall measure all GSM cells present in the monitored set
- the relevant requirements for GSM dedicated mode when a TCH channel is assigned in TS 45.008 shall apply. This is further detailed in the following sub-sections.

##### 8.4.2.5.1 GSM carrier RSSI

1) For a UE requiring measurement occasions.

A UE supporting GSM measurements using measurement occasions shall meet the minimum number of GSM carrier RSSI measurements specified in Table 8.11. This measurement shall be based on measurement occasions allocated for GSM carrier RSSI measurements as described in 8.4.2.5. In the CELL\_FACH state the measurement period for the GSM carrier RSSI measurement is 480 ms.

The UE shall meet the measurement accuracy requirements stated for RXLEV in TS 45.008, 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.

Table 8.11

Length of measurement occasion (frames)	Number of GSM carrier RSSI samples in each measurement occasion, $N_{\text{GSM carrier RSSI}}$
1	16
2	32
4	64
8	128

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.

2) For a UE not requiring measurement occasions

The samples allocated to each carrier shall as far as possible be uniformly distributed over each measurement period. At least 3 received signal level measurement samples are required per RSSI value. The measurement period is 480 ms.

In case UTRA RACH procedure prevents the UE from acquiring the required number of samples per GSM carrier during one measurement period, the GSM carriers that were not measured during that measurement period shall be measured in the following measurement periods.

#### 8.4.2.5.2 BSIC verification

1) For a UE requiring measurement occasions.

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 FDD and GSM cell. The UE shall trigger the initial BSIC identification within 50% of the available measurement occasions used for GSM measurements as specified in 8.4.2.1. The requirements for Initial BSIC identification can be found in 8.4.2.5.2.1.

##### 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 occasions used for GSM as specified in 8.4.2.1. The requirements for BSIC re-confirmation can be found in 8.4.2.5.2.2.

The BSIC of a GSM cell is considered to be "verified" if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification) and from that moment the BSIC shall be re-confirmed at least once every 6 times  $T_{\text{re-confirm\_GSM}}$  seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified".

$T_{\text{re-confirm\_GSM}}$  indicates the maximum time allowed for the re-confirmation of the BSIC of one GSM cell in the BSIC re-confirmation procedure according to section 8.4.2.5.2.2.

The UE shall be able to decode a BSIC within a measurement occasion when the time difference between the middle of the received GSM synchronisation burst at the UE and the middle of the measurement occasion is within the limits specified in table 8.12.

**Table 8.12: The measurement occasion length and maximum time difference for BSIC verification**

Measurement occasion length (frames)	Maximum time difference [ $\mu\text{s}$ ]
1	$\pm 4100$
2	$\pm 9100$
4	$\pm 19100$
8	$\pm 39100$

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.

## 2) For a UE not requiring measurement occasions

The UE shall attempt to check the BSIC for at least the 6 strongest GSM carriers at least every 10 seconds, to confirm that it is monitoring the same cell, as far as UTRA RACH procedure does not prevent UE from decoding BSIC.

If a BSIC is decoded and matches the expected value, it is considered as "verified", else it 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.

## 8.4.2.5.2.1 Initial BSIC identification

This measurement shall be based on the measurement occasions allocated for Initial BSIC identification as described in 8.4.2.5.

The UE shall continuously attempt to decode the BSIC of SCH on the BCCH carrier of the 6 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.

When the UE attempts to decode the BSIC of one GSM BCCH carrier with unknown BSIC, the UE shall use all available measurements occasions allocated for GSM initial BSIC identification according section 8.4.2.5 to attempt to decode the BSIC from that GSM BCCH carrier.

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  $T_{\text{identify, GSM}}$  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 6 strongest GSM BCCH carriers in the monitored set with unknown BSIC.

$T_{\text{identify, GSM}}$  is given for the combinations of  $T_{\text{meas}}$  and  $N_{\text{TTI}}$  that are given in table 8.13. The values given in table 8.13 represent the number of patterns required to guarantee at least two attempts to decode the BSIC for one GSM BCCH carrier.

**Table 8.13: The worst-case time for identification of one previously not identified GSM cell**

$T_{\text{meas}}$ (ms)	$N_{\text{TTI}}=1$ frame $T_{\text{identify, GSM}}$ (ms)	$N_{\text{TTI}}=2$ frames $T_{\text{identify, GSM}}$ (ms)	$N_{\text{TTI}}=4$ frames $T_{\text{identify, GSM}}$ (ms)	$N_{\text{TTI}}=8$ frames $T_{\text{identify, GSM}}$ (ms)
80	2880	1280		-
160	7680	2880	1280	640
240	29760	5280		-
320	14080	6400	2560	1280
480	34560	12480	2880	1920
640	34560	12800	5120	2560
960	*	24960	5760	3840
1280	*	20480	10240	5120
1920	*	34560	15360	7680
NOTE *: There are no performance requirements for these combinations of parameters because they result in long identification time.				

## 8.4.2.5.2.2 BSIC re-confirmation

The requirements of this section are applicable for BSIC re-confirmation.

The UE shall maintain the timing information of 6 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 occasion allocated for GSM BSIC reconfirmation as described in 8.4.2.5, the UE shall attempt to decode the BSIC falling within the measurement occasion duration according to table 8.12. When the UE has to select one out of several possible GSM cells to reconfirm within the possible allocation of measurement occasions, according to 8.4.2.5, priority shall be given to the least recently decoded BSIC.

If the UE fails to decode the BSIC after two successive attempts 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 8.4.2.5.2.1. The UE shall be able to make BSIC re-confirmation attempts for the 6 strongest GSM cells in the monitored list.

$T_{\text{re-confirm\_GSM}}$  is given for the combinations of  $T_{\text{meas}}$  and  $N_{\text{TTI}}$  that are given in table 8.14. The values given in table 8.14 represent the number of patterns required to guarantee at least two attempts to decode the BSIC for one GSM BCCH carrier. Different values for  $T_{\text{re-confirm\_GSM}}$  might apply when more than one GSM cell is in the BSIC reconfirmation procedure at the same time.

**Table 8.14: The worst-case time for reconfirmation of one previously identified GSM cell**

$T_{\text{meas}}$ (ms)	$N_{\text{TTI}}=1$ frame $T_{\text{re-confirm,GSM}}$ (ms)	$N_{\text{TTI}}=2$ frames $T_{\text{re-confirm,GSM}}$ (ms)	$N_{\text{TTI}}=4$ frames $T_{\text{re-confirm,GSM}}$ (ms)	$N_{\text{TTI}}=8$ frames $T_{\text{re-confirm,GSM}}$ (ms)
80	2880	1600	-	-
160	6400	3200	2240	1600
240	17280	4800	-	-
320	14080	6400	4480	3200
480	22080	9600	6720	4800
640	26880	12800	10240	6400
960	*	17280	13440	9600
1280	*	33280	17920	12800
1920	*	*	26880	19200

\* Note: There are no performance requirements for these combinations of parameters because they result in long reconfirmation time.

#### 8.4.2.6 E-UTRAN measurements when HS-DSCH discontinuous reception is not ongoing

The requirements in this section apply only to UE supporting FDD and E-UTRA.

When absolute priority based reselection is used, measurement rules defined in [1] apply (based on  $S_{\text{prioritysearch1}}$  and  $S_{\text{prioritysearch2}}$  thresholds)

If E-DCH resources are allocated to the UE or timer T321[16] is running, the UE is not required to perform E-UTRA measurements.

The requirements below apply to both cell reselection to E-UTRA and network controlled mobility to E-UTRA (i.e. E-UTRA measurement for CELL\_FACH and E-UTRA RACH reporting).

##### 8.4.2.6.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify, E-UTRAN}} = \text{Ceil} \left\{ \frac{T_{\text{basic identify E-UTRAN}}}{T_{\text{E-UTRAN FACH}}} \right\} \cdot T_{\text{meas}} \cdot K_n \cdot N_{E-UTRA,n} \quad \text{ms}$$

(normal performance) and

$$T_{\text{identify, E-UTRAN}} = \text{Ceil} \left\{ \frac{T_{\text{basic identify E-UTRAN}}}{T_{\text{E-UTRAN FACH}}} \right\} \cdot T_{\text{meas}} \cdot K_r \cdot N_{E-UTRA,r} \quad \text{ms}$$

(reduced performance)

where

$T_{\text{basic\_identify\_E-UTRAN}}$  is specified in 8.1.2.6.

$N_{\text{E-UTRA}}$ : Number of E-UTRA frequencies in the E-UTRA cell info list

$N_{E-UTRA,n}$ : Number of E-UTRAN carriers to be monitored with normal performance

$N_{E-UTRA,r}$ : Number of E-UTRAN carriers to be monitored with reduced performance.

If  $N_{E-UTRA,r}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.0a. Otherwise  $K_n=1$  and all E-UTRA layers have normal performance.

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring E-UTRA [16,31] are calculated assuming all E-UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e.  $N_{E-UTRA,n} = N_{E-UTRA}$  and  $N_{E-UTRA,r}=0$ .

$T_{Meas}$  and  $M\_REP$  are specified in 8.4.2.1.

$$T_{E-UTRAN\_FACH} = (N_{TTI} * 10 - 2 * 0.5) \text{ ms}$$

A cell shall be considered detectable based on requirements defined in [24].

#### 8.4.2.6.2 UE RSRP and RSRQ measurement capability

When a measurement occasion cycle is scheduled for E-UTRA measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.4a/b with measurement period given by

$$T_{\text{measurement E-UTRAN}} = \text{Max} \left\{ T_{\text{Measurement\_Period E-UTRAN}}, 2 \cdot T_{\text{meas}}, \text{Ceil} \left\{ \frac{T_{\text{basic measurement E-UTRAN}}}{T_{E-UTRAN\_FACH}} \right\} \cdot K_n \cdot T_{\text{meas}} \cdot N_{E-UTRA,n} \right\}$$

ms (normal performance), and

$$T_{\text{measurement E-UTRAN}} = \text{Max} \left\{ T_{\text{Measurement\_Period E-UTRAN}}, 2 \cdot T_{\text{meas}}, \text{Ceil} \left\{ \frac{T_{\text{basic measurement E-UTRAN}}}{T_{E-UTRAN\_FACH}} \right\} \cdot K_r \cdot T_{\text{meas}} \cdot N_{E-UTRA,r} \right\}$$

where

$$T_{\text{basic\_measurement\_E-UTRAN}} = 60 \text{ ms.}$$

$T_{\text{Measurement\_Period E-UTRAN}}$  is specified in section 8.1.2.6.

$T_{\text{Meas}}$  is specified in section 8.4.2.1.

$N_{E-UTRA,n}$ ,  $N_{E-UTRA,r}$ ,  $K_n$  and  $K_r$  and  $T_{E-UTRAN\_FACH}$  are specified in section 8.4.2.6.1

If the UE does not need measurement occasions to perform E-UTRA measurements, the measurement period for E-UTRA measurements is 480 ms.

#### 8.4.2.6.3 E-UTRA measurements reporting

If E-UTRA measurement for CELL\_FACH is configured by upper layers, UE can report measurements in measurement reports, whose report criteria can be set to Event triggered or Periodical reporting. In both cases, the UE shall send only one measurement report. The UE shall be able to support at least 1 E-UTRA measurement per carrier on up to 4 E-UTRA carriers for CELL\_FACH configuration.

Reported measurements shall meet the requirements in section 9.

##### 8.4.2.6.3.1 Event Triggered reporting

The measurement reporting delay is defined as the time between the triggering of a measurement report (the measured quality of any cell on a configured E-UTRA frequency exceeds the configured threshold) until the moment in time when the UE starts sending the preambles on the PRACH for sending the measurement report

The event triggered measurement reporting delay shall be less than  $T_{\text{identify,E-UTRAN}} + T_{\text{RA}}$ , where  $T_{\text{identify,E-UTRAN}}$  is defined in Section 8.4.2.6.1 and  $T_{\text{RA}}$  is the additional delay caused by the random access procedure.

If a cell has been detectable at least for the time period than  $T_{\text{identify\_E-UTRAN}}$  and then triggers the measurement report, the event triggered measurement reporting delay shall be less than  $T_{\text{Measurement\_Period\_E-UTRAN}} + T_{\text{RA}}$  provided the timing to that cell has not changed more than  $\pm 50 T_s$  while transmission gap has not been available.

## 8.4a Measurements in CELL\_FACH State when HS-DSCH discontinuous reception is ongoing

### 8.4a.1 Introduction

This section contains requirements on the UE regarding cell reselection and measurement reporting in CELL\_FACH state when HS-DSCH discontinuous reception is ongoing. The requirements for cell re-selection are split in FDD intra frequency, FDD inter frequency, TDD, GSM and E-UTRA measurements. The measurements are defined in TS 25.215, the measurement model is defined in TS 25.302 and measurement accuracies are specified in section 9. Control of measurement reporting is specified in TS 25.331. DRX in CELL\_FACH state is described in TS 25.331.

If UE indicates support for increased UE carrier monitoring UTRA or increased carrier monitoring E-UTRA the measurement performance for different carriers may be configured by higher layers to be either normal or reduced. A measurement scaling factor [16] defining the relaxation to be applied to the requirements for carriers measured with reduced measurement performance is signalled by higher layers and has the possible settings shown in table 8.0a. The same measurement scaling factor mapping is used in Cell FACH state as cell DCH state.

The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring UTRA [16, 31] are calculated as defined in section 8.4a.2.3 provided that  $N_{\text{freq,FDD},n} \leq 2$  or if all FDD interfrequency carriers are indicated to have normal performance. The minimum performance requirements for a UE which indicates support for Increased UE carrier monitoring E-UTRA [16, 31] are calculated as defined in section 8.4a.2.6 provided that  $N_{\text{E-UTRA},n} \leq 4$  for a UE capable of either FDD E-UTRA carrier monitoring or TDD E-UTRA carrier monitoring or  $N_{\text{freq,E-UTRA},n} \leq 8$  for a UE capable of both FDD and TDD E-UTRA carrier monitoring provided  $N_{\text{freq,E-UTRA},n,\text{FDD}} \leq 4$  and  $N_{\text{freq,E-UTRA},n,\text{TDD}} \leq 4$  or if all E-UTRA carriers are indicated to have normal performance.

Capabilities for number of carriers to monitor for UE which indicates support for Increased UE carrier monitoring UTRA or E-UTRA are specified in section 8.4.2.1a.

### 8.4a.2 Requirements

#### 8.4a.2.1 UE Measurement Capability

In CELL\_FACH state, the number of cells the UE shall be able to monitor is defined in section 8.4.2.1 and 8.4.2.1a.

The requirements in section 9 on CPICH Ec/Io and RSCP measurements are applicable for a UE performing measurements according to this section. For inter-frequency FDD, TDD, GSM and E-UTRAN cell re-selection, DRX gaps as specified in TS 25.331 are used to find and measure on other cells.

It is defined below how the measurements on different systems and modes are performed given the time allocated to that system. The requirements in this section are based on an assumption that the time during the DRX gaps that is allocated to each of the different modes and systems shall be equally shared by the modes which the UE has capability for and that are in the monitored set signalled by the network.

#### 8.4a.2.2 FDD intra frequency measurements when HS-DSCH discontinuous reception is ongoing

During the CELL\_FACH state the UE shall continuously measure identified intra frequency cells and search for new intra frequency cells in the monitoring set during the on part of the DRX cycle.

##### 8.4a.2.2.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify,intra}} = \text{Min} \left\{ 30000, \text{Max} \left\{ 300, \text{ceil} \left\{ \frac{T_{\text{basic identify FDD, intra_HS-DSCH-DRX}}}{T_{\text{on}}} \right\} T_{\text{DRX\_Cycle}} \right\} \right\} \text{ where}$$

$T_{\text{basic identify FDD, intra_HS-DSCH-DRX}}$  is 300ms

*HS-DSCH Rx burst<sub>FACH</sub>* is the duration of the on part of the DRX cycle (frames)

*HS-DSCH DRX cycle<sub>FACH</sub>* is the duration of the total DRX cycle (frames)

A cell shall be considered detectable when

- CPICH Ec/Io  $\geq$  -17 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.

#### 8.4a.2.2.2 UE CPICH measurement capability

In the CELL\_FACH state the measurement period for intra frequency measurements is

$$T_{\text{Measurement\_PeriodIntra}} = \text{Min} \left\{ 10240, \text{Max} \left\{ 200, \text{ceil} \left\{ \frac{200}{T_{\text{on}}} \right\} T_{\text{DRX\_Cycle}} \right\} \right\} \text{ ms}$$

The UE shall be capable of performing CPICH measurements for 8 identified intra-frequency cells of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement\_Period,Intra}}$ .

where

*HS-DSCH Rx burst<sub>FACH</sub>* is the duration of the on part of the DRX cycle (frames)

*HS-DSCH DRX cycle<sub>FACH</sub>* is the duration of the total DRX cycle (frames)

#### 8.4a.2.2.3 RACH reporting

Reporting measurements in the measurement reports sent on the RACH shall meet the requirements in section 9.

#### 8.4a.2.3 FDD inter frequency measurements

In the CELL\_FACH state when DRX is being performed by the UE, the UE shall measure identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information, according to the measurement rules defined in [1].

When absolute priority based reselection is used:

- If  $S_{\text{rxlev}}^{\text{ServingCell}} > S_{\text{prioritysearch1}}$  and  $S_{\text{qual}}^{\text{ServingCell}} > S_{\text{prioritysearch2}}$  then the UE shall search for inter frequency layers of higher priority at least every  $T_{\text{higher\_priority\_search}}$ , where  $T_{\text{higher\_priority\_search}}$  is described in section 4.2.2.
- If  $S_{\text{rxlev}}^{\text{ServingCell}} \leq S_{\text{prioritysearch1}}$  or  $S_{\text{qual}}^{\text{ServingCell}} \leq S_{\text{prioritysearch2}}$  then the UE shall search for all inter frequency layers based on the requirements below.

If E-DCH resources are allocated to the UE or timer T321 [16] is running, the UE is not required to perform interfrequency cell identification or measurements as continuous HS-DSCH reception is required.

##### 8.4a.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within



$$T_{\text{identify, inter}} = \text{Min} \left\{ 30000, \text{Ceil} \left\{ \frac{T_{\text{basic identify FDD inter}}}{T_{\text{Inter FACH, DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot K_n \cdot N_{\text{Freq, FDD, n}} \quad \text{ms (normal$$

performance) and

$$T_{\text{identify, inter}} = \text{Min} \left\{ 30000, \text{Ceil} \left\{ \frac{T_{\text{basic identify FDD inter}}}{T_{\text{Inter FACH, DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot K_r \cdot N_{\text{Freq, FDD, r}} \quad \text{ms (reduced$$

performance)

where

$T_{\text{basic\_identify\_FDD, inter}}$  is specified in 8.1.2.3.2.

$N_{\text{Freq, FDD}}$ : Number of FDD frequencies in the Inter-frequency cell info list

$N_{\text{Freq, FDD, n}}$ : Number of frequencies in the inter frequency cell info list indicated for normal performance

$N_{\text{Freq, FDD, r}}$ : Number of frequencies in the inter frequency cell info list indicated for reduced performance excluding any interfrequency higher priority layers indicated to have reduced performance

If  $N_{\text{Freq, FDD, r}}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.0a. Otherwise  $K_n=1$  and all interfrequency layers have normal performance.

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring UTRA [16,31] are calculated assuming all UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e.  $N_{\text{Freq, FDD, n}} = N_{\text{Freq, FDD}}$  and  $N_{\text{Freq, FDD, r}}=0$ .

$T_{\text{Inter FACH, DRX}} = \text{Min}(\text{HS-DSCH DRX cycle}_{\text{FACH}} - \text{HS-DSCH Rx burst}_{\text{FACH}}, \text{HS-DSCH Rx burst}_{\text{FACH}}) - 2 \cdot 0.5 \text{ms}$  [ms]

$\text{HS-DSCH Rx burst}_{\text{FACH}}$  is the duration of the on part of the DRX cycle (frames)

$\text{HS-DSCH DRX cycle}_{\text{FACH}}$  is the duration of the total DRX cycle (frames)

$$T_{\text{scale}} = N_{\text{FDD}} + N_{\text{TDD}} + N_{\text{GSM}} + N_{\text{E-UTRAN}}$$

If absolute priority based reselection is used, and  $S_{\text{rxlev}}^{\text{ServingCell}} > S_{\text{prioritysearch1}}$  and  $S_{\text{qual}}^{\text{ServingCell}} > S_{\text{prioritysearch2}}$ ,  $T_{\text{identify, inter}}$  shall be increased by  $T_{\text{higher\_priority\_search}}$ .

A cell shall be considered detectable when

- CPICH  $E_c/I_0 \geq -17$  dB,
- SCH  $E_c/I_0 \geq -17$  dB for at least one channel tap and SCH  $E_c/I_0$  is equally divided between primary synchronisation code and secondary synchronisation code.

#### 8.4a.2.3.2 UE CPICH measurement capability

The UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.2 with measurement period is given by within

$$T_{\text{measurement inter}} = \text{Max} \left\{ T_{\text{Measurement\_Period, Inter}}, \text{Min} \left\{ 10240, \text{Ceil} \left\{ \frac{T_{\text{basic\_measurement\_FDD, inter}}}{T_{\text{Inter FACH, DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot K_n \cdot N_{\text{Freq, FDD, n}} \right\}$$

ms (normal performance) and

$$T_{\text{measurement inter}} = \text{Max} \left\{ T_{\text{Measurement\_Period, Inter}}, \text{Min} \left\{ 10240, \text{Ceil} \left\{ \frac{T_{\text{basic\_measurement\_FDD, inter}}}{T_{\text{Inter FACH, DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot K_r \cdot N_{\text{Freq, FDD, r}} \right\}$$

ms (reduced performance)

where

$N_{\text{Freq,FDD}}$ : Number of FDD frequencies in the Inter-frequency cell info list

$N_{\text{Freq,FDD,n}}$ : Number of frequencies in the inter frequency cell info list indicated for normal performance

$N_{\text{Freq,FDD,r}}$ : Number of frequencies in the inter frequency cell info list indicated for reduced performance excluding any interfrequency higher priority layers indicated to have reduced performance

If  $N_{\text{Freq,FDD,r}}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.0a. Otherwise  $K_n=1$  and all interfrequency layers have normal performance.

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring UTRA [16,31] are calculated assuming all UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e.  $N_{\text{Freq,FDD,n}} = N_{\text{Freq,FDD}}$  and  $N_{\text{Freq,FDD,r}}=0$ .

$T_{\text{Measurement\_Period Inter}}$  is specified in section 8.1.2.3.2.

$T_{\text{Inter FACH,DRX}} = \text{Min}(\text{HS-DSCH DRX cycle}_{\text{FACH}} - \text{HS-DSCH Rx burst}_{\text{FACH}}, \text{HS-DSCH Rx burst}_{\text{FACH}}) - 2 * 0.5\text{ms}$  [ms]

*HS-DSCH Rx burst<sub>FACH</sub>* is the duration of the on part of the DRX cycle (frames)

*HS-DSCH DRX cycle<sub>FACH</sub>* is the duration of the total DRX cycle (frames)

The UE shall be capable of performing CPICH measurements for  $X_{\text{basic measurement FDD inter}}$  inter-frequency cells per FDD frequency of the monitored set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement\_Inter}}$ .

$X_{\text{basic measurement FDD inter}}$  is defined in section 8.1.2.3.2

$T_{\text{scale}} = N_{\text{FDD}} + N_{\text{TDD}} + N_{\text{GSM}} + N_{\text{E-UTRAN}}$

#### 8.4a.2.4 TDD measurements when HS-DSCH discontinuous reception is ongoing

The requirements in this section shall apply to UE supporting FDD and TDD.

The UE shall continuously measure identified inter frequency TDD cells and search for new inter-frequency TDD cells indicated in the measurement control information. If E-DCH resources are allocated to the UE or timer T321[16] is running, the UE is not required to perform interfrequency TDD cell identification or measurements as continuous HS-DSCH reception is required.

##### 8.4a.2.4.1 Identification of a new cell

###### 8.4.2.4.1.13,84 Mcps TDD Option

The UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within

$$T_{\text{identify, TDD}} = \text{Max} \left\{ 5000, \text{Min} \left\{ 30000, \text{Ceil} \left\{ \frac{T_{\text{basic identify TDD inter}}}{T_{\text{Inter FACH,DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot N_{\text{Freq,TDD}} \right\} \text{ ms}$$

Where

$T_{\text{basic\_identify\_TDD,inter}} = 800\text{ms}$

$N_{\text{Freq,TDD}}$ : Number of TDD frequencies indicated in the Inter-frequency cell info list

$T_{\text{Inter FACH,DRX}} = \text{Min}(\text{HS-DSCH DRX cycle}_{\text{FACH}} - \text{HS-DSCH Rx burst}_{\text{FACH}}, \text{HS-DSCH Rx burst}_{\text{FACH n}}) - 2 * 0.5\text{ms}$  [ms]

*HS-DSCH Rx burst<sub>FACH</sub>* is the duration of the on part of the DRX cycle (frames)

**HS-DSCH DRX cycle<sub>FACH</sub>** is the duration of the total DRX cycle (frames)

$$T_{\text{scale}} = N_{\text{FDD}} + N_{\text{TDD}} + N_{\text{GSM}}$$

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

An inter-frequency TDD cell shall be considered detectable when  $P\text{-CCPCH}_{\text{Ec/Io}} \geq -8$  dB and  $SCH_{\text{Ec/Io}} \geq -13$  dB.

The received  $P\text{-CCPCH}_{\text{Ec/Io}}$  is defined as

$$\left( \frac{P\text{-CCPCH}_{\text{Ec}}}{I_o} \right) \Big|_{\text{in dB}} = \left( \frac{P\text{-CCPCH}_{\text{Ec}}}{I_{or}} \right) \Big|_{\text{in dB}} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{\text{in dB}}$$

and the received  $SCH_{\text{Ec/Io}}$  is defined as

$$\left( \frac{SCH_{\text{Ec}}}{I_o} \right) \Big|_{\text{in dB}} = \left( \frac{SCH_{\text{Ec}}}{I_{or}} \right) \Big|_{\text{in dB}} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{\text{in dB}}$$

#### 8.4a.2.4.1.2 1.28 Mcps TDD Option

The UE shall be able to identify a new detectable inter-frequency TDD cell belonging to the monitored set within

$$T_{\text{identify, TDD}} = \text{Max} \left\{ 5000, \text{Min} \left\{ 30000, \text{Ceil} \left\{ \frac{T_{\text{basic identify TDD inter}}}{T_{\text{Inter FACH,DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot N_{\text{Freq,TDD}} \right\} \text{ms}$$

where

$$T_{\text{basic\_identify\_TDD,inter}} = 800\text{ms}$$

$N_{\text{Freq,TDD}}$ : Number of TDD frequencies indicated in the Inter-frequency cell info list

$T_{\text{Measurement\_Period TDD inter}}$  is specified in section 8.1.2.4.2

$$T_{\text{Inter FACH,DRX}} = \text{Min}(\text{HS-DSCH DRX cycle}_{\text{FACH}} - \text{HS-DSCH Rx burst}_{\text{FACH}}, \text{HS-DSCH Rx burst}_{\text{FACH}}) - 2 * 0.5\text{ms [ms]}$$

**HS-DSCH Rx burst<sub>FACH</sub>** is the duration of the on part of the DRX cycle (frames)

**HS-DSCH DRX cycle<sub>FACH</sub>** is the duration of the total DRX cycle (frames)

$$T_{\text{scale}} = N_{\text{FDD}} + N_{\text{TDD}} + N_{\text{GSM}}$$

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

A cell shall be considered detectable when  $P\text{-CCPCH}_{\text{Ec/Io}} \geq -8$  dB and  $DwPCH_{\text{Ec/Io}} \geq -5$  dB.

The received  $P\text{-CCPCH}_{\text{Ec/Io}}$  is defined as

$$\left( \frac{P\text{-CCPCH}_{\text{Ec}}}{I_o} \right) \Big|_{\text{in dB}} = \left( \frac{P\text{-CCPCH}_{\text{Ec}}}{I_{or}} \right) \Big|_{\text{in dB}} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{\text{in dB}}$$

The received  $DwPTS_{\text{Ec/Io}}$  is defined as

$$\left( \frac{DwPCH - E_c}{I_o} \right) \Big|_{in \text{ dB}} = \left( \frac{DwPCH - E_c}{I_{or}} \right) \Big|_{in \text{ dB}} - \left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in \text{ dB}}$$

#### 8.4a.2.4.2 P-CCPCH RSCP measurement period

When a DRX cycle as previously described is scheduled for inter frequency TDD measurements the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.11 and with a measurement period as given by

$$T_{\text{measurement,TDD}} = \text{Max} \left\{ T_{\text{Measurement_Period, Inter}}, \text{Min} \left\{ 10240, \text{Ceil} \left\{ \frac{T_{\text{basic\_measurement\_TDD, inter}}}{T_{\text{Inter FACH, DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot N_{\text{Freq,FDD}} \right\}$$

where

$N_{\text{Freq,TDD}}$ : Number of TDD frequencies in the Inter-frequency cell info list

$T_{\text{Measurement_Period Inter}}$  is specified in section 8.1.2.3.2.

$T_{\text{Inter FACH,DRX}} = \text{Min}(\text{HS-DSCH DRX cycle}_{\text{FACH}} - \text{HS-DSCH Rx burst}_{\text{FACH}}, \text{HS-DSCH Rx burst}_{\text{FACH}}) - 2 * 0.5\text{ms}$  [ms]

$\text{HS-DSCH Rx burst}_{\text{FACH}}$  is the duration of the on part of the DRX cycle (frames)

$\text{HS-DSCH DRX cycle}_{\text{FACH}}$  is the duration of the total DRX cycle (frames)

$T_{\text{scale}} = N_{\text{FDD}} + N_{\text{TDD}} + N_{\text{GSM}}$

The UE shall be capable of performing P-CCPCH RSCP measurements for  $X_{\text{basic\_measurement\_TDD\_inter}}$  inter-frequency TDD cells per TDD frequency of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of  $T_{\text{Measurement\_TDD}}$ .

$X_{\text{basic\_measurement\_TDD\_inter}}$  is defined in section 8.1.2.4.2

#### 8.4a.2.5 GSM measurements when HS-DSCH discontinuous reception is ongoing

The requirements in this section apply only to UE supporting FDD and GSM. If E-DCH resources are allocated to the UE or timer T321[16] is running, the UE is not required to perform GSM BSIC identification or RSSI measurement.

To support cell reselection the UE shall always perform BSIC verification in Cell FACH state.

##### 8.4a.2.5.1 GSM carrier RSSI

A UE supporting GSM measurements shall be able to measure at least 32 GSM cells and shall be able to obtain RSSI samples of these cells during a DRX off period. In the CELL\_FACH state the measurement period for the GSM carrier RSSI measurement is

$$T_{\text{measurement\_period,GSM}} = \text{min}(30720, \text{max}(480\text{ms}, T_{\text{scale}} * T_{\text{DRX\_CYCLE}} * 6)).$$

The UE shall meet the measurement accuracy requirements stated for RXLEV in TS 45.008, 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 UTRA RACH procedure prevents the UE from acquiring the required number of samples per GSM carrier during one measurement period, the GSM carriers that were not measured during that measurement period shall be measured in the following measurement periods.

##### 8.4a.2.5.2 BSIC verification

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 FDD and GSM cell. The requirements for Initial BSIC identification can be found in 8.4a.2.5.2.1.

#### BSIC re-confirmation

Tracking and decoding the BSIC of a GSM cell after initial BSIC identification is performed. The requirements for BSIC re-confirmation can be found in 8.4s.2.5.2.2.

The BSIC of a GSM cell is considered to be "verified" if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification) and from that moment 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 decode a BSIC within a measurement occasion when the time difference between the middle of the received GSM synchronisation burst at the UE and the middle of the measurement occasion is within TBD.

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.

#### 8.4a.2.5.2.1 Initial BSIC identification

The UE shall continuously attempt to decode the BSIC of SCH on the BCCH carrier of the 6 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.

The UE is required to decode the BSIC within  $T_{\text{identify\_GSM,DRX}}=500\text{ms}$  for all DRX cycles. This value guarantees at least two attempts to decode the BSIC for one GSM BCCH carrier.

If the UE has not successfully decoded the BSIC of the GSM BCCH carrier within  $T_{\text{identify\_GSM,DRX}}=500\text{ms}$ , 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 6 strongest GSM BCCH carriers in the monitored set with unknown BSIC. Additionally, the UE is not required to attempt to decode the BSIC of a GSM carrier for a period of 30 seconds after an unsuccessful decoding attempt has been made on that GSM carrier.

#### 8.4a.2.5.2.2 BSIC re-confirmation

The requirements of this section are applicable for BSIC re-confirmation.

The UE shall maintain the timing information of 6 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.

If the UE fails to decode the BSIC after two successive attempts 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 8.4a.2.5.2.1. The UE shall be able to make BSIC re-confirmation attempts for the 6 strongest GSM cells in the monitored list.

The UE shall perform BSIC re-confirmation at least every  $T_{\text{re-confirm\_GSM,DRX}}=30\text{seconds}$ .

#### 8.4a.2.6 E-UTRA measurements when HS-DSCH discontinuous reception is ongoing

In the CELL\_FACH state when DRX is being performed by the UE, the UE shall measure identified E-UTRAN cells and search for new E-UTRAN cells indicated in the measurement control information, according to the measurement rules defined in [1].

When absolute priority based reselection is used:

- If  $S_{rxlev}^{ServingCell} > S_{prioritysearch1}$  and  $S_{qual}^{ServingCell} > S_{prioritysearch2}$  then the UE shall search for E-UTRA layers of higher priority at least every  $T_{higher\_priority\_search}$  where  $T_{higher\_priority\_search}$  is described in section 4.2.2.
- If  $S_{rxlev}^{ServingCell} \leq S_{prioritysearch1}$  or  $S_{qual}^{ServingCell} \leq S_{prioritysearch2}$  then the UE shall search for all E-UTRA layers based on the requirements below.

If E-DCH resources are allocated to the UE or timer T321 [16] is running, the UE is not required to perform E-UTRAN cell identification or measurements as continuous HS-DSCH reception is required.

The requirements below apply to both cell reselection to E-UTRA and network controlled mobility to E-UTRA (i.e. E-UTRA measurement for CELL\_FACH and E-UTRA RACH reporting).

#### 8.4a.2.6.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify, E-UTRAN} = \min \left\{ 60000, Ceil \left\{ \frac{T_{basic\ identify\ E-UTRAN}}{T_{E-UTRAN\ FACH,DRX}} \right\} \cdot T_{scale} \cdot T_{DRX\_Cycle} \right\} \cdot K_n \cdot N_{E-UTRA,n} \quad ms$$

(normal performance) and

$$T_{identify, E-UTRAN} = \min \left\{ 60000, Ceil \left\{ \frac{T_{basic\ identify\ E-UTRAN}}{T_{E-UTRAN\ FACH,DRX}} \right\} \cdot T_{scale} \cdot T_{DRX\_Cycle} \right\} \cdot K_r \cdot N_{E-UTRA,r} \quad ms \text{ (reduced}$$

performance)

where

$T_{basic\_identify\_E-UTRAN}$  is specified in 8.1.2.6.

$N_{E-UTRA}$ : Number of E-UTRA frequencies in the E-UTRA neighbor list

$N_{E-UTRA,n}$ : Number of frequencies in the E-UTRA neighbour list indicated for normal performance

$N_{E-UTRA,r}$ : Number of frequencies in the E-UTRA neighbour list indicated for reduced performance excluding any E-UTRA higher priority layers indicated to have reduced performance.

If  $N_{E-UTRA,r}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.0a. Otherwise  $K_n=1$  and all E-UTRA layers have normal performance.

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring E-UTRA [16,31] are calculated assuming all E-UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e.  $N_{E-UTRA,n} = N_{E-UTRA}$  and  $N_{E-UTRA,r}=0$ .

$$T_{E-UTRAN\ FACH,DRX} = \text{Min}(HS-DSCH\ DRX\ cycle_{FACH} - HS-DSCH\ Rx\ burst_{FACH}, HS-DSCH\ Rx\ burst_{FACH}) - 2*0.5ms \quad [ms]$$

$HS-DSCH\ Rx\ burst_{FACH}$  is the duration of the on part of the DRX cycle (frames)

$HS-DSCH\ DRX\ cycle_{FACH}$  is the duration of the total DRX cycle (frames)

$$T_{scale} = N_{FDD} + N_{TDD} + N_{GSM} + N_{E-UTRAN}$$

If absolute priority based reselection is used, and  $S_{rxlev}^{ServingCell} > S_{prioritysearch1}$  and  $S_{qual}^{ServingCell} > S_{prioritysearch2}$ ,  $T_{identify, E-UTRAN}$  shall be increased by  $T_{higher\_priority\_search}$ .

A cell shall be considered detectable according to [36.133]

### 8.4a.2.6.2 UE RSRP and RSRQ measurement capability

The UE physical layer shall be capable of reporting E-UTRA measurements to higher layers with measurement accuracy as specified in sub-clause 9.1.4a/b with measurement period given by

$$T_{\text{measurement E-UTRAN}} = \text{Max} \left\{ T_{\text{Measurement_Period, E-UTRAN}}, \min \left\{ 30720, \text{Ceil} \left\{ \frac{T_{\text{basic\_measurement\_E-UTRAN}}}{T_{\text{E-UTRAN FACH, DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot K_n \right\},$$

ms (normal performance) and

$$T_{\text{measurement E-UTRAN}} = \text{Max} \left\{ T_{\text{Measurement_Period, E-UTRAN}}, \min \left\{ 30720, \text{Ceil} \left\{ \frac{T_{\text{basic\_measurement\_E-UTRAN}}}{T_{\text{E-UTRAN FACH, DRX}}} \right\} \cdot T_{\text{scale}} \cdot T_{\text{DRX\_Cycle}} \right\} \cdot K_r \right\},$$

ms (reduced performance)

where

$N_{\text{E-UTRA}}$ : Number of E-UTRA frequencies in the E-UTRA cell info list

$N_{\text{E-UTRA,n}}$ : Number of frequencies in the E-UTRA neighbour list indicated for normal performance

$N_{\text{E-UTRA,r}}$ : Number of frequencies in the E-UTRA neighbour list indicated for reduced performance excluding any E-UTRA higher priority layers indicated to have reduced performance.

If  $N_{\text{E-UTRA,r}}$  is not equal to zero then  $K_n$  and  $K_r$  are as shown in table 8.0a. Otherwise  $K_n=1$  and all E-UTRA layers have normal performance.

The minimum performance requirements for a UE which does not indicate support for Increased UE carrier monitoring E-UTRA [16,31] are calculated assuming all E-UTRA carriers required to be monitored for such UE, are having normal performance and are in normal performance group, i.e.  $N_{\text{E-UTRA,n}} = N_{\text{E-UTRA}}$  and  $N_{\text{E-UTRA,r}}=0$ .

$T_{\text{Measurement_Period E-UTRAN}}$  is specified in section 8.1.2.6.

$T_{\text{basic\_measurement\_E-UTRAN}} = 60$  ms.

$T_{\text{E-UTRAN FACH, DRX}} = \text{Min}(\text{HS-DSCH DRX cycle}_{\text{FACH}} - \text{HS-DSCH Rx burst}_{\text{FACH}}, \text{HS-DSCH Rx burst}_{\text{FACH}}) - 2 * 0.5\text{ms}$   
[ms]

$\text{HS-DSCH Rx burst}_{\text{FACH}}$  is the duration of the on part of the DRX cycle (frames)

$\text{HS-DSCH DRX cycle}_{\text{FACH}}$  is the duration of the total DRX cycle (frames)

$T_{\text{scale}} = N_{\text{FDD}} + N_{\text{TDD}} + N_{\text{GSM}} + N_{\text{E-UTRA}}$

### 8.4a.2.6.3 E-UTRA measurements reporting

If E-UTRA measurement for CELL\_FACH is configured by upper layers, UE can report measurements in measurement reports, whose report criteria can be set to Event triggered or Periodical reporting. In both cases, the UE shall send only one measurement report. The UE shall be able to support at least 1 E-UTRA measurement per carrier on up to 4 E-UTRA carriers for CELL\_FACH configuration.

Reported measurements shall meet the requirements in section 9.

#### 8.4a.2.6.3.1 Event Triggered reporting

The measurement reporting delay is defined as the time between the triggering of a measurement report (the measured quality of any cell on a configured E-UTRA frequency exceeds the configured threshold) until the moment in time when the UE starts sending the preambles on the PRACH for sending the measurement report

The event triggered measurement reporting delay shall be less than  $T_{\text{identify,E-UTRAN}} + T_{\text{RA}}$ , where  $T_{\text{identify,E-UTRAN}}$  is defined in Section 8.4.2.6.1 and  $T_{\text{RA}}$  is the additional delay caused by the random access procedure.

If a cell has been detectable at least for the time period than  $T_{\text{identify\_E-UTRAN}}$  and then triggers the measurement report, the event triggered measurement reporting delay shall be less than  $T_{\text{Measurement\_Period\_E-UTRAN}} + T_{\text{RA}}$  provided the timing to that cell has not changed more than  $\pm 50 T_s$  while transmission gap has not been available.

## 8.5 Capabilities for Support of Event Triggering and Reporting Criteria in CELL\_FACH state

### 8.5.1 Introduction

This section contains requirements on UE capabilities for support of event triggering and reporting criteria.

### 8.5.2 Requirements

In this section reporting criteria can be either event triggered reporting criteria or periodic reporting criteria.

**Table 8.15: Requirements for reporting criteria per measurement category**

Measurement category	E <sub>cat</sub>	Note
Traffic volume measurements	2 per transport channel type	The transport channel types are "E-DCH" and "RACH"

## 9 Measurements Performance Requirements

One of the key services provided by the physical layer is the measurement of various quantities which are used to trigger or perform a multitude of functions. Both the UE and the UTRAN are required to perform a variety of measurements. The physical layer measurement model and a complete list of measurements is specified in TS 25.302 "Services Provided by Physical Layer". The physical layer measurements for FDD are described and defined in TS25.215 "Physical layer - Measurements (FDD)". In this clause for each measurement the relevant requirements on the measurement period, reporting range, granularity and performance in terms of accuracy are specified.

Since the UE reference sensitivity requirements are different depending on supported band, this is noted in each case with definition of the range  $I_0$  for each frequency band. Definitions of each frequency bands can be found in TS 25.101.

The accuracy requirements in this clause are applicable for AWGN radio propagation conditions.

### 9.1 Measurement Performance for UE

The requirements in this clause are applicable for a UE:

- in state CELL\_DCH and/or state CELL\_FACH when DRX is not configured.
- performing measurements according to section 8.
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS25.302.

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

**NOTE:** It needs to be clarified how the accuracy requirements shall be handled when the UE is measuring on cells using IPDL.



NOTE: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

When DRX is configured in state CELL\_FACH, the accuracy specified for idle mode reselections in chapter 4 is applicable to UE measurements.

NOTE: The requirements for Band XXXII are applicable only with dual band configuration (e.g., DB-DC-HSDPA or dual band 4C-HSDPA).

## 9.1.1 CPICH RSCP

NOTE: This measurement is for handover evaluation, DL open loop power control, UL open loop power control and for the calculation of pathloss.

### 9.1.1.1 Intra frequency measurements accuracy

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.2.

#### 9.1.1.1.1 Absolute accuracy requirement

The accuracy requirements in table 9.1 are valid under the following conditions:

CPICH\_RSCP1<sub>dBm</sub> according to Annex B.3.1 for a corresponding Band

$$\left| \frac{I_o}{\hat{I}_{or}} \right|_{in\ dB} - \left( \frac{CPICH - E_c}{I_{or}} \right)_{in\ dB} \leq 20dB$$

**Table 9.1: CPICH\_RSCP Intra frequency absolute accuracy**

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	Operating bands	I <sub>o</sub> [dBm/3,84MHz]	
				Minimum I <sub>o</sub>	Maximum I <sub>o</sub>
CPICH_RSCP	± 6	± 9	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-70
			II, V and VII	-92	-70
			XXV and XXVI	-90.5 (Note 1)	-70
			III, VIII, XII, XIII, XIV, XX and XXII	-91	-70
			IX	-93	-70
	± 8	± 11	Note 2	-70	-50

NOTE 1: The minimum I<sub>o</sub> is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.  
NOTE 2: The same bands apply for this requirement as for the corresponding highest accuracy requirement..

#### 9.1.1.1.2 Relative accuracy requirement

The relative accuracy of CPICH RSCP is defined as the CPICH RSCP measured from one cell compared to the CPICH RSCP measured from another cell on the same frequency

The accuracy requirements in table 9.2 are valid under the following conditions:

CPICH\_RSCP1,2<sub>dBm</sub> according to Annex B.3.2 for a corresponding Band.

$$\left| CPICH\_RSCP1_{in\ dBm} - CPICH\_RSCP2_{in\ dBm} \right| \leq 20dB$$

$$\left| \frac{I_o}{\hat{I}_{or}} \right|_{in\ dB} - \left( \frac{CPICH - E_c}{I_{or}} \right)_{in\ dB} \leq 20dB$$

Table 9.2: CPICH\_RSCP Intra frequency relative accuracy

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	Operating bands	Io [dBm/3,84 [MHz]	
				Minimum Io	Maximum Io
CPICH_RSCP	± 3	± 3	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
			II, V and VII	-92	-50
			XXV and XXVI	-90.5 (Note 1)	-50
			III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
			IX	-93	-50

NOTE 1: The minimum Io is -90.5 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.1.2 Inter frequency measurement accuracy

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.3.

#### 9.1.1.2.1 Relative accuracy requirement

The relative accuracy of CPICH RSCP in inter frequency case is defined as the CPICH RSCP measured from one cell compared to the CPICH RSCP measured from another cell on a different frequency.

The accuracy requirements in table 9.3 are valid under the following conditions:

$CPICH\_RSCP1_{dBm}$  according to Annex B.3.3 for a corresponding Band

$$\left| CPICH\_RSCP1 \Big|_{in\ dBm} - CPICH\_RSCP2 \Big|_{in\ dBm} \right| \leq 20\ dB$$

$$| Channel\ 1\_Io_{dBm/3,84\ MHz} - Channel\ 2\_Io_{dBm/3,84\ MHz} | \leq 20\ dB.$$

$$\left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB} - \left( \frac{CPICH\_E_c}{I_{or}} \right) \Big|_{in\ dB} \leq 20\ dB$$

Table 9.3: CPICH\_RSCP Inter frequency relative accuracy

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	CPICH_RSCP is on Band	Io [dBm/3,84 [MHz]	
				Minimum Io	Maximum Io
CPICH_RSCP	± 6	± 6	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
			II, V and VII	-92	-50
			XXV and XXVI	-90.5 (Note 1)	-50
			III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
			IX	-93	-50

NOTE 1: The minimum Io is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.1.3 CPICH RSCP measurement report mapping

The reporting range is for CPICH RSCP is from -120 dBm ...-25 dBm.

In table 9.4 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.4

Reported value	Measured quantity value	Unit
CPICH_RSCP_LEV_-05	CPICH RSCP < -120	dBm
CPICH_RSCP_LEV_-04	-120 ≤ CPICH RSCP < -119	dBm
CPICH_RSCP_LEV_-03	-119 ≤ CPICH RSCP < -118	dBm
...	...	...
CPICH_RSCP_LEV_89	-27 ≤ CPICH RSCP < -26	dBm
CPICH_RSCP_LEV_90	-26 ≤ CPICH RSCP < -25	dBm
CPICH_RSCP_LEV_91	-25 ≤ CPICH RSCP	dBm

## 9.1.2 CPICH Ec/Io

NOTE: This measurement is for Cell selection/re-selection and for handover evaluation.

### 9.1.2.1 Intra frequency measurements accuracy

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.2.

#### 9.1.2.1.1 Absolute accuracy requirement

The accuracy requirements in table 9.5 are valid under the following conditions:

CPICH\_RSCP1<sub>dBm</sub> according to Annex B.3.4 for a corresponding Band

$$\left| \frac{I_o}{\hat{I}_{or}} \right|_{in\ dB} - \left( \frac{CPICH - E_c}{I_{or}} \right)_{in\ dB} \leq 20dB$$

Table 9.5: CPICH\_Ec/Io Intra frequency absolute accuracy

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	Operating bands	Io [dBm/3,84 [MHz]	
				Minimum Io	Maximum Io
CPICH_Ec/Io	± 1.5 for -14 ≤	± 3	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
	CPICH Ec/Io ± 2 for -16 ≤		II, V and VII	-92	-50
	CPICH Ec/Io <		XXV and XXVI	-90.5 (Note 1)	-50
	-14 ± 3 for -20 ≤		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
	CPICH Ec/Io < -16		IX	-93	-50

NOTE 1: The minimum Io is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

#### 9.1.2.1.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io is defined as the maximum allowable error in the measured difference between the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on the same frequency.

The relative accuracy is defined using the lower CPICH\_Ec/Io of cell 1 and cell 2.

The accuracy requirements in table 9.6 are valid under the following conditions:

CPICH\_RSCP1,2<sub>dBm</sub> according to Annex B.3.5 for a corresponding Band

$$\left| CPICH\_RSCP1 \Big|_{in\ dBm} - CPICH\_RSCP2 \Big|_{in\ dBm} \right| \leq 20dB$$

$$\left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB} - \left( \frac{CPICH\_E_c}{I_{or}} \right) \Big|_{in\ dB} \leq 20dB$$

Table 9.6: CPICH\_Ec/Io Intra frequency relative accuracy

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	Operating bands	Io [dBm/3,84 [MHz]	
				Minimum Io	Maximum Io
The lower of the CPICH_Ec/Io from cell1 and cell2	± 1.5 for -14	± 3	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
	≤ CPICH Ec/Io ± 2 for -16		II, V and VII	-92	-50
	≤ CPICH Ec/Io		XXV and XXVI	-90.5 (Note 1)	-50
	< -14 ± 3 for -20		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
	≤ CPICH Ec/Io		IX	-93	-50
< -16					

NOTE 1: The minimum Io is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.2.2 Inter frequency measurement accuracy

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.3.

#### 9.1.2.2.1 Absolute accuracy requirement

The accuracy requirements in table 9.7 are valid under the following conditions:

CPICH\_RSCP1<sub>dBm</sub> according to Annex B.3.6 for a corresponding Band

$$\left( \frac{I_o}{\hat{I}_{or}} \right) \Big|_{in\ dB} - \left( \frac{CPICH\_E_c}{I_{or}} \right) \Big|_{in\ dB} \leq 20dB$$

Table 9.7: CPICH\_Ec/Io Inter frequency absolute accuracy

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	Operating bands	Io [dBm/3,84 [MHz]	
				Minimum Io	Maximum Io
CPICH_Ec/Io	± 1.5 for -14	± 3	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
	≤ CPICH Ec/Io ± 2 for -16		II, V and VII	-92	-50
	≤ CPICH Ec/Io		XXV and XXVI	-90.5 (Note 1)	-50
	< -14 ± 3 for -20		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
	≤ CPICH Ec/Io		IX	-93	-50
< -16					

NOTE 1: The minimum Io is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

9.1.2.2.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io in the inter frequency case is defined as the maximum allowable error in the measured difference between the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on a different frequency

The relative accuracy is defined using the lower CPICH\_Ec/Io of cell 1 and cell 2.

The accuracy requirements in table 9.8 are valid under the following conditions:

CPICH\_RSCP1<sub>dBm</sub> according to Annex B.3.7 for a corresponding Band

$$\left| CPICH\_RSCP1_{in\ dBm} - CPICH\_RSCP2_{in\ dBm} \right| \leq 20\ dB$$

$$\left| Channel\ 1\_Io_{dBm/3,84\ MHz} - Channel\ 2\_Io_{dBm/3,84\ MHz} \right| \leq 20\ dB.$$

$$\left( \frac{I_o}{\hat{I}_{or}} \right)_{in\ dB} - \left( \frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \leq 20\ dB$$

**Table 9.8: CPICH\_Ec/Io Inter frequency relative accuracy**

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	CPICH_Ec/Io is on Band	Io [dBm/3,84 [MHz]	
				Minimum Io	Maximum Io
The lower of the CPICH_Ec/Io from cell1 and cell2	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
			II, V and VII	-92	-50
			XXV and XXVI	-90.5 (Note 1)	-50
			III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
			IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

9.1.2.3 CPICH Ec/Io measurement report mapping

The reporting range is for CPICH Ec/Io is from -24 ...0 dB.

In table 9.9 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.9**

Reported value	Measured quantity value	Unit
CPICH_Ec/No_00	CPICH Ec/Io < -24	dB
CPICH_Ec/No_01	-24 ≤ CPICH Ec/Io < -23.5	dB
CPICH_Ec/No_02	-23.5 ≤ CPICH Ec/Io < -23	dB
...	...	...
CPICH_Ec/No_47	-1 ≤ CPICH Ec/Io < -0.5	dB
CPICH_Ec/No_48	-0.5 ≤ CPICH Ec/Io < 0	dB
CPICH_Ec/No_49	0 ≤ CPICH Ec/Io	dB

9.1.3 UTRA Carrier RSSI

NOTE: This measurement is for Inter-frequency handover evaluation.

The measurement period is equal to the measurement period for UE CPICH measurements, For CELL\_DCH state the measurement period can be found in sub clause 8.1.2.2 for intra frequency measurements and in sub clause 8.1.2.3 for inter frequency measurements.

### 9.1.3.1 Absolute accuracy requirement

**Table 9.10: UTRA Carrier RSSI Inter frequency absolute accuracy**

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	Operating bands	Io [dBm/3,84MHz]	
				Minimum Io	Maximum Io
UTRA Carrier RSSI	± 4	± 7	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-70
			II, V and VII	-92	-70
			XXV and XXVI	-90.5 (Note 1)	-70
			III, VIII, XII, XIII, XIV, XX and XXII	-91	-70
			IX	-93	-70
	± 6	± 9	Note 2	-70	-50
NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.					
NOTE 2: The same bands apply for this requirement as for the corresponding highest accuracy requirement..					

### 9.1.3.2 Relative accuracy requirement

The relative accuracy requirement is defined as the UTRA carrier RSSI measured from one frequency compared to the UTRA carrier RSSI measured from another frequency.

The accuracy requirements in table 9.11 are valid under the following condition:

$$| \text{Channel 1}_{Io|dBm} - \text{Channel 2}_{Io|dBm} | < 20 \text{ dB.}$$

**Table 9.11: UTRA Carrier RSSI Inter frequency relative accuracy**

Parameter	Accuracy [dB]		Conditions		
	Normal condition	Extreme condition	UTRA Carrier RSSI is on Band	Io [dBm/3,84 [MHz]	
				Minimum Io	Maximum Io
UTRA Carrier RSSI	± 7	± 11	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
			II, V and VII	-92	-50
			XXV and XXVI	-90.5 (Note 1)	-50
			III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
			IX	-93	-50
	± 6	± 9	Note 2	-70	-50
NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.					
NOTE 2: The same bands apply for this requirement as for the corresponding highest accuracy requirement..					

### 9.1.3.3 UTRA Carrier RSSI measurement report mapping

The reporting range for *UTRA carrier RSSI* is from -100 ...-25 dBm.

In table 9.12 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.12

Reported value	Measured quantity value	Unit
UTRA_carrier_RSSI_LEV_00	UTRA carrier RSSI < -100	dBm
UTRA_carrier_RSSI_LEV_01	-100 ≤ UTRA carrier RSSI < -99	dBm
UTRA_carrier_RSSI_LEV_02	-99 ≤ UTRA carrier RSSI < -98	dBm
...	...	...
UTRA_carrier_RSSI_LEV_74	-27 ≤ UTRA carrier RSSI < -26	dBm
UTRA_carrier_RSSI_LEV_75	-26 ≤ UTRA carrier RSSI < -25	dBm
UTRA_carrier_RSSI_LEV_76	-25 ≤ UTRA carrier RSSI	dBm

### 9.1.4 GSM carrier RSSI

NOTE: This measurement is for handover between UTRAN and GSM.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for CELL\_DCH state can be found in section 8.1.2.5. The measurement period for CELL\_FACH state can be found in section 8.4.2.5.

If the UE, in CELL\_DCH state, does not need compressed mode to perform GSM measurements, the measurement accuracy requirements for RXLEV in TS 45.008 shall apply.

If the UE, in CELL\_DCH state, needs compressed mode to perform GSM measurements, the GSM measurement procedure and measurement accuracy requirement is stated in section 8.1.2.5 shall apply.

If the UE, in CELL\_FACH state, does not need measurement occasions to perform GSM measurements, the measurement accuracy requirements for RXLEV in TS 45.008 shall apply.

If the UE, in CELL\_FACH state, needs measurement occasions to perform GSM measurements, the GSM measurement procedure and measurement accuracy requirement stated in section 8.4.2.5 shall apply.

The reporting range and mapping specified for RXLEV in TS 45.008 shall apply.

#### 9.1.4a E-UTRAN RSRP

NOTE: This measurement is for handover between UTRAN and E-UTRAN.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for E-UTRA RSRP in CELL\_DCH state can be found in section 8.1.2.6.

If the UE, in CELL\_DCH state, needs compressed mode to perform E-UTRAN measurements, the E-UTRAN measurement procedure and compressed mode gap pattern stated in section 8.1.2.6 shall apply.

In Cell DCH state, whether or not UE requires compressed mode to perform E-UTRAN measurements, the requirements for accuracy of E-UTRA RSRP measurements in CELL\_DCH state shall be the same as the inter-frequency RSRP Accuracy Requirements in 3GPP TS 36.133 [24].

The reporting range and mapping specified for RSRP in 3GPP TS 36.133 [24] shall apply.

#### 9.1.4b E-UTRAN RSRQ

NOTE: This measurement is for handover between UTRAN and E-UTRAN.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for E-UTRA RSRQ in CELL\_DCH state can be found in section 8.1.2.6.

If the UE, in CELL\_DCH state, needs compressed mode to perform E-UTRAN measurements, the E-UTRAN measurement procedure is stated in section 8.1.2.6 shall apply.

In CELL DCH state, whether or not UE requires compressed mode to perform E-UTRAN measurements, the requirements for accuracy of E-UTRA RSRQ measurements in CELL\_DCH state shall be the same as the inter-frequency RSRQ Accuracy Requirements in 3GPP TS 36.133 [24].

The reporting range and mapping specified for RSRQ in 3GPP TS 36.133 [24] shall apply.

### 9.1.4c E-UTRAN WB-RSRQ

NOTE: This measurement is for handover between UTRAN and E-UTRAN.

The requirements in this section are valid for terminals supporting this capability.

The requirements in this section shall apply when the measurement configuration message received by the UE contains the IE “Wideband RSRQ measurements” defined in TS 25.331 [2].

The measurement period for E-UTRA WB-RSRQ in CELL\_DCH state is the same as defined for E-UTRA RSRQ in section 8.1.2.6.

If the UE, in CELL\_DCH state, needs compressed mode to perform E-UTRAN measurements, the E-UTRAN measurement procedure is stated in section 8.1.2.6 shall apply.

In CELL DCH state, whether or not UE requires compressed mode to perform E-UTRAN measurements, the requirements for accuracy of E-UTRA WB-RSRQ measurements in CELL\_DCH state shall be the same as the inter-frequency absolute WB-RSRQ Accuracy Requirements in 3GPP TS 36.133 [24].

The reporting range and mapping for E-UTRA WB-RSRQ shall be the same as defined for RSRQ in 3GPP TS 36.133 [24].

## 9.1.5 Transport channel BLER

### 9.1.5.1 BLER measurement requirement

Transport channel BLER value shall be calculated from a window with the size equal to the IE Reporting interval as specified in section 10.3.7.53 Periodical reporting criteria in TS 25.331.

### 9.1.5.2 Transport channel BLER measurement report mapping

The *Transport channel BLER* reporting range is from 0 to 1.

In table 9.13 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.13**

Reported value	Measured quantity value	Unit
BLER_LOG_00	Transport channel BLER = 0	-
BLER_LOG_01	$-\infty < \text{Log}_{10}(\text{Transport channel BLER}) < -4.03$	-
BLER_LOG_02	$-4.03 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -3.965$	-
BLER_LOG_03	$-3.965 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -3.9$	-
...	...	...
BLER_LOG_61	$-0.195 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -0.13$	-
BLER_LOG_62	$-0.13 \leq \text{Log}_{10}(\text{Transport channel BLER}) < -0.065$	-
BLER_LOG_63	$-0.065 \leq \text{Log}_{10}(\text{Transport channel BLER}) \leq 0$	-

## 9.1.6 UE transmitted power

### 9.1.6.1 Accuracy requirement

This requirement is applicable in CELL\_DCH state. The measured quantity is the transmitted power averaged over the longest period (excluding a 25µs period either side of any expected composite power change) during which the nominal



composite symbol power reaches the maximum during 1 DPCH slot interval. The UE measured quantity absolute accuracy is defined in Table 9.15.

**Table 9.14: (void)**

### 9.1.6.2 UE transmitted power measurement report mapping

The reporting range for *UE transmitted power* is from -50 ...+33 dBm.

In table 9.15 the mapping of the measured quantity specified in Section 9.1.6.1 and the accuracy range are defined. The range in the signalling may be larger than the guaranteed accuracy range. For each empty slot created by compressed mode or discontinuous uplink DPCCCH transmission, no value shall be reported by the UE L1 for these slots.

**Table 9.15**

Reported value	Measured quantity value (dBm)	Accuracy (dB) note 1	
UE_TX_POWER_104	33<= to <34	note 2	
UE_TX_POWER_103	32<= to <33	note 2	
UE_TX_POWER_102	31<= to <32	note 2	
...	...		
UE_TX_POWER_096	25<= to <26	note 2	
UE_TX_POWER_095	24<= to <25	2.0	-2.0
UE_TX_POWER_094	23<= to <24	2.0	-2.0
UE_TX_POWER_093	22<= to <23	2.0	-2.0
UE_TX_POWER_092	21<= to <22	2.0	-2.0
UE_TX_POWER_091	20<= to <21	2.5	-2.5
UE_TX_POWER_090	19<= to <20	3.0	-3.0
UE_TX_POWER_089	18<= to <19	3.5	-3.5
UE_TX_POWER_088	17<= to <18	4.0	-4.0
UE_TX_POWER_087	16<= to <17	4.0	-4.0
UE_TX_POWER_086	15<= to <16	4.0	-4.0
UE_TX_POWER_085	14<= to <15	4.0	-4.0
UE_TX_POWER_084	13<= to <14	4.0*	-4.0 (note 3)
UE_TX_POWER_083	12<= to <13	4.0*	-4.0 (note 3)
UE_TX_POWER_082	11<= to <12	4.0*	-4.0 (note 3)
UE_TX_POWER_081	10<= to <11	note 2	
...	...		
UE_TX_POWER_023	-48<= to <-47	note 2	
UE_TX_POWER_022	-49<= to <-48	note 2	
UE_TX_POWER_021	-50<= to <-49	note 2	
NOTE 1: The tolerance is specified for the maximum and minimum measured quantity value (dBm), i.e. $\text{MIN}(\text{Measured quantity value}) + \text{MIN}(\text{Accuracy}) \leq \text{UE transmitted Power} < \text{Max}(\text{Measured quantity value}) + \text{MAX}(\text{Accuracy})$ NOTE 2: No tolerance is specified. NOTE 3: Applicable to power class 4			

### 9.1.7 SFN-CFN observed time difference

NOTE: This measurement is for handover timing purposes to identify active cell and neighbour cell time difference.

#### 9.1.7.1 Intra frequency measurement requirement

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.2.

The accuracy requirement in table 9.16 is valid under the following conditions:

CPICH\_RSCP<sub>1,2</sub><sub>[dBm]</sub> according to Annex B.3.8 for a corresponding Band

$$\left| CPICH\_RSCP1 \Big|_{in\ dBm} - CPICH\_RSCP2 \Big|_{in\ dBm} \right| \leq 20\text{dB}$$

$$\left| \frac{I_o}{\hat{I}_{or}} \Big|_{in\ dB} - \left( \frac{CPICH\_E_c}{I_{or}} \right) \Big|_{in\ dB} \right| \leq 20\text{dB}$$

$$\left| \frac{I_o}{\hat{I}_{or}} \Big|_{in\ dB} - \left( \frac{P - CCPCH\_E_c}{I_{or}} \right) \Big|_{in\ dB} \right| \text{ is low enough to ensure successful SFN decoding.}$$

Table 9.16

Parameter	Accuracy [chip]	Conditions		
		Operating bands	Io [dBm/3,84 [MHz]	
			Minimum Io	Maximum Io
SFN-CFN observed time difference	± 1	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
		II, V and VII	-92	-50
		XXV and XXVI	-90.5 (Note 1)	-50
		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
		IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.7.2 Inter frequency measurement requirement

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.3.

The accuracy requirement in table 9.17 is valid under the following conditions:

$CPICH\_RSCP1|_{dBm}$  according to Annex B.3.9 for a corresponding Band.

$$\left| CPICH\_RSCP1 \Big|_{in\ dBm} - CPICH\_RSCP2 \Big|_{in\ dBm} \right| \leq 20\text{dB} ,$$

$$| \text{Channel 1\_Io}|_{dBm/3,84\ MHz} - \text{Channel 2\_Io}|_{dBm/3,84\ MHz} | \leq 20\text{ dB} ,$$

$$\left| \frac{I_o}{\hat{I}_{or}} \Big|_{in\ dB} - \left( \frac{CPICH\_E_c}{I_{or}} \right) \Big|_{in\ dB} \right| \leq 20\text{dB} .$$

Table 9.17

Parameter	Accuracy [chip]	Conditions		
		SFN-CFN observed time difference is on Band	Io [dBm/3,84 [MHz]	
			Minimum Io	Maximum Io
SFN-CFN observed time difference	± 1	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
		II, V and VII	-92	-50
		XXV and XXVI	-90.5 (Note 1)	-50
		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
		IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.7.3 SFN-CFN observed time difference measurement report mapping

The reporting range is for *CFN-SFN observed time difference* is from 0 ... 9830400 chip.

In table 9.18 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.18**

Reported value	Measured quantity value	Unit
SFN-CFN_TIME_0000000	$0 \leq \text{SFN-CFN observed time difference} < 1$	chip
SFN-CFN_TIME_0000001	$1 \leq \text{SFN-CFN observed time difference} < 2$	chip
SFN-CFN_TIME_0000002	$2 \leq \text{SFN-CFN observed time difference} < 3$	chip
...	...	...
SFN-CFN_TIME_9830397	$9830397 \leq \text{SFN-CFN observed time difference} < 9830398$	chip
SFN-CFN_TIME_9830398	$9830398 \leq \text{SFN-CFN observed time difference} < 9830399$	chip
SFN-CFN_TIME_9830399	$9830399 \leq \text{SFN-CFN observed time difference} < 9830400$	chip

## 9.1.8 SFN-SFN observed time difference

### 9.1.8.1 SFN-SFN observed time difference type 1

NOTE: This measurement is for identifying time difference between two cells.

#### 9.1.8.1.1 Measurement requirement

The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.2.

The accuracy requirement in table 9.19 is valid under the following conditions:

$CPICH\_RSCP1|_{dBm}$  according to Annex B.3.10 for a corresponding Band

$$\left| CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm} \right| \leq 20\text{dB} ,$$

$$\left| \frac{I_o}{\hat{I}_{or}} \right|_{in\ dB} - \left( \frac{CPICH\_E_c}{I_{or}} \right) \Big|_{in\ dB} \leq 20\text{dB} ,$$

$$\left| \frac{I_o}{\hat{I}_{or}} \right|_{in\ dB} - \left( \frac{P - CCPCH\_E_c}{I_{or}} \right) \Big|_{in\ dB}$$

is low enough to ensure successful SFN decoding.

Table 9.19

Parameter	Accuracy [chip]	Conditions		
		SFN-SFN observed time difference type 1 is on Band	Io [dBm/3,84 [MHz]	
			Minimum Io	Maximum Io
SFN-SFN observed time difference type1	± 1	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
		II, V and VII	-92	-50
		XXV and XXVI	-90.5 (Note 1)	-50
		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
		IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.8.1.2 SFN-SFN observed time difference type 1 measurement report mapping

The reporting range is for *SFN-SFN observed time difference type 1* is from 0 ... 9830400 chip.

In table 9.20 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.20

Reported value	Measured quantity value	Unit
T1_SFN-SFN_TIME _0000000	0 ≤ SFN-SFN observed time difference type 1 < 1	chip
T1_SFN-SFN_TIME _0000001	1 ≤ SFN-SFN observed time difference type 1 < 2	chip
T1_SFN-SFN_TIME _0000002	2 ≤ SFN-SFN observed time difference type 1 < 3	chip
...	...	...
T1_SFN-SFN_TIME _9830397	9830397 ≤ SFN-SFN observed time difference type 1 < 9830398	chip
T1_SFN-SFN_TIME _9830398	9830398 ≤ SFN-SFN observed time difference type 1 < 9830399	chip
T1_SFN-SFN_TIME _9830399	9830399 ≤ SFN-SFN observed time difference type 1 < 9830400	chip

### 9.1.8.2 SFN-SFN observed time difference type 2

NOTE: This measurement is for location service purposes to identify time difference between two cells.

It is optional for terminal to support the use of IPDL periods together with SFN-SFN observed time difference type 2. The support of IPDL depends on the supported UE positioning methods.

NOTE: Requirement on the UE shall be reconsidered when the state of the art technology progress.

#### 9.1.8.2.1 Intra frequency measurement requirement accuracy without IPDL period active

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.2.

The accuracy requirement in table 9.21 is valid under the following conditions:

CPICH\_RSCP<sub>1,2</sub><sub>dBm</sub> according to Annex B.3.11 for a corresponding Band

$$\left| \frac{I_o}{\hat{I}_{or}} \right|_{in \text{ dB}} - \left( \frac{CPICH\_E_c}{I_{or}} \right)_{in \text{ dB}} \leq 20dB$$

Table 9.21

Parameter	Accuracy [chip]	Conditions		
		Operating bands	Io [dBm/3,84 [MHz]	
			Minimum Io	Maximum Io
SFN-SFN observed time difference type 2	± 0.5	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
		II, V and VII	-92	-50
		XXV and XXVI	-90.5 (Note 1)	-50
		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
		IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.8.2.2 Intra frequency measurement requirement accuracy with IPDL period active

This requirement is valid only for UEs supporting IPDL measurements.

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.2.

The accuracy requirement in table 9.22 is valid under the following conditions:

$CPICH\_RSCP_{1,2}|_{dBm}$  according to Annex B.3.11 for a corresponding Band

$$\left. \frac{I_o}{\hat{I}_{or}} \right|_{in\ dB} - \left( \frac{CPICH - E_c}{I_{or}} \right) \Big|_{in\ dB} \leq 20dB$$

Additionally the accuracy requirement in table 9.22 is also valid for neighbour cells for which the following conditions apply to during idle periods provided idle periods have a length of 1 slot:

$CPICH\_RSCP_{x,y}|_{dBm} \geq -114\ dBm$ .

$$\left. \frac{I_{o\_idle\_period}}{\hat{I}_{or}} \right|_{in\ dB} - \left( \frac{CPICH - E_c}{I_{or}} \right) \Big|_{in\ dB} \leq 20dB,$$

where  $x$  and  $y$  represent cells measured using idle periods and  $I_{o\_idle\_period}$  is the total received power during the idle period.

NOTE: Additional general conditions are needed for the requirements in table 9.22 to be valid.

Table 9.22

Parameter	Accuracy [chip]	Conditions		
		Operating bands	Io [dBm/3,84 [MHz]	
			Minimum Io	Maximum Io
SFN-SFN observed time difference type 2	± 0.5	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
		II, V and VII	-92	-50
		XXV and XXVI	-90.5 (Note 1)	-50
		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
		IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.8.2.3 Inter frequency measurement requirement accuracy

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.3.

The accuracy requirement in table 9.23 is valid under the following conditions:

$CPICH\_RSCP1_{dBm}$  according to Annex B.3.12 for a corresponding Band

$|Channel\ 1\_Io_{dBm} - Channel\ 2\_Io_{dBm}| \leq 20\ dB$ ,

$$\left( \frac{I_o}{\hat{I}_{or}} \right)_{in\ dB} - \left( \frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \leq 20\ dB.$$

**Table 9.23**

Parameter	Accuracy [chip]	Conditions		
		SFN-SFN observed time difference type 2 is on Band	Io [dBm/3,84 [MHz]	
			Minimum Io	Maximum Io
SFN-SFN observed time difference type 2	± 1	I, IV, VI, X, XI, XIX, XXI and XXXII	-94	-50
		II, V and VII	-92	-50
		XXV and XXVI	-90.5 (Note 1)	-50
		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
		IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.8.2.4 SFN-SFN observed time difference type 2 measurement report mapping

The reporting range is for *SFN-SFN observed time difference type 2* is from -1280 ... +1280 chip.

In table 9.24 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.24**

Reported value	Measured quantity value	Unit
T2_SFN-SFN_TIME_00000	SFN-SFN observed time difference type 2 < -1280.0000	chip
T2_SFN-SFN_TIME_00001	-1280.0000 ≤ SFN-SFN observed time difference type 2 < -1279.9375	chip
T2_SFN-SFN_TIME_00002	-1279.9375 ≤ SFN-SFN observed time difference type 2 < -1279.8750	chip
...	...	...
T2_SFN-SFN_TIME_40959	1279.8750 ≤ SFN-SFN observed time difference type 2 < 1279.9375	chip
T2_SFN-SFN_TIME_40960	1279.9375 ≤ SFN-SFN observed time difference type 2 < 1280.0000	chip
T2_SFN-SFN_TIME_40961	1280.0000 ≤ SFN-SFN observed time difference type 2	chip

## 9.1.9 UE Rx-Tx time difference

### 9.1.9.1 UE Rx-Tx time difference type 1

NOTE: This measurement is used for call set up purposes to compensate propagation delay of DL and UL.

The measurement period in CELL\_DCH state is 100 ms.

## 9.1.9.1.1 Measurement requirement

Table 9.25

Parameter	Accuracy [chip]	Conditions		
		Operating bands	Io [dBm/3,84 [MHz]	
			Minimum Io	Maximum Io
UE RX-TX time difference	± 1.5	I, IV, VI, X, XI, XIX and XXI	-94	-50
		II, V and VII	-92	-50
		XXV and XXVI	-90.5 (Note 1)	-50
		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
		IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

## 9.1.9.1.2 UE Rx-Tx time difference type 1 measurement report mapping

The reporting range is for *UE Rx-Tx time difference type 1* is from 768 ... 1280 chip.

In table 9.26 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.26

Reported value	Measured quantity value	Unit
RX-TX_TIME_768	UE Rx-Tx Time difference type 1 < 768	chip
RX-TX_TIME_769	768 ≤ UE Rx-Tx Time difference type 1 < 769	chip
RX-TX_TIME_770	769 ≤ UE Rx-Tx Time difference type 1 < 770	chip
RX-TX_TIME_771	770 ≤ UE Rx-Tx Time difference type 1 < 771	chip
...	...	...
RX-TX_TIME_1277	1276 ≤ UE Rx-Tx Time difference type 1 < 1277	chip
RX-TX_TIME_1278	1277 ≤ UE Rx-Tx Time difference type 1 < 1278	chip
RX-TX_TIME_1279	1278 ≤ UE Rx-Tx Time difference type 1 < 1279	chip
RX-TX_TIME_1280	1279 ≤ UE Rx-Tx Time difference type 1	chip

## 9.1.9.2 UE Rx-Tx time difference type 2

NOTE: This measurement is used for UE positioning purposes.

It is optional for a terminal to support a subset of UE positioning methods. This measurement represents an instantaneous value that is time stamped as defined in the IE description in TS 25.331 [16].

## 9.1.9.2.1 Measurement requirement

Table 9.27

Parameter	Accuracy [chip]	Conditions		
		Operating bands	Io [dBm/3,84 [MHz]	
			Minimum Io	Maximum Io
UE RX-TX time difference	± 1.0	I, IV, VI, X, XI, XIX and XXI	-94	-50
		II, V and VII	-92	-50
		XXV and XXVI	-90.5 (Note 1)	-50
		III, VIII, XII, XIII, XIV, XX and XXII	-91	-50
		IX	-93	-50

NOTE 1: The minimum condition is -92 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

### 9.1.9.2.2 UE Rx-Tx time difference type 2 measurement report mapping

The reporting range is for *UE Rx-Tx time difference type2* is from 768 ... 1280 chip.

In table 9.28 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.28**

Reported value	Measured quantity value	Unit
RX-TX_TIME_0000	UE Rx-Tx Time difference type 2 < 768.000	chip
RX-TX_TIME_0001	768.000 ≤ UE Rx-Tx Time difference type 2 < 768.0625	chip
RX-TX_TIME_0002	768.0625 ≤ UE Rx-Tx Time difference type 2 < 768.1250	chip
RX-TX_TIME_0003	768.1250 ≤ UE Rx-Tx Time difference type 2 < 768.1875	chip
...	...	...
RX-TX_TIME_8189	1279.7500 ≤ UE Rx-Tx Time difference type 2 < 1279.8125	chip
RX-TX_TIME_8190	1279.8125 ≤ UE Rx-Tx Time difference type 2 < 1279.8750	chip
RX-TX_TIME_8191	1279.8750 ≤ UE Rx-Tx Time difference type 2	chip

### 9.1.10 (void)

**Table 9.29 (void)**

**Table 9.30 (void)**

### 9.1.11 P-CCPCH RSCP

NOTE: This measurement is used for handover between UTRA FDD and UTRA TDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for CELL\_DCH state can be found in sub clause 8.1.2.4. The measurement period for CELL\_FACH state can be found in sub clause 8.4.2.4.

#### 9.1.11.1 Absolute accuracy requirements

##### 9.1.11.1.1 3,84 Mcps TDD Option

The accuracy requirement in table 9.31 is valid under the following conditions:

P-CCPCH\_RSCP ≥ -102 dBm.

$$\left| \frac{I_o}{\hat{I}_{or}} \right|_{in \text{ dB}} - \left( \frac{P - CCPCH - E_c}{I_{or}} \right)_{in \text{ dB}} \leq 8 \text{ dB}$$

**Table 9.31: P-CCPCH\_RSCP Inter frequency absolute accuracy**

Parameter	Unit	Accuracy [dB]		Conditions Io [dBm/3,84 MHz]
		Normal conditions	Extreme conditions	
P-CCPCH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-70...-50

##### 9.1.11.1.2 1.28 Mcps TDD Option

The accuracy requirement in table 9.31A is valid under the following conditions:

P-CCPCH RSCP ≥ -102 dBm



P-CCPCH  $E_c/I_o \geq -8$  dB

**Table 9.31A: P-CCPCH\_RSCP Inter frequency absolute accuracy**

Parameter	Unit	Accuracy [dB]		Conditions Io [dBm/1.28 MHz]
		Normal conditions	Extreme conditions	
P-CCPCH_RSCP	dBm	$\pm 6$	$\pm 9$	-94...-70
	dBm	$\pm 8$	$\pm 11$	-70...-50

### 9.1.11.2 P-CCPCH RSCP measurement report mapping

The reporting range is for *P-CCPCH RSCP* is from -115 ... -25 dBm.

In table 9.32 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.32**

Reported value	Measured quantity value	Unit
PCCPCH_RSCP_LEV_00	PCCPCH RSCP < -115	dBm
PCCPCH_RSCP_LEV_01	$-115 \leq \text{PCCPCH RSCP} < -114$	dBm
PCCPCH_RSCP_LEV_02	$-114 \leq \text{PCCPCH RSCP} < -113$	dBm
PCCPCH_RSCP_LEV_03	$-113 \leq \text{PCCPCH RSCP} < -112$	dBm
...	...	...
PCCPCH_RSCP_LEV_89	$-27 \leq \text{PCCPCH RSCP} < -26$	dBm
PCCPCH_RSCP_LEV_90	$-26 \leq \text{PCCPCH RSCP} < -25$	dBm
PCCPCH_RSCP_LEV_91	$-25 \leq \text{PCCPCH RSCP}$	dBm

### 9.1.12 UE GPS Timing of Cell Frames for UE positioning

The requirements in this section are valid for terminals supporting this capability:

**Table 9.33**

Parameter	Unit	Accuracy [chip]	Conditions
UE GPS Timing of Cell Frames for UE positioning	chip	[ ]	

#### 9.1.12.1 UE GPS timing of Cell Frames for UE positioning measurement report mapping

The reporting range is for UE GPS timing of Cell Frames for UE positioning is from 0 ... 2322432000000 chip.

In table 9.34 the mapping of measured quantity is defined.

Table 9.34

Reported value	Measured quantity value	Unit
GPS_TIME_00000000000000	UE GPS timing of Cell Frames for UE positioning < 0.0625	chip
GPS_TIME_00000000000001	0.0625 ≤ UE GPS timing of Cell Frames for UE positioning < 0.1250	chip
GPS_TIME_00000000000002	0.1250 ≤ UE GPS timing of Cell Frames for UE positioning < 0.1875	chip
...	...	...
GPS_TIME_3715891199997	2322431999999.8125 ≤ UE GPS timing of Cell Frames for UE positioning < 2322431999999.8750	chip
GPS_TIME_3715891199998	2322431999999.8750 ≤ UE GPS timing of Cell Frames for UE positioning < 2322431999999.9375	chip
GPS_TIME_3715891199999	2322431999999.9375 ≤ UE GPS timing of Cell Frames for UE positioning < 2322432000000.0000	chip

## 9.1.13 UE transmission power headroom

### 9.1.13.1 Delay requirement

The UE transmission power headroom measurement reporting delay is defined as the time between the end of the UE transmission power headroom measurement period and the time when the UE starts transmitting the measurement report over the Uu interface. The reporting delay of the UE transmission power headroom measurement result shall be not more than 10 ms, which is applicable for all configured triggering mechanisms for UE transmission power headroom measurement.

### 9.1.13.2 Measurement period requirement

The reported UE transmission power headroom measurement result shall be an estimate of the average value of the UE transmission power headroom over a 100 ms period. The UE transmission power headroom measurement shall exclude the empty slots created by the compressed mode or discontinuous uplink DPCCH transmission.

If the UE is in CELL\_FACH state, the UE can be configured to send DPCCH for a configurable number of radio frames prior to the start of the E-DCH transmissions. The UE in CELL\_FACH state reports the headroom available based on the average of the DPCCH power including the period DPCCH is transmitted prior to the start of the E-DCH transmissions. The averaging period for the UE transmission power headroom measurement in CELL\_FACH state, after the commencement of the data transmission, is 10ms.

For the first measurement, if less than 20 ms of DPCCH is configured prior to the start of the E-DCH transmissions, the UE in CELL\_FACH state reports the headroom available based on the last successfully transmitted PRACH preamble power. In this case, the UPH can be computed from  $P_{\text{preamble}}$  using the  $P_{\text{p-e}}$ :

$$\text{UPH} = P_{\text{max,tx}} - P_{\text{preamble}} - P_{\text{p-e}}$$

where  $P_{\text{max,tx}}$  is the UE maximum transmission power,  $P_{\text{preamble}}$  is the transmitted code power on PRACH preamble, and  $P_{\text{p-e}}$  is the power offset between the power of the last transmitted preamble and the initial DPCCH transmission power, all in dB.

### 9.1.13.3 UE transmission power headroom measurement report mapping

The UE transmission power headroom reporting range is from 0 ...+31 dB. Table 9.34A defines the mapping

Table 9.34A

Reported value	Measured quantity value (dB)
UE_POWER_HEADROOM_0	$0 \leq \text{UPH} < 1$
UE_POWER_HEADROOM_1	$1 \leq \text{UPH} < 2$
UE_POWER_HEADROOM_2	$2 \leq \text{UPH} < 3$
UE_POWER_HEADROOM_3	$3 \leq \text{UPH} < 4$
UE_POWER_HEADROOM_4	$4 \leq \text{UPH} < 5$
UE_POWER_HEADROOM_5	$5 \leq \text{UPH} < 6$
UE_POWER_HEADROOM_6	$6 \leq \text{UPH} < 7$
UE_POWER_HEADROOM_7	$7 \leq \text{UPH} < 8$
UE_POWER_HEADROOM_8	$8 \leq \text{UPH} < 9$
UE_POWER_HEADROOM_9	$9 \leq \text{UPH} < 10$
UE_POWER_HEADROOM_10	$10 \leq \text{UPH} < 11$
UE_POWER_HEADROOM_11	$11 \leq \text{UPH} < 12$
UE_POWER_HEADROOM_12	$12 \leq \text{UPH} < 13$
UE_POWER_HEADROOM_13	$13 \leq \text{UPH} < 14$
UE_POWER_HEADROOM_14	$14 \leq \text{UPH} < 15$
UE_POWER_HEADROOM_15	$15 \leq \text{UPH} < 16$
UE_POWER_HEADROOM_16	$16 \leq \text{UPH} < 17$
UE_POWER_HEADROOM_17	$17 \leq \text{UPH} < 18$
UE_POWER_HEADROOM_18	$18 \leq \text{UPH} < 19$
UE_POWER_HEADROOM_19	$19 \leq \text{UPH} < 20$
UE_POWER_HEADROOM_20	$20 \leq \text{UPH} < 21$
UE_POWER_HEADROOM_21	$21 \leq \text{UPH} < 22$
UE_POWER_HEADROOM_22	$22 \leq \text{UPH} < 23$
UE_POWER_HEADROOM_23	$23 \leq \text{UPH} < 24$
UE_POWER_HEADROOM_24	$24 \leq \text{UPH} < 25$
UE_POWER_HEADROOM_25	$25 \leq \text{UPH} < 26$
UE_POWER_HEADROOM_26	$26 \leq \text{UPH} < 27$
UE_POWER_HEADROOM_27	$27 \leq \text{UPH} < 28$
UE_POWER_HEADROOM_28	$28 \leq \text{UPH} < 29$
UE_POWER_HEADROOM_29	$29 \leq \text{UPH} < 30$
UE_POWER_HEADROOM_30	$30 \leq \text{UPH} < 31$
UE_POWER_HEADROOM_31	$\text{UPH} \geq 31$

#### 9.1.13.4 UE transmission power headroom measurement report accuracy

The accuracy requirements for UE transmission power headroom depends on the total power transmitted by the UE. Table 9.34B defines the accuracy of the measured quantity.

Table 9.34B

Total UE output power value (dBm)	UPH reporting accuracy(dB) (note 1)
25<= total output power <34	note 2
24<= total output power <25	±2.0
23<= total output power <24	±2.0
22<= total output power <23	±2.0
21<= total output power <22	±2.0
20<= total output power < 21	±2.5
19<= total output power <20	±3.0
18<= total output power <19	±3.5
17<= total output power <18	±4.0
16<= total output power <17	±4.0
15<= total output power <16	±4.0
14<= total output power <15	±4.0
13<= total output power <14	±4.0 (power class 4) ±6.0 (power class 3)
12<= total output power <13	±4.0 (power class 4) ±6.0 (power class 3)
11<= total output power <12	±4.0 (power class 4) ±6.0 (power class 3)
-50<= total output power <11	±6.0
Note 1 : UPH reporting accuracy is the difference between the UPH reported by the UE and the actual uplink power headroom	
Note 2 : No tolerance is specified.	

## 9.1.14 IEEE 802.11 Measurements

### 9.1.14.1 Introduction

The requirements in this clause are applicable for a UE:

- in CELL\_DCH and CELL\_FACH states,
- synchronised to the IEEE 802.11 access point that is measured.

### 9.1.14.2 IEEE 802.11 Beacon RSSI

#### 9.1.14.2.1 Accuracy requirement

NOTE: This measurement is for access network selection and traffic steering between UTRAN and IEEE 802.11 [1].

The requirements in this clause are valid for the UE supporting this capability.

Beacon RSSI is defined in sub-clause 5.1.20 of [13]. The UE shall meet Beacon RSSI accuracy requirement defined in [30].

## 9.2 Measurements Performance for UTRAN

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS 25.302.

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

Test like descriptions of these measurements are located in the TS 25.141 as an informative Annex H. The Annex H specifies test specific parameters for some of the UTRAN requirements in this chapter. The tests provide additional information to how the requirements should be tested. Some requirements may lack a test.

## 9.2.1 Received total wideband power

The measurement period shall be 100 ms.

### 9.2.1.1 Absolute accuracy requirement

Table 9.35

Parameter	Unit	Accuracy [dB]	Conditions	BS class
			lob [dBm/3,84 MHz]	
lob	dBm/3,84 MHz	$\pm 4$	-103.. -74	Wide area BS
lob	dBm/3,84 MHz	$\pm 4$	-93.. -64	Medium Range BS
lob	dBm/3,84 MHz	$\pm 4$	-89.. -60	Local area BS

### 9.2.1.2 Relative accuracy requirement

The relative accuracy is defined as the Received total wideband power measured at one frequency compared to the Received total wideband power measured from the same frequency at a different time.

Table 9.36

Parameter	Unit	Accuracy [dB]	Conditions	BS class
			lob [dBm/3,84 MHz]	
lob	dBm/3,84 MHz	$\pm 0.5$	-103.. -74 AND for changes $\leq \pm 9.0$ dB	Wide area BS
lob	dBm/3,84 MHz	$\pm 0.5$	-93.. -64 AND for changes $\leq \pm 9.0$ dB	Medium Range BS
lob	dBm/3,84 MHz	$\pm 0.5$	-89.. -60 AND for changes $\leq \pm 12.0$ dB	Local area BS

### 9.2.1.3 Received total wideband power measurement report mapping

The reporting range for *Received total wideband power (RTWP)* is from -112 ... -50 dBm.

In table 9.37 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.37

Reported value	Measured quantity value	Unit
RTWP_LEV_000	$RTWP < -112.0$	dBm
RTWP_LEV_001	$-112.0 \leq RTWP < -111.9$	dBm
RTWP_LEV_002	$-111.9 \leq RTWP < -111.8$	dBm
...	...	...
RTWP_LEV_619	$-50.2 \leq RTWP < -50.1$	dBm
RTWP_LEV_620	$-50.1 \leq RTWP < -50.0$	dBm
RTWP_LEV_621	$-50.0 \leq RTWP$	dBm

## 9.2.2 SIR

The measurement period shall be 80 ms.

### 9.2.2.1 Accuracy requirement

**Table 9.38**

Parameter	Unit	Accuracy [dB]	Conditions
			Range
SIR	dB	$\pm 3$	For $-7 < \text{SIR} < 20$ dB when lob > -105 dBm/3,84 MHz

### 9.2.2.2 SIR measurement report mapping

The reporting range for SIR is from -11 ... 20 dB.

In table 9.39 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.39**

Reported value	Measured quantity value	Unit
UTRAN_SIR_00	$\text{SIR} < -11.0$	dB
UTRAN_SIR_01	$-11.0 \leq \text{SIR} < -10.5$	dB
UTRAN_SIR_02	$-10.5 \leq \text{SIR} < -10.0$	dB
...	...	...
UTRAN_SIR_61	$19.0 \leq \text{SIR} < 19.5$	dB
UTRAN_SIR_62	$19.5 \leq \text{SIR} < 20.0$	dB
UTRAN_SIR_63	$20.0 \leq \text{SIR}$	dB

## 9.2.3 SIR<sub>error</sub>

The measurement period shall be 80 ms.

NOTE: The measurement period is the same as for the SIR measurement in section 9.2.2. SIR<sub>error</sub> is calculated from SIR and SIR<sub>target</sub>, see TS 25.215.

### 9.2.3.1 Accuracy requirement

**Table 9.40**

Parameter	Accuracy	Range
SIR <sub>error</sub>	$\pm 3$ dB	The accuracy requirement for SIR <sub>error</sub> is valid for SIR within the guaranteed accuracy range specified in section 9.2.2.

NOTE: The accuracy requirement for SIR<sub>error</sub> is the same as for the SIR measurement specified in section 9.2.2. SIR<sub>error</sub> is calculated from SIR and SIR<sub>target</sub>, see TS 25.215.

### 9.2.3.2 SIR<sub>error</sub> measurement report mapping

The reporting range for SIR<sub>error</sub> is from -31 ... 31 dB.

In table 9.41 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.41

Reported value	Measured quantity value	Unit
UTRAN_SIR_ERROR_000	$SIR_{error} < -31.0$	dB
UTRAN_SIR_ERROR_001	$-31.0 \leq SIR_{error} < -30.5$	dB
UTRAN_SIR_ERROR_002	$-30.5 \leq SIR_{error} < -30.0$	dB
...	...	...
UTRAN_SIR_ERROR_062	$-0.5 \leq SIR_{error} < 0.0$	dB
UTRAN_SIR_ERROR_063	$0.0 \leq SIR_{error} < 0.5$	dB
...	...	...
UTRAN_SIR_ERROR_123	$30.0 \leq SIR_{error} < 30.5$	dB
UTRAN_SIR_ERROR_124	$30.5 \leq SIR_{error} < 31.0$	dB
UTRAN_SIR_ERROR_125	$31.0 \leq SIR_{error}$	dB

## 9.2.4 Transmitted carrier power

The measurement period shall be 100 ms.

### 9.2.4.1 Accuracy requirement

Table 9.42

Parameter	Unit	Accuracy [% units]	Conditions
			Range
P <sub>tot</sub>	%	± 5	For $5\% \leq$ Transmitted carrier power $\leq 95\%$

### 9.2.4.2 Transmitted carrier power measurement report mapping

The reporting range for *Transmitted carrier power* is from 0 ... 100 %.

In table 9.43 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.43

Reported value	Measured quantity value	Unit
UTRAN_TX_POWER_000	Transmitted carrier power = 0	%
UTRAN_TX_POWER_001	$0 < \text{Transmitted carrier power} \leq 1$	%
UTRAN_TX_POWER_002	$1 < \text{Transmitted carrier power} \leq 2$	%
UTRAN_TX_POWER_003	$2 < \text{Transmitted carrier power} \leq 3$	%
...	...	...
UTRAN_TX_POWER_098	$97 < \text{Transmitted carrier power} \leq 98$	%
UTRAN_TX_POWER_099	$98 < \text{Transmitted carrier power} \leq 99$	%
UTRAN_TX_POWER_100	$99 < \text{Transmitted carrier power} \leq 100$	%

## 9.2.5 Transmitted code power

The measurement period shall be 100 ms.

### 9.2.5.1 Absolute accuracy requirement

Table 9.44

Parameter	Unit	Accuracy [dB]	Conditions
			Range
P <sub>code</sub>	dBm	± 3	Over the full range

### 9.2.5.2 Relative accuracy requirement

The relative accuracy of Transmitted code power is defined as the Transmitted code power measured at one dedicated radio link compared to the Transmitted code power measured from a different dedicated radio link in the same cell.

**Table 9.45**

Parameter	Unit	Accuracy [dB]	Conditions
			Range
Pcode	dBm	$\pm 2$	Over the full range

### 9.2.5.3 Transmitted code power measurement report mapping

The reporting range for *Transmitted code power* is from -10 ... 46 dBm.

In table 9.46 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.46**

Reported value	Measured quantity value	Unit
UTRAN_CODE_POWER_010	$-10.0 \leq \text{Transmitted code power} < -9.5$	dBm
UTRAN_CODE_POWER_011	$-9.5 \leq \text{Transmitted code power} < -9.0$	dBm
UTRAN_CODE_POWER_012	$-9.0 \leq \text{Transmitted code power} < -8.5$	dBm
...	...	...
UTRAN_CODE_POWER_120	$45.0 \leq \text{Transmitted code power} < 45.5$	dBm
UTRAN_CODE_POWER_121	$45.5 \leq \text{Transmitted code power} < 46.0$	dBm
UTRAN_CODE_POWER_122	$46.0 \leq \text{Transmitted code power} < 46.5$	dBm

## 9.2.6 (void)

### 9.2.7 Physical channel BER

The measurement period shall be equal to the TTI of the transport channel, to which the Physical channel BER is associated via the IE QE-Selector, see TS 25.433. Each reported Physical channel BER measurement shall be an estimate of the BER averaged over one measurement period only.

#### 9.2.7.1 Accuracy requirement

The average of consecutive Physical channel BER measurements is required to fulfil the accuracy stated in table 9.47 if the total number of erroneous bits during these measurements is at least 500 and the absolute BER value for each of the measurements is within the range given in table 9.47.

**Table 9.47**

Parameter	Unit	Accuracy [% of absolute BER value]	Conditions
			Range
PhyBER	-	+/- 10	for absolute BER value $\leq 30\%$

#### 9.2.7.2 Physical channel BER measurement report mapping

The *Physical channel BER* reporting range is from 0 to 1.

In table 9.48 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.



Table 9.48

Reported value	Measured quantity value	Unit
PhCh_BER_LOG_000	Physical channel BER = 0	-
PhCh_BER_LOG_001	$-\infty < \text{Log}_{10}(\text{Physical channel BER}) < -2.06375$	-
PhCh_BER_LOG_002	$-2.06375 \leq \text{Log}_{10}(\text{Physical channel BER}) < -2.055625$	-
PhCh_BER_LOG_003	$-2.055625 \leq \text{Log}_{10}(\text{Physical channel BER}) < -2.0475$	-
...	...	...
PhCh_BER_LOG_253	$-0.024375 \leq \text{Log}_{10}(\text{Physical channel BER}) < -0.01625$	-
PhCh_BER_LOG_254	$-0.01625 \leq \text{Log}_{10}(\text{Physical channel BER}) < -0.008125$	-
PhCh_BER_LOG_255	$-0.008125 \leq \text{Log}_{10}(\text{Physical channel BER}) \leq 0$	-

## 9.2.8 Round trip time

The measurement period shall be 100 ms. The support of extended round trip time is optional.

### 9.2.8.1 Absolute accuracy requirement

#### 9.2.8.1.1 Minimum requirement

Table 9.49

Parameter	Unit	Accuracy [chip]	Conditions
			Range [chips]
RTT	chip	+/- 0.5	876, ..., 2923.50

#### 9.2.8.1.2 Requirement for extended round trip time

Table 9.49X

Parameter	Unit	Accuracy [chip]	Conditions
			Range [chips]
RTT	chip	+/- 0.5	2923.75, ..., 5783.2500

### 9.2.8.2 Round trip time measurement report mapping

#### 9.2.8.2.1 Minimum requirement

The *Round trip time* reporting range is from 876.0000 ... 2923.8750 chip.

In table 9.50 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.50

Reported value	Measured quantity value	Unit
RT_TIME_0000	Round trip time < 876.0000	chip
RT_TIME_0001	$876.0000 \leq \text{Round trip time} < 876.0625$	chip
RT_TIME_0002	$876.0625 \leq \text{Round trip time} < 876.1250$	chip
RT_TIME_0003	$876.1250 \leq \text{Round trip time} < 876.1875$	chip
...	...	...
RT_TIME_32764	$2922.6875 \leq \text{Round trip time} < 2923.7500$	chip
RT_TIME_32765	$2923.7500 \leq \text{Round trip time} < 2923.8125$	chip
RT_TIME_32766	$2923.8125 \leq \text{Round trip time} < 2923.8750$	chip
RT_TIME_32767	$2923.8750 \leq \text{Round trip time}$	chip

### 9.2.8.2.2 Requirement for extended round trip time

The *extended Round trip time* reporting range is from 2923.8750 ... 7316 chip.

In table 9.50X the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.50X**

Reported value	Measured quantity value	Unit
RT_TIME_32767	$2923.8750 \leq \text{Round trip time} < 2923.9375$	chip
RT_TIME_32768	$2923.9375 \leq \text{Round trip time} < 2924.0000$	chip
RT_TIME_32769	$2924.0000 \leq \text{Round trip time} < 2924.0625$	chip
RT_TIME_32770	$2924.0625 \leq \text{Round trip time} < 2924.1250$	chip
RT_TIME_32771	$2924.1250 \leq \text{Round trip time} < 2924.1875$	chip
...	...	...
RT_TIME_103038	$7315.8125 \leq \text{Round trip time} < 7315.8750$	chip
RT_TIME_103039	$7315.8750 \leq \text{Round trip time} < 7315.9375$	chip
RT_TIME_103040	$7315.9375 \leq \text{Round trip time} < 7316.0000$	chip
RT_TIME_103041	$7316.0000 \leq \text{Round trip time}$	chip

## 9.2.9 Transport Channel BER

The measurement period shall be equal to the TTI of the transport channel. Each reported Transport channel BER measurement shall be an estimate of the BER averaged over one measurement period only.

### 9.2.9.1 Accuracy requirement

The average of consecutive Transport channel BER measurements is required to fulfil the accuracy stated in table 9.51 if the total number of erroneous bits during these measurements is at least 500 and the absolute BER value for each of the measurements is within the range given in table 9.51.

**Table 9.51**

Parameter	Unit	Accuracy [% of the absolute BER value]	Conditions
			Range
TrpBER	-	+/- 10	Convolutional coding 1/3 <sup>rd</sup> with any amount of repetition or a maximum of 25% puncturing: for absolute BER value $\leq 15\%$ Convolutional coding 1/2 with any amount of repetition or no puncturing: for absolute BER value $\leq 15\%$ Turbo coding 1/3 <sup>rd</sup> with any amount of repetition or a maximum of 20% puncturing: for absolute BER value $\leq 15\%$ .

### 9.2.9.2 Transport channel BER measurement report mapping

The *Transport channel BER* reporting range is from 0 to 1.

In table 9.52 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.52

Reported value	Measured quantity value	Unit
TrCh_BER_LOG_000	Transport channel BER = 0	-
TrCh_BER_LOG_001	$-\infty < \text{Log}_{10}(\text{Transport channel BER}) < -2.06375$	-
TrCh_BER_LOG_002	$-2.06375 \leq \text{Log}_{10}(\text{Transport channel BER}) < -2.055625$	-
TrCh_BER_LOG_003	$-2.055625 \leq \text{Log}_{10}(\text{Transport channel BER}) < -2.0475$	-
...	...	...
TrCh_BER_LOG_253	$-0.024375 \leq \text{Log}_{10}(\text{Transport channel BER}) < -0.01625$	-
TrCh_BER_LOG_254	$-0.01625 \leq \text{Log}_{10}(\text{Transport channel BER}) < -0.008125$	-
TrCh_BER_LOG_255	$-0.008125 \leq \text{Log}_{10}(\text{Transport channel BER}) \leq 0$	-

## 9.2.10 UTRAN GPS Timing of Cell Frames for UE positioning

NOTE: This measurement is used for UE positioning purposes.

The measurement period shall be [1] second.

### 9.2.10.1 Accuracy requirement

Three accuracy classes are defined for the UTRAN GPS Timing of Cell Frames for UE positioning measurement, i.e. accuracy class A, B and C. The implemented accuracy class depends on the UE positioning methods that are supported.

Table 9.53

Parameter	Unit	Accuracy [chip]	Conditions
UTRAN GPS Timing of Cell Frames for UE positioning	chip	Accuracy Class A: +/- [20000] chip Accuracy Class B: +/- [20] chip Accuracy Class C: +/- [X] chip	Over the full range

### 9.2.10.2 UTRAN GPS timing of Cell Frames for UE positioning measurement report mapping

The reporting range is for UTRAN GPS timing of Cell Frames for UE positioning is from 0 ... 2322432000000 chip.

In table 9.54 the mapping of measured quantity is defined.

Table 9.54

Reported value	Measured quantity value	Unit
GPS_TIME_0000000000000000	UTRAN GPS timing of Cell Frames for UE positioning < 0.0625	chip
GPS_TIME_0000000000000001	$0.0625 \leq \text{UTRAN GPS timing of Cell Frames for UE positioning} < 0.1250$	chip
GPS_TIME_0000000000000002	$0.1250 \leq \text{UTRAN GPS timing of Cell Frames for UE positioning} < 0.1875$	chip
...	...	...
GPS_TIME_37158911999997	$232243199999.8125 \leq \text{UTRAN GPS timing of Cell Frames for UE positioning} < 232243199999.8750$	chip
GPS_TIME_37158911999998	$232243199999.8750 \leq \text{UTRAN GPS timing of Cell Frames for UE positioning} < 232243199999.9375$	chip
GPS_TIME_37158911999999	$232243199999.9375 \leq \text{UTRAN GPS timing of Cell Frames for UE positioning} < 2322432000000.0000$	chip

## 9.2.11 PRACH Propagation delay

### 9.2.11.1 Accuracy requirement

#### 9.2.11.1.1 PRACH Propagation delay

The accuracy requirements in table 9.55 and table 9.55X are valid under the following conditions:

- The radio conditions are according to 25.104 section 8.7.2.1 Minimum requirements for Static Propagation Condition for BLER=10<sup>-1</sup>.
- Only RACH messages with correct CRC shall be considered

The support of extended PRACH propagation delay is optional.

**Table 9.55 Minimum requirement**

Parameter	Unit	Accuracy [chip]	Conditions
			Range [chips]
PRACH PropDelay	chip	+/-2	0, ... , 765

**Table 9.55X Requirement for extended PRACH propagation delay**

Parameter	Unit	Accuracy [chip]	Conditions
			Range [chips]
PRACH PropDelay	chip	+/-2	766, ..., 2307

#### 9.2.11.1.2 (void)

**Table 9.55A (void)**

### 9.2.11.2 PRACH Propagation delay measurement report mapping

#### 9.2.11.2.1 Minimum requirement

The *PRACH Propagation delay* reporting range is from 0 ... 765 chip.

In table 9.56 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.56**

Reported value	Measured quantity value	Unit
PROP_DELAY_000	0 ≤ PRACH Propagation delay < 3	chip
PROP_DELAY_001	3 ≤ PRACH Propagation delay < 6	chip
PROP_DELAY_002	6 ≤ PRACH Propagation delay < 9	chip
...	...	...
PROP_DELAY_252	756 ≤ PRACH Propagation delay < 759	chip
PROP_DELAY_253	759 ≤ PRACH Propagation delay < 762	chip
PROP_DELAY_254	762 ≤ PRACH Propagation delay < 765	chip
PROP_DELAY_255	765 ≤ PRACH Propagation delay	chip

#### 9.2.11.2.2 Requirement for extended PRACH propagation delay

The *extended PRACH Propagation delay* reporting range is from 765 ... 3069 chip.

In table 9.56X the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.56X**

Reported value	Measured quantity value	Unit
PROP_DELAY_255	$765 \leq \text{PRACH Propagation delay} < 768$	chip
PROP_DELAY_256	$768 \leq \text{PRACH Propagation delay} < 771$	chip
PROP_DELAY_257	$771 \leq \text{PRACH Propagation delay} < 774$	chip
PROP_DELAY_258	$774 \leq \text{PRACH Propagation delay} < 777$	chip
...	...	...
PROP_DELAY_1020	$3060 \leq \text{PRACH Propagation delay} < 3063$	chip
PROP_DELAY_1021	$3063 \leq \text{PRACH Propagation delay} < 3066$	chip
PROP_DELAY_1022	$3066 \leq \text{PRACH Propagation delay} < 3069$	chip
PROP_DELAY_1023	$3069 \leq \text{PRACH Propagation delay}$	chip

## 9.2.12 Acknowledged PRACH preambles

The measurement period shall be 20 ms.

### 9.2.12.1 Acknowledged PRACH preambles measurement report mapping

The *Acknowledged PRACH preambles* reporting range is from 0 ... 240 acknowledgements.

In table 9.57 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.57**

Reported value	Measured quantity value	Unit
ACK_PRACH_PREAMBLE_000	Acknowledged PRACH preambles = 0	-
ACK_PRACH_PREAMBLE_001	Acknowledged PRACH preambles = 1	-
ACK_PRACH_PREAMBLE_002	Acknowledged PRACH preambles = 2	-
...	...	...
ACK_PRACH_PREAMBLE_237	Acknowledged PRACH preambles = 237	-
ACK_PRACH_PREAMBLE_238	Acknowledged PRACH preambles = 238	-
ACK_PRACH_PREAMBLE_239	Acknowledged PRACH preambles = 239	-
ACK_PRACH_PREAMBLE_240	Acknowledged PRACH preambles = 240	-

## 9.2.13 (void)

**Table 9.58 (void)**

## 9.2.14 (void)

**Table 9.59 (void)**

## 9.2.15 SFN-SFN observed time difference

This measurement is needed for RTD estimation in UTRAN.

### 9.2.15.1 Accuracy requirement

#### 9.2.15.1.1 Accuracy requirement without IPDL

The measurement period shall be [100] ms.

Table 9.60

Parameter	Unit	Accuracy [chip]	Conditions
			Range [chips]
SFN-SFN observed time difference	chip	+/- 0.5	-19200.0000 ... 19200.0000

### 9.2.15.1.2 Accuracy requirement with IPDL

The measurement period shall be [TBD] ms.

IPDL pattern parameters [TBD].

Table 9.61

Parameter	Unit	Accuracy [chip]	Conditions
			Range [chips]
SFN-SFN observed time difference	chip	+/- 0.5	-19200.0000 ... 19200.0000

### 9.2.15.2 SFN-SFN observed time difference measurement report mapping

The SFN-SFN observed time difference reporting range is from -19200.0000 ... 19200.0000 chip.

In table 9.62 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.62

Reported value	Measured quantity value	Unit
SFN-SFN_TIME_00000	$-19200.0000 \leq \text{SFN-SFN observed time difference} < -19199.9375$	chip
SFN-SFN_TIME_00001	$-19199.9375 \leq \text{SFN-SFN observed time difference} < -19199.8750$	chip
...	...	...
SFN-SFN_TIME_614398	$19199.8750 \leq \text{SFN-SFN observed time difference} < 19199.9375$	chip
SFN-SFN_TIME_614399	$19199.9375 \leq \text{SFN-SFN observed time difference} \leq 19200.0000$	chip

### 9.2.16 Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission

The measurement period shall be 100 ms.

#### 9.2.16.1 Accuracy requirement

Table 9.63

Parameter	Unit	Accuracy [% units]	Conditions
			Range
P <sub>tot</sub>	%	± 5	For $5\% \leq$ Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission $\leq 95\%$

### 9.2.16.2 Measurement report mapping for transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission

The reporting range for *Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission* is from 0 ... 100 %.

In table 9.64 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.64**

Reported value	Measured quantity value	Unit
Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission_000	Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission = 0	%
Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission_001	0 < Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission ≤ 1	%
Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission_002	1 < Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission ≤ 2	%
Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission_003	2 < Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission ≤ 3	%
...	...	...
Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission_098	97 < Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission ≤ 98	%
Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission_099	98 < Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission ≤ 99	%
Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission_100	99 < Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission ≤ 100	%

### 9.2.17 DL Transmission Branch Load

This measurement is applicable in case of TX diversity.

The measurement period shall be 100 ms.

#### 9.2.17.1 Accuracy requirement

**Table 9.65**

Parameter	Unit	Accuracy [% units]	Conditions
			Range
Pbranchtot	%	± 5	For 5% ≤ DL Transmission Branch Load ≤ 95%

#### 9.2.17.2 DL Transmission Branch Load measurement report mapping

The reporting range for *DL Transmission Branch Load measurement* is from 0 ... 100 %.

In table 9.66 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.66**

Reported value	Measured quantity value	Unit
branch_load_000	DL Transmission Branch Load = 0	%
branch_load_001	$0 < \text{DL Transmission Branch Load} \leq 1$	%
branch_load_002	$1 < \text{DL Transmission Branch Load} \leq 2$	%
branch_load_003	$2 < \text{DL Transmission Branch Load} \leq 3$	%
...	...	...
branch_load_098	$97 < \text{DL Transmission Branch Load} \leq 98$	%
branch_load_099	$98 < \text{DL Transmission Branch Load} \leq 99$	%
branch_load_100	$99 < \text{DL Transmission Branch Load} \leq 100$	%
branch_load_101	DL Transmission Branch Load > 100	%

## 9.2.18 Received scheduled E-DCH power share (RSEPS)

The measurement period shall be 100 ms.

### 9.2.18.1 Accuracy requirement

**Table 9.67**

Parameter	Unit	Accuracy [dB]	Conditions
			Range
RSEPS	dB	$\pm 3$	For $-15 \text{ dB} \leq \text{RSEPS} \leq 0 \text{ dB}$

### 9.2.18.2 Received scheduled E-DCH power share measurement report mapping

The reporting range for *Received scheduled E-DCH power share* is from -15 ... 0 dB.

In table 9.yy the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 9.68**

Reported value	Measured quantity value	Unit
RSEPS_LEV_000	$\text{RSEPS} < -15.0$	dB
RSEPS_LEV_001	$-15.0 \leq \text{RSEPS} < -14.9$	dB
RSEPS_LEV_002	$-14.9 \leq \text{RSEPS} < -14.8$	dB
...	...	...
RSEPS_LEV_149	$-0.2 \leq \text{RSEPS} < -0.1$	dB
RSEPS_LEV_150	$-0.1 \leq \text{RSEPS} < 0$	dB
RSEPS_LEV_151	$0 \leq \text{RSEPS}$	dB



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# Annex A (normative): Test Cases

## A.1 Purpose of Annex

This Annex specifies test specific parameters for some of the functional requirements in chapters 4 to 9. The tests provide additional information to how the requirements should be interpreted for the purpose of conformance testing. The tests in this Annex are described such that one functional requirement may be tested in one or several test and one test may verify several requirements. Some requirements may lack a test.

The conformance tests are specified in TS34.121. Statistical interpretation of the requirements is described in Annex A.2.

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## A.2 Requirement classification for statistical testing

Editors note: Each requirement in the annex have to be gone through and updated with which type it belongs to and in applicable cases, which success rate that defines the requirement. Tdoc R4 00 619 shall be used as a base for that work.

Requirements in this specification are either expressed as absolute requirements with a single value stating the requirement, or expressed as a success rate. There are no provisions for the statistical variations that will occur when the parameter is tested.

Annex A outlines the test in more detail and lists the test parameters needed. The test will result in an outcome of a test variable value for the DUT inside or outside the test limit. Overall, the probability of a "good" DUT being inside the test limit(s) and the probability of a "bad" DUT being outside the test limit(s) should be as high as possible. For this reason, when selecting the test variable and the test limit(s), the statistical nature of the test is accounted for.

The statistical nature depends on the type of requirement. Some have large statistical variations, while others are not statistical in nature at all. When testing a parameter with a statistical nature, a confidence level is set. This establishes the probability that a DUT passing the test actually meets the requirement and determines how many times a test has to be repeated and what the pass and fail criteria are. Those aspects are not covered by TS 25.133. The details of the tests, how many times to run it and how to establish confidence in the tests are described in TS 34.121. This Annex establishes what the test variable is and whether it can be viewed as statistical in nature or not.

### A.2.1 Types of requirements in TS 25.133

#### **Time and delay requirements on UE higher layer actions**

A very large part of the RRM requirements are delay requirements:

- In idle mode (A.4) there is cell re-selection delay.
- In UTRAN Connected Mode Mobility (A.5) there is measurement reporting delay, handover delay and cell re-selection delay.
- In RRC Connection Control (A.6) there is RRC re-establishment delay and TFC blocking delay.

All have in common that the UE is required to perform an action observable in higher layers (e.g. camp on the correct cell) within a certain time after a specific event (e.g. a new strong pilot arises). The delay time is statistical in nature for several reasons, among others that measurements required by the UE are performed in a fading radio environment.

The variations make a strict limit unsuitable for a test. Instead there is a condition set for a correct action by the UE, e.g. that the UE shall camp on the correct cell within X seconds. Then the rate of correct events is observed during repeated tests and a limit is set on the rate of correct events, usually 90% correct events are required. How the limit is applied in the test depends on the confidence required, further detailed are in TS 34.121.

#### **Measurements of power levels, relative powers and time**

A very large number of requirements are on measurements that the UE performs:

- In UTRAN Connected Mode Mobility (A.5) there are measurement reports.
- Measurement performance requirements (A.8) has requirements on all type of measurements.

The accuracy requirements on measurements are expressed in this specification as a fixed limit (e.g. +/-X dB), but the measurement error will have a distribution that is not easily confined in fixed limits. Assuming a Gaussian distribution of the error, the limits will have to be set at  $\pm 3.29\sigma$  if the probability of failing a "good DUT" in a single test is to be kept at 0.1%. It is more reasonable to set the limit tighter and test the DUT by counting the rate of measurements that are within the limits, in a way similar to the requirements on delay.

### Implementation requirements

A few requirements are strict actions the UE should take or capabilities the UE should have, without any allowance for deviations. These requirements are absolute and should be tested as such. Examples are

- "Event triggered report rate" and "Active set dimension" in UTRAN Connected Mode Mobility (A.5)
- "Correct behaviour at time-out" in RRC connection control (A.6)

### Physical layer timing requirements

All requirements on "Timing Characteristics" (A.7) are absolute limits on timing accuracy.

### BER and BLER requirements

Some measurement report procedures in "UE Measurement procedures" (A.8) have requirements on DCH BLER. These are tested in the same way as BLER requirements in TS 25.101.

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## A.3 RRM test configurations

### A.3.1 UE with single antenna connector

For testing a UE with a single UTRA antenna connector, the test configuration is fully described in sections A.4 to A.9

### A.3.2 UE with multiple antenna connectors

For testing a UE with multiple UTRA receive diversity antenna connectors, test signals from each cell in section A.4 to A.9 shall be generated with independent fading (fading applicable to test cases A.8.1.4, A.8.1.5, A.8.1.6, A.8.2.2 and A.8.2.3 only) and applied to each antenna port. For each carrier frequency specified in the testcase, independent noise shall be generated and applied to each antenna port.

The received power spectral density at each antenna connector  $n$ , denoted as  $\hat{I}_{or,n}$  shall be the same as to the received power spectral density  $\hat{I}_{or}$  specified for testing a UE with a single antenna connector. The noise spectral density at each antenna connector  $n$ , denoted as  $I_{oc,n}$  shall be the same as the noise spectral density  $I_{oc}$  specified for testing a UE with a single antenna connector.

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## A.4 Idle Mode

### A.4.1 (void)

### A.4.2 Cell Re-Selection

Five scenarios are considered:

- Scenario 1: Single carrier case
- Scenario 2: Multi carrier case
- Scenario 3: Idle mode interfrequency reselection with an increased number of carriers
- Scenario 4: Idle mode intrafrequency reselection with extended DRX cycle
- Scenario 5: Idle mode interfrequency reselection with extended DRX cycle

For each of them a test is proposed.

NOTE: Existing scenarios cover only requirements in section 4.2.2.2 and 4.2.2.3. More scenarios, covering requirements in section 4.2.2.1, will be added later.

## A.4.2.1 Scenario 1: Single carrier case

### A.4.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in the single carrier case reported in section 4.2.2.

This scenario implies the presence of 1 carrier and 6 cells as given in tables A.4.1 and A.4.2. The UE is requested to monitor neighbouring cells on 1 carrier. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2 shall belong to different Location Areas.

**Table A.4.1: General test parameters for Cell Re-selection single carrier multi-cell case**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
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	15	T2 need to be defined so that cell re-selection reaction time is taken into account.

**Table A.4.2: Cell re-selection single carrier multi-cell case**

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2

UTRA RF Channel Number		Channel 1	Channel 1	Channel 1	Channel 1	Channel 1	Channel 1
CPICH $E_c/I_{or}$	dB	-10	-10	-10	-10	-10	-10
PCCPCH $E_c/I_{or}$	dB	-12	-12	-12	-12	-12	-12
SCH $E_c/I_{or}$	dB	-12	-12	-12	-12	-12	-12
PICH $E_c/I_{or}$	dB	-15	-15	-15	-15	-15	-15
OCNS $E_c/I_{or}$	dB	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941
$\hat{I}_{or}/I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27	0.27
$I_{oc}$	dBm / 3,84 MHz	-70					
CPICH $E_c/I_o$	dB	-16	-13	-13	-16	-23	-23
Propagation Condition		AWGN					
Cell_selection_and_ reselection_quality_measure		CPICH $E_c/N_0$	CPICH $E_c/N_0$	CPICH $E_c/N_0$	CPICH $E_c/N_0$	CPICH $E_c/N_0$	CPICH $E_c/N_0$
Qqualmin	dB	-20	-20	-20	-20	-20	-20
Qrxlevmin	dBm	-115	-115	-115	-115	-115	-115
UE_TXPWR_MAX_ RACH	dB	21	21	21	21	21	21
Qoffset <sub>2s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0
Qhyst2	dB	0	0	0	0	0	0
Treselection	s	0	0	0	0	0	0
Sintrasearch	dB	not sent	not sent	not sent	not sent	not sent	not sent

### A.4.2.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{\text{evaluateFDD}} + T_{\text{SI}}$ ,

where:

$T_{\text{evaluateFDD}}$  See Table 4.1 in section 4.2.2.

$T_{\text{SI}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

### A.4.2.2 Scenario 2: Multi carrier case

#### A.4.2.2.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in the multi carrier case reported in section 4.2.2.

This scenario implies the presence of 2 carriers and 6 cells as given in tables A.4.3 and A.4.4. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4.3: General test parameters for Cell Re-selection in Multi carrier case

Parameter	Unit	Value	Comment
Initial condition	Active cell	Cell2	
	Neighbour cells	Cell1, Cell3, Cell4, Cell5, Cell6	
Final condition	Active cell	Cell1	
Access Service Class (ASC#0) - Persistence value	-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS			Not used
DRX cycle length	s	1.28	The value shall be used for all cells in the test.
T1	s	30	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2	s	15	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.4: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/lor	dB	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
PCCPCH_Ec/lor	dB	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
SCH_Ec/lor	dB	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
PICH_Ec/lor	dB	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15
OCNS_Ec/lor	dB	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941
$\hat{I}_{or}/I_{oc}$	dB	-3.4	2.2	2.2	-3.4	-7.4	-4.8	-7.4	-4.8	-4.8	-7.4	-4.8	-7.4
$I_{oc}$	dBm / 3,84 MHz	-70											
CPICH_Ec/lo	dB	-16	-13	-13	-16	-20	-20	-20	-20	-20	-20	-20	-20
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dB	21		21		21		21		21		21	
Qoffset2 <sub>s,n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0		C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0		C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0		C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0		C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0		C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0	
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

#### A.4.2.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{\text{evaluateFDD}} + T_{\text{SI}}$ ,

where:

$T_{\text{evaluateFDD}}$	See Table 4.1 in section 4.2.2.
$T_{\text{SI}}$	Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

### A.4.2.3 Idle mode interfrequency reselection with an increased number of carriers

#### A.4.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay for the increased UE carrier monitoring case reported in section 4.2.2.

This scenario implies the presence of 4 carriers and 4 cells as given in tables A.4.4A, A.4.4B and A.4.4C. The UE is requested to monitor neighbouring cells on 5 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2, 3 and 4 shall all belong to different Location Areas. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the normal performance group and two frequencies belong to the reduced performance group. The neighbour lists of cells 2, 3 and 4 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test. Cells 1,2,3 and 4 all have equal absolute priority.

**Table A.4.4A: General test parameters for Cell Re-selection in increased UE carrier monitoring case**

Parameter	Unit	Value	Comment
T0	Active cell		T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2,3,4 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings
T1 start condition	Active cell	Cell 1	
T1 end condition	Active Cell	Cell 2	UE shall perform reselection to cell 2 during T1
	Neighbour cell	Cell 1,3,4	
T2 start condition	Active Cell	Cell 2	
T2 end condition	Active Cell	Cell 3	UE shall perform reselection to cell 3 during T2
	Neighbour cell	Cell 1,2,4	
T3 start condition	Active cell	Cell 3	
T3 end condition	Active Cell	Cell 4	UE shall perform reselection to cell 4 during T3
	Neighbour cell	Cell 1,2,3	
T4 start condition	Active Cell	Cell 4	
T4 end condition	Active Cell	Cell 1	UE shall perform reselection to cell 1 during T4
	Neighbour cell	Cell 2,3,4	
UE configured UTRA RF Channel Number		1, 2,3,4,5,6	Serving cell and five UTRA FDD interfrequency carrier frequencies are used in the UE neighbour cell list. Frequencies 4,5,6 are indicated to have reduced performance
Test equipment configuration		Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6	
HCS			Not used
DRX cycle length	s	1.28	The value shall be used for all cells in the test.
T0	s	180	Initialisation time need to be defined so that cell detection time is taken into account.
T1	s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2	s	120	T2 need to be defined so that cell re-selection reaction time is taken into account.
T3	s	120	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4	s	15	T4 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.4B: Cell re-selection multi carrier multi cell case (cell 1,2)

Parameter	Unit	Cell 1					Cell 2				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number		Channel 1					Randomly selected from 2,3 such that cell 2 is in the normal performance group				
CPICH_Ec/Ior	dB	-10					-10				
PCCPCH_Ec/Ior	dB	-12					-12				
SCH_Ec/Ior	dB	-12					-12				
PICH_Ec/Ior	dB	-15					-15				
OCNS_Ec/Ior	dB	-0.941					-0.941				
$\hat{I}_{or}/I_{oc}$	dB	-0.02	-4.74	-4.74	-4.74	0.02	-4.72	-0.02	-4.72	-4.72	-4.72
$I_{oc}$	dBm / 3,84 MHz	-70									
-CPICH_Ec/Io	dB	-13	-16	-16	-16	-13	-16	-13	-16	-16	-16
Propagation Condition		AWGN									
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>					CPICH E <sub>c</sub> /N <sub>0</sub>				
Qqualmin	dB	-20					-20				
Qrxlevmin	dBm	-115					-115				
UE_TXPWR_MAX_RACH	dB	21					21				
Qoffset2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0					C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0				
Qhyst2	dB	0					0				
Treselection	s	0					0				
Sintrasearch	dB	not sent					not sent				
Sintersearch	dB	not sent					not sent				



Table A.4.4C: Cell re-selection multi carrier multi cell case (cell 3,4)

Parameter	Cell 3					Cell 4				
	T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
UTRA RF Channel Number	Randomly selected from 4,5, 6 such that cell 3 is in the reduced performance group					Randomly selected from 4,5, 6 such that cell 4 is in the reduced performance group				
CPICH_Ec/Ior	-10					-10				
PCCPCH_Ec/Ior	-12					-12				
SCH_Ec/Ior	-12					-12				
PICH_Ec/Ior	-15					-15				
OCNS_Ec/Ior	-0.941					-0.941				
$\hat{I}_{or}/I_{oc}$	-4.74	-4.74	-0.02	-4.74	-4.74	-4.74	-4.74	-4.74	-0.02	-4.74
$I_{oc}$	-70									
CPICH_Ec/Io	-16	-16	-13	-16	-16	-16	-16	-16	-13	-16
Propagation Condition	AWGN									
Cell_selection_and_reselection_quality_measure	CPICH E <sub>c</sub> /N <sub>0</sub>					CPICH E <sub>c</sub> /N <sub>0</sub>				
Qqualmin	-20					-20				
Qrxlevmin	-115					-115				
UE_TXPWR_MAX_RACH	21					21				
Qoffset2 <sub>s, n</sub>	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0					C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0				
Qhyst2	0					0				
Treselection	0					0				
Sintrasearch	not sent					not sent				
Sintersearch	not sent					not sent				

### A.4.2.3.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of the relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on the target cell.

Table A.4.4D

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	14.1
T2	Cell 3 (reduced performance group)	116.5
T3	Cell 4 (reduced performance group)	116.5
T4	Cell 1 (normal performance group)	14.1

The rate of correct cell reselections observed during repeated tests shall be at least 90%, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved. At least 90% of reselections to the reduced performance group shall be within the required time, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved.

NOTE: The cell re-selection delay can be expressed as:

$$N_{\text{norm, inter}} * T_{\text{evaluateFDD}} + T_{\text{SI}} \text{ (normal performance group) and } N_{\text{reduced, inter}} * 6 * T_{\text{evaluateFDD}} + T_{\text{SI}} \text{ (reduced performance group)}$$

where:

$T_{\text{evaluateFDD}}$  See Table 4.1 in section 4.2.2.

$T_{\text{SI}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of

14.08 s when  $N_{\text{norm, inter}}=2$  for reselections to normal performance group, allow 14.1s in the test case.

116.48 s when  $N_{\text{norm, reduced}}=3$  for reselections to reduced performance group, allow 116.5s in the test case.

#### A.4.2.4 Scenario 4: Single carrier case with extended DRX

##### A.4.2.4.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in the single carrier case reported in section 4.2.2.

This scenario implies the presence of 1 carrier and 6 cells as given in tables A.4.1 and A.4.2. The UE is requested to monitor neighbouring cells on 1 carrier. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2 shall belong to different Location Areas.

**Table A.4.4E: General test parameters for Cell Re-selection single carrier multi-cell case**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
Final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
UTRAN eDRX cycle length duration		s	40.96	See [24.008, Table 10.5.5.32] The value shall be used for all cells in the test.
Paging Time Window		s	4	See [24.008, Table 10.5.5.32], The value shall be used for all cells in the test.
T2		s	15	T2 need to be defined so that cell re-selection reaction time is taken into account.

**Table A.4.4F: Cell re-selection single carrier multi-cell case**

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2

UTRA RF Channel Number		Channel 1	Channel 1	Channel 1	Channel 1	Channel 1	Channel 1
CPICH $E_c/I_{or}$	dB	-10	-10	-10	-10	-10	-10
PCCPCH $E_c/I_{or}$	dB	-12	-12	-12	-12	-12	-12
SCH $E_c/I_{or}$	dB	-12	-12	-12	-12	-12	-12
PICH $E_c/I_{or}$	dB	-15	-15	-15	-15	-15	-15
OCNS $E_c/I_{or}$	dB	-0.941	-0.941	-0.941	-0.941	-0.941	-0.941
$\hat{I}_{or}/I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27	0.27
$I_{oc}$	dBm / 3,84 MHz	-70					
CPICH $E_c/I_o$	dB	-16	-13	-13	-16	-23	-23
Propagation Condition		AWGN					
Cell_selection_and_reselection_quality_measure		CPICH $E_c/N_0$	CPICH $E_c/N_0$	CPICH $E_c/N_0$	CPICH $E_c/N_0$	CPICH $E_c/N_0$	CPICH $E_c/N_0$
Qqualmin	dB	-20	-20	-20	-20	-20	-20
Qrxlevmin	dBm	-115	-115	-115	-115	-115	-115
UE_TXPWR_MAX_RACH	dB	21	21	21	21	21	21
Qoffset <sub>2s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0
Qhyst2	dB	0	0	0	0	0	0
Treselection	S	0	0	0	0	0	0
Sintrasearch	dB	not sent	not sent	not sent	not sent	not sent	not sent

#### A.4.2.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 1.

The cell re-selection delay shall be less than  $[40.96s+4s+1.28s]$ .

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $eDRX\ cycle + PTW + T_{SI}$ ,

where:

PTW            Paging Time Window defined in Table A.4.4E above

$T_{SI}$             Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 46.24 s, allow 47 s in the test case.

#### A.4.2.4 Scenario 5: Idle mode interfrequency reselection with extended DRX

This test is to verify the requirement for the cell re-selection delay for the extended DRX carrier monitoring case reported in section 4.2.2.

This scenario implies the presence of 2 carriers and 6 cells as given in tables A.4.4G and A.4.4H. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2 shall belong to different Location Areas.

**Table A.4.4G: General test parameters for Cell Re-selection in Multi carrier case**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
Final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
HCS				Not used
UTRAN eDRX cycle length duration		s	40.96	See [24.008, Table 10.5.5.32] The value shall be used for all cells in the test.
Paging Time Window		s	4	See [24.008, Table 10.5.5.32], The value shall be used for all cells in the test.
T1		s	>>40.96	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	>40.96	T2 need to be defined so that cell re-selection reaction time is taken into account.

**Table A.4.4H: Cell re-selection multi carrier multi cell case**

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/I <sub>o</sub>	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/I <sub>o</sub>	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/I <sub>o</sub>	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/I <sub>o</sub>	dB	-15		-15		-15		-15		-15		-15	
OCNS_Ec/I <sub>o</sub>	dB	-0.941		-0.941		-0.941		-0.941		-0.941		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-3.4	2.2	2.2	-3.4	-7.4	-4.8	-7.4	-4.8	-4.8	-7.4	-4.8	-7.4
$I_{oc}$	dBm / 3,84 MHz	-70											
CPICH_Ec/I <sub>o</sub>	dB	-16	-13	-13	-16	-20		-20		-20		-20	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dB	21		21		21		21		21		21	
Qoffset2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

### A.4.2.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 1.

The cell re-selection delay shall be less than [40.96s+4s+1.28s].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as: eDRX cycle + PTW + T<sub>SI</sub>,

where:

PTW Paging Time Window defined in Table A.4.4G above

T<sub>SI</sub> 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 46.24 s, allow 47 s in the test case.

## A.4.3 UTRAN to GSM Cell Re-Selection

### A.4.3.1 Scenario 1

#### A.4.3.1.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to GSM cell re-selection delay reported in section 4.2.

This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 UMTS carrier and 12 GSM cells. Test parameters are given in Table, A.4.5, A.4.6, A.4.7. Cell 1 and cell 2 shall belong to different Location Areas.

**Table A.4.5: General test parameters for UTRAN to GSM Cell Re-selection**

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
DRX cycle length		s	1.28	
HCS				Not used
T1		s	45	
T2		s	35	

**Table A.4.6: Cell re-selection UTRAN to GSM cell case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
OCNS_Ec/lor	dB	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	0	-5
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/lo	dB	-13	-16.2
CPICH_RSCP	dBm	-80	-85
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qoffset1 <sub>s, n</sub>	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	s	0	
Ssearch <sub>RAT</sub>	dB	not sent	

**Table A.4.7: Cell re-selection UTRAN to GSM cell case (cell 2)**

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

### A.4.3.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than  $26\text{ s} + T_{\text{BCCH}}$ , where  $T_{\text{BCCH}}$  is the maximum time allowed to read BCCH data from GSM cell [21].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $4 * T_{\text{measureGSM}} + T_{\text{BCCH}}$ , where:

$T_{\text{measureGSM}}$  See Table 4.1 in section 4.2.2.

$T_{\text{BCCH}}$  Maximum time allowed to read BCCH data from GSM cell [21].  
According to [21], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

This gives a total of  $25.6\text{ s} + T_{\text{BCCH}}$ , allow  $26\text{ s} + T_{\text{BCCH}}$  in the test case.

## A.4.3.2 Scenario 2

### A.4.3.2.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to GSM cell re-selection delay reported in section 4.2.

This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 UMTS carrier and 12 GSM cells. Test parameters are given in Table, A.4.7A, A.4.7B, A.4.7C. Cell 1 and cell 2 shall belong to different Location Areas.

**Table A.4.7A: General test parameters for UTRAN to GSM Cell Re-selection**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
DRX cycle length		s	1.28	
HCS				Not used
T1		s	45	
T2		s	12	

**Table A.4.7B: Cell re-selection UTRAN to GSM cell case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
OCNS_Ec/lor	dB	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	20	-9
$I_{oc}$	dBm/3,84 MHz	-81	
CPICH_Ec/lo	dB	-10.0	-19.5
CPICH_RSCP	dBm	-70	-100
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH Ec/No	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qoffset1 <sub>s,n</sub>	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	s	0	
Ssearch <sub>RAT</sub>	dB	not sent	

**Table A.4.7C: Cell re-selection UTRAN to GSM cell case (cell 2)**

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-80	-80
RXLEV_ACCESS_MIN	dBm	-104	
MS_TXPWR_MAX_CCH	dBm	33	

### A.4.3.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than  $7.7 \text{ s} + T_{\text{BCCH}}$ , where  $T_{\text{BCCH}}$  is the maximum time allowed to read BCCH data from GSM cell [21].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $\text{Max}(3 * T_{\text{measureFDD}}, T_{\text{measureGSM}} + \text{DRX cycle length}) + T_{\text{BCCH}}$ , where:

$T_{\text{measureFDD}}$  See Table 4.1 in section 4.2.2.

$T_{\text{measureGSM}}$  See Table 4.1 in section 4.2.2.

DRX cycle length 1.28s see Table A.4.7.A

$T_{\text{BCCH}}$  Maximum time allowed to read BCCH data from GSM cell [21].  
According to [21], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

This gives a total of  $7.68 \text{ s} + T_{\text{BCCH}}$ , allow  $7.7 \text{ s} + T_{\text{BCCH}}$  in the test case.

### A.4.3.3 Scenario 3

#### A.4.3.3.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to GSM cell re-selection delay reported in section 4.2 when measurement rules according to HCS is used.

This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 UMTS carrier and 12 GSM cells. Test parameters are given in Table, A.4.7D, A.4.7E, A.4.7F. Cell 1 and cell 2 shall belong to different Location Areas.

**Table A.4.7D: General test parameters for UTRAN to GSM Cell Re-selection**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
DRX cycle length		s	1.28	
HCS				Used
T1		s	45	
T2		s	45	

**Table A.4.7E: Cell re-selection UTRAN to GSM cell case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
OCNS_Ec/lor	dB	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	40	10
$I_{oc}$	dBm/3,84 MHz	-100	
CPICH_Ec/lo	dB	-10.0	-10.4
CPICH_RSCP	dBm	-70	-100
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qoffset1 <sub>s, n</sub>	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	s	0	
Ssearch <sub>RAT</sub>	dB	0	
SHCS, <sub>RAT</sub> m	dB	25	
Slimit, <sub>SearchRAT</sub>	dB	0	
Penalty_time	s	0 (default value)	
HCS_PRIO		0 (default value)	
Qhcs		0 (default value)	
T <sub>Cmax</sub>	s	not used (default value)	



**Table A.4.7F: Cell re-selection UTRAN to GSM cell case (cell 2)**

Parameter	Unit	Cell 2 (GSM)	
		T1	T2
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-80	-80
RXLEV_ACCESS_MIN	dBm	-104	
MS_TXPWR_MAX_CCH	dBm	33	

### A.4.3.3.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay shall be less than  $37.7 \text{ s} + T_{\text{BCCH}}$ , where  $T_{\text{BCCH}}$  is the maximum time allowed to read BCCH data from GSM cell [21].

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to unidentified GSM cells can be expressed as:  $30 \text{ s} + T_{\text{measureGSM}} + \text{DRX cycle length} + T_{\text{BCCH}}$ , where:

$T_{\text{measureFDD}}$  See Table 4.1 in section 4.2.2.

$T_{\text{measureGSM}}$  See Table 4.1 in section 4.2.2.

DRX cycle length 1.28s see Table A.4.7D

$T_{\text{BCCH}}$  Maximum time allowed to read BCCH data from GSM cell [21].  
According to [21], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

This gives a total of  $37.68 \text{ s} + T_{\text{BCCH}}$ , allow  $37.7 \text{ s} + T_{\text{BCCH}}$  in the test case.

## A.4.4 FDD/TDD Cell Re-selection

### A.4.4.1 Test Purpose and Environment

#### A.4.4.1.1 3,84 Mcps TDD Option

This test is to verify the requirement for the FDD/TDD cell re-selection delay reported in section 4.2.2.

This scenario implies the presence of UTRA FDD and 1 UTRA TDD cell as given in Table A.4.8, A.4.9 and A.4.10. The maximum repetition period of the relevant system information blocks that need to be received by the UE to camp on a cell shall be 1280 ms.

Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4.8: General test parameters for FDD/TDD Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	FDD cell
	Neighbour cells		Cell2	TDD cell
Final condition	Active cell		Cell2	TDD cell
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Access Service Class (ASC#0) - Persistence value			1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.4.9: Cell 1 specific test parameters for FDD/TDD Cell Re-Selection

Parameter	Unit	Cell 1	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/Ior	dB	-10	
P-CCPCH_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	9	3
$I_{oc}$	dBm / 3,84 MHz	-70	
CPICH_RSCP	dBm	-71	-77
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH_Ec/No	
Qrxlevmin	dBm	-115	
Qoffset1s,n	dB	0	
Qhyst1	dB	0	
PENALTY_TIME	s	0	
TEMPORARY_OFFSET	dB	0	
Treselection	s	0	
Sintrasearch	dB	not sent	
Sintersearch	dB	not sent	

Table A.4.10: Cell 2 specific test parameters for FDD/TDD Cell Re-Selection

Parameter	Unit	Cell 2			
		0		8	
DL timeslot number		T1	T2	T1	T2
UTRA RF Channel Number		Channel 2			
P-CCPCH Ec/Ior	dB	-3		n.a.	
PICH Ec/Ior	dB	n.a.		-3	
SCH Ec/Ior	dB	-9			
SCH <sub>toffset</sub>	dB	10			
OCNS Ec/Ior	dB	-3.12			
$\hat{I}_{or}/I_{oc}$	dB	-4	2	-4	2
P-CCPCH RSCP	dBm	-77	-71	n.a.	n.a.
	$I_{oc}$	dBm/3,84 MHz		-70	
	Propagation Condition	AWGN			
	Qrxlevmin	dBm		-103	
	Qoffset2 <sub>s,n</sub>	dB		0	
	Qhyst2	dB		0	
	PENALTY_TIME	s		0	
	TEMPORARY_OFFSET	dB		0	
	Treselection	s		0	
	Sintrasearch	dB		not sent	
	Sintersearch	dB		not sent	
Note that the transmit energy per PN chip for the SCH is averaged over the 256 chip duration when the SCH is present in the time slot.					

#### A.4.4.1.2 1.28 Mcps TDD Option

This test is to verify the requirement for the FDD/TDD cell re-selection delay reported in section 4.2.2.

This scenario implies the presence of UTRA FDD and 1 UTRA TDD cell as given in Table A.4.11, A.4.12 and A4.13. The maximum repetition period of the relevant system information blocks that need to be received by the UE to camp on a cell shall be 1280 ms.

Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4.11: General test parameters for FDD/TDD cell re-selection

Parameter	Unit	Value	Comment
Initial condition	Active cell	Cell1	FDD cell
	Neighbour cells	Cell2	TDD cell
Final condition	Active cell	Cell2	TDD cell
UE_TXPWR_MAX_RACH	dBm	21	The value shall be used for all cells in the test.
Access Service Class (ASC#0) - Persistence value		1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS			Not used
DRX cycle length	s	1.28	The value shall be used for all cells in the test.
T1	s	15	
T2	s	15	

Table A.4.12: FDD/TDD cell re-selection

Parameter	Unit	Cell 1	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/Ior	dB	-10	
P-CCPCH_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	9	3
$I_{oc}$	dBm / 3,84 MHz	-70	
CPICH_RSCP	dBm	-71	-77
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH_Ec/No	
Qrxlevmin	dBm	-115	
Qoffset1s,n	dB	0	
Qhyst1	dB	0	
Treselection	s	0	
Sintrasearch	dB	not sent	
Sintersearch	dB	not sent	

Table A.4.13: Cell 2 specific test parameters for FDD/TDD Cell Re-Selection

Parameter	Unit	Cell 2			
		0		DwPTs	
DL timeslot number		T1	T2	T1	T2
UTRA RF Channel Number		Channel 2			
P-CCPCH_Ec/Ior	dB	-3			
DwPCH_Ec/Ior	dB			0	
OCNS_Ec/Ior	dB	-3			
$\hat{I}_{or}/I_{oc}$	dB	-4	2	-4	2
P-CCPCH RSCP	dBm	-77	-71		
$I_{oc}$		dBm/1.28 MHz		-70	
Propagation Condition		AWGN			
Qrxlevmin	dBm	-103			
Qoffset1s,n	dB	0			
Qhyst1	dB	0			
Treselection	s	0			
Sintrasearch	dB	not sent			
Sintersearch	dB	not sent			

#### A.4.4.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:

$$T_{\text{evaluateTDD}} + T_{\text{SI}}$$

where:

$T_{\text{evaluateTDD}}$  See Table 4.1 in section 4.2.2.

$T_{SI}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

## A.4.5 UTRAN to E-UTRA Cell Reselection

### A.4.5.1 E-UTRA FDD is of higher priority

#### A.4.5.1.1 Test Purpose and Environment

This test is to verify the requirement for the UTRA FDD to E-UTRA FDD inter-RAT cell reselection delay reported in section 4.2.

The test scenario comprises two different cells, with cell 1 being the UTRA serving cell and cell 2 being the E-UTRA cell to be re-selected to. Test parameters are given in Tables A.4.14, A.4.15, A.4.16. The test consists of three successive time periods, with time duration of T1, T2, and T3, respectively. UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

Cell 1 and cell 2 shall belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

**Table A.4.14: General test parameters for UTRAN to E-UTRA Cell Reselection**

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	
T3 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T3
	Neighbour cell		Cell2	
DRX cycle length		s	1.28	
HCS				Not used
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA access barring information			Not sent	No additional delays in random access procedure
T1		s	>20	During T1, cell 2 shall be powered off, and during the off time its 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	85	T2 needs to be defined so that cell re-selection reaction time is taken into account.
T3		s	25	T3 needs to be defined so that cell re-selection reaction time is taken into account.

Table A.4.15: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 1)

Parameter	Unit	Cell 1 (UTRA)		
		T1	T2	T3
UTRA RF Channel Number		Channel 1		
CPICH_Ec/Ior	dB	-10		
PCCPCH_Ec/Ior	dB	-12		
SCH_Ec/Ior	dB	-12		
PICH_Ec/Ior	dB	-15		
OCNS_Ec/Ior	dB	-0.941		
$\hat{I}_{or}/I_{oc}$	dB	13	13	13
$I_{oc}$	dBm/3,84 MHz	-70		
CPICH_Ec/Io	dB	-10.21	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67	-67
Qqualmin	dB	-20		
Qrxlevmin	dBm	-115		
UE_TXPWR_MAX_RACH	dBm	21		
Treselection	s	0		
S <sub>prioritysearch1</sub>	dB	42		
S <sub>prioritysearch2</sub>	dB	0		
S <sub>searchE-UTRA</sub>	dB	Not sent		
Thresh <sub>x, high</sub> (Note 1)	dB	48		
Propagation Condition		AWGN		
Note 1: This refers to the value of Thresh <sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell.				

Table A.4.16: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 2)

Parameter	Unit	Cell 2		
		T1	T2	T3
E-UTRA RF Channel number		2		
BW <sub>channel</sub>	MHz	10		
OCNG Patterns defined in TS 36.133 A.3.2.1.2 (OP.2 FDD) [24]		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 <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
Qrxlevmin	dBm			
$N_{oc}$	dBm/15 kHz	-98		
RSRP	dBm/15 KHz	-infinity	-86	-102
$\hat{E}_s/N_{oc}$	dB	-infinity	12	-4
$\hat{E}_s/I_{ot}$	dB	-infinity	12	-4
Treselection <sub>EUTRAN</sub>	s	0		
S <sub>nonintrasearch</sub>	dB	Not sent		
Thresh <sub>serv, low</sub>	dB	44		

Thresh <sub>x, low</sub> (Note 2)	dB	42
Propagation Condition		AWGN
Note 1: OCNG shall be used such that cell 2 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 <sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.		

### A.4.5.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send 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 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 can be expressed as:  $T_{\text{higher\_priority\_search}} + T_{\text{evaluateEUTRA}} + T_{\text{SI}}$ , where:

$T_{\text{higher\_priority\_search}}$  See section 4.2.2

$T_{\text{evaluateEUTRA}}$  See Table 4.2 in section 4.2.2.5a

$T_{\text{SI}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s, allow 81 s in the test case.

## A.4.5.2 E-UTRA FDD is of lower priority

### A.4.5.2.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to E-UTRAN cell reselection delay reported in section 4.2.

This scenario implies the presence of 1 UTRAN serving cell, and 1 E-UTRAN cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 UTRAN carrier and 1 E-UTRAN carrier. Test parameters are given in Table, A.4.17, A.4.18, A.4.19. The test consists of two successive time periods, with time duration of T1 and T2, respectively. Both UTRA cell 1 and E-UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.



Table A.4.17: General test parameters for UTRAN to E-UTRAN Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	UTRAN cell
	Neighbour cell		Cell 2	E-UTRAN cell
Final condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T3
DRX cycle length		s	1.28	
HCS				Not used
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA access barring information			Not sent	No additional delays in random access procedure
T1		s	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	25	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.18: Cell re-selection UTRAN to E-UTRAN cell case (cell 1)

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
OCNS_Ec/lor	dB	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	11	-5
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/lo	dB	-10.33	-16.19
CPICH_RSCP	dBm	-69	-85
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qhyst1	dB	0	
Treselection	s	0	
Sprioritysearch1	dB	62	
Sprioritysearch2	dB	0	
Thresh <sub>serv, low</sub>	dB	36	
Thresh <sub>x, low</sub> (Note 1)	dB	50	
Note 1 : This refers to the value of Thresh <sub>x, low</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell			

Table A.4.19: Cell re-selection UTRAN to E-UTRAN cell case (cell 2)

Parameter	Unit	Cell 2 (E-UTRA)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{\text{channel}}$	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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
Qrxlevmin	dBm		
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-84	-84
$\hat{E}_s / N_{oc}$	dB	14	14
$\hat{E}_s / I_{ot}$	dB	14	14
Treselection <sub>EUTRAN</sub>	s	0	
Snonintrasearch	dB	50	
Thresh <sub>x, high</sub>	dB	40	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell 2 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 <sub>x, high</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell			

### A.4.5.2.2 Test Requirements

The cell reselection 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 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 shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{\text{evaluateEUTRA}} + T_{\text{SI-EUTRA}}$ , where:

$T_{\text{evaluateEUTRA}}$  See Table 4.2 in section 4.2.2.

$T_{\text{SI-EUTRA}}$  Maximum time allowed to read system information from a E-UTRA cell [24]. According to [24], the maximum time allowed to read relevant system info blocks, that need to be received by the UE to camp on a cell, is 1280 ms.

This gives a total of 20.48 s, allow 21 s in the test case.

### A.4.5.3 RSRQ based reselection when E-UTRA FDD is of higher priority

#### A.4.5.3.1 Test Purpose and Environment

This test is to verify the requirement for the UTRA FDD to E-UTRA FDD inter-RAT cell reselection delay reported based on RSRQ measurement in section 4.2.

The test scenario comprises two different cells, with cell 1 being the UTRA serving cell, cell 2 being the E-UTRA cell to be re-selected to. Test parameters are given in Tables A.4.20, A.4.21, A.4.22. The test consists of four successive time periods, with time duration of T1, T2, T3 and T4, respectively. UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

Cell 1 and cell 2 shall belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

**Table A.4.20: General test parameters for UTRAN to E-UTRA Cell Reselection**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
T2 end condition	Active cell		Cell1	UE shall not perform reselection to cell 2 during T2
	Neighbour cell		Cell2	
T3 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
	Neighbour cell		Cell1	
T4 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 during T4
	Neighbour cell		Cell2	
DRX cycle length		s	1.28	
HCS				Not used
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA access barring information			Not sent	No additional delays in random access procedure
T1		s	>20	During T1, cell 2 shall be powered off, and during the off time its 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	85	T2 needs to be defined, in order to ensure UE do not conduct cell reselect to Cell2
T3		s	25	T3 needs to be defined so that cell re-selection reaction time is taken into account.
T4		s	25	T4 needs to be defined, in order to ensure UE conducting cell reselection to Cell 1 by end of the T4.

Table A.4.21: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 1)

Parameter	Unit	Cell 1 (UTRA)			
		T1	T2	T3	T4
UTRA RF Channel Number		Channel 1			
CPICH_Ec/Ior	dB	-10			
PCCPCH_Ec/Ior	dB	-12			
SCH_Ec/Ior	dB	-12			
PICH_Ec/Ior	dB	-15			
OCNS_Ec/Ior	dB	-0.941			
$\hat{I}_{or} / I_{oc}$	dB	13	13	13	13
$I_{oc}$	dBm/3,84 MHz	-70			
CPICH_Ec/Io	dB	-10.21	-10.21	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67	-67	-67
Qqualmin	dB	-20			
Qrxlevmin	dBm	-115			
UE_TXPWR_MAX_RACH	dBm	21			
Treselection	s	0			
S <sub>prioritysearch1</sub>	dB	42			
S <sub>prioritysearch2</sub>	dB	0			
S <sub>searchE-UTRA</sub>	dB	Not sent			
Thresh <sub>x, highQ</sub> (Note 1)	dB	5			
Propagation Condition		AWGN			
Note 1: This refers to the value of Thresh <sub>x, highQ</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell.					

Table A.4.22: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 2)

Parameter	Unit	Cell 2			
		T1	T2	T3	T4
E-UTRA RF Channel Number		2			
$BW_{channel}$	MHz	10			
OCNG Patterns defined in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD			
PBCH_RA	dB	0			
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
Qrxlevmin	dBm	-140			
Qqualmin	dB	-20			
$N_{oc}$	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-inf	-105.5	-84.91	-105.5
RSRQ	dB	-inf	-19	-11	-19
$\hat{E}_s / I_{ot}$	dB	-inf	-7.50	13.09	-7.50
$\hat{E}_s / N_{oc}$	dB	-inf	-7.50	13.09	-7.50
Treselection	S	0			
Snonintrasearch	dB	Not sent			
Thresh <sub>serv, lowQ</sub>		5			
Thresh <sub>x, lowQ</sub> (Note 2)		5			
Propagation Condition		AWGN			
Note 1: OCNG shall be used such that cell 2 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 <sub>x, lowQ</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.					

### A.4.5.3.2 Test Requirements

The UE shall not send preambles on the PRACH before the end of T2.

The cell re-selection delay is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2. The cell re-selection delay shall be less than 21 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{higher\_priority\_search} + T_{evaluateEUTRA} + T_{SI}$ , where:

$T_{higher\_priority\_search}$  See section 4.2.2, where, this value should be 0s, since the cell2 shall be already identified at the beginning of T3

$T_{evaluateEUTRA}$  See Table 4.2 in section 4.2.2.5a

$T_{SI}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s in the test case.

## A.4.5.4 E-UTRA FDD is of higher priority (Increased UE carrier monitoring)

### A.4.5.4.1 Test Purpose and Environment

This test is to verify the requirement for the UTRA FDD to E-UTRA FDD inter-RAT cell reselection delay for the increased UE carrier monitoring case reported in section 4.2.

The test scenario comprises four different cells, with cell 1 being the UTRA serving cell and cell 2, cell 3 and cell 4 being the E-UTRA FDD cells to be re-selected to. The UE is requested to monitor E-UTRA FDD neighbouring cells on 8 carriers. Test parameters are given in Tables A.4.23, A.4.24, A.4.25, A.4.26, A.4.27. The test consists of seven successive time periods, with time duration of T0, T1, T2, T3, T4, T5 and T6 respectively respectively. All cells are identified by the UE during T0. Cell 2, cell 3 and cell 4 are of higher priority than cell 1. Cells 2, 3 and 4 are chosen randomly, such that one frequency belongs to the E-UTRA FDD normal performance group and two frequencies belong to the E-UTRA FDD reduced performance group. The neighbour lists of cells 2, 3 and 4 shall include the frequency of cell 1 (in the UTRA FDD normal performance group) as well as the other frequencies configured to the UE in the test.

Cell 1 and cells 2, 3 and 4 shall all belong to different location areas. Furthermore, UE has not registered with network for the location area containing cells 2, 3 and 4.

**Table A.4.23: General test parameters for UTRAN to E-UTRA Cell Reselection (Increased UE carrier monitoring)**

Parameter	Unit	Value	Comment
T0	Active Cell	Cell 1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2,3,4 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings
T1 start condition	Active Cell	Cell 1	
T1 end condition	Active Cell	Cell 2	UE shall perform reselection to cell 2 during T1
	Neighbour cell	Cell 1,3,4	
T2 end condition	Active Cell	Cell 1	UE shall be forced to back to cell 1 in T2 so that reselection from cell 1 to cell 3 occurs during the first T3 phase
T3 end condition	Active Cell	Cell 3	UE shall perform reselection to cell 3 during T3
	Neighbour cell	Cell 1,2,4	
T4 end condition	Active Cell	Cell 1	UE shall be forced to back to cell 1 in T4 so that reselection from cell 1 to cell 4 occurs during the first T5 phase
T5 end condition	Active Cell	Cell 4	UE shall perform reselection to cell 4 during T5
	Neighbour cell	Cell 1,2,3	
T6 end condition	Active Cell	Cell 1	UE shall be forced to back to cell 1 in T6 so that next repetition of test can start from T1
UE configured UTRA and E-UTRA FDD RF Channel Number		1, 2,3,4,5,6,7,8,9	Serving UTRA cell and eight E-UTRA FDD carrier frequencies are used in the UE neighbour cell list. Frequencies 6,7,8 and 9 are indicated to have reduced performance
Test equipment configuration		Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from E-UTRA FDD frequencies 2,3,4,5,6,7,8 and 9	
HCS			Not used
DRX cycle length	s	1.28	The value shall be used for all cells in the test.
E-UTRA PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA access barring information		Not sent	No additional delays in random access procedure
Init	s	180	Initialisation time need to be defined so that cell detection time is taken into account.
T0	s	Test equipment frequency selection and configuration time) + 180	T0 is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.
T1	s	80	T1 need to be defined so that cell re-selection reaction time is taken into account.
T3	s	470	T3 need to be defined so that cell re-selection reaction time is taken into account.
T5	s	470	T5 need to be defined so that cell re-selection reaction time is taken into account.

**Table A.4.24: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 1) (Increased UE carrier monitoring)**

Parameter	Unit	Cell 1 (UTRA)						
		T0	T1	T2	T3	T4	T5	T6
UTRA RF Channel Number		Channel 1						
CPICH_Ec/Ior	dB	-10						
PCCPCH_Ec/Ior	dB	-12						
SCH_Ec/Ior	dB	-12						
PICH_Ec/Ior	dB	-15						
OCNS_Ec/Ior	dB	-0.941						
$\hat{I}_{or}/I_{oc}$	dB	13	13	13	13	13	13	13
$I_{oc}$	dBm/3,84 MHz	-70						
CPICH_Ec/Io	dB	-10.21	-10.21	-10.21	-10.21	-10.21	-10.21	-10.21
CPICH_RSCP	dBm	-79	-79	-79	-79	-79	-79	-79
Qqualmin	dB	-20						
Qrxlevmin	dBm	-115						
UE_TXPWR_MAX_RACH	dBm	21						
Treselection	s	0						
S <sub>prioritysearch1</sub>	dB	42						
S <sub>prioritysearch2</sub>	dB	0						
S <sub>searchE-UTRA</sub>	dB	Not sent						
Thresh <sub>x, high</sub> (Note 1)	dB	48						
Propagation Condition		AWGN						
Note 1: This refers to the value of Thresh <sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell.								



**Table A.4.25: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 2) (Increased UE carrier monitoring)**

Parameter	Unit	Cell 2 (E-UTRA)						
		T0	T1	T2	T3	T4	T5	T6
E-UTRA RF Channel number		Randomly selected from channels 2,3,4,5 such that cell 2 is in the E-UTRA FDD normal performance group						
$BW_{\text{channel}}$	MHz	10						
OCNG Patterns defined in TS 36.133 A.3.2.1.2 (OP.2 FDD) [24]		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 <sup>Note 1</sup>	dB							
OCNG_RB <sup>Note 1</sup>	dB							
Qrxlevmin	dBm	-140						
$N_{oc}$	dBm/15 kHz	-98						
RSRP	dBm/15 KHz	-infinity	-86	-102	-102	-102	-102	-102
$\hat{E}_s / N_{oc}$	dB	-infinity	12	-4	-4	-4	-4	-4
$\hat{E}_s / I_{ot}$	dB	-infinity	12	-4	-4	-4	-4	-4
Treselection <sub>EUTRAN</sub>	s	0						
Snonintrasearch	dB	Not sent						
Thresh <sub>serv, low</sub>	dB	44						
Thresh <sub>x, low</sub> (Note 2)	dB	42						
Propagation Condition		AWGN						
Note 1:	OCNG shall be used such that cell 2 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 <sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.							

**Table A.4.26: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 3) (Increased UE carrier monitoring)**

Parameter	Unit	Cell 3 (E-UTRA)							
		T0	T1	T2	T3	T4	T5	T6	
E-UTRA RF Channel number		Randomly selected from channels 6,7,8,9 such that cell 3 is in the E-UTRA FDD reduced performance group							
$BW_{channel}$	MHz	10							
OCNG Patterns defined in TS 36.133 A.3.2.1.2 (OP.2 FDD) [24]		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 <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
Qrxlevmin	dBm								
$N_{oc}$	dBm/15 kHz	-98							
RSRP	dBm/15 KHz	-infinity	-102	-102	-86	-102	-102	-102	
$\hat{E}_s / N_{oc}$	dB	-infinity	-4	-4	12	-4	-4	-4	
$\hat{E}_s / I_{ot}$	dB	-infinity	-4	-4	12	-4	-4	-4	
Treselection <sub>EUTRAN</sub>	s	0							
Snonintrasearch	dB	Not sent							
Thresh <sub>serv, low</sub>	dB	44							
Thresh <sub>x, low</sub> (Note 2)	dB	42							
Propagation Condition		AWGN							
Note 1:	OCNG shall be used such that cell 3 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 <sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.								

**Table A.4.27: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 4) (Increased UE carrier monitoring)**

Parameter	Unit	Cell 4 (E-UTRA)							
		T0	T1	T2	T3	T4	T5	T6	
E-UTRA RF Channel number		Randomly selected from channels 6,7,8,9 such that cell 4 is in the E-UTRA FDD reduced performance group							
$BW_{\text{channel}}$	MHz	10							
OCNG Patterns defined in TS 36.133 A.3.2.1.2 (OP.2 FDD) [24]		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 <sup>Note 1</sup>	dB								
OCNG_RB <sup>Note 1</sup>	dB								
Qrxlevmin	dBm								
$N_{oc}$	dBm/15 kHz	-98							
RSRP	dBm/15 KHz	-infinity	-102	-102	-102	-102	-86	-102	
$\hat{E}_s/N_{oc}$	dB	-infinity	-4	-4	-4	-4	12	-4	
$\hat{E}_s/I_{ot}$	dB	-infinity	-4	-4	-4	-4	12	-4	
Treselection <sub>EUTRAN</sub>	s	0							
Snonintrasearch	dB	Not sent							
Thresh <sub>serv, low</sub>	dB	44							
Thresh <sub>x, low</sub> (Note 2)	dB	42							
Propagation Condition		AWGN							
Note 1: OCNG shall be used such that cell 4 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 <sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.									

#### A.4.5.4.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of the relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on the target cell.

Time phase	Target cell	Requirement for reselection delay (seconds)
T0	Cell 1	
T1	Cell 2 (E-UTRA FDD normal performance group)	78.1
T2	Cell 1	21
T3	Cell 3 (E-UTRA FDD reduced performance group)	462.1
T4	Cell 1	21
T5	Cell 4 (E-UTRA FDD reduced performance group)	462.1

The rate of correct cell reselections observed during repeated tests shall be at least 90%, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved. At least 90% of reselections to the reduced performance group shall be within the required time and at least 90% of reselections to the normal performance group shall be within the required time, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved.

NOTE: The cell re-selection delay can be expressed as:

$$K_{\text{norm, EUTRA}} * T_{\text{evaluateEUTRA}} + T_{\text{SI}}, \text{ for E-UTRA FDD normal performance group} = 4 * 19.2 + 1.28 = 76.8 + 1.28 = 78.08\text{s}$$

$$K_{\text{reduced, EUTRA}} * 6 * T_{\text{evaluateEUTRA}} + T_{\text{SI}}, \text{ for E-UTRA FDD reduced performance group} = 4 * 6 * 19.2 + 1.28 = 460.8 + 1.28 = 462.08\text{s}$$

where:

$K_{\text{norm, EUTRA}}$  See section 4.2.2

$K_{\text{reduced, EUTRA}}$  See section 4.2.2

$T_{\text{higher\_priority\_search}}$  See section 4.2.2

$T_{\text{evaluateEUTRA}}$  See Table 4.2 in section 4.2.2.5a

$T_{\text{SI}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of:

78.08 s when  $K_{\text{norm, EUTRA}}=4$  for reselections to E-UTRA FDD normal performance group, allow 78.1s in the test case.

462.08 s when  $K_{\text{reduced, EUTRA}}=4$  for reselections to E-UTRA FDD reduced performance group, allow 462.1s in the test case.

## A.4.5A UTRAN to E-UTRA TDD Cell Reselection with Increased Carrier Monitoring

### A.4.5A.1 Test Purpose and Environment

This test is to verify the requirement for the UTRA FDD to E-UTRA TDD inter-RAT cell reselection delay for increased carrier monitoring case reported in section 4.2. 3 cells on 3 different carriers are configured on test equipment with Cell 1 being the serving cell and Cells 2 and 3 being the neighbour EUTRA cells such that Cell 2 belongs to the normal performance group and Cell 3 belongs to the reduced performance group. The UE is requested to monitor neighbouring cells on 8 carriers. E-UTRA cells are of higher priority than UTRA.

The test scenario comprises three different cells, with cell 1 being the UTRA serving cell and cell 2 and 3 being the E-UTRA cells to be re-selected to. Test parameters are given in Tables A.4.14A, A.4.15A, A.4.16A, A.4.17A,. The test consists of five successive time periods, with time durations T0, T1, T2, T3 and T4, respectively.

Cell 1, Cell 2, Cell 3 shall belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2 and Cell 3.

**Table A.4.14A: General test parameters for UTRAN to E-UTRA Cell Reselection**

Parameter	Unit	Value	Comment
T0	Active cell	Cell1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2, 3 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell	Cell 1	
T1 end condition	Active cell	Cell2	UE shall perform reselection to cell 2 during T1
	Neighbour cell	Cell1	
T2 end condition	Active cell	Cell1	UE shall perform reselection to cell 1 during T2

T3 end condition	Active cell		Cell3	UE shall perform reselection to cell 3 during T3
	Neighbour cell		Cell1	
T4 end condition	Active cell		Cell1	UE shall perform reselection to cell 1 in T4 so that next repetition of test can start from T0
UE configured EUTRA RF Channel Number			1, 2, 3, 4, 5, 6, 7, 8	Serving cell and eight E-UTRA FDD interfrequency carrier frequencies are used in the UE neighbour cell list. Frequencies 5, 6,7,8 are indicated to have reduced performance.
Test equipment configuration			Cell 1, 2, 3	Cell 1 uses UTRA RF channel number 1 Cell 2 is randomly selected to use different frequencies selected from EUTRA RF channel numbers 1, 2, 3, 4 such that cell 2 is in the normal performance group. Cell 3 is randomly selected to use different frequencies selected from EUTRA RF channel numbers 5, 6, 7, 8 such that cell 3 is in the reduced performance group.
DRX cycle length		s	1.28	
HCS				Not used
E-UTRA PRACH configuration			53	As specified in table 5.7.1-2 in TS 36.211
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
T0		s	(Test equipment frequency selection and configuration time) + 960	T0 is defined so that the Test equipment selects frequencies and configures the cells, then the UE cell detection time is taken into account.
T1		s	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
T3		s	510	T3 need to be defined so that cell re-selection reaction time is taken into account.
T4		s	25	T4 need to be defined so that cell re-selection reaction time is taken into account

Table A.4.15A: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 1)

Parameter	Unit	Cell 1 (UTRA)				
		T0	T1	T2	T3	T4
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				
OCNS_Ec/Ior	dB	-0.941				
$I_{oc}$	dBm/3.84 MHz	-70				
$\hat{I}_{or}/I_{oc}$	dB	13	13	13	13	13
CPICH_Ec/Io	dB	-10.21	-10.21	-10.21	-10.21	-10.21
CPICH_RSCP	dBm	-79				
Qqualmin	dB	-20				
Qrxlevmin	dBm	-115				
UE_TXPWR_MAX_RACH	dBm	21				
Treselection	s	0				
Sprioritysearch1	dB	42				
Sprioritysearch2	dB	0				
SsearchE-UTRA	dB	Not sent				
Thresh <sub>x, high</sub> (Note 1)	dB	48				
Propagation Condition		AWGN				
Note 1: This refers to the value of Thresh <sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell.						

Note 2: CPICH\_Ec/Io and CPICH\_RSCP have been derived from other parameters for information purposes. They are not settable parameters themselves.

**Table A.4.16A: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 2)**

Parameter	Unit	Cell 2				
		T0	T1	T2	T3	T4
E-UTRA RF Channel number		Randomly selected from 1, 2, 3, 4 such that cell 2 is in the normal performance group				
BW <sub>channel</sub>	MHz	5MHz: N <sub>RB</sub> = 25 10MHz: N <sub>RB</sub> = 50				
OCNG Patterns defined in TS 36.133 A.3.2.1.2 and A.3.2.1.16		5MHz: OP.16 FDD 10MHz: OP.2 FDD				
PBCH_RA	dB	0				
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}$ <sup>Note 2</sup>	dBm/15kHz					
$\hat{E}_s / N_{oc}$	dB	-4	12	-4	-4	-4
$\hat{E}_s / I_{ot}$ <sup>Note 3</sup>	dB	-4	12	-4	-4	-4
RSRP <sup>Note 3</sup>	dBm/15kHz	-102	-86	-102	-102	-102
Q <sub>rxlevmin</sub>	dBm/15kHz	-140				
S <sub>nonintrasearch</sub>	dB	Not sent				
Thresh <sub>servin, low</sub>	dB	44				
Thresh <sub>x, low</sub> <sup>Note 4</sup>	dB	42				
Propagation Condition		AWGN				
Antenna Configuration		1x2				
<p>Note 1: OCNG shall be used such that Cell 2 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.</p> <p>Note 3: E<sub>s</sub>/I<sub>ot</sub> and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: This refers to the value of Thresh<sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell.</p>						

**Table A.4.17A: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 3)**

Parameter	Unit	Cell 3				
		T0	T1	T2	T3	T4
E-UTRA RF Channel number		Randomly selected from 5, 6, 7, 8 such that cell 3 is in the reduced performance group				
BW <sub>channel</sub>	MHz	5MHz: N <sub>RB</sub> = 25 10MHz: N <sub>RB</sub> = 50				
OCNG Patterns defined in TS 36.133 A.3.2.1.2 and A.3.2.1.16		5MHz: OP.16 FDD 10MHz: OP.2 FDD				
PBCH_RA	dB	0				

PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB					
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA <sup>Note 1</sup>	dB					
OCNG_RB <sup>Note 1</sup>	dB					
$N_{oc}$ <sup>Note 2</sup>	dBm/15kHz	-98				
$\hat{E}_s/N_{oc}$	dB	-4	-4	-4	12	-4
$\hat{E}_s/I_{ot}$ <sup>Note 3</sup>	dB	-4	-4	-4	12	-4
RSRP <sup>Note 3</sup>	dBm/15kHz	-102	-102	-102	-86	-102
$Q_{rxlevmin}$	dBm/15kHz	-140				
$S_{noninrasearch}$	dB	Not sent				
Thresh <sub>servng, low</sub>	dB	44				
Thresh <sub>x, low</sub> <sup>Note 4</sup>	dB	42				
Propagation Condition		AWGN				
Antenna Configuration		1x2				
Note 1: OCNG shall be used such that Cell 3 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.						
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for to be fulfilled.						
Note 3: $E_s/I_{ot}$ and RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.						
Note 4: This refers to the value of Thresh <sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell.						

#### A.4.5A.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on the target Cell.

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	78.08
T3	Cell 3 (reduced performance group)	462.08

The rate of correct cell reselections observed during repeated tests shall be at least 90% with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved. At least 90% of reselections to the reduced performance group shall be within the required time, and at least 90% of reselections to the normal performance group shall be within the required time, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved.

NOTE: The cell re-selection delay can be expressed as:  $K_{norm, EUTRA} * T_{evaluateEUTRA} + T_{SI}$  for normal performance group and  $K_{reduced, EUTRA} * T_{evaluateE-UTRA} + T_{SI}$  for reduced performance group where:

$T_{evaluateEUTRA}$  See Table 4.2 in section 4.2.2.5a

$K_{norm, EUTRA}$  Number of E-UTRA carriers in the normal performance group

$K_{reduced, EUTRA}$  Number of E-UTRA carriers in the reduced performance group

$T_{SI}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of

78.08s when  $K_{norm, EUTRA} = 4$  for reselections to normal performance group, allow 78.1s in the test case.

462.08s when  $K_{reduced, EUTRA} = 4$  for reselections to reduced performance group, allow 462.1s in the test case.

## A.5 UTRAN Connected Mode Mobility

### A.5.1 FDD/FDD Soft Handover

#### A.5.1.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the soft handover delay in CELL\_DCH state specified in section 5.1.2.

The test parameters are given in Table A.5A and A.5B below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A shall be used, and that CPICH Ec/Io and SFN-CFN observed time difference shall be reported together with Event 1A. The test consists of six successive time periods, with a time duration of T1, T2, T3, T4, T5 and T6 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

**Table A.5A: General test parameters for Soft handover**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Initial conditions	Active cell	Cell 1	
	Neighbouring cell	Cell 2	
Final condition	Active cell	Cell 2	
Reporting range	dB	3	Applicable for event 1A and 1B
Hysteresis	dB	0	
W		1	Applicable for event 1A and 1B
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	0	
Filter coefficient		0	
T1	s	5	
T2	s	3	
T3	s	0.5	
T4	ms	60	This is the requirement on active set update delay, see section 5.1.2.2, where KC=1 and OC=0.
T5	ms	20	
T6	s	2	



Table A.5B: Cell specific test parameters for Soft handover

Parameter	Unit	Cell 1						Cell 2					
		T1	T2	T3	T4	T5	T6	T1	T2	T3	T4	T5	T6
CPICH_Ec/Ior	dB	-10						-10					
PCCPCH_Ec/Ior	dB	-12						-12					
SCH_Ec/Ior	dB	-12						-12					
PICH_Ec/Ior	dB	-15						-15					
DPCH_Ec/Ior	dB	Note1	Note1	Note1		N/A	N/A	N/A	N/A	Note3	Note1	Note1	
OCNS		Note2	Note2	Note2		-0.94	-0.94	-0.94	-0.94	Note2	Note2	Note2	
$\hat{I}_{or}/I_{oc}$	dB	0	2.91	2.91		2.91	2.91	-Inf	2.91	2.91	2.91	2.91	
$I_{oc}$	dBm/ 3,84 MHz	-70											
CPICH_Ec/Io	dB	-13	-14	-14		-14	-14	-Inf	-14	-14	-14	-14	
Propagation Condition		AWGN											
Relative delay of paths received from cell 2 with respect to cell 1	chips	{-148 ... 148} Note 4											
NOTE 1: The DPCH level is controlled by the power control loop													
NOTE 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$													
NOTE 3: The DPCH level is controlled by the power control loop. The initial power shall be set equal to the DPCH_Ec/Ior of Cell 1 at the end of T2.													
NOTE 4: The relative delay of the path from cell 2 with respect to cell 1 shall always be within $\pm 148$ chip.													

### A.5.1.1.1 Test procedure

- 1) The test is started at the beginning of T1.
- 2) During time period T2 an Event 1A triggered measurement report shall be sent by the UE containing the CFN-SFN observed time difference between cell 1 and cell 2.
- 3) At the beginning of T3 the downlink DPCH of cell 2 shall be activated.
- 4) UTRAN shall send a Active Set Update command with activation time now adding cell 2 to the active set. The Active Set Update message shall be sent to the UE so that the whole message is available at the UE at the beginning of T4.
- 5) At the beginning of T5 the DPCH from cell 1 shall be switched off.

### A.5.1.2 Test Requirements

The measured quality on the DTCH of the UE downlink during T6 shall be  $BLER=0.01\pm 30\%$ .

## A.5.2 FDD/FDD Hard Handover

### A.5.2.1 Handover to intra-frequency cell

#### A.5.2.1.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the hard handover delay in CELL\_DCH state in the single carrier case reported in section 5.2.2.1.

The test parameters are given in Table A.5.0 and A.5.0A below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A and 1B shall be used, and that CPICH Ec/Io and SFN-CFN observed timed difference shall be reported together with Event 1A. The test consists of three successive time periods,

with a time duration of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

UTRAN shall send a Physical Channel reconfiguration with activation time "now" with a new active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE during period T2, after the UE has reported event 1A. T3 is defined as the end of the last TTI containing the physical channel reconfiguration message.

**Table A.5.0: General test parameters for Handover to intra-frequency cell**

Parameter	Unit	Value	Comment
DCH parameters		DL and UL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1 and A.2.1
Power Control		On	
Target quality value on DTCH	BLER	0.001	
Initial conditions	Active cell	Cell 1	
	Neighbouring cell	Cell 2	
Final condition	Active cell	Cell 2	
Reporting range	dB	3	Applicable for event 1A and 1B
Hysteresis	dB	0	
W		1	Applicable for event 1A and 1B
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	0	
Filter coefficient		0	
T1	s	5	
T2	s	≤5	
T3	s	1	

**Table A.5.0A: Cell specific test parameters for Handover to intra-frequency cell**

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
CPICH_Ec/lor	dB	-10			-10		
PCCPCH_Ec/lor	dB	-12			-12		
SCH_Ec/lor	dB	-12			-12		
PICH_Ec/lor	dB	-15			-15		
DPCH_Ec/lor	dB	Note1	Note1	Note3	N/A	N/A	Note1
OCNS		Note2	Note2	Note2	-0.941	-0.941	Note2
$\hat{I}_{or}/I_{oc}$	dB	0	6.97		-Infinity	5.97	
$I_{oc}$	dBm/ 3,84 MHz	-70					
CPICH_Ec/lo	dB	-13			-Infinity	-14	
Propagation Condition		AWGN					
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ . Note 3: The DPCH may not be power controlled by the power control loop.							

### A.5.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCCCH to Cell 2 less than 190 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

## A.5.2.2 Handover to inter-frequency cell

### A.5.2.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the inter frequency hard handover delay in CELL\_DCH state as specified in section 5.2.2.1.

The test consists of three successive time periods, with a time duration T1, T2 and T3. The test parameters are given in tables A.5.0B and A.5.0C below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used. The CPICH Ec/I0 of the best cell on the unused frequency shall be reported together with Event 2C reporting. At the start of time duration T1, the UE may not have any timing information of cell 2.

UTRAN shall send a Physical Channel reconfiguration with activation time "now" with one active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE during period T2, after the UE has reported event 2C T3 is defined as the end of the last TTI containing the physical channel reconfiguration message.

**Table A.5.0B: General test parameters for Handover to inter-frequency cell**

Parameter		Unit	Value	Comment
DCH parameters			DL and UL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1 and A.2.1
Power Control			On	
Target quality value on DTCH		BLER	0.001	
Compressed mode			A.22 set 1	As specified in TS 25.101 section A.5.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Threshold non used frequency		dB	-18	Absolute Ec/I0 threshold for event 2C
Hysteresis		dB	0	
W non-used frequency			1	Applicable for event 2C
Time to Trigger		ms	0	
Filter coefficient			0	
T1		s	5	
T2		s	≤5	
T3		s	1	

**Table A.5.0C: Cell Specific parameters for Handover to inter-frequency cell**

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1			Channel 2		
CPICH_Ec/I <sub>or</sub>	dB	-10			-10		
PCCPCH_Ec/I <sub>or</sub>	dB	-12			-12		
SCH_Ec/I <sub>or</sub>	dB	-12			-12		
PICH_Ec/I <sub>or</sub>	dB	-15			-15		
DPCH_Ec/I <sub>or</sub>	dB	Note 1	Note 1	Note3	N/A	N/A	Note 1
OCNS		Note 2			-0.941	-0.941	Note 2
$\hat{I}_{or}/I_{oc}$	dB	0			-Infinity	-1.8	-1.8
$I_{oc}$	dBm/3,84 MHz	-70					
CPICH_Ec/I <sub>o</sub>	dB	-13			-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 <sub>or</sub> .							
NOTE 3: The DPCH may not be power controlled by the power control loop.							

#### A.5.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than 220 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

## A.5.3 (void)

**Table A.5.0CA: (void)**

**Table A.5.0CB: (void)**

**Table A.5.0CC: (void)**

**Table A.5.0CD: (void)**

**Table A.5.0CE: (void)**

**Table A.5.0CF: (void)**

## A.5.4 Inter-system Handover from UTRAN FDD to GSM

### A.5.4.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to GSM cell handover delay reported in section 5.4.2.1.

The test parameters are given in Table A.5.0D, A.5.0E and A.5.0F below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 3C shall be used.. The test consists of three successive time periods, with a time duration of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

The UTRAN shall send a Handover from UTRAN command with activation time "now" with a new active cell, cell 2. In the GSM Handover command contained in that message, the IE starting time shall not be included. The RRC HANDOVER FROM UTRAN COMMAND message shall be sent to the UE. The start of T3 is defined as the end of last TTI containing the HO command.

The requirements are also applicable for a UE not requiring compressed mode, in which case no compressed mode pattern should be sent for the parameters specified in table A5.0D

**Table A.5.0D: General test parameters for Correct reporting of GSM neighbours in AWGN propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.001	
Compressed mode patterns - GSM carrier RSSI measurement  - GSM Initial BSIC identification  - GSM BSIC re-confirmation		DL Compressed mode reference pattern 2 in Set 2  Pattern 2  Pattern 2	Only applicable for UE requiring compressed mode patterns  As specified in table A.22 TS 25.101 section A.5  As specified in section 8.1.2.5.2.1 table 8.7.  As specified in section 8.1.2.5.2.2 table 8.8.
Active cell		Cell 1	
Inter-RAT measurement quantity		GSM Carrier RSSI	
BSIC verification required		Required	
Threshold other system	dBm	-80	Absolute GSM carrier RSSI threshold for event 3B and 3C.
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		24 FDD neighbours on Channel 1 6 GSM neighbours including ARFCN 1	Measurement control information is sent before the compressed mode patterns starts.
N Identify abort		66	Taken from table 8.7.
T Reconfirm abort		5.5	Based on table 8.8 and requirement specified in section 10.3.6.33 of TS 25.331.
T1	s	20	
T2	s	5	
T3	s	1	

**Table A.5.0E: Cell Specific Parameters for Handover UTRAN to GSM cell case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)
		T1, T2, T3
CPICH_Ec/lor	dB	-10
PCCPCH_Ec/lor	dB	-12
SCH_Ec/lor	dB	-12
PICH_Ec/lor	dB	-15
DCH_Ec/lor	dB	Note 1
OCNS_Ec/lor	dB	Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
$I_{oc}$	dBm/3,84 MHz	-70
CPICH_Ec/lo	dB	-13
Propagation Condition		AWGN
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .		

**Table A.5.0F: Cell Specific Parameters for Handover UTRAN to GSM cell case (cell 2)**

Parameter	Unit	Cell 2 (GSM)	
		T1	T2, T3
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-85	-75

### A.5.4.2 Test Requirements

The UE shall begin to send access bursts on the new DCCH of the target cell less than 100 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The test requirement in this test case is expressed as:

$$T_{\text{Handover delay}} = 90 \text{ ms (Table 5.2)} + T_{\text{offset}} + T_{\text{UL}}$$

$T_{\text{offset}}$ : Equal to 4.65 ms, GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

$T_{\text{UL}}$ : Equal to 4.65 ms, the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 99.3 ms, allow 100 ms in the test case.

## A.5.4a Inter-system Handover from UTRAN FDD to E-UTRAN FDD

### A.5.4a.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN FDD to E-UTRAN FDD handover requirements specified in section 5.4a.

The test parameters are given in Table A.5.0G, A.5.0H and A.5.0I below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 3A shall be used. 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.

The UTRAN shall send a Handover from UTRAN command with activation time "now" with a new active cell, cell 2. In the E-UTRAN Handover command contained in that message, the IE starting time shall not be included. The RRC HANDOVER FROM UTRAN COMMAND message shall be sent to the UE. The start of T3 is defined as the end of last TTI containing the HO command.

The requirements are also applicable for a UE not requiring compressed mode, in which case no compressed mode pattern should be sent for the parameters specified in table A.5.0G.

**Table A.5.0G: General test parameters for UTRAN FDD to E-UTRAN FDD handover test case**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.001	
Compressed mode		DL Compressed mode reference pattern 2 in Set 5	Only applicable for UE requiring compressed mode patterns  As specified in table A.22 TS 25.101 section A.5
Active cell		Cell 1	
UTRAN FDD measurement quantity		CPICH Ec/N0	
Inter-RAT (E- UTRAN) measurement quantity		RSRP	
Threshold own system	dB	-10	Absolute UTRAN CPICH Ec/N0 threshold for event 3A
Threshold other system	dBm	-99	Absolute E-UTRAN RSRP threshold for event 3A
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored UTRA FDD cell list size		24 UTRA FDD neighbours on Channel 1	Measurement control information is sent before the compressed mode patterns starts.
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in TS 36.133 section A.3.1.1.1
PCFICH/PDCCH/PHI CH parameters		DL Reference Measurement Channel R.6 FDD	As specified in TS 36.133 section A.3.1.2.1
PRACH configuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211
Access Barring Information	-	Not sent	No additional delays in random access procedure
T1	s	5	
T2	s	≤7	
T3	s	1	

**Table A.5.0H: Cell specific test parameters for UTRAN FDD to E-UTRAN FDD handover test case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)
		T1, T2, T3
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
DCH_Ec/Ior	dB	Note 1
OCNS_Ec/Ior	dB	Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
$I_{oc}$	dBm/3,84 MHz	-70
CPICH_Ec/Io	dB	-13
Propagation Condition		AWGN
Note 1: The DPCH level is controlled by the power control loop		
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .		

**Table A.5.0I: Cell specific test parameters for UTRAN FDD to E-UTRAN FDD handover test case (cell 2)**

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
BW <sub>channel</sub>	MHz	10		
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD	OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			



$\hat{E}_s / I_{ot}$	dB	-infinity	7	7
$N_{oc}$ Note 2	dBm/15 kHz	-98		
$\hat{E}_s / N_{oc}$ Note 3	dB	-infinity	7	7
RSRP Note 3	dBm/15 KHz	-infinity	-91	-91
$I_o$ Note 3	dBm/9 MHz	-70.22	-62.43	-62.43
Propagation Condition		AWGN		
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p>				

### A.5.4a.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 85 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

## A.5.4b Inter-system Handover from UTRAN FDD to E-UTRAN TDD

### A.5.4b.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN FDD to E-UTRAN TDD handover requirements specified in section 5.4b.

The test parameters are given in Table A.5.0J, A.5.0K and A.5.0L below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 3A shall be used. 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.

The UTRAN shall send a Handover from UTRAN command with activation time "now" with a new active cell, cell 2. In the E-UTRAN Handover command contained in that message, the IE starting time shall not be included. The RRC HANDOVER FROM UTRAN COMMAND message shall be sent to the UE. The start of T3 is defined as the end of last TTI containing the HO command.

The requirements are also applicable for a UE not requiring compressed mode, in which case no compressed mode pattern should be sent for the parameters specified in table A.5.0J.

**Table A.5.0J: General test parameters for UTRAN FDD to E-UTRAN TDD handover test case**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.001	
Compressed mode		DL Compressed mode reference pattern 2 in Set 5	Only applicable for UE requiring compressed mode patterns  As specified in table A.22 TS 25.101 section A.5
Active cell		Cell 1	
UTRAN FDD measurement quantity		CPICH Ec/N0	
Inter-RAT (E- UTRAN) measurement quantity		RSRP	
Threshold own system	dB	-10	Absolute UTRAN CPICH Ec/N0 threshold for event 3A
Threshold other system	dBm	-99	Absolute E-UTRAN RSRP threshold for event 3A
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored UTRA FDD cell list size		24 UTRA FDD neighbours on Channel 1	Measurement control information is sent before the compressed mode patterns starts.
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.3.1.1.2
PCFICH/PDCCH/PHI CH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.3.1.2.2
PRACH configuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211
Access Barring Information	-	Not sent	No additional delays in random access procedure
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		53	As specified in table 5.7.1-3 in 3GPP TS 36.211
T1	s	5	
T2	s	≤7	
T3	s	1	

**Table A.5.0K: Cell specific test parameters for UTRAN FDD to E-UTRAN TDD handover test case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)
		T1, T2, T3
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
DCH_Ec/Ior	dB	Note 1
OCNS_Ec/Ior	dB	Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
$I_{oc}$	dBm/3,84 MHz	-70
CPICH_Ec/Io	dB	-13
Propagation Condition		AWGN
Note 1: The DPCH level is controlled by the power control loop		
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .		

**Table A.5.0L: Cell specific test parameters for UTRAN FDD to E-UTRAN TDD handover test case (cell 2)**

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel number		1		
BW <sub>channel</sub>	MHz	10		
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	OP.2 TDD	OP.1 TDD
PBCH_RA	dB	0		
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$\hat{E}_s/I_{ot}$	dB	-infinity	7	7
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz	-98		
$\hat{E}_s/N_{oc}$ <sup>Note 3</sup>	dB	-infinity	7	7
RSRP <sup>Note 3</sup>	dBm/15 KHz	-infinity	-91	-91
$I_o$ <sup>Note 3</sup>	dBm/9 MHz	-70.22	-62.43	-62.43
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 and $I_o$ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				

### A.5.4b.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 80 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

## A.5.4c Inter-system Handover from UTRAN FDD to E-UTRAN FDD; Unknown Target Cell

### A.5.4c.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN FDD to E-UTRAN FDD handover requirements for the case when the target E-UTRAN FDD cell is unknown as specified in section 5.4a.

The test parameters are given in Table A.5.0M, A.5.0N and A.5.0O below. 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. No compressed mode patterns are configured in the test case.

The UTRAN shall send a Handover from UTRAN command with activation time "now" with a new active cell, cell 2. In the E-UTRAN Handover command contained in that message, the IE starting time shall not be included. The RRC HANDOVER FROM UTRAN COMMAND message shall be sent to the UE towards the end of the time period T1. The start of T2 is defined as the end of last TTI containing the handover command.

**Table A.5.0M: General test parameters for UTRAN FDD to E-UTRAN FDD handover test case; unknown target E-UTRAN FDD cell**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.001	
Initial condition	Active cell	Cell 1	UTRAN FDD
	Neighbouring cell	Cell 2	E-UTRAN FDD
Final condition	Active cell	Cell 2	E-UTRAN FDD
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in TS 36.133 section A.3.1.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in TS 36.133 section A.3.1.2.1
PRACH configuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211
Access Barring Information	-	Not sent	No additional delays in random access procedure
T1	s	≤5	
T2	s	1	

**Table A.5.0N: Cell specific test parameters for cell # 1 in UTRAN FDD to E-UTRAN FDD handover test**

Parameter	Unit	Cell 1 (UTRA FDD)	
		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	0	
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-13	
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop			
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .			

**Table A.5.0O: Cell specific test parameters for cell # 2 in UTRAN FDD to E-UTRAN FDD handover test case**

Parameter	Unit	Cell 1 (E-UTRA FDD)	
		T1	T2
E-UTRA RF Channel number		1	
$BW_{channel}$	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (OP.1 FDD) and in A.3.2.1.2 (OP.2 FDD)		OP.2 FDD	OP.1 FDD
PBCH_RA	dB	0	
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\hat{E}_s/I_{ot}$	dB		
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	-infinity	0
RSRP <sup>Note 3</sup>	dBm/15 KHz	-infinity	-98
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.			
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.			
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

### A.5.4c.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 165 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay is expressed as: RRC procedure delay +  $T_{\text{interrupt}}$ , where:

$T_{\text{interrupt}}$  also includes time to detect E-UTRAN FDD cell; see section 5.4a.2.2.

## A.5.4d Inter-system Handover from UTRAN FDD to E-UTRAN TDD; Unknown Target Cell

### A.5.4d.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN FDD to E-UTRAN TDD handover requirements for the case when the target E-UTRAN FDD cell is unknown as specified in section 5.4b.

The test parameters are given in Table A.5.0P, A.5.0Q and A.5.0R below. 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. No compressed mode patterns are configured in the test case.

The UTRAN shall send a Handover from UTRAN command with activation time "now" with a new active cell, cell 2. In the E-UTRAN Handover command contained in that message, the IE starting time shall not be included. The RRC HANDOVER FROM UTRAN COMMAND message shall be sent to the UE towards the end of the time period T1. The start of T2 is defined as the end of last TTI containing the handover command.

**Table A.5.0P: General test parameters for UTRAN FDD to E-UTRAN TDD handover test case**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.001	
Initial condition	Active cell	Cell 1	UTRAN FDD
	Neighbouring cell	Cell 2	E-UTRAN TDD
Final condition	Active cell	Cell 2	E-UTRAN TDD
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
PRACH configuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211
Access Barring Information	-	Not sent	No additional delays in random access procedure
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		53	As specified in table 5.7.1-3 in 3GPP TS 36.211
T1	s	≤5	
T2	s	1	

Table A.5.0Q: Cell specific test parameters for cell # 1 in UTRAN FDD to E-UTRAN TDD handover test

Parameter	Unit	Cell 1 (UTRA FDD)	
		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	0	
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-13	
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop			
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .			

Table A.5.0R: Cell specific test parameters for cell # 2 in UTRAN FDD to E-UTRAN TDD handover test

Parameter	Unit	Cell 1 (E-UTRA TDD)	
		T1	T2
E-UTRA RF Channel number		1	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in A.3.2.2.1 (OP.1 TDD) and in A.3.2.2.2 (OP.2 TDD)		OP.2 TDD	OP.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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$\hat{E}_s/I_{ot}$	dB		
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz	-98	
$\hat{E}_s/N_{oc}$	dB	-infinity	0
RSRP <sup>Note 3</sup>	dBm/15 KHz	-infinity	-98
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.			
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.			
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			

### A.5.4d.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 160 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay is expressed as: RRC procedure delay +  $T_{interrupt}$ , where:

$T_{\text{interrupt}}$  also includes time to detect E-UTRAN TDD cell; see section 5.4b.2.2.

## A.5.5 Cell Re-selection in CELL\_FACH

### A.5.5.1 One frequency present in neighbour list and FACH measurement occasions configured

#### A.5.5.1.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in the single carrier case reported in section 5.5.2.1.1.

The test parameters are given in Table A.5.1 and A.5.2. The UE is requested to monitor neighbouring cells on 1 carrier. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms

**Table A.5.1 General test parameters for Cell Re-selection in CELL\_FACH**

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
T1		s	15(initial), 5 (repetition)	
T2		s	5	

The transport and physical parameters of the S-CCPCH carrying the FACH are defined in Table A.5.1A and Table A.5.1B.

**Table A.5.1A: Physical channel parameters for S-CCPCH.**

Parameter	Unit	Level
Channel bit rate	kbps	120
Channel symbol rate	ksps	60
Slot Format #1	-	8
TFCI	-	ON
Power offsets of TFCI and Pilot fields relative to data field	dB	0

NOTE: Transport channel parameters for S-CCPCH are taken from TS34.108 clause 6.1.0b (Content of System Information Block type 5 (FDD))



Table A.5.2 Cell specific test parameters for Cell Re-selection in CELL\_FACH

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
S-CCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
OCNS_Ec/Ior	dB	-1.295		-1.295		-1.295		-1.295		-1.295		-1.295	
$\hat{I}_{or}/I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27		0.27		0.27		0.27	
$I_{oc}$	dBm/ 3,84 MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-23		-23		-23		-23	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH Ec/N0		CPICH Ec/N0		CPICH Ec/N0		CPICH Ec/N0		CPICH Ec/N0		CPICH Ec/N0	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset 2s,n	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
IE "FACH Measurement occasion info"		not sent		not sent		not sent		not sent		not sent		not sent	

### A.5.5.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the the CELL UPDATE message with cause value "cell reselection" in Cell 1.

The cell re-selection delay shall be less than 1.6 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

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

$$T_{\text{reselection, intra}} = T_{\text{Measurement_Period Intra}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms,}$$

where:

$T_{\text{Measurement_Period Intra}}$  is specified in 8.4.2.2.2 as 200 ms in this case.

$T_{\text{SI}}$ : The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell. 1280 ms is assumed in this test case.

NOTE: Since 1280 ms is one of the typical values for repeating system information blocks,  $T_{\text{SI}}$  of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms

$T_{\text{RA}}$ :  $T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

This gives a total of 1.55 s, allow 1.6 s in the test case.

## A.5.5.1A One frequency present in neighbour list and HS-DSCH DRX configured

### A.5.5.1A.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in the single carrier case reported in section 5.5.2.1.1.

The test parameters are given in Table A.5.2A and A.5.2B. The UE is requested to monitor neighbouring cells on 1 carrier. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. HS-DSCH first DRX cycle shall be configured

**Table A.5.2A General test parameters for Cell Re-selection in CELL\_FACH when HS-DSCH DRX is configured**

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
HS-DSCH DRX cycle <sub>FACH</sub>		frames	8	DRX cycle length
HS-DSCH Rx burst <sub>FACH</sub>		frames	1	On time during DRX cycle
T321		msec	100	Time before the DRX cycle is activated
T1		s	15 (Initial) 5 (Repetition)	
T2		s	5	

Table A.5.2B Cell specific test parameters for Cell Re-selection in CELL\_FACH

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/I <sub>or</sub>	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/I <sub>or</sub>	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/I <sub>or</sub>	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/I <sub>or</sub>	dB	-15		-15		-15		-15		-15		-15	
HS-PDSCH_Ec/I <sub>or</sub> (Note 1)	dB	-10		-10		-10		-10		-10		-10	
HS-SCCH1_Ec/I <sub>or</sub> (Note 1)	dB	-13		-13		-13		-13		-13		-13	
OCNS_Ec/I <sub>or</sub>	dB	-1.837		-1.837		-1.837		-1.837		-1.837		-1.837	
$\hat{I}_{or}/I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27		0.27		0.27		0.27	
$I_{oc}$	dBm/ 3,84 MHz	-70											
CPICH_Ec/I <sub>o</sub>	dB	-16	-13	-13	-16	-23		-23		-23		-23	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset 2 <sub>s,n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
IE "FACH Measurement occasion info"		not sent		not sent		not sent		not sent		not sent		not sent	
Note 1: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled													

### A.5.5.1A.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the the CELL UPDATE message with cause value "cell reselection" in Cell 1.

The cell re-selection delay shall be less than 3 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

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

$$T_{\text{reselection, intra}} = T_{\text{Measurement_PeriodIntra}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms,}$$

where:

$T_{\text{Measurement_Period Intra}}$  is specified in 8.4A.2.2.2 as 1600 ms in this case.

$T_{\text{SI}}$ : The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell. 1280 ms is assumed in this test case.

NOTE: Since 1280 ms is one of the typical values for repeating system information blocks,  $T_{SI}$  of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms

$T_{RA}:T_{RA}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{RA}$  in this test case is 40 ms.

This gives a total of 2.95 s, allow 3 s in the test case.

## A.5.5.1B One frequency present in neighbour list and HS-DSCH 2<sup>nd</sup> DRX configured

### A.5.5.1B.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in the single carrier case reported in section 5.5.2.1.1.

The test parameters are given in Table A.5.2C and A.5.2D. The UE is requested to monitor neighbouring cells on 1 carrier. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms

**Table A.5.2C General test parameters for Cell Re-selection in CELL\_FACH with HS-DSCH 2<sup>nd</sup> DRX configured**

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
HS-DSCH second DRX cycle <sub>FACH</sub>		frames	512	DRX cycle length
HS-DSCH second Rx burst <sub>FACH</sub>		frames	1	On time during DRX cycle
DRX Level			1 level DRX	2 <sup>nd</sup> DRX cycle only
T329		msec	500	Time before the DRX cycle is activated
T1		s	60(initial), 15 (repetition)	
T2		s	15	

Table A.5.2D Cell specific test parameters for Cell Re-selection in CELL\_FACH

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
HS-PDSCH_Ec/Ior (Note 1)	dB	-10		-10		-10		-10		-10		-10	
HS-SCCH1_Ec/Ior (Note 1)	dB	-13		-13		-13		-13		-13		-13	
OCNS_Ec/Ior	dB	-1.837		-1.837		-1.837		-1.837		-1.837		-1.837	
$\hat{I}_{or}/I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27		0.27		0.27		0.27	
$I_{oc}$	dBm/ 3,84 MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-23		-23		-23		-23	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset 2 <sub>s,n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
IE "FACH Measurement occasion info"		not sent		not sent		not sent		not sent		not sent		not sent	
Note 1: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled													

### A.5.5.1B.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the the CELL UPDATE message with cause value "cell reselection" in Cell 1.

The cell re-selection delay shall be less than 12 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

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

$$T_{\text{reselection, intra}} = T_{\text{Measurement_PeriodIntra}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms,}$$

where:

$T_{\text{Measurement_Period Intra}}$  is specified in 8.4A.2.2.2 as 10240 ms in this case.

$T_{\text{SI}}$ : The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell. 1280 ms is assumed in this test case.

NOTE: Since 1280 ms is one of the typical values for repeating system information blocks,  $T_{SI}$  of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms

$T_{RA}:T_{RA}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{RA}$  in this test case is 40 ms.

This gives a total of 11.59 s, allow 12 s in the test case.

## A.5.5.1C One frequency present in neighbour list and FACH measurement occasions configured, secondary BCH in use

### A.5.5.1C.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in the single carrier case reported in section 5.5.2.1.1.

The test parameters are given in Table A.5.2E, A.5.2F and A.5.2G. The UE is requested to monitor neighbouring cells on 1 carrier. The maximum repetition period of the relevant system info blocks transmitted on P-CCPCH and S-CCPCH that needs to be received by the UE to camp on a cell shall be 1280 ms. It is assumed that the UE decodes system info blocks on P-CCPCH and S-CCPCH in parallel.

**Table A.5.2E General test parameters for Cell Re-selection in CELL\_FACH**

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	At least cell 1 shall only be indicated in SIB11bis. SIB11bis shall be broadcast only on the secondary broadcast channel and shall be scheduled at least every 640ms.
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
T1		s	15(initial), 5 (repetition)	
T2		s	5	

The transport and physical parameters of the S-CCPCH carrying the FACH are defined in Table A.5.2F and Table A.5.2G.

**Table A.5.2F: Physical channel parameters for S-CCPCH1.**

Parameter	Unit	Level
Channel bit rate	kbps	120
Channel symbol rate	ksps	60
Slot Format #1	-	8
TFCI	-	ON
Power offsets of TFCI and Pilot fields relative to data field	dB	0

NOTE: Transport channel parameters for S-CCPCH1 are taken from TS34.108 clause 6.1.0b (Content of System Information Block type 5 (FDD)). S-CCPCH2 carries secondary broadcast including SIB11bis

Table A.5.2G Cell specific test parameters for Cell Re-selection in CELL\_FACH

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
S-CCPCH1_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
S-CCPCH2_Ec/Ior <sup>Note</sup>	dB	-12		-12		-12		-12		-12		-12	
OCNS_Ec/Ior	dB	-1.68		-1.68		-1.68		-1.68		-1.68		-1.68	
$\hat{I}_{or} / I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27		0.27		0.27		0.27	
$I_{oc}$	dBm/ 3.84 MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-23		-23		-23		-23	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset 2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
IE "FACH Measurement occasion info"		not sent		not sent		not sent		not sent		not sent		not sent	

<sup>Note</sup> : Secondary BCH is transmitted using S-CCPCH2

### A.5.5.1C.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the CELL UPDATE message with cause value "cell reselection" in Cell 1.

The cell re-selection delay shall be less than 1.6 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

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

$$T_{\text{reselection, intra}} = T_{\text{Measurement_Period Intra}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms,}$$

where:

$T_{\text{Measurement_Period Intra}}$  is specified in 8.4.2.2.2 as 200 ms in this case.

$T_{\text{SI}}$ : The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell. 1280 ms is assumed in this test case.

NOTE: Since 1280 ms is one of the typical values for repeating system information blocks,  $T_{\text{SI}}$  of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms

$T_{RA}$ :  $T_{RA}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{RA}$  in this test case is 40 ms.

This gives a total of 1.55 s, allow 1.6 s in the test case.

## A.5.5.2 Two frequencies present in the neighbour list and FACH measurement occasions configured

### A.5.5.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in section 5.5.2.1.2.

The test parameters are given in tables A5.3 and A5.4. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms.

**Table A.5.3: General test parameters for Cell Re-selection in CELL\_FACH**

	Parameter	Unit	Value	Comment
initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
	T1	s	15 (initial), 5 (repetition)	
	T2	s	5	

The transport and physical parameters of the S-CCPCH carrying the FACH are defined in Table A.5.3A and Table A.5.3B.

**Table A.5.3A: Physical channel parameters for S-CCPCH.**

Parameter	Unit	Level
Channel bit rate	kbps	60
Channel symbol rate	ksps	30
Slot Format #1	-	4
TFCI	-	OFF
Power offsets of TFCI and Pilot fields relative to data field	dB	0

**Table A.5.3B: Transport channel parameters for S-CCPCH**

Parameter	FACH
Transport Channel Number	1
Transport Block Size	240
Transport Block Set Size	240
Transmission Time Interval	10 ms
Type of Error Protection	Convolution Coding
Coding Rate	$\frac{1}{2}$
Rate Matching attribute	256
Size of CRC	16
Position of TrCH in radio frame	Fixed



Table A.5.4: Cell specific test parameters for Cell re-selection in CELL\_FACH state

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/I <sub>oc</sub>	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/I <sub>oc</sub>	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/I <sub>oc</sub>	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/I <sub>oc</sub>	dB	-15		-15		-15		-15		-15		-15	
S-CCPCH_Ec/I <sub>oc</sub>	dB	-12		-12		-12		-12		-12		-12	
OCNS_Ec/I <sub>oc</sub>	dB	-1.295		-1.295		-1.295		-1.295		-1.295		-1.295	
$\hat{I}_{or}/I_{oc}$	dB	-1.8	2.2	2.2	-1.8	-6.8	-4.8	-6.8	-4.8	-4.8	-6.8	-4.8	-6.8
$I_{oc}$	dBm/ 3,84 MHz	-70											
CPICH_Ec/I <sub>o</sub>	dB	-15	-13	-13	-15	-20		-20		-20		-20	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset <sub>2s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
IE "FACH Measurement occasion info"		sent		sent		sent		sent		sent		sent	
FACH Measurement occasion cycle length coefficient		3		3		3		3		3		3	
Inter-frequency FDD measurement indicator		TRUE		TRUE		TRUE		TRUE		TRUE		TRUE	
Inter-frequency TDD measurement indicator		FALSE		FALSE		FALSE		FALSE		FALSE		FALSE	

### A.5.5.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the the CELL UPDATE message with cause value "cell reselection" in Cell 1.

The cell re-selection delay shall be less than 1.9 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

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

$$T_{\text{reselection, inter}} = T_{\text{Measurement inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms,}$$

where:

$T_{\text{Measurement inter}}$  is specified in 8.4.2.3.2 as 480 ms in this case.

$T_{\text{SI}}$ : The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell. 1280 ms is assumed in this test case.

NOTE: Since 1280 ms is one of the typical values for repeating system information blocks,  $T_{SI}$  of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms.

$T_{RA}$ :  $T_{RA}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{RA}$  in this test case is 40 ms.

This gives a total of 1.83 s, allow 1.9 s in the test case.

## A.5.5.2A Two frequencies present in the neighbour list and HS-DSCH DRX configured (Absolute priority levels not configured)

### A.5.5.2A.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in section 5.5.2.1.2.

This scenario implies the presence of 2 carriers and 6 cells as given in tables A.5.4AA and A.5.4AB. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2 shall belong to different Location Areas.

**Table A.5.4AA: General test parameters for Cell Re-selection in Multi carrier case**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
Final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
HS-DSCH DRX $cycle_{FACH}$		frames	8	DRX cycle length
HS-DSCH Rx $burst_{FACH}$		frames	1	On time during DRX cycle
T321		msec	100	Time before the DRX cycle is activated
T1		s	5	T1 need to be defined so that cell 1 and cell 2 are identified
T2		s	5	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.5.4AB: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
HS-PDSCH_Ec/Ior (Note 1)	dB	-10		-10		-10		-10		-10		-10	
HS-SCCH1_Ec/Ior (Note 1)	dB	-13		-13		-13		-13		-13		-13	
OCNS_Ec/Ior	dB	-1.837		-1.837		-1.837		-1.837		-1.837		-1.837	
$\hat{I}_{or}/I_{oc}$	dB	-3.4	2.2	2.2	-3.4	-7.4	-4.8	-7.4	-4.8	-4.8	-7.4	-4.8	-7.4
$I_{oc}$	dBm / 3,84 MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-20		-20		-20		-20	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dB	21		21		21		21		21		21	
Qoffset2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

Note 1: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled

### A.5.5.2A.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 1.

The cell re-selection delay shall be less than 2 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:

$$T_{\text{reselection, inter}} = T_{\text{Measurement, inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}},$$

where:

$T_{\text{measurement, inter}}$  See section 8.4a.2.3.2 as 480 ms in this case

$T_{\text{IU}}$  10msec

$T_{\text{SI}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

$T_{\text{RA}}$ :  $T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

This gives a total of 1.83 s, allow 2s in the test case.

## A.5.5.2B Two frequencies present in the neighbour list and HS-DSCH DRX configured (Absolute priority levels configured)

### A.5.5.2B.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in section 5.5.2.1.2.

This scenario implies the presence of 2 carriers and 6 cells as given in tables A.5.4AC and A.5.4AD. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2 shall belong to different Location Areas. The target UTRA carrier (cell 1) shall have higher absolute priority than the starting carrier (cell 2).

**Table A.5.4AC: General test parameters for Cell Re-selection in Multi carrier case**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
Final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
HS-DSCH DRX cycle <sub>FACH</sub>		frames	8	DRX cycle length
HS-DSCH Rx burst <sub>FACH</sub>		frames	1	On time during DRX cycle
T321		msec	100	Time before the DRX cycle is activated
T1		s	>5	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	70	T2 need to be defined so that cell re-selection reaction time is taken into account.
S <sub>prioritysearch1</sub>		dB	30	
S <sub>prioritysearch2</sub>		dB	0	
Thresh <sub>x, high2</sub>		dB	4	
Thresh <sub>x, low2</sub>		dB	0	
Pmax		dBm	21	

Table A.5.4AD: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
HS-PDSCH (Note 1)	dB	-10		-10		-10		-10		-10		-10	
HS-SCCH1 (Note 1)	dB	-13		-13		-13		-13		-13		-13	
OCNS_Ec/Ior	dB	-1.837		-1.837		-1.837		-1.837		-1.837		-1.837	
$\hat{I}_{or}/I_{oc}$	dB	-7.5	2.2	2.2	2.2	-7.5	-4.9	-7.5	-4.9	-4.8	-4.8	-4.8	-4.8
$I_{oc}$	dBm / 3,84 MHz	-70											
CPICH_Ec/Io	dB	-19.4	-13.0	-13.0	-13	-19.4	-20.1	-19.4	-20.1	-20			-20
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dB	21		21		21		21		21		21	
Qoffset2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

Note 1: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled

### A.5.5.2B.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 1.

The cell re-selection delay shall be less than 65 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:

$$T_{\text{reselection, inter}} = T_{\text{HigherPrioritySearch}} + T_{\text{identify, inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}}$$

where:

$T_{\text{identify, inter}}$  See section 8.4a.2.3.2 as 2720 ms in this case

$T_{\text{IU}}$  10msec

$T_{\text{SI}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

$T_{\text{RA}}$ :  $T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

$T_{\text{higher\_priority\_search}}$  is described in section 4.2.2

This gives a total of 64.05 s, allow 65s in the test case.

## A.5.5.2C Two frequencies present in the neighbour list and HS-DSCH 2<sup>nd</sup> DRX configured (Absolute priority levels not configured)

### A.5.5.2C.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in section 5.5.2.1.2.

This scenario implies the presence of 2 carriers and 6 cells as given in tables A.5.4AE and A.5.4AF. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2 shall belong to different Location Areas. Both UTRA carriers shall have equal priority.

**Table A.5.4AE: General test parameters for Cell Re-selection in Multi carrier case**

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
Final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
HS-DSCH second DRX cycle <sub>FACH</sub>		frames	512	DRX cycle length
HS-DSCH second Rx burst <sub>FACH</sub>		frames	1	On time during DRX cycle
DRX Level			1 level DRX	2 <sup>nd</sup> DRX cycle only
T329		msec	500	Time before the DRX cycle is activated
T1		s	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	15	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.5.4AF: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
HS-PDSCH_Ec/Ior (Note 1)	dB	-10		-10		-10		-10		-10		-10	
HS-SCCH1_Ec/Ior (Note 1)	dB	-13		-13		-13		-13		-13		-13	
OCNS_Ec/Ior	dB	-1.837		-1.837		-1.837		-1.837		-1.837		-1.837	
$\hat{I}_{or}/I_{oc}$	dB	-3.4	2.2	2.2	-3.4	-7.4	-4.8	-7.4	-4.8	-4.8	-7.4	-4.8	-7.4
$I_{oc}$	dBm / 3,84 MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-20		-20		-20		-20	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dB	21		21		21		21		21		21	
Qoffset2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

Note 1: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled

### A.5.5.2C.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 1.

The cell re-selection delay shall be less than 12 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:

$$T_{\text{reselection, inter}} = T_{\text{Measurement, inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}},$$

where:

$T_{\text{measurement, inter}}$  See section 8.4a.2.3.2; as 10240 ms in this case

$T_{\text{SI}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

$T_{\text{IU}}$  10msec

$T_{\text{RA}}:T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

This gives a total of 11.6 s, allow 12s in the test case.

## A.5.5.2D Two frequencies present in the neighbour list and HS-DSCH 2<sup>nd</sup> DRX configured (Absolute priority levels configured)

### A.5.5.2D.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in section 5.5.2.1.2.

This scenario implies the presence of 2 carriers and 6 cells as given in tables A.5.4AG and A.5.4AH. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms. Cell 1 and cell 2 shall belong to different Location Areas. The target UTRA carrier (cell 1) shall have higher absolute priority than the starting carrier (cell 2).

**Table A.5.4AG: General test parameters for Cell Re-selection in Multi carrier case**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
Final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
HS-DSCH second DRX cycle <sub>FACH</sub>		frames	512	DRX cycle length
HS-DSCH second Rx burst <sub>FACH</sub>		frames	1	On time during DRX cycle
DRX Level			1 level DRX	2 <sup>nd</sup> DRX cycle only
T329		msec	500	Time before the DRX cycle is activated
T1		s	35	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	100	T2 need to be defined so that cell re-selection reaction time is taken into account.
Sprioritysearch1		dB	30	
Sprioritysearch2		dB	0	
Threshx, high2		dB	4	
Threshx, low2		dB	0	
Pmax		dBm	21	



Table A.5.4AH: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
HS-PDSCH (Note 1)	dB	-10		-10		-10		-10		-10		-10	
HS-SCCH 1 (Note 1)	dB	-13		-13		-13		-13		-13		-13	
OCNS_Ec/Ior	dB	-1.837		-1.837		-1.837		-1.837		-1.837		-1.837	
$\hat{I}_{or}/I_{oc}$	dB	-7.5	2.2	2.2	2.2	-7.5	-4.9	-7.5	-4.9	-4.8	-4.8	-4.8	-4.8
$I_{oc}$	dBm / 3,84 MHz	-70											
CPICH_Ec/Io	dB	-19.4	-13.0	-13.0	-13	-19.4	-20.1	-19.4	-20.1	-20			-20
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dB	21		21		21		21		21		21	
Qoffset2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

Note 1: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled

### A.5.5.2D.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 1.

The cell re-selection delay shall be less than 92 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:

$$T_{\text{reselection, inter}} = T_{\text{HigherPrioritySearch}} + T_{\text{identify, inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}}$$

where:

$T_{\text{identify, inter}}$  See section 8.4a.2.3.2; 30000 ms in this case

$T_{\text{SI}}$  Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

$T_{\text{IU}}$  10msec

$T_{\text{RA}}$ :  $T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

$T_{\text{higher\_priority\_search}}$  is described in section 4.2.2

This gives a total of 91.34 s, allow 92s in the test case.

## A.5.5.2E Five frequencies present in the neighbour list and FACH measurement occasions configured for Increased Carrier Monitoring

### A.5.5.2E.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in section 5.5.2.1.2.

The test parameters are given in tables A5.4AI, A5.4AJ, A5.4AK and A5.4AL. The UE is requested to monitor neighbouring cells on 5 carriers. Each repetition of the test consists of five successive time periods, with time duration of T0, T1, T2, T3 and T4 respectively. In the initialisation phase and at the start of each repetition of T0, the test equipment provides signals for cell 1 (serving cell), and selects frequencies for cells 2, 3 and 4 which are chosen from the 5 inter-frequency layers which are configured in the UE neighbour cell list as described in general and cell specific parameters. The neighbour lists of cells 2, 3 and 4 shall include the frequency of cell 1 in the normal performance group as well as the other frequencies configured to the UE in the test. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms.

**Table A.5.4AI: General test parameters for Cell Re-selection in CELL\_FACH**

Parameter	Unit	Value	Comment
UE configured UTRA RF Channel Number		1,2,3,4,5,6	Serving cell and five UTRA FDD interfrequency carrier frequencies are used in the UE neighbour cell list. Frequencies 4,5,6 are indicated to have reduced performance
Test equipment configuration		Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6	
T0	Active cell	Cell1	T0 is repeated on each repetition of the test. In T0 the test equipment selects frequencies for cell 2, 3, 4 and then time is allowed for the UE to identify the neighbour cells. See cell specific parameters for detailed settings.
T1 start condition	Active cell	Cell1	
T1 final condition	Active cell	Cell2	UE shall perform reselection to cell 2 during T1
	Neighbour cells	Cell1, Cell3, Cell4	
T2 final condition	Active cell	Cell3	UE shall perform reselection to cell 3 during T2
	Neighbour cells	Cell1, Cell2, Cell4	
T3 final condition	Active cell	Cell4	UE shall perform reselection to cell 4 during T3
	Neighbour cells	Cell1, Cell2, Cell3	
T4 final condition	Active cell	Cell1	UE shall perform reselection to cell 1 during T4
	Neighbour cells	Cell2, Cell3, Cell4	
Access Service Class (ASC#0) - Persistence value	-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS			Not used
Reduced Performance Group Scaling Factor	-	8	
T0	s	(Test equipment frequency selection and configuration time) + 66	
T1	s	5	
T2	s	10	
T3	s	10	
T4	s	5	

The transport and physical parameters of the S-CCPCH carrying the FACH are defined in Table A.5.4AJ and Table A.5.4AK.

**Table A.5.4AJ: Physical channel parameters for S-CCPCH**

Parameter	Unit	Level
Channel bit rate	Kbps	60
Channel symbol rate	Ksps	30
Slot Format #1	-	4
TFCI	-	OFF
Power offsets of TFCI and Pilot fields relative to data field	dB	0

Table A.5.4AK: Transport channel parameters for S-CCPCH

Parameter	FACH
Transport Channel Number	1
Transport Block Size	240
Transport Block Set Size	240
Transmission Time Interval	10 ms
Type of Error Protection	Convolution Coding
Coding Rate	$\frac{1}{2}$
Rate Matching attribute	256
Size of CRC	16
Position of TrCH in radio frame	Fixed

Table A.5.4AL: Cell specific test parameters for Cell re-selection in CELL\_FACH state (Cell 1, Cell 2)

Parameter	Unit	Cell 1					Cell 2				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
E-UTRA RF Channel number		1					Randomly selected from 2,3 such that cell 2 is in the normal performance group				
CPICH_Ec/Ior	dB	-10					-10				
PCCPCH_Ec/Ior	dB	-12					-12				
SCH_Ec/Ior	dB	-12					-12				
PICH_Ec/Ior	dB	-15					-15				
S-CCPCH_Ec/Ior	dB	-12					-12				
OCNS_Ec/Ior	dB	-1.295					-1.295				
$I_{oc}$	dBm/ 3,84 MHz	-70					-70				
$\hat{I}_{or}/I_{oc}$	dB	2.4	-3.3	-3.3	-3.3	2.4	-3.3	2.4	-3.3	-3.3	-3.3
CPICH_Ec/Io	dB	-12	-15	-15	-15	-12	-15	-12	-15	-15	-15
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>					CPICH E <sub>c</sub> /N <sub>0</sub>				
Qqualmin	dB	-20					-20				
Qrxlevmin	dBm	-115					-115				
UE_TXPWR_MAX_RACH	dBm	21					21				
Qoffset2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0					C2, C1: 0 C2, C3: 0 C2, C4: 0				
Qhyst2	dB	0					0				
Treselection	s	0					0				
Sintrasearch	dB	not sent					not sent				
Sintersearch		not sent					not sent				
IE "FACH Measurement occasion info"		sent					sent				
FACH Measurement occasion cycle length coefficient		3					3				
Inter-frequency FDD measurement indicator		TRUE					TRUE				
Inter-frequency TDD measurement indicator		FALSE					FALSE				
Propagation Condition		AWGN					AWGN				

**Table A.5.4AM: Cell specific test parameters for Cell re-selection in CELL\_FACH state (Cell3, Cell4)**

Parameter	Unit	Cell 3					Cell 4				
		T0	T1	T2	T3	T4	T0	T1	T2	T3	T4
E-UTRA RF Channel number		Randomly selected from 4,5,6 such that cell 3 is in the reduced performance group					Randomly selected from 4,5,6 such that cell 4 is in the reduced performance group				
CPICH_Ec/Ior	dB	-10					-10				
PCCPCH_Ec/Ior	dB	-12					-12				
SCH_Ec/Ior	dB	-12					-12				
PICH_Ec/Ior	dB	-15					-15				
S-CCPCH_Ec/Ior	dB	-12					-12				
OCNS_Ec/Ior	dB	-1.295					-1.295				
$I_{oc}$	dBm/ 3,84 MHz	-70					-70				
$\hat{I}_{or}/I_{oc}$	dB	-3.3	-3.3	2.4	-3.3	-3.3	-3.3	-3.3	-3.3	2.4	-3.3
CPICH_Ec/Io	dB	-15	-15	-12	-15	-15	-15	-15	-15	-12	-15
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>					CPICH E <sub>c</sub> /N <sub>0</sub>				
Qqualmin	dB	-20					-20				
Qrxlevmin	dBm	-115					-115				
UE_TXPWR_MAX_RACH	dBm	21					21				
Qoffset2 <sub>s, n</sub>	dB	C3, C1: 0 C3, C2: 0 C3, C4: 0					C4, C1: 0 C4, C2: 0 C4, C3: 0				
Qhyst2	dB	0					0				
Treselection	s	0					0				
Sintrasearch	dB	not sent					not sent				
Sintersearch		not sent					not sent				
IE "FACH Measurement occasion info"		sent					sent				
FACH Measurement occasion cycle length coefficient		3					3				
Inter-frequency FDD measurement indicator		TRUE					TRUE				
Inter-frequency TDD measurement indicator		FALSE					FALSE				
Propagation Condition		AWGN					AWGN				

### A.5.5.2E.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of a relevant time period, to the moment when the UE camps on the target cell, and starts to send preambles on the PRACH for sending the the CELL UPDATE message with cause value "cell reselection" on the target Cell.

This gives a total of

Time phase	Target cell	Requirement for reselection delay (seconds)
T1	Cell 2 (normal performance group)	2.5s
T2	Cell 3 (reduced performance group)	12.9s
T3	Cell 4 (reduced performance group)	12.9s
T4	Cell 1 (normal performance group)	2.5s

The rate of correct cell reselections to the normal performance group observed during repeated tests shall be at least 90% and the rate of correct cell reselections to the reduced performance group observed during repeated tests shall be at least 90%, with a successful reselection counted if it is within the required time regardless of the carrier frequencies involved.

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

$$T_{\text{reselection, inter}} = T_{\text{Measurement inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms,}$$

where:

$T_{\text{measurement inter}}$  is specified in 8.4.2.3.2 as xxx ms in this case.

$T_{\text{SI}}$ : The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell. 1280 ms is assumed in this test case.

NOTE: Since 1280 ms is one of the typical values for repeating system information blocks,  $T_{\text{SI}}$  of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms.

$T_{\text{RA}}$ :  $T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

### A.5.5.3 Cell Reselection to GSM

#### A.5.5.3.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in section 5.5.2.1.4.

This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 UMTS carrier and 6 GSM cells. Test parameters are given in Table, A.5.4A, A.5.4B, A.5.4C, A.5.4D, A.5.4E.

**Table A.5.4A: General test parameters for UTRAN to GSM Cell Re-selection**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
HCS				Not used
Neighbour cell list size			24 FDD neighbours on Channel 1 6 GSM neighbours including ARFCN 1	
T1		s	5	
T2		s	10	

The transport and physical parameters of the S-CCPCH carrying the FACH are defined in Table A.5.3A and Table A.5.3B.

**Table A.5.4B: Physical channel parameters for S-CCPCH.**

Parameter	Unit	Level
Channel bit rate	kbps	60
Channel symbol rate	ksps	30
Slot Format #1	-	4
TFCI	-	OFF
Power offsets of TFCI and Pilot fields relative to data field	dB	0

Table A.5.4C: Transport channel parameters for S-CCPCH

Parameter	FACH
Transport Channel Number	1
Transport Block Size	240
Transport Block Set Size	240
Transmission Time Interval	10 ms
Type of Error Protection	Convolution Coding
Coding Rate	$\frac{1}{2}$
Rate Matching attribute	256
Size of CRC	16
Position of TrCH in radio frame	Fixed

Table A.5.4D: Cell re-selection UTRAN to GSM cell case (cell 1)

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
S-CCPCH_Ec/lor	dB	-12	
OCNS_Ec/lor	dB	-1.295	
$\hat{I}_{or}/I_{oc}$	dB	0	-5
$I_{oc}$	dBm/3, 84 MHz	-70	
CPICH_Ec/lo	dB	-13	-16.2
CPICH_RSCP	dBm	-80	-85
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH Ec/lo	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qoffset1 <sub>s, n</sub>	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	s	0	
Ssearch <sub>RAT</sub>	dB	Not sent	
IE "FACH Measurement occasion info"		Sent	
FACH Measurement occasion cycle length coefficient		3	
Inter-frequency FDD measurement indicator		FALSE	
Inter-frequency TDD measurement indicator		FALSE	
Inter-RAT measurement indicators		Included	
>RAT type		GSM	

**Table A.5.4E: Cell re-selection UTRAN to GSM cell case (cell 2)**

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

### A.5.5.3.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to transmit the random access in Cell 2 (the GSM cell).

The cell re-selection delay shall be less than  $5.5 + T_{RA}$  s.

The rate of correct reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed

$$T_{\text{reselection, GSM}} = T_{\text{identify, GSM}} + T_{\text{measurement, GSM}} + 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

where:

$T_{\text{identify, GSM}}$  Specified in 8.4.2.5.2.1, here it is 2880 ms

$T_{\text{measurement, GSM}}$  Specified in 5.5.2.1.4, here it is 640 ms

$T_{\text{BCCH}}$  According to [21], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

$T_{\text{RA}}$  The additional delay caused by the random access procedure in the GSM cell. Shall be defined by T1/RF when the test case is further detailed in TS 34.121.

This gives a total of  $5.46 + T_{RA}$  s, allow  $5.5 + T_{RA}$  s.

### A.5.5.3A Cell Reselection to GSM in DRX

#### A.5.5.3A.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_FACH state in section 5.5.2.1.4.

This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 UMTS carrier and 6 GSM cells. Test parameters are given in Table, A.5.4E1, A.5.4E2, and A.5.4E3.



**Table A.5.4E1: General test parameters for UTRAN to GSM Cell Re-selection**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
HS-DSCH DRX cycle <sub>FACH</sub>		frames	4	DRX cycle length
HS-DSCH Rx burst <sub>FACH</sub>		frames	2	On time during DRX cycle
T321		msec	100	Time before the DRX cycle is activated
Neighbour cell list size			24 FDD neighbours on Channel 1 6 GSM neighbours including ARFCN 1	
T1		s	5	
T2		s	10	

Table A.5.4E2: Cell re-selection UTRAN to GSM cell case (cell 1)

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
HS-PSDCH_Ec/lor (Note 1)	dB	-10	
HS-SCCH_Ec/lor (Note 1)	dB	-13	
OCNS_Ec/lor	dB	-1.837	
$\hat{I}_{or}/I_{oc}$	dB	0	-5
$I_{oc}$	dBm/3, 84 MHz	-70	
CPICH_Ec/lo	dB	-13	-16.2
CPICH_RSCP	dBm	-80	-85
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH Ec/lo	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qoffset1 <sub>s,n</sub>	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	S	0	
Ssearch <sub>RAT</sub>	dB	Not sent	
Inter-frequency FDD measurement indicator		FALSE	
Inter-frequency TDD measurement indicator		FALSE	
Inter-RAT measurement indicators		Included	
>RAT type		GSM	
Note 1: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled			

Table A.5.4E3: Cell re-selection UTRAN to GSM cell case (cell 2)

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

### A.5.5.3.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE starts to transmit the random access in Cell 2 (the GSM cell).

The cell re-selection delay shall be less than  $2.9 + T_{RA}$  s.

The rate of correct reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed

$$T_{\text{reselection, GSM}} = T_{\text{identify, GSM}} + T_{\text{measurement, GSM}} + 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

where:

$T_{\text{identify, GSM}}$  Specified in 8.4.2.5.2.1, here it is 500 ms

$T_{\text{measurement, GSM}}$  Specified in 5.5.2.1.4, here it is 480 ms

$T_{\text{BCCH}}$  According to [21], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

$T_{\text{RA}}$  The additional delay caused by the random access procedure in the GSM cell. Shall be defined by RAN5 when the test case is further detailed in TS 34.121.

This gives a total of  $2.88 + T_{RA}$  s, allow  $2.9 + T_{RA}$  s.

## A.5.5.4 Cell Reselection during an MBMS session, two frequencies present in neighbour list

### A.5.5.4.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell identification for UEs in an MBMS PTM session and the required functionality on measurement occasions by use of a cell re-selection test case.

The test parameters are given in tables A.5.4F, A.5.4G, A.5.4H, A.5.4I, A.5.4J and A.5.4K. The UE is requested to receive the MBMS service and monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms.

**Table A.5.4F: General test parameters for Cell Re-selection in CELL\_FACH**

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell2	
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
<b>MBMS preferred frequency layer</b>				<b>Not used</b>
T1		s	15 (initial), 5 (repetition)	
T2		s	3	
T3		s	3	

The transport and physical parameters of the S-CCPCH carrying the FACH are defined in Table A.5.4G and Table A.5.4H.

**Table A.5.4G: Physical channel parameters for S-CCPCH\_1 carrying the FACH.**

Parameter	Unit	Level
Channel bit rate	Kbps	120
Channel symbol rate	Ksps	60
Slot Format #1	-	8
TFCI	-	ON
Power offsets of TFCI and Pilot fields relative to data field	dB	0

**Table A.5.4H: Void**

The transport channel parameters for S-CCPCH\_1 carrying FACH are taken from TS34.108 clause 6.1.0b (Content of System Information Block type 5 (FDD)) with M2 condition and with the exception that TTI for FACH carrying BCCH set to 20ms.

The transport and physical parameters of the S-CCPCH carrying the MTCH are defined in Table A.5.4I and Table A.5.4J.

**Table A.5.4I: Physical channel parameters for S-CCPCH\_2 carrying the MTCH.**

Parameter	Unit	Level
Channel bit rate	kbps	960
Channel symbol rate	ksps	480
Slot Format #1	-	14
TFCI	-	ON
Power offsets of TFCI and Pilot fields relative to data field	dB	0

**Table A.5.4J: Transport channel parameters for S-CCPCH\_2**

Parameter	FACH
Transport Channel Number	1
Transport Block Size	2536
Transport Block Set Size	10144
Transmission Time Interval	40ms
Type of Error Protection	Turbo Coding
Coding Rate	1/3
Rate Matching attribute	256
Size of CRC	16
Position of TrCH in radio frame	Flexible

**Table A.5.4K: Cell specific test parameters for Cell re-selection in CELL\_FACH state**

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1			Channel 2		
CPICH_Ec/Ior	dB	-10			-10		
PCCPCH_Ec/Ior	dB	-12			-12		
SCH_Ec/Ior	dB	-12			-12		
PICH_Ec/Ior	dB	-15			-15		
S-CCPCH_1_Ec/Ior	dB	-12			-12		
S-CCPCH_2_Ec/Ior	dB	n.a.			-6		
OCNS_Ec/Ior	dB	Note 1			Note 1		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-3.37	0	0	0	-5
$I_{oc}$	dBm/3,8 4 MHz	-70					
CPICH_Ec/Io	dB	-infinity	-15	-13	-13	-13	-16.2
Propagation Condition		AWGN					
Cell_selection_and_reselection_quality_measure		CPICH Ec/No			CPICH Ec/No		
Qqualmin	dB	-20			-20		
Qrxlevmin	dBm	-115			-115		
UE_TXPWR_MAX_RACH	dBm	21			21		
Qoffset2s, n	dB	C1, C2: 0			C2, C1: 0		
Qhyst2	dB	0			0		
Treselection	s	0			0		
Sintrasearch	dB	not sent			not sent		
Sintersearch	dB	not sent			not sent		
IE "FACH Measurement occasion info"		Sent			Sent		
FACH Measurement occasion cycle length coefficient		2			2		
Inter-frequency FDD measurement indicator		TRUE			TRUE		
Inter-frequency TDD measurement indicator		FALSE			FALSE		
NOTE 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior.							

#### A.5.5.4.2 Test Requirements

The cell re-selection delay 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 CELL UPDATE message with cause value "cell reselection" in Cell 1.

The cell re-selection delay shall be less than 1.9s.

During T1 and T2 the MTCH SDU ER shall not exceed 4.0%.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

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

$$T_{\text{reselection, inter}} = T_{\text{Measurement, inter}} + T_{\text{IU}} + 20 + T_{\text{SI}} + T_{\text{RA}} \text{ ms,}$$

where:

$T_{\text{Measurement, inter}}$  Specified in 8.4.2.3.2 as 480ms

$T_{\text{identify, inter}}$  Specified in 8.4.2.3.1 as 2.72 s in this case, thus 3sec for T2 is sufficient for identification of cell 1.

Note: The calculation based on the S-CCPCH carrying the FACH provides a measurement occasion of 20ms repeated every 80ms. As the MTCH TTI length is only 40ms this has to be shortened to a gap of 10ms every 80ms, the re-selection delay is based upon.

$T_{\text{SI}}$ : The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell. 1280 ms is assumed in this test case.

Note: Since 1280 ms is one of the typical values for repeating system information blocks,  $T_{\text{SI}}$  of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms.

$T_{\text{RA}}$ :  $T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

Note: The maximum allowed time to be used to perform the measurements for a UE in an MBMS session may be smaller than the duration of the measurement occasion to fulfill the MBMS demodulation performance.

This gives a total of 1.83 s, allow 1,9s in the test case.

## A.5.5.5 UTRAN to E-UTRA Cell Reselection

### A.5.5.5.1 Reselection to E-UTRA FDD when HS-DSCH DRX is configured (E-UTRA has higher priority)

#### A.5.5.5.1.1 Test Purpose and Environment

This test is to verify the requirement for the UTRA FDD to E-UTRA FDD inter-RAT cell reselection delay reported in section 5.5.2.1.5

The test scenario comprises two different cells, with cell 1 being the UTRA serving cell and cell 2 being the E-UTRA cell to be re-selected to. Test parameters are given in Tables A.5.4L, A.5.4M, A.5.4N. The test consists of two successive time periods, with time duration of T1, T2. UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

Cell 1 and cell 2 shall belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

CELL\_FACH with discontinuous HS-DSCH reception should be configured. The UE should not be scheduled with HS-DSCH data during T1 and T2 such that the DRX cycle becomes active

**Table A.5.4L: General test parameters for UTRAN to E-UTRA Cell Reselection**

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	
	HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	Length of the DRX cycle
	HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
	T321	msec	100	Number of seconds until the DRX cycle is initiated
	HCS			Not used
	E-UTRA PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
	E-UTRA access barring information		Not sent	No additional delays in random access procedure
	T1	s	>70	During T1, cell 2 shall be powered off, and during the off time its 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	70	T2 needs to be defined so that cell re-selection reaction time is taken into account.

**Table A.5.4M: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
HS-PSDCH_Ec/Ior (Note 2)	dB	-10	
HS-SCCH_Ec/Ior (Note 2)	dB	-13	
OCNS_Ec/Ior	dB	-1.1837	
$\hat{I}_{or} / I_{oc}$	dB	13	13
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	s	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
SsearchE-UTRA	dB	Not sent	
Thresh <sub>x, high</sub> (Note 1)	dB	48	
Propagation Condition		AWGN	
Note 1: This refers to the value of Thresh <sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell. Note 2: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled			

**Table A.5.4N: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 2)**

Parameter	Unit	Cell 2	
		T1	T2
E-UTRA RF Channel number		2	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in TS 36.133 A.3.2.1.2 (OP.2 FDD) [24]		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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		



Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-infinity	-86
$\hat{E}_s/N_{oc}$	dB	-infinity	12
$\hat{E}_s/I_{ot}$	dB	-infinity	12
Treselection <sub>EUTRAN</sub>	s	0	
Snonintrasearch	dB	Not sent	
Thresh <sub>serv,low</sub>	dB	44	
Thresh <sub>x,low</sub> (Note 2)	dB	42	
Propagation Condition		AWGN	
Note 1:	OCNG shall be used such that cell 2 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 <sub>x,low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.		

#### A.5.5.5.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send 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 shall be less than 66 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{\text{reselection}, E-UTRAN} = T_{\text{HigherPrioritySearch}} + 40 + T_{\text{SI}} + T_{\text{RA}}$ , where:

$T_{\text{SI}}$  = the maximum time allowed acquire system information from a E-UTRAN cell, 1280msec [24].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure, 30msec [24]

$T_{\text{Identify}, E-UTRAN}$  = Time to identify an E-UTRA cell, as defined in section 8.4a.2.6.1

$T_{\text{higher\_priority\_search}}$  is described in section 4.2.2

This gives a total of 67.7, allow 66 s in the test case.

#### A.5.5.5.2 Reselection to E-UTRA FDD when HS-DSCH DRX is configured (E-UTRA has lower priority)

##### A.5.5.5.2.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to E-UTRAN cell reselection delay reported in section 5.5.2.1.5.

This scenario implies the presence of 1 UTRAN serving cell, and 1 E-UTRAN cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 UTRAN carrier and 1 E-UTRAN carrier. Test parameters are given in Table, A.5.4O, A.5.4P, A.5.4Q. The test consists of two successive time periods, with time duration of T1 and T2, respectively. Both UTRA cell 1 and E-UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

CELL\_FACH with discontinuous HS-DSCH reception and with only the first DRX cycle active should be configured. The UE should not be scheduled with HS-DSCH data during T1 and T2 such that the DRX cycle becomes active.

**Table A.5.40: General test parameters for UTRAN to E-UTRAN Cell Re-selection**

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	UTRAN cell
	Neighbour cell		Cell 2	E-UTRAN cell
Final condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
HS-DSCH DRX cycle <sub>FACH</sub>		frames	8	DRX cycle length
HS-DSCH Rx burst <sub>FACH</sub>		frames	1	On time during DRX cycle
T321		msec	100	Time before the DRX cycle is activated
E-UTRA PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211
E-UTRA access barring information			Not sent	No additional delays in random access procedure
T1		s	>20	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	7	T2 need to be defined so that cell re-selection reaction time is taken into account.

**Table A.5.4P: Cell re-selection UTRAN to E-UTRAN cell case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
HS-PDSCH_Ec/lor (Note 2)	dB	-10	
HS-SCCH1_Ec/lor (Note 2)	dB	-13	
OCNS_Ec/lor	dB	-1.837	
$\hat{I}_{or}/I_{oc}$	dB	11	-5
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/lo	dB	-10.33	-16.19
CPICH_RSCP	dBm	-69	-85
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qhyst1	dB	0	
Treselection	s	0	
S <sub>prioritysearch1</sub>	dB	62	
S <sub>prioritysearch2</sub>	dB	0	
Thresh <sub>-serving, low</sub>	dB	36	
Thresh <sub>x, low</sub> (Note 1)	dB	50	
<p>Note 1: This refers to the value of Thresh<sub>x, low</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell.</p> <p>Note 2: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled</p>			

**Table A.5.4Q: Cell re-selection UTRAN to E-UTRAN cell case (cell 2)**

Parameter	Unit	Cell 2 (E-UTRA)	
		T1	T2
E-UTRA RF Channel number		1	
BW <sub>channel</sub>	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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		

Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-84	-84
$\hat{E}_s / N_{oc}$	dB	14	14
$\hat{E}_s / I_{ot}$	dB	14	14
Treselection <sub>EUTRAN</sub>	s	0	
Snonintrasearch	dB	50	
Thresh <sub>x, high</sub>	dB	40	
Propagation Condition		AWGN	
Note 1:	OCNG shall be used such that cell 2 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 <sub>x, high</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.		

#### A.5.5.5.2.2 Test Requirements

The cell reselection 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 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 shall be less than 5.7 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

$$T_{\text{reselection}, E\text{-UTRAN}} = T_{\text{identify}, E\text{-UTRAN}} + 40 + T_{\text{SI}} + T_{\text{RA}}, \text{ where:}$$

$T_{\text{SI}}$  = the maximum time allowed acquire system information from a E-UTRAN cell, 1280msec [24].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure, 30msec [24]

$T_{\text{identify}, E\text{-UTRAN}}$  = Time to identify an E-UTRA cell, as defined in section 8.4a.2.6.1

This gives a total of 5.61 s, allow 5.7 s in the test case.

#### A.5.5.5.3 Reselection to E-UTRA FDD when HS-DSCH 2<sup>nd</sup> DRX is configured (E-UTRA has higher priority)

##### A.5.5.5.3.1 Test Purpose and Environment

This test is to verify the requirement for the UTRA FDD to E-UTRA FDD inter-RAT cell reselection delay reported in section 5.5.2.1.5

The test scenario comprises two different cells, with cell 1 being the UTRA serving cell and cell 2 being the E-UTRA cell to be re-selected to. Test parameters are given in Tables A.5.4R, A.5.4S, A.5.4T. The test consists of two successive time periods, with time duration of T1, T2. UTRA cell 1 is already identified by the UE prior to the start of the test. Cell2 shall have higher priority than Cell 1.

Cell 1 and cell 2 shall belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

CELL\_FACH with discontinuous HS-DSCH reception and 2<sup>nd</sup> DRX cycle should be configured. The UE should not be scheduled with HS-DSCH data during T1 and T2 such that the DRX cycle becomes active.

**Table A.5.4R: General test parameters for UTRAN to E-UTRA Cell Reselection**

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	
	HS-DSCH second DRX cycle <sub>FACH</sub>	frames	512	Length of the DRX cycle
	HS-DSCH second Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
	T329	msec	500	Number of seconds until the DRX cycle is initiated
	DRX level		Single level DRX	Second DRX only active
	HCS			Not used
	E-UTRA PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
	E-UTRA access barring information		Not sent	No additional delays in random access procedure
	T1	s	>20	During T1, cell 2 shall be powered off, and during the off time its 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	70	T2 needs to be defined so that cell re-selection reaction time is taken into account.

**Table A.5.4S: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
HS-PDSCH_Ec/Ior (Note 2)	dB	-10	
HS-SCCH1_Ec/Ior (Note 2)	dB	-13	
OCNS_Ec/Ior	dB	-1.837	
$\hat{I}_{or}/I_{oc}$	dB	13	13
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	s	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
SsearchE-UTRA	dB	Not sent	
Thresh <sub>x,high</sub> (Note 1)	dB	48	
Propagation Condition		AWGN	
Note 1: This refers to the value of Thresh <sub>x,high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell. Note 2: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled			

**Table A.5.4T: Cell specific test parameters for UTRAN to E-UTRA cell reselection (cell 2)**

Parameter	Unit	Cell 2	
		T1	T2
E-UTRA RF Channel number		2	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in TS 36.133 A.3.2.1.2 (OP.2 FDD) [24]		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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		

Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-infinity	-86
$\hat{E}_s/N_{oc}$	dB	-infinity	12
$\hat{E}_s/I_{ot}$	dB	-infinity	12
Treselection <sub>EUTRAN</sub>	s	0	
Snonintrasearch	dB	Not sent	
Thresh <sub>serv,low</sub>	dB	44	
Thresh <sub>x,low</sub> (Note 2)	dB	42	
Propagation Condition		AWGN	
Note 1:	OCNG shall be used such that cell 2 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 <sub>x,low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.		

### A.5.5.5.3.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send 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 shall be less than 66 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:

$$T_{\text{reselection, E-UTRAN}} = T_{\text{HigherPrioritySearch}} + T_{\text{Identify, E-UTRAN}} + 40 + T_{\text{SI}} + T_{\text{RA}}, \text{ where:}$$

$T_{\text{SI}}$  = the maximum time allowed acquire system information from a E-UTRAN cell, 1280msec [24].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure, 30msec [24]

$T_{\text{Identify, E-UTRAN}}$  = Time to identify an E-UTRA cell, as defined in section 8.4a.2.6.1

$T_{\text{higher\_priority\_search}}$  is described in section 4.2.2

This gives a total of 65.67, allow 66 s in the test case.

### A.5.5.5.4 Reselection to E-UTRA TDD when HS-DSCH DRX is configured (E-UTRA has higher priority)

#### A.5.5.5.4.1 Test Purpose and Environment

This test is to verify the requirement for the UTRA FDD to E-UTRA TDD inter-RAT cell reselection delay reported in section 5.5.2.1.5

The test scenario comprises two different cells, with cell 1 being the UTRA serving cell and cell 2 being the E-UTRA cell to be re-selected to. Test parameters are given in Tables A.5.4U, A.5.4V, A.5.4W. The test consists of two successive time periods, with time duration of T1, T2. UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

Cell 1 and cell 2 shall belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

CELL\_FACH with discontinuous HS-DSCH reception should be configured. The UE should not be scheduled with HS-DSCH data during T1 and T2 such that the DRX cycle becomes active.

**Table A.5.4U: General test parameters for UTRAN to E-UTRA Cell Reselection**

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	
	HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	Length of the DRX cycle
	HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
	T321	msec	100	Number of seconds until the DRX cycle is initiated
	HCS			Not used
	E-UTRA PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
	E-UTRA access barring information		Not sent	No additional delays in random access procedure
	T1	s	>70	During T1, cell 2 shall be powered off, and during the off time its 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	70	T2 needs to be defined so that cell re-selection reaction time is taken into account.



**Table A.5.4V: Cell specific test parameters for UTRAN to E-UTRA TDD cell reselection (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
HS-PDSCH_Ec/Ior	dB	-10	
HS-SCCH1_Ec/Ior	dB	-13	
OCNS_Ec/Ior	dB	-1.837	
$\hat{I}_{or}/I_{oc}$	dB	13	13
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	s	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
SsearchE-UTRA	dB	Not sent	
Thresh <sub>x,high</sub> (Note 1)	dB	48	
Propagation Condition		AWGN	
Note 1: This refers to the value of Thresh <sub>x,high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell. Note 2: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled			

**Table A.5.4W: Cell specific test parameters for UTRAN to E-UTRA TDD cell reselection (cell 2)**

Parameter	Unit	Cell 2	
		T1	T2
E-UTRA RF Channel number		2	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in TS 36.133 A.3.2.2.2 (OP.2 TDD) [24]		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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		

Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-infinity	-86
$\hat{E}_s/N_{oc}$	dB	-infinity	12
$\hat{E}_s/I_{ot}$	dB	-infinity	12
Treselection <sub>EUTRAN</sub>	s	0	
Snonintrasearch	dB	Not sent	
Thresh <sub>serv,low</sub>	dB	44	
Thresh <sub>x,low</sub> (Note 2)	dB	42	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell 2 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 <sub>x,low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.			

#### A.5.5.5.4.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send 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 shall be less than 66 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:

$$T_{\text{reselection, E-UTRAN}} = T_{\text{HigherPrioritySearch}} + T_{\text{Identify, E-UTRAN}} + 40 + T_{\text{SI}} + T_{\text{RA}}, \text{ where:}$$

$T_{\text{SI}}$  = the maximum time allowed acquire system information from a E-UTRAN cell, 1280msec [24].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure, 30msec [24]

$T_{\text{Identify, E-UTRAN}}$  = Time to identify an E-UTRA cell, as defined in section 8.4a.2.6.1

$T_{\text{higher\_priority\_search}}$  is described in section 4.2.2

This gives a total of 65.70, allow 66 s in the test case.

#### A.5.5.5.5 Reselection to E-UTRA TDD when HS-DSCH DRX is configured (E-UTRA has lower priority)

##### A.5.5.5.5.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to E-UTRAN cell reselection delay reported in section 5.5.2.1.5.

This scenario implies the presence of 1 UTRAN serving cell, and 1 E-UTRAN cell to be re-selected. The UE is requested to monitor neighbouring cells on 1 UTRAN carrier and 1 E-UTRAN carrier. Test parameters are given in Table, A.5.4X, A.5.4Y, A.5.4Z. The test consists of two successive time periods, with time duration of T1 and T2, respectively. Both UTRA cell 1 and E-UTRA cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than cell 1. Cell 1 and cell 2 shall belong to different tracking areas.

CELL\_FACH with discontinuous HS-DSCH reception and with only the first DRX cycle active should be configured. The UE should not be scheduled with HS-DSCH data during T1 and T2 such that the DRX cycle becomes active.

**Table A.5.4X: General test parameters for UTRAN to E-UTRAN Cell Re-selection**

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	UTRAN cell
	Neighbour cell		Cell 2	E-UTRAN cell
Final condition	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
	HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	DRX cycle length
	HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
	T321	msec	100	Time before the DRX cycle is activated
	E-UTRA PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
	E-UTRA access barring information		Not sent	No additional delays in random access procedure
	T1	s	>20	T1 need to be defined so that cell re-selection reaction time is taken into account.
	T2	s	7	T2 need to be defined so that cell re-selection reaction time is taken into account.

**Table A.5.4Y: Cell re-selection UTRAN to E-UTRAN TDD cell case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
HS-PDSCH_Ec/Ior (Note 2)	dB	-10	
HS-SCCH1_Ec/Ior (Note 2)	dB	-13	
OCNS_Ec/Ior	dB	-1.837	
$\hat{I}_{or} / I_{oc}$	dB	11	-5
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.33	-16.19
CPICH_RSCP	dBm	-69	-85
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH Ec/N0	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qhyst1	dB	0	
Treselection	s	0	
Sprioritysearch1	dB	62	
Sprioritysearch2	dB	0	
Thresh <sub>serv, low</sub>	dB	36	
Thresh <sub>x, low</sub> (Note 1)	dB	50	

Note 1: This refers to the value of Thresh<sub>x, high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell.

Note 2: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled

**Table A.5.4Z: Cell re-selection UTRAN to E-UTRAN TDD cell case (cell 2)**

Parameter	Unit	Cell 2 (E-UTRA)	
		T1	T2
E-UTRA RF Channel number		1	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		

Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-84	-84
$\hat{E}_s / N_{oc}$	dB	14	14
$\hat{E}_s / I_{ot}$	dB	14	14
Treselection <sub>EUTRAN</sub>	s	0	
Snonintrasearch	dB	50	
Thresh <sub>x, high</sub>	dB	40	
Propagation Condition		AWGN	
Note 1:	OCNG shall be used such that cell 2 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 <sub>x, high</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell		

#### A.5.5.5.2 Test Requirements

The cell reselection 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 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 shall be less than 5.7 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

$T_{\text{reselection, E-UTRAN}} = T_{\text{identify, E-UTRAN}} + 40 + T_{\text{SI}} + T_{\text{RA}}$ , where:

$T_{\text{SI}}$  = the maximum time allowed acquire system information from a E-UTRAN cell, 1280msec [24].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure, 30msec [24]

$T_{\text{identify, E-UTRAN}}$  = Time to identify an E-UTRA cell, as defined in section 8.4a.2.6.1

This gives a total of 5.61 s, allow 5.7s in the test case.

#### A5.5.5.6 Reselection to E-UTRA TDD when HS-DSCH 2<sup>nd</sup> DRX is configured configured (E-UTRA has higher priority)

##### A.5.5.5.6.1 Test Purpose and Environment

This test is to verify the requirement for the UTRA FDD to E-UTRA TDD inter-RAT cell reselection delay reported in section 5.5.2.1.5

The test scenario comprises two different cells, with cell 1 being the UTRA serving cell and cell 2 being the E-UTRA cell to be re-selected to. Test parameters are given in Tables A.5.4ZA, A.5.4ZB, A.5.4ZC. The test consists of two successive time periods, with time duration of T1, T2. UTRA cell 1 is already identified by the UE prior to the start of the test. Cell 2 shall have higher priority than Cell 1.

Cell 1 and cell 2 shall belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

CELL\_FACH with discontinuous HS-DSCH reception and 2<sup>nd</sup> DRX cycle should be configured. The UE should not be scheduled with HS-DSCH data during T1 and T2 such that the DRX cycle becomes active

Table A.5.4ZA: General test parameters for UTRAN to E-UTRA TDD Cell Reselection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	
T2 end condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
	Neighbour cell		Cell1	
	HS-DSCH second DRX cycle <sub>FACH</sub>	frames	512	Length of the DRX cycle
	HS-DSCH second Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
	T329	msec	500	Number of seconds until the DRX cycle is initiated
	DRX level		Single level DRX	Second DRX only active
	HCS			Not used
	E-UTRA PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
	E-UTRA access barring information		Not sent	No additional delays in random access procedure
	T1	s	>20	During T1, cell 2 shall be powered off, and during the off time its 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	70	T2 needs to be defined so that cell re-selection reaction time is taken into account.

**Table A.5.4ZB: Cell specific test parameters for UTRAN to E-UTRA TDD cell reselection (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
HS-PDSCH_Ec/Ior	dB	-10	
HS-SCCH1_Ec/Ior	dB	-13	
OCNS_Ec/Ior	dB	-1.837	
$\hat{I}_{or}/I_{oc}$	dB	13	13
$I_{oc}$	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-10.21	-10.21
CPICH_RSCP	dBm	-67	-67
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Treselection	s	0	
Sprioritysearch1	dB	42	
Sprioritysearch2	dB	0	
SsearchE-UTRA	dB	Not sent	
Thresh <sub>x,high</sub> (Note 1)	dB	48	
Propagation Condition		AWGN	
Note 1: This refers to the value of Thresh <sub>x,high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell. Note 2: The UE under test shall not be continuously scheduled to ensure that it operates in DRX when the reselection is being performed. The test equipment shall schedule with a different common H-RNTI when the UE under test is not being scheduled			

**Table A.5.4ZC: Cell specific test parameters for UTRAN to E-UTRA TDD cell reselection (cell 2)**

Parameter	Unit	Cell 2	
		T1	T2
E-UTRA RF Channel number		2	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in TS 36.133 A.3.2.2.2 (OP.2 TDD) [24]		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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		

Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-infinity	-86
$\hat{E}_s / N_{oc}$	dB	-infinity	12
$\hat{E}_s / I_{ot}$	dB	-infinity	12
Treselection <sub>EUTRAN</sub>	s	0	
Snonintrasearch	dB	Not sent	
Thresh <sub>serv, low</sub>	dB	44	
Thresh <sub>x, low</sub> (Note 2)	dB	42	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that cell 2 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 <sub>x, low</sub> which is included in E-UTRA system information, and is a threshold for the UTRA target cell.			

### A.5.5.5.6.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send 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 shall be less than 66 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:

$$T_{\text{reselection, E-UTRAN}} = T_{\text{HigherPrioritySearch}} + T_{\text{Identify, E-UTRAN}} + 40 + T_{\text{SI}} + T_{\text{RA}}, \text{ where:}$$

$T_{\text{SI}}$  = the maximum time allowed acquire system information from a E-UTRAN cell, 1280msec [24].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure, 30msec [24]

$T_{\text{Identify, E-UTRAN}}$  = Time to identify an E-UTRA cell, as defined in section 8.4a.2.6.1

$T_{\text{higher\_priority\_search}}$  is described in section 4.2.2

This gives a total of 65.70, allow 66 s in the test case.

### A.5.5.5.7 Reselection to E-UTRA FDD with FACH measurement occasions configured

#### A.5.5.5.7.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to E-UTRA cell re-selection delay reported in section 5.5.2.1.5 with measurement occasions configured.

This scenario implies the presence of 1 UTRAN serving cell, and 1 E-UTRA FDD cell to be re-selected. The UE is requested to monitor neighbouring cells on 2 UMTS carriers, 12 GSM cells and 1 E-UTRA FDD carrier. Test parameters are given in Table, A.5.4ZF, A.5.4ZG and A.5.4ZH. During time phase T1, the E-UTRA cell can be identified but is not sufficiently strong to trigger reselection. Cell 2 is of higher priority than cell 1. The GERAN neighbour cells are not assigned any absolute priority.

The transport and physical parameters of the S-CCPCH carrying the FACH are defined in Table A.5.4ZD and Table A.5.4ZE.



**Table A.5.4ZD: Physical channel parameters for S-CCPCH.**

Parameter	Unit	Level
Channel bit rate	Kbps	60
Channel symbol rate	Ksps	30
Slot Format #1	-	4
TFCI	-	OFF
Power offsets of TFCI and Pilot fields relative to data field	dB	0

**Table A.5.4ZE: Transport channel parameters for S-CCPCH**

Parameter	FACH
Transport Channel Number	1
Transport Block Size	240
Transport Block Set Size	240
Transmission Time Interval	10 ms
Type of Error Protection	Convolution Coding
Coding Rate	$\frac{1}{2}$
Rate Matching attribute	256
Size of CRC	16
Position of TrCH in radio frame	Fixed

**Table A.5.4ZF General test parameters for UTRAN to E-UTRA Cell Re-selection**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
HCS				Not used
T1		S	9	
T2		S	3	
FACH Measurement occasion cycle length coefficient			3	N_TTI=1
GSM neighbour cell list				Includes 12 GSM Cells
UTRA intrafrequency neighbour cell list				Includes cell 1 and 23 other cells on channel 1
UTRA interfrequency neighbour cell list				Includes 24 interfrequency neighbour cells on UARFCN channel 3
E-UTRA cell list				Includes channel 2
CELL_FACH Absolute Priority Measurement Indicator			All layers	

**Table A.5.4ZG: Cell re-selection UTRAN to E-UTRA cell case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
S-CCPCH_Ec/lor	dB	-12	
OCNS_Ec/lor	dB	-1.294	
$\hat{I}_{or}/I_{oc}$	dB	0	
$I_{oc}$	dBm/3,84 MHz	-69	
CPICH_Ec/lo	dB	-13	
CPICH_RSCP	dBm	-79	
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH RSCP	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qoffset1 <sub>s,n</sub>	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	S	0	
Ssearch <sub>RAT</sub>	dB	Not sent	
S <sub>prioritysearch1</sub>	dB	0	
S <sub>prioritysearch2</sub>	dB	0 (default)	
S <sub>searchE-UTRA</sub>	dB	Not sent	
Thresh <sub>x,high</sub> (Note 1)	dB	48	
Propagation Condition		AWGN	
Note 1: This refers to the value of Thresh <sub>x,high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell.			

**Table A.5.4ZH: Cell re-selection UTRAN to E-UTRA cell case (cell 2)**

Parameter	Unit	Cell 2	
		T1	T2
E-UTRA RF Channel number		2	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in TS 36.133 A.3.2.1.2 (OP.2 FDD) [24]		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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		

Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-98	-86
$\hat{E}_s / N_{oc}$	dB	0	12
$\hat{E}_s / I_{ot}$	dB	0	12
Treselection <sub>EUTRAN</sub>	S	0	
Snonintrasearch	dB	Not sent	
Thresh <sub>serv, low</sub>	dB	30	

#### A.5.5.5.7.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send 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 shall be less than 2.5 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE1: The cell re-selection delay can be expressed as:

$$T_{\text{reselection}, \text{E-UTRAN}} = T_{\text{measurement}, \text{E-UTRAN}} + 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

where

$T_{\text{measurement}, \text{E-UTRAN}}$  = Time to measure E-UTRA RSRP or RSRQ, as defined in section 8.4.2.6.2, 1120ms.

$T_{\text{BCCH}}$  = The maximum time allowed to read BCCH data from the E-UTRAN cell, 1280ms [24].  $T_{\text{RA}}$  = the additional delay caused by the random access procedure, 30msec [24]

This gives a total of 2460ms, allow 2.5 seconds in the test case.

NOTE2: The reselection delay is based on  $N_{\text{freq}}=2$  since measurements of GERAN are not required by the higher layers in this scenario.

### A.5.5.5.8 Reselection to E-UTRA TDD with FACH measurement occasions configured

#### A.5.5.5.8.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to E-UTRA cell re-selection delay reported in section 5.5.2.1.5 with measurement occasions configured.

This scenario implies the presence of 1 UTRAN serving cell, and 1 E-UTRA TDD cell to be re-selected. The UE is requested to monitor neighbouring cells on 2 UMTS carriers, 12 GSM cells and 1 E-UTRA TDD carrier. Test parameters are given in Table, A.5.4ZK, A.5.4ZL and A.5.5.4ZM. During time phase T1, the E-UTRA cell can be identified but is not sufficiently strong to trigger reselection. Cell 2 is of higher priority than cell 1. The GERAN neighbour cells are not assigned any absolute priority.

The transport and physical parameters of the S-CCPCH carrying the FACH are defined in Table A.5.4ZI and Table A.5.4ZJ.

**Table A.5.4ZI: Physical channel parameters for S-CCPCH.**

Parameter	Unit	Level
Channel bit rate	Kbps	60
Channel symbol rate	Ksps	30
Slot Format #1	-	4
TFCI	-	OFF
Power offsets of TFCI and Pilot fields relative to data field	dB	0

**Table A.5.4ZJ: Transport channel parameters for S-CCPCH**

Parameter	FACH
Transport Channel Number	1
Transport Block Size	240
Transport Block Set Size	240
Transmission Time Interval	10 ms
Type of Error Protection	Convolution Coding
Coding Rate	$\frac{1}{2}$
Rate Matching attribute	256
Size of CRC	16
Position of TrCH in radio frame	Fixed

**Table A.5.4ZK General test parameters for UTRAN to E-UTRA Cell Re-selection**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
HCS				Not used
T1		S	9	
T2		S	3	
FACH Measurement occasion cycle length coefficient			3	N_TTI=1
GSM neighbour cell list				Includes 12 GSM Cells
UTRA intrafrequency neighbour cell list				Includes cell 1 and 23 other cells on channel 1
UTRA interfrequency neighbour cell list				Includes 24 interfrequency neighbour cells on UARFCN channel 3
E-UTRA cell list				Includes channel 2
CELL_FACH Absolute Priority Measurement Indicator			All layers	

**Table A.5.4ZL: Cell re-selection UTRAN to E-UTRA cell case (cell 1)**

Parameter	Unit	Cell 1 (UTRA)	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/lor	dB	-10	
PCCPCH_Ec/lor	dB	-12	
SCH_Ec/lor	dB	-12	
PICH_Ec/lor	dB	-15	
S-CCPCH_Ec/lor	dB	-12	
OCNS_Ec/lor	dB	-1.294	
$\hat{I}_{or}/I_{oc}$	dB	0	
$I_{oc}$	dBm/3,84 MHz	-69	
CPICH_Ec/lo	dB	-13	
CPICH_RSCP	dBm	-79	
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH RSCP	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
Qoffset1 <sub>s,n</sub>	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	S	0	
Ssearch <sub>RAT</sub>	dB	not sent	
Sprioritysearch1	dB	0	
Sprioritysearch2	dB	0 (default)	
SsearchE-UTRA	dB	Not sent	
Thresh <sub>x,high</sub> (Note 1)	dB	48	
Propagation Condition		AWGN	
Note 1: This refers to the value of Thresh <sub>x,high</sub> which is included in UTRA system information, and is a threshold for the E-UTRA target cell.			

**Table A.5.4ZM: Cell re-selection UTRAN to E-UTRA cell case (cell 2)**

Parameter	Unit	Cell 2	
		T1	T2
E-UTRA RF Channel number		2	
BW <sub>channel</sub>	MHz	10	
OCNG Patterns defined in A.3.2.1.1 (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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		

Qrxlevmin	dBm	-140	
$N_{oc}$	dBm/15 kHz	-98	
RSRP	dBm/15 KHz	-98	-86
$\hat{E}_s/N_{oc}$	dB	0	12
$\hat{E}_s/I_{ot}$	dB	0	12
TreselectionEUTRAN	S	0	
Snonintrasearch	dB	Not sent	
Thresh <sub>serv, low</sub>	dB	30	

### A.5.5.5.8.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send 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 shall be less than 2.5 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE1: The cell re-selection delay can be expressed as:

$$T_{\text{reselection, E-UTRAN}} = T_{\text{measurement, E-UTRAN}} + 40 + T_{\text{BCCH}} + T_{\text{RA}} \text{ ms}$$

where

$T_{\text{measurement, E-UTRAN}}$  = Time to measure E-UTRA RSRP or RSRQ, as defined in section 8.4.2.6.2, 1120ms.

$T_{\text{BCCH}}$  = The maximum time allowed to read BCCH data from the E-UTRAN cell, 1280ms [24].

$T_{\text{RA}}$  = the additional delay caused by the random access procedure, 30msec [24]

This gives a total of 2460ms, allow 2.5 seconds in the test case.

NOTE2: The reselection delay is based on  $N_{\text{freq}}=2$  since measurements of GERAN are not required by the higher layers in this scenario.

## A.5.6 Cell Re-selection in CELL\_PCH

### A.5.6.1 One frequency present in the neighbour list

#### A.5.6.1.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_PCH state in section 5.6.2.

The test parameters are given in Table A5.5 and A5.6. The UE is requested to monitor neighbouring cells on 1 carrier. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms.

Table A.5.5: General test parameters for Cell Re-selection in CELL\_PCH

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
Final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
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	15	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.5.6: Cell specific test parameters for Cell re-selection in CELL\_PCH state

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
OCNS_Ec/Ior	dB	-0.941		-0.941		-0.941		-0.941		-0.941		-0.941	
$\hat{I}_{or} / I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27		0.27		0.27		0.27	
$I_{oc}$	dBm/ 3,84MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-23		-23		-23		-23	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset <sub>2s,n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0		C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0		C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0		C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0		C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0		C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0	
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

### A.5.6.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the CELL UPDATE message with cause value "cell reselection" in Cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{\text{evaluateFDD}} + T_{\text{SI}}$ ,

where:

$T_{\text{evaluateFDD}}$ : See section 5.6.2.

$T_{\text{SI}}$ : Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

## A.5.6.2 Two frequencies present in the neighbour list

### A.5.6.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL\_PCH state in section 5.6.2. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms.

The test parameters are given in Table A.5.7 and A.5.8

**Table A.5.7: General test parameters for Cell Re-selection in CELL\_PCH**

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	30	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	15	T2 need to be defined so that cell re-selection reaction time is taken into account.



Table A.5.8: Cell specific test parameters for Cell re-selection in CELL\_PCH state

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
OCNS_Ec/Ior	dB	-0.941		-0.941		-0.941		-0.941		-0.941		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-3.4	2.2	2.2	-3.4	-7.4	-4.8	-7.4	-4.8	-4.8	-7.4	-4.8	-7.4
$I_{oc}$	dBm/ 3,84 MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-20		-20		-20		-20	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH Ec/N0		CPICH Ec/N0		CPICH Ec/N0		CPICH Ec/N0		CPICH Ec/N0		CPICH Ec/N0	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset2s_n	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

### A.5.6.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the CELL UPDATE message with cause value "cell reselection" in Cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{\text{evaluateFDD}} + T_{\text{SI}}$ ,

where:

$T_{\text{evaluateFDD}}$ : See section 5.6.2.

$T_{\text{SI}}$ : Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

### A.5.6.3 Cell re-selection during an MBMS session, one UTRAN inter-frequency and 2 GSM cells present in the neighbour list

#### A.5.6.3.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the GSM BSIC identification for UEs in an MBMS PTM session according to section 4.2.2.3 and 4.2.2.5. Furthermore, the required functionality on the limitation of measurements in dependence of the MBMS TTI as specified in section 4.2.2.9 are tested.

This scenario implies the presence of 1 UTRAN serving cell, 1 UTRAN inter-frequency cell and 2 GSM cells of which one is to be re-selected. The UE is requested to monitor neighbor cells on 2 UMTS carriers (Channel 1, Channel 2) and 12 GSM cells. Test parameters are given in Tables A.5.8A, A.5.8B, A.5.8C, A.5.8D and A.5.8E.

**Table A.5.8A: General test parameters for Cell Re-selection**

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UMTS cell providing the MBMS session
	Neighbour cells		Cell1	UMTS inter-frequency neighbour cell
			Cell3, Cell4	GSM cells
Final condition	Active cell		Cell3	
DRX cycle length		ms	160	
HCS				Not used
MBMS preferred frequency layer				Not used
T1		s	15 (initial), 5 repeated	
T2		s	45	
T3		s	7	

The transport and physical channel parameters of the S-CCPCH carrying the MTCH are defined in Table A.5.8B and Table A.5.8C

**Table A.5.8B: Physical channel parameters for S-CCPCH carrying the MTCH.**

Parameter	Unit	Level
Channel bit rate	kbps	960
Channel symbol rate	ksps	480
Slot Format #1	-	14
TFCI	-	ON
Power offsets of TFCI and Pilot fields relative to data field	dB	0

**Table A.5.8C: Transport channel parameters for S-CCPCH**

Parameter	FACH
Transport Channel Number	1
Transport Block Size	2536
Transport Block Set Size	10144
Transmission Time Interval	40ms
Type of Error Protection	Turbo Coding
Coding Rate	1/3
Rate Matching attribute	256
Size of CRC	16
Position of TrCH in radio frame	Flexible

Table A.5.8D: Cell specific test parameters for serving Cell2 and inter-frequency neighbour Cell1

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1			Channel 2		
CPICH_Ec/lor	dB	-10			-10		
PCCPCH_Ec/lor	dB	-12			-12		
SCH_Ec/lor	dB	-12			-12		
PICH_Ec/lor	dB	-15			-15		
S-CCPCH_1_Ec/lor	dB	-12			-12		
S-CCPCH_2_Ec/lor	dB	n.a.			-6,8		
OCNS_Ec/lor	dB	Note 1			Note 1		
$\hat{I}_{or}/I_{oc}$	dB	-infinity	-4.75	-infinity	0	0	-15
$I_{oc}$	dBm/3,84 MHz	-70					
CPICH_Ec/lo	dB	-infinity	-16	-infinity	-13	-13	-25.14
CPICH_RSCP		-infinity	-84,75	-infinity	-80	-80	-95
Propagation Condition		AWGN					
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>			CPICH E <sub>c</sub> /N <sub>0</sub>		
Qqualmin	dB	-20			-20		
Qrxlevmin	dBm	-115			-115		
UE_TXPWR_MAX_RACH	dBm	21			21		
Qoffset2 <sub>s,n</sub>	dB	C1, C2: 0			C2, C1: 0		
Qhyst2	dB	0			0		
Qoffset1 <sub>s,n</sub>	dB				C2, C3: 0; C2, C4: 0		
Qhyst1	dB	0			0		
Treselection	s	0			0		
Sintrasearch	dB	not sent			not sent		
Sintersearch	dB	not sent			not sent		
SsearchRAT	dB	not sent			not sent		

NOTE 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to lor.

Table A.5.8E: Cell re-selection parameters for GSM cells case (cell 3 and cell4,cell5,cell6)

Parameter	Unit	Cell 3 (GSM)			Cell 4 (GSM)		
		T1	T2	T3	T1	T2	T3
Absolute RF Channel Number		ARFCN 2			ARFCN 1		
RXLEV	dBm	-infinity	-85	-85	-infinity	-85	-infinity
RXLEV_ACCESS_MIN	dBm	-104			-104		
MS_TXPWR_MAX_CCH	dBm	33			33		

### A.5.6.3.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 3, and starts to send the RR Channel Request message for location update to Cell 3.

The cell re-selection delay shall be less than  $2,75 \text{ s} + T_{\text{BCCH}}$ , where  $T_{\text{BCCH}}$  is the maximum time allowed to read BCCH data from GSM cell [21].

During T1 and T2 the MTCH SDU ER shall not exceed 4.0%.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $\text{Max}(3 * T_{\text{measureFDD}}, T_{\text{measureGSM}} + \text{DRX cycle length}) + T_{\text{BCCH}}$ , where:

$T_{\text{measureFDD}}$  See Table 4.1 in section 4.2.2.

$T_{\text{measureGSM}}$  See Table 4.1 in section 4.2.2.

DRX cycle length 160mss see Table A.4.7.A

$T_{\text{BCCH}}$  Maximum time allowed to read BCCH data from GSM cell [21].  
According to [21], the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier, is 1.9 s.

This gives a total of  $2.72 \text{ s} + T_{\text{BCCH}}$ , allow  $2.75 \text{ s} + T_{\text{BCCH}}$  in the test case.

## A.5.7 Cell Re-selection in URA\_PCH

### A.5.7.1 One frequency present in the neighbour list

#### A.5.7.1.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in URA\_PCH state in section 5.7.2.

The test parameters are given in Table A.5.9 and A.5.10. The UE is requested to monitor neighbouring cells on 1 carrier. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms.

Cells possible for re-selection shall belong to different UTRAN Registration Areas (URA).

**Table A.5.9: General test parameters for Cell Re-selection in URA\_PCH**

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
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	15	T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.5.10: Cell specific test parameters for Cell re-selection in URA\_PCH state

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15		-15		-15	
OCNS_Ec/Ior	dB	-0.941		-0.941		-0.941		-0.941		-0.941		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	7.3	10.27	10.27	7.3	0.27		0.27		0.27		0.27	
$I_{oc}$	dBm/ 3,84 MHz	-70											
CPICH_Ec/Io	dB	-16	-13	-13	-16	-23		-23		-23		-23	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset <sub>2s,n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sinrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

### A.5.7.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the URA UPDATE message with cause value "URA reselection" in Cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{\text{evaluateFDD}} + T_{\text{SI}}$ ,

where:

$T_{\text{evaluateFDD}}$ : See section 5.7.2.

$T_{\text{SI}}$ : Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

## A.5.7.2 Two frequencies present in the neighbour list

### A.5.7.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in URA\_PCH state in section 5.7.2.

The test parameters are given in Table A5.11 and A5.12. The UE is requested to monitor neighbouring cells on 2 carriers. The maximum repetition period of the relevant system info blocks that needs to be received by the UE to camp on a cell shall be 1280 ms.

Cells possible for re-selection shall belong to different UTRAN Registration Areas (URA).

**Table A.5.11: General test parameters for Cell Re-selection in URA\_PCH**

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell2	
	Neighbour cells		Cell1, Cell3, Cell4, Cell5, Cell6	
final condition	Active cell		Cell1	
Access Service Class (ASC#0) - Persistence value		-	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
HCS				Not used
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	30	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	15	T2 need to be defined so that cell re-selection reaction time is taken into account.

**Table A.5.12: Cell specific test parameters for Cell re-selection in URA\_PCH state**

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		Cell 6	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2		Channel 1		Channel 1		Channel 2		Channel 2	
CPICH_Ec/lor	dB	-10		-10		-10		-10		-10		-10	
PCCPCH_Ec/lor	dB	-12		-12		-12		-12		-12		-12	
SCH_Ec/lor	dB	-12		-12		-12		-12		-12		-12	
PICH_Ec/lor	dB	-15		-15		-15		-15		-15		-15	
OCNS_Ec/lor	dB	-0.941		-0.941		-0.941		-0.941		-0.941		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-3.4	2.2	2.2	-3.4	-7.4	-4.8	-7.4	-4.8	-4.8	-7.4	-4.8	-7.4
$I_{oc}$	dBm/3,84 MHz	-70											
CPICH_Ec/lo	dB	-16	-13	-13	-16	-20		-20		-20		-20	
Propagation Condition		AWGN											
Cell_selection_and_reselection_quality_measure		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>		CPICH E <sub>c</sub> /N <sub>0</sub>	
Qqualmin	dB	-20		-20		-20		-20		-20		-20	
Qrxlevmin	dBm	-115		-115		-115		-115		-115		-115	
UE_TXPWR_MAX_RACH	dBm	21		21		21		21		21		21	
Qoffset2 <sub>s, n</sub>	dB	C1, C2: 0 C1, C3: 0 C1, C4: 0 C1, C5: 0 C1, C6: 0	C2, C1: 0 C2, C3: 0 C2, C4: 0 C2, C5: 0 C2, C6: 0	C3, C1: 0 C3, C2: 0 C3, C4: 0 C3, C5: 0 C3, C6: 0	C4, C1: 0 C4, C2: 0 C4, C3: 0 C4, C5: 0 C4, C6: 0	C5, C1: 0 C5, C2: 0 C5, C3: 0 C5, C4: 0 C5, C6: 0	C6, C1: 0 C6, C2: 0 C6, C3: 0 C6, C4: 0 C6, C5: 0						
Qhyst2	dB	0		0		0		0		0		0	
Treselection	s	0		0		0		0		0		0	
Sintrasearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	
Sintersearch	dB	not sent		not sent		not sent		not sent		not sent		not sent	

**A.5.7.2.2 Test Requirements**

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending URA UPDATE message with cause value "URA reselection" in Cell 1.

The cell re-selection delay shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay can be expressed as:  $T_{\text{evaluateFDD}} + T_{\text{SI}}$ ,

where:

$T_{\text{evaluateFDD}}$ : See section 5.7.2.

$T_{\text{SI}}$ : Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

## A.5.8 Serving HS-DSCH cell change

### A.5.8.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the delay when performing the serving HS-DSCH cell change in CELL\_DCH state specified in section 5.10.

The test parameters are given in Table A.5.13 and A.5.14 below. The test consists of 4 successive time periods, with a time duration of T1, T2, T3 and T4 respectively. At the start of time duration T1 the UE have cell 1 and cell 2 in active set and cell 1 as the serving HS-DSCH cell.

Data shall be transmitted continuously to the UE on the HS-DSCH channel.

**Table A.5.13: General test parameters for serving HS-DSCH cell change**

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control			On	
Target quality value on DTCH		BLER	0.001	
HSDPA parameters			Fixed Reference Channel Definition H-Set 1, with QPSK modulation only	As specified in TS 25.101 section A.7.1.1
Initial conditions	Active cells		Cell 1 and Cell 2	
	Serving HS-DSCH cell		Cell 1	
Final condition	Active cell		Cell 1 and Cell 2	
	Serving HS-DSCH cell		Cell 2	
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
CQI Feedback cycle, k		ms	2	
CQI repetition factor			1	
T1		s	5	
T2		s	3	
T3		s	0.5	
T4		ms	100	

Table A.5.14: Cell specific test parameters for serving HS-DSCH cell change

Parameter	Unit	Cell 1				Cell 2			
		T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number		Channel 1				Channel 1			
CPICH_Ec/Ior	dB	-10				-10			
PCCPCH_Ec/Ior	dB	-12				-12			
SCH_Ec/Ior	dB	-12				-12			
PICH_Ec/Ior	dB	-15				-15			
DPCH_Ec/Ior	dB	Note 1	Note 1	Note 1	N/A	N/A	N/A	Note 3	Note 1
HS-PDSCH_Ec/Ior	dB	-10			-inf	-inf			-10
HS-SCCH-1_Ec/Ior	dB	-13			-inf	-inf			-13
OCNS		Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
$\hat{I}_{or}/I_{oc}$	dB	3.64		1.14		1.14		3.64	
$I_{oc}$	dBm/ 3,84 MHz	-70							
CPICH_Ec/Io	dB	-13		-15.5		-15.5		-13	
Propagation Condition		AWGN							
Relative delay of paths received from cell 2 with respect to cell 1	Chips	{-148 ... 148} Note 4							
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ Note 3: The DPCH level is controlled by the power control loop. The initial power shall be set equal to the DPCH_Ec/Ior of Cell 1 at the end of T2. Note 4: The relative delay of the path from cell 2 with respect to cell 1 shall always be within $\pm 148$ chip.									

### A.5.8.1.1 Test procedure

- 1) The test is started at the beginning of T1.
- 2) During time period T2 an Event 1D triggered measurement report shall be sent by the UE.
- 3) During time period T3 UTRAN shall send a Physical Channel Configuration command with activation time now changing serving HS-DSCH from cell 1 to cell 2. The Physical Channel Configuration message shall be sent to the UE so that the whole message is available at the UE at the beginning of T4.

### A.5.8.2 Test Requirements

The UE shall start to transmit the CQI to cell 2 less than 74 ms from the beginning of time period T4.

The UE shall also start to receive the first HS-SCCH message from cell 2 less than 74 ms from the beginning of time period T4 and transmit the ACK or NAK which corresponds to the HS-SCCH message.

NOTE: The delay  $D_{\text{cell\_change}}$  equals the RRC procedure delay defined in TS25.331 Section 13.5.2 plus the interruption time of receiving HS-DSCH data stated in section 5.10.2.2.  
The RRC procedure delay is 50 ms and the interruption time is given by  $T_{\text{interrupt}1} = T_{\text{IU}} + 22 \text{ ms} = 24 \text{ ms}$ .

The total delay  $D_{\text{cell\_change}} = 50 + 24 \text{ ms} = 74 \text{ ms}$ .

## A.5.9 Enhanced Serving HS-DSCH cell change

### A.5.9.1 Test Purpose and Environment

This test case is only applicable to UEs which support enhanced HS-DSCH serving cell change.

The purpose of this test is to verify the requirement for the delay when performing the enhanced serving HS-DSCH cell change in CELL\_DCH state specified in section 5.11.



The test parameters are given in Table A.5.15 and A.5.16 below. The test consists of 4 successive time periods, with a time duration of T1, T2, T3 and T4 respectively. At the start of time duration T1 the UE has cell 1 and cell 2 in the active set and cell 1 as the serving HS-DSCH cell. Target cell preconfiguration is provided for cell 2 in the active set update. The target cell preconfiguration shall not contain the optional IE "Activation time offset". After sending event 1D during time period T2, the UE should start to monitor HS-SCCH-1 from cell 2. A single HS-SCCH order implying serving cell change starts to be transmitted from cell 2 during T3. By the start of T4, the single HS-SCCH order implying serving cell change completes transmission, and within the time specified in section 5.11 the UE shall also be monitoring the HS-SCCH-2 on target cell 2.

Data shall be transmitted continuously to the UE on the HS-DSCH channel of cell 1 during T1 and T2, and on the HS-DSCH channel of cell2 during T4.

**Table A.5.15: General test parameters for enhanced serving HS-DSCH cell change**

Parameter		Unit	Value	Comment
F-DPCH slot format			0	
Power Control			On	
Target quality value on F-DPCH		TPC BER	0.05	5%
HSDPA parameters			Fixed Reference Channel Definition H-Set 1, with QPSK modulation only	As specified in TS 25.101 section A.7.1.1
Initial conditions	Active cells		Cell 1 and Cell 2	
	Serving HS-DSCH cell		Cell 1	
Final condition	Active cell		Cell 1 and Cell 2	
	Serving HS-DSCH cell		Cell 2	
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
T1		s	5	
T2		s	1	
T3		ms	100	
T4		ms	100	

**Table A.5.16: Cell specific test parameters for enhanced serving HS-DSCH cell change**

Parameter	Unit	Cell 1				Cell 2			
		T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number		Channel 1				Channel 1			
CPICH_Ec/I <sub>or</sub>	dB	-10				-10			
PCCPCH_Ec/I <sub>or</sub>	dB	-12				-12			
SCH_Ec/I <sub>or</sub>	dB	-12				-12			
PICH_Ec/I <sub>or</sub>	dB	-15				-15			
F-DPCH_Ec/I <sub>or</sub>	dB	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
HS-PDSCH_Ec/I <sub>or</sub>	dB	-10		-inf		-inf		-10	
HS-SCCH-1_Ec/I <sub>or</sub>	dB	-13		-inf		-inf		-13	-inf
HS-SCCH-2_Ec/I <sub>or</sub>	dB	-inf				-inf			
OCNS		Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
$\hat{I}_{or}/I_{oc}$	dB	3.64	1.14			1.14	3.64		
$I_{oc}$	dBm/ 3,84 MHz	-70							
CPICH_Ec/I <sub>o</sub>	dB	-13	-15.5			-15.5	-13		
Propagation Condition		AWGN							
Relative delay of paths received from cell 2 with respect to cell 1	Chips	{-148 ... 148} Note 3							
Note 1: The F-DPCH level is controlled by the power control loop									
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .									
Note 3: The relative delay of the path from cell 2 with respect to cell 1 shall always be within $\pm 148$ chip.									

### A.5.9.1.1 Test procedure

- 1) The test is started at the beginning of T1.
- 2) During time period T2 an Event 1D triggered measurement report shall be sent by the UE.
- 3) During time period T3 UTRAN shall send an HS-SCCH order on HS-SCCH-1 from cell 2 implying enhanced serving HS-DSCH from cell 1 to cell 2. The HS-SCCH order message shall be sent to the UE so that the end of the TTI containing the HS-SCCH order corresponds to the beginning of T4.
- 4) At the start of T4, UTRAN shall transmit data to the UE using HS-SCCH-2 and HS-PDSCH on cell 2. Any ACK/NACK received from the UE indicates that the UE is monitoring HS-SCCH-2

### A.5.9.2 Test Requirements

The UE shall start to receive the first HS-SCCH message on HS-SCCH-2 from cell 2 within no more than 40 ms from the beginning of time period T4 and transmit the ACK or NACK which corresponds to the HS-SCCH message.

Note: Since HS-SCCH-2 on cell 2 is the only HS-SCCH which is being transmitted from the start of T4, either ACK or NACK transmission from the UE after the start of T4 implies that the enhanced serving cell change has been completed.

The rate of correct serving cell changes observed during repeated tests shall be at least 90%.

## A.5.10 Intrafrequency System information acquisition for CSG cell

### A.5.10.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for intrafrequency CSG SI acquisition in section 5.13.2. The test parameters are given in Table A.5.17 and A.5.18 below. In the measurement control information cell 2 shall be included in the "Intra-frequency SI Acquisition" IE. The test consists of two successive time periods, with time duration of T1 and T2 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

**Table A.5.17: General test parameters for intrafrequency CSG SI acquisition**

Parameter	Unit	Value	Comment
DCH parameters		DL and UL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1 and A.2.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Initial conditions	Active cell	Cell 1	
	Neighbouring cell	Cell 2	
Final condition	Active cell	Cell 1	Handover to cell 2 is not requested
Reporting range	dB	3	Applicable for event 1A
Hysteresis	dB	0	
W		1	Applicable for event 1A
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	Ms	0	
SIB3_REP	Frames	32	Applicable for cell 2 SIB3 scheduling
SIB3_SEG_COUNT		1	Applicable for cell 2 SIB3 scheduling
UE whitelist		Empty	
Monitored cell list size		24 on channel 1	Measurement control information is sent before the start of the test
CSG id (of cell 2)		Set to any non-empty value	
Filter coefficient		0	
T1	S	5	
T2	S	5	

**Table A.5.18: Cell specific test parameters for intrafrequency CSG SI acquisition**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
CPICH_Ec/I <sub>or</sub>	dB	-10		-10	
PCCPCH_Ec/I <sub>or</sub>	dB	-12		-12	
SCH_Ec/I <sub>or</sub>	dB	-12		-12	
PICH_Ec/I <sub>or</sub>	dB	-15		-15	
DPCH_Ec/I <sub>or</sub>	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	0	6.97	-Infinity	5.97
$I_{oc}$	dBm/ 3,84 MHz	-63.01	-70	Note 3	Note 3
CPICH_Ec/I <sub>o</sub>	dB	-13		-Infinity	-14
Propagation Condition		AWGN			
Note 1: The DPCH level is controlled by the power control loop					
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I <sub>or</sub> .					
Note 3: The I <sub>oc</sub> level is common for cell 1 and cell 2					

## A.5.10.2 Test Requirements

The UE shall transmit an Event 1A-triggered measurement report containing the cell identity and CSG identity of cell 2 and membership indication sent to false within [2.71] seconds from the start of T2

$$\begin{aligned}
 \text{Test requirement} &= T_{\text{identify intra}} + T_{\text{CSG-SI-Report}} \\
 &= 800 + [630] + 40 \cdot 32 \text{ from the start of T2} \\
 &= [2.71] \text{ seconds.}
 \end{aligned}$$

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled..

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

The measured quality on the DTCH of the UE downlink during T2 shall not exceed  $BLER=0.01\pm30\% = 0.013$

## A.5.11 Interfrequency System information acquisition for CSG cell

### A.5.11.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for interfrequency CSG SI acquisition in section 5.13.2. The test parameters are given in Table A.5.19 and A.5.20 below.

The test consists of three successive time periods, with a time duration T1, T2 and T3. The test parameters are given in tables A.5.19 and A.5.20 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used. The CPICH Ec/Io of the best cell on the unused frequency shall be reported together with Event 2C reporting. At the start of time duration T1, the UE may not have any timing information of cell 2.

During T2, the UE shall transmit a measurement report with event 2C, and UTRAN shall respond with a measurement control message which reconfigures interfrequency measurements with the Inter-frequency SI Acquisition IE containing the PSC of cell 2. The start of T3 is defined as the end of the last TTI containing this measurement control message.

**Table A.5.19: General test parameters for Handover to inter-frequency cell**

Parameter		Unit	Value	Comment
DCH parameters			DL and UL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1 and A.2.1
Power Control			On	
Target quality value on DTCH		BLER	0.001	
Compressed mode			A.22 set 1	As specified in TS 25.101 section A.5.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 1	Handover to cell 2 is not requested
Threshold non used frequency		dB	-18	Absolute Ec/I0 threshold for event 2C
Hysteresis		dB	0	
W non-used frequency			1	Applicable for event 2C
Time to Trigger		Ms	0	
Filter coefficient			0	
SIB3_REP		Frames	32	Applicable for cell 2 SIB3 scheduling
SIB3_SEG_COUNT			1	Applicable for cell 2 SIB3 scheduling
CSG id (of cell 2)			Set to any non-empty value	
CSG Indicator (of cell 2)			Set to TRUE	
UE whitelist			Empty	
Monitored cell list size			24 on channel 1 16 on channel 2	Measurement control information is sent before the compressed mode pattern starts.
T1		S	5	
T2		S	≤5	
T3		S	5	

**Table A.5.20: Cell Specific parameters for Handover to inter-frequency cell**

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1			Channel 2		
CPICH_Ec/I <sub>or</sub>	dB	-10			-10		
PCCPCH_Ec/I <sub>or</sub>	dB	-12			-12		
SCH_Ec/I <sub>or</sub>	dB	-12			-12		
PICH_Ec/I <sub>or</sub>	dB	-15			-15		
DPCH_Ec/I <sub>or</sub>	dB	Note 1			N/A		
OCNS		Note 2			-0.941		
$\hat{I}_{or}/I_{oc}$	dB	0			-Infinity	-1.8	-1.8
$I_{oc}$	dBm/3,84 MHz	-70					
CPICH_Ec/I <sub>o</sub>	dB	-13			-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 <sub>or</sub> .							

### A.5.11.2 Test Requirements

The UE shall transmit a measurement report containing the cell identity, CSG identity of cell 2 and membership indication set to FALSE within [1.96] seconds from the start of T3.

Test requirement = RRC Procedure delay + T<sub>CSG-SI-Report</sub>

= 50+ [630]+40\*32 from the start of T3

= [1.96] 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: The actual overall delays measured in the test may be up to 2 x TTI<sub>UL DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

The measured quality on the DTCH of the UE downlink measured from the start of T3 until 1.96 seconds after the start of T3 using loopback shall not exceed BLER= 0.612

- NOTE: The test BLER is defined from the requirements as follows:
- 600ms of downlink interruption and 600ms of uplink interruption may occur = 30 DTCH TTI
- Due to loopback delay (up to 10 TTI), this means that 30 + 30 = 60 TTI loopback throughput may be lost due to gaps in uplink and downlink
- There are 98 TTI in the test interval (1.96 seconds)
- The remaining 98-60 = 38 TTI should have a BLER not exceeding 0.001+30% = 0.0013

Overall maximum allowed BLER is (38/98)\*0.0013 + (60/98)\*1 = 0.612

## A.6 RRC Connection Control

### A.6.1 RRC Re-establishment delay

#### A.6.1.1 Test Purpose and Environment

The purpose is to verify that the RRC re-establishment delay is within the specified limits. These tests will verify the requirements in section 6.1.2.

##### A.6.1.1.1 TEST 1

The test parameters are given in table A.6.1 and table A.6.2 below. In the measurement control information it is indicated to the UE that periodic reporting shall be used. The test consist of 2 successive time periods, with a time duration of T1 and T2 respectively. At the start of time period T2, the dedicated channel is removed.

**Table A.6.1 General test parameters for RRC re-establishment delay, Test 1**

Parameter	Unit	Value	Comment
DCH Parameters		DL Reference measurement channel 12.2 kbps	As specified in TS 25.101, section A.3.1
Power Control		On	
Active cell, initial condition		Cell 1	
Active cell, final condition		Cell 2	
N313		20	
N315		1	
T313	Seconds	0	
T <sub>SI</sub>	ms	1280	Time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell (ms). Note: Since 1280 ms is one of the typical values for repeating system information blocks, T <sub>SI</sub> of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms.
Monitored cell list size		24	Monitored set shall only include intra frequency neighbours.
Cell 2			Included in the monitored set.
Reporting frequency	Seconds	4	
T1	s	10	
T2	s	6	

Table A.6.2 Cell specific parameters for RRC re-establishment delay test, Test 1

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
Cell Frequency	ChNr	1		1	
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DCH_Ec/Ior	dB	Note 1	-Infinity	Not applicable	
OCNS_Ec/Ior	dB	Note 2	-0.941	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	2,39	-Infinity	4,39	0,02
$I_{oc}$	dBm/ 3,84 MHz	-70			
CPICH_Ec/Io	dB	-15	-Infinity	-13	
Propagation Condition		AWGN			
Note 1:	The DPCH level is controlled by the power control loop				
Note 2:	The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .				

## A.6.1.1.2 TEST 2

The test parameters are given in table A.6.3 and table A.6.4 below. In the measurement control information it is indicated to the UE that periodic reporting shall be used. The test consists of 2 successive time periods, with a time duration of T1 and T2 respectively. At the start of time period T2, the dedicated channel is removed.

Table A.6.3 General test parameters for RRC re-establishment delay, Test 2

Parameter	Unit	Value	Comment
DCH Parameters		DL Reference measurement channel 12.2 kbps	As specified in TS 25.101, section A.3.1
Power Control		On	
Active cell, initial condition		Cell 1	
Active cell, final condition		Cell 2	
N313		20	
N315		1	
T313	Seconds	0	
T <sub>SI</sub>	ms	1280	Time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell (ms). Note: Since 1280 ms is one of the typical values for repeating system information blocks, T <sub>SI</sub> of 1280 ms could be increased by the RRC procedure delay in order to allow the SIB repetition period of 1280 ms.
Monitored cell list size		24	Monitored set shall include 2 additional frequencies.
Cell 2			Cell 2 is not included in the monitored set. Cell 2 is located on one of the 2 additional frequencies of the monitored set.
Reporting frequency	Seconds	4	
T1	s	10	
T2	s	6	

Table A.6.4 Cell specific parameters for RRC re-establishment delay test, Test 2

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
Cell Frequency	ChNr	1		2	
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DCH_Ec/Ior	dB	Note 1	-Infinity	Not applicable	
OCNS_Ec/Ior	dB	Note 2	-0.941	-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-3,35	-Infinity	-Infinity	0,02
$I_{oc}$	dBm/ 3,84 MHz	-70			
CPICH_Ec/Io	dB	-15	-Infinity	-Infinity	-13
Propagation Condition		AWGN			
NOTE 1: The DPCH level is controlled by the power control loop					
NOTE 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .					

## A.6.1.2 Test Requirements

### A.6.1.2.1 Test 1

The Re-establishment delay  $T_{RE-ESTABLISH}$  to a known cell shall be less than 1.9s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The Re-establishment delay in this case can be expressed as

$$T_{RE-ESTABLISH} = T_{RRC-RE-ESTABLISH} + T_{UE-RE-ESTABLISH-REQ-KNOWN}$$

where

$$T_{RRC-RE-ESTABLISH} = 160\text{ms} + (N_{313} - 1) * 10\text{ms} + T_{313}$$

$$T_{UE-RE-ESTABLISH-REQ-KNOWN} = 50\text{ms} + T_{\text{search}} + T_{SI} + T_{RA}$$

$$N_{313} = 20$$

$$T_{313} = 0\text{s}$$

$$T_{\text{search}} = 100\text{ms}$$

$T_{RA}$  = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

$T_{SI}$  is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell (ms). 1280 ms is assumed in this test case.

This gives a total of 1820ms, allow 1.9s in the test case.

### A.6.1.2.2 Test 2

The Re-establishment delay to an unknown cell shall be less than 4.2s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The Re-establishment delay in this case can be expressed as

$$T_{RE-ESTABLISH} = T_{RRC-RE-ESTABLISH} + T_{UE-RE-ESTABLISH-REQ-UNKNOWN}$$

where



$$T_{\text{RRC-RE-ESTABLISH}}=160\text{ms}+(N_{313}-1)*10\text{ms}+T_{313}$$

$$T_{\text{UE-RE-ESTABLISH-REQ-UNKNOWN}}=50\text{ms}+T_{\text{search}}*NF + T_{\text{SI}} + T_{\text{RA}},$$

$$N_{313}=20$$

$$T_{313}=0\text{s}$$

$$T_{\text{search}}=800\text{ms}$$

$NF$  is the number of different frequencies in the monitored set. 3 frequencies are assumed in this test case.

$T_{\text{RA}}$  = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

$T_{\text{SI}}$  is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks defined in 25.331 for a UTRAN cell (ms).1280 ms is assumed in this test case.

This gives a total of 4120ms, allow 4.2s in the test case.

## A.6.2 Random Access

### A.6.2.1 Test Purpose and Environment

The purpose of these tests is to verify that the behaviour of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This tests will verify the requirements in section 6.3.2 and section 7.4.2.

**Table A.6.5: RF Parameters for Random Access test**

Parameter	Unit	Cell 1
UTRA RF Channel Number		Channel 1
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
Number of other transmitted Acquisition Indicators	-	0
AICH_Ec/Ior	dB	-10
PICH_Ec/Ior	dB	-15
OCNS_Ec/Ior when an AI is not transmitted	dB	-0.941
OCNS_Ec/Ior when an AI is transmitted	dB	-1.516
$\hat{I}_{or}/I_{oc}$	dB	0
$I_{oc}$	dBm/3,84 MHz	-70
CPICH_Ec/Io	dB	-13
Propagation Condition	AWGN	

The test parameters "System Information Block (SIB) type 5 (ASC #0)" defined in section 6.1 of TS34.108, shall be used in all random access tests. Crucial parameters for the test requirements are repeated in Table A.6.6 and A.6.7 and these overrule the parameters defined in SIB type 5.

**Table A.6.6: UE parameters for Random Access test**

Parameter	Unit	Value
Access Service Class (ASC#0) - Persistence value	0..1	1
Maximum number of preamble ramping cycles ( $M_{max}$ ).		2
Maximum number of preambles in one preamble ramping cycle (Preamble Retrans Max)		12
The backoff time $T_{B01}$ $N_{B01min}=N_{B01max}$	ms #TTI	N/A 10
Power step when no acquisition indicator is received (Power offset P0)	dB	3
Power offset between the last transmitted preamble and the control part of the message (Power offset P <sub>p-m</sub> )	dB	0
Maximum allowed UL TX power	dBm	21

**Table A.6.7: UTRAN parameters for Random Access test**

Parameter	Unit	Value
Primary CPICH DL TX power	dBm	-8
UL interference	dBm	-92
SIR in open loop power control (Constant value)	dB	-10
AICH Power Offset	dB	0

## A.6.2.2 Test Requirements

### A.6.2.2.1 Correct behaviour when receiving an ACK

The UE shall stop transmitting preambles upon a ACK on the AICH has been received and then transmit a message. An ACK shall be transmitted after 10 preambles have been received by the UTRAN.

The absolute power applied to the first preamble shall be -30 dBm with an accuracy as specified in section 6.4.1.1 of TS 25.101 [3]. The relative power applied to additional preambles shall have an accuracy as specified in section 6.5.2.1 of TS 25.101 [3].

The UE shall transmit 10 preambles and 1 message.

The transmit timing of all PRACH transmissions shall be within the accuracy specified in subclause 7.4.2.

### A.6.2.2.2 Correct behaviour when receiving an NACK

The UE shall stop transmitting preambles upon a NACK on the AICH has been received and then repeat the ramping procedure when the back off timer  $T_{B01}$  expires. The NACK shall be transmitted after the 10 preambles have been received by the UTRAN.

The UE shall transmit 10 preambles in the first ramping cycle and no transmission shall be done by the UE within 100 ms after the NACK has been transmitted by the UTRAN. Then the UE shall start the second preamble ramping cycle.

### A.6.2.2.3 Correct behaviour at Time-out

The UE shall stop transmit preambles when reaching the maximum number of preambles allowed in a cycle. The UE shall then repeat the ramping procedure until the maximum number of preamble ramping cycles are reached. No ACK/NACK shall be sent by UTRAN during this test.

The UE shall transmit 2 preambles cycles, consisting of 12 preambles in each preamble cycle.

### A.6.2.2.4 Correct behaviour when reaching maximum transmit power

The UE shall not exceed the maximum allowed UL TX power configured by the UTRAN. No ACK/NACK shall be sent by UTRAN during this test.

The absolute power of any preambles belonging to the first or second preamble cycle shall not exceed 0 dBm with more than the tolerance given in section 6.5.

**Table A.6.7A: Specific UE parameter for correct behaviour when reaching maximum transmit power**

Parameter	Unit	Value
Maximum allowed UL TX power	dBm	0
Power step when no acquisition indicator is received (Power offset P <sub>0</sub> )	dB	6

### A.6.2.2.5 Correct behaviour when selecting 2 or 10msec TTI length for Enhanced Uplink in CELL\_FACH state and idle mode

No ACK/NACK shall be sent by UTRAN during this test.

The UE shall select a preamble corresponding to 2msec TTI when the transmit power of the preamble is less than -16 dBm. The UE shall select a preamble corresponding to the 10msec TTI when the transmit power of the preamble is greater than -4 dBm.

**Table A.6.7B: Specific UE parameters for correct behaviour when selecting 2 or 10msec TTI length for Enhanced Uplink in CELL\_FACH state and idle mode**

Parameter	Unit	Value
Maximum allowed UL TX power	dBm	0
Power step when no acquisition indicator is received (Power offset P <sub>0</sub> )	dB	6
Power offset between the last transmitted preamble and the initial power of the DPCCH transmission in the Enhanced Uplink in CELL_FACH state and Idle mode (Power offset P <sub>p-e</sub> )	dB	0
Power headroom threshold for switching between 2msec TTI and 10msec TTI	dB	10

## A.6.3 (void)

## A.6.4 Transport format combination selection in UE

### A.6.4.1 Test Purpose and Environment

The purpose is to verify the UE blocks (stops using) a currently used TFC when the UE output power is not sufficient to support that TFC. This test will verify the general requirement on TFC selection in section 6.4.

### A.6.4.1.1 Interactive or Background, PS, UL: 64 kbps

The test will verify the general requirement on TFC selection in section 6.4 for a RAB intended for packet data services, i.e. Interactive or Background, PS, UL: 64kbps as defined in TS 34.108.

The test parameters are given in Table A.6.8 , A.6.9 and Table A.6.10 below. The test consists of 2 successive time periods, with a time duration of T1 and T2 respectively.

Details on the UL reference RAB in table A.6.8 and A.6.9 can be found in TS 34.108 section "Interactive or background / UL:64 DL: 64 kbps / PS RAB + UL:3.4 DL:3.4 kbps SRBs for DCCH".

**Table A.6.8: UL reference RAB, Interactive or Background**

	TFI	64 kbps RAB (20ms TTI)	DCCH 3.4kbps (40ms TTI)
TFS	TF0, bits	0x336	0x148
	TF1, bits	1x336	1x148
	TF2, bits	2x336	N/A
	TF3, bits	3x336	N/A
	TF4, bits	4x336	N/A

**Table A.6.9: UL TFCI**

TFCI	(64 kbps RAB, DCCH)
UL_TFC0	(TF0, TF0)
UL_TFC1	(TF0, TF1)
UL_TFC2	(TF1, TF0)
UL_TFC3	(TF1, TF1)
UL_TFC4	(TF2, TF0)
UL_TFC5	(TF2, TF1)
UL_TFC6	(TF3, TF0)
UL_TFC7	(TF3, TF1)
UL_TFC8	(TF4, TF0)
UL_TFC9	(TF4, TF1)

**Table A.6.10: General test parameters**

Parameter	Unit	Value	Comment
TFCS size		10	
TFCS		UL_TFC0, UL_TFC1, UL_TFC2, UL_TFC3, UL_TFC4, UL_TFC5, UL_TFC6, UL_TFC7, UL_TFC8, UL_TFC9	
Power Control		On	
Active cell		Cell 1	
Maximum allowed UL TX power	dBm	21	
T1	s	30	
T2	s	2	
Propagation condition		AWGN	

The radio conditions in the test shall be sufficient, so that decoding of the TPC commands can be made without errors.

The amount of available user data shall be sufficient to allow uplink transmission at the highest bit rate (UL\_TFC8 or UL\_TFC9) during the entire test and it shall be ensured that the UE is using UL\_TFC8 or UL\_TFC9 at the end of T1.

The test shall be performed in the following way:

#### Before time period T1:

The allowed TFCS according to table A.6.10 shall be signalled to the UE.

#### During time period T1:

The system simulator shall ensure that the UE output power is commanded to be between 14 to 15 dB below the UE Maximum allowed UL TX power.

#### During time period T2:

The system simulator shall continuously send TPC\_cmd=1 to the UE from the beginning of T2 until the end of T2.

NOTE: This will emulate that UL\_TFC8 to UL\_TFC9 can not be supported because the UE reaches the maximum UL Tx power and still UTRAN is sending power-up commands. The time from the beginning of T2 until the UE blocks (stops using) UL\_TFC8 and UL\_TFC9 shall be measured.

#### A.6.4.1.2 Interactive or Background, PS, UL: 64 kbps + Conversational / speech, CS, UL: 12.2kbps

The test will verify the general requirement on TFC selection in section 6.4 for a RAB intended for circuit switched and packet data services, i.e. Interactive or Background, PS, UL: 64kbps + Conversational / speech / CS UL:12.2kbps as defined in TS 34.108 [3].

The test parameters are given in Table A.6.8a , A.6.9a and Table A.6.10a below. The test consists of 2 successive time periods, with a time duration of T1 and T2 respectively.

Details on the UL reference RAB in table A.6.8a and A.6.9a can be found in TS 34.108 [3] section “Conversational / speech / UL:12.2 DL:12.2 kbps / CS RAB + Interactive or background / UL:64 DL:64 kbps / PS RAB+ UL:3.4 DL: 3.4 kbps SRBs for DCCH”.

**Table A.6.8a: UL reference RAB, Interactive or Background + Conversational/ Speech**

	TFI	12.2kbps RAB subflow#1 (20ms TTI)	12.2kbps RAB subflow#2 (20ms TTI)	12.2kbps RAB subflow#3 (20ms TTI)	64 kbps RAB (20ms TTI)	DCCH 3.4kbps (40ms TTI)
TFS	TF0, bits	0x81	0x103	0x60	0x340	0x148
	TF1, bits	1x39	1x103	1x60	1x340	1x148
	TF2, bits	1x81	N/A	N/A	2x340	N/A
	TF3, bits	N/A	N/A	N/A	3x340	N/A
	TF4, bits	N/A	N/A	N/A	4x340	N/A

Table A.6.9a: UL TFCI

TFCI	(12.2kbps RAB subflow#1, 12.2kbps RAB subflow#2, 12.2kbps RAB subflow#3, 64 kbps RAB, DCCH)
UL_TFC0	(TF0,TF0,TF0,TF0,TF0)
UL_TFC1	(TF1,TF0,TF0,TF0,TF0)
UL_TFC2	(TF2,TF1,TF1,TF0,TF0)
UL_TFC3	(TF0,TF0,TF0,TF1,TF0)
UL_TFC4	(TF1,TF0,TF0,TF1,TF0)
UL_TFC5	(TF2,TF1,TF1,TF1,TF0)
UL_TFC6	(TF0,TF0,TF0,TF2,TF0)
UL_TFC7	(TF1,TF0,TF0,TF2,TF0)
UL_TFC8	(TF2,TF1,TF1,TF2,TF0)
UL_TFC9	(TF0,TF0,TF0,TF3,TF0)
UL_TFC10	(TF1,TF0,TF0,TF3,TF0)
UL_TFC11	(TF2,TF1,TF1,TF3,TF0)
UL_TFC12	(TF0,TF0,TF0,TF4,TF0)
UL_TFC13	(TF1,TF0,TF0,TF4,TF0)
UL_TFC14	(TF2,TF1,TF1,TF4,TF0)
UL_TFC15	(TF0,TF0,TF0,TF0,TF1)
UL_TFC16	(TF1,TF0,TF0,TF0,TF1)
UL_TFC17	(TF2,TF1,TF1,TF0,TF1)
UL_TFC18	(TF0,TF0,TF0,TF1,TF1)
UL_TFC19	(TF1,TF0,TF0,TF1,TF1)
UL_TFC20	(TF2,TF1,TF1,TF1,TF1)
UL_TFC21	(TF0,TF0,TF0,TF2,TF1)
UL_TFC22	(TF1,TF0,TF0,TF2,TF1)
UL_TFC23	(TF2,TF1,TF1,TF2,TF1)
UL_TFC24	(TF0,TF0,TF0,TF3,TF1)
UL_TFC25	(TF1,TF0,TF0,TF3,TF1)
UL_TFC26	(TF2,TF1,TF1,TF3,TF1)
UL_TFC27	(TF0,TF0,TF0,TF4,TF1)
UL_TFC28	(TF1,TF0,TF0,TF4,TF1)
UL_TFC29	(TF2,TF1,TF1,TF4,TF1)

Table A.6.10a: General test parameters

Parameter	Unit	Value	Comment
TFCS size		30	
TFCS		UL_TFC0, UL_TFC1, UL_TFC2, UL_TFC3, UL_TFC4, UL_TFC5, UL_TFC6, UL_TFC7, UL_TFC8, UL_TFC9, UL_TFC10, UL_TFC11, UL_TFC12, UL_TFC13, UL_TFC14, UL_TFC15, UL_TFC16, UL_TFC17, UL_TFC18, UL_TFC19, UL_TFC20, UL_TFC21, UL_TFC22, UL_TFC23, UL_TFC24, UL_TFC25, UL_TFC26, UL_TFC27, UL_TFC28, UL_TFC29	
Power Control		On	
Active cell		Cell 1	
Maximum allowed UL TX power	dBm	21	
T1	S	30	
T2	S	2	
Propagation condition		AWGN	

The radio conditions in the test shall be sufficient, so that decoding of the TPC commands can be made without errors.

The amount of available user data shall be sufficient to allow uplink transmission at the highest bit rate (UL\_TFC28 or UL\_TFC29) during the entire test and it shall be ensured that the UE is using UL\_TFC28 or UL\_TFC29 at the end of T1.

The test shall be performed in the following way:

#### Before time period T1:

The allowed TFCS according to table A.6.10a shall be signalled to the UE.

#### During time period T1:

The system simulator shall ensure that the UE output power is commanded to be between 14 to 15 dB below the UE Maximum allowed UL TX power.

#### During time period T2:

The system simulator shall continuously send TPC\_cmd=1 to the UE from the beginning of T2 until the end of T2.

NOTE: This will emulate that UL\_TFC28 to UL\_TFC29 can not be supported because the UE reaches the maximum UL Tx power and still UTRAN is sending power-up commands. The time from the beginning of T2 until the UE blocks (stops using) UL\_TFC28 and UL\_TFC29 shall be measured.

## A.6.4.2 Test Requirements

### A.6.4.2.1 Interactive or Background, PS, UL: 64 kbps

The UE shall have stopped using UL\_TFC8 and UL\_TFC9 within 140 ms from beginning of time period T2.

The rate of correct tests observed during repeated tests shall be at least 90%.

NOTE: The delay from the beginning of T2 can be expressed as:

$$T_{\text{ramp}} + T_{\text{detect\_block}} + T_{\text{notify}} + T_{\text{modify}} + T_{\text{LL\_proc}} + T_{\text{align\_TTI}}$$

where:

$T_{\text{ramp}}$	Margin added for the increase of UE output power to the UE maximum power. A margin of 1 frame (10ms) is used, i.e. 15 TPC commands.
$T_{\text{detect\_block}}$	The time needed to detect that UL_TFC8 and UL_TFC9 can no longer be supported, i.e. defines the maximum time to detect that the <i>Elimination</i> criterion is fulfilled for UL_TFC8 and UL_TFC9. According to X and Y values of 15 and 30 as defined in Section 6.4.2 and by assuming the maximum misalignment between the frame boundary, where the evaluation of the <i>Elimination</i> criterion is performed and the last slot needed for triggering the <i>Elimination</i> criterion on L1, $T_{\text{detect\_block}}$ becomes 15 slots + 14 slots = 19.33 ms.
$T_{\text{notify}}$	Equal to 15 ms, the time allowed for MAC to indicate to higher layers that UL_TFC8 and UL_TFC9 can no longer be supported.
$T_{\text{modify}}$	Equal to $\text{MAX}(T_{\text{adapt\_max}}, T_{\text{TTI}}) = \text{MAX}(0, 40) = 40\text{ms}$
$T_{\text{adapt\_max}}$	Equals to 0ms for the case without codec.
$T_{\text{LL\_proc}}$	Equals 15ms.
$T_{\text{align\_TTI}}$	Align with the longest uplink TTI where the new TFC can be selected. The worst case equals 40ms in this test case.
$T_{\text{TTI}}$	See section 6.4.2. Equals 40 ms in the test case.

This gives a maximum delay of  $(10 + 19.33 + 15 + 40 + 15 + 40)$  ms = 139.33 ms from the beginning of T2, allow 140 ms in the test case.

### A.6.4.2.2 Interactive or Background, PS, UL: 64 kbps + Conversational / speech, CS, UL: 12.2kbps

The UE shall have stopped using UL\_TFC28 and UL\_TFC29 within 140 ms from beginning of time period T2.

The rate of correct tests observed during repeated tests shall be at least 90%.

NOTE: The delay from the beginning of T2 can be expressed as:

$$T_{\text{ramp}} + T_{\text{detect\_block}} + T_{\text{notify}} + T_{\text{modify}} + T_{\text{L1\_proc}} + T_{\text{align\_TTI}}$$

where:

$T_{\text{ramp}}$	Margin added for the increase of UE output power to the UE maximum power. A margin of 1 frame (10ms) is used, i.e. 15 TPC commands.
$T_{\text{detect\_block}}$	The time needed to detect that UL_TFC28 and UL_TFC29 can no longer be supported, i.e. defines the maximum time to detect that the <i>Elimination</i> criterion is fulfilled for UL_TFC28 and UL_TFC9. According to X and Y values of 15 and 30 as defined in Section 6.4.2 and by assuming the maximum misalignment between the frame boundary, where the evaluation of the <i>Elimination</i> criterion is performed and the last slot needed for triggering the <i>Elimination</i> criterion on L1, $T_{\text{detect\_block}}$ becomes 15 slots + 14 slots = 19.33 ms.
$T_{\text{notify}}$	Equal to 15 ms, the time allowed for MAC to indicate to higher layers that UL_TFC28 and UL_TFC29 can no longer be supported.
$T_{\text{modify}}$	Equal to $\text{MAX}(T_{\text{adapt\_max}}, T_{\text{TTI}}) = \text{MAX}(0, 40) = 40\text{ms}$
$T_{\text{adapt\_max}}$	Equals to 0ms for the case without codec.
$T_{\text{L1\_proc}}$	Equals 15ms.
$T_{\text{align\_TTI}}$	Align with the longest uplink TTI where the new TFC can be selected. The worst case equals 40ms in this test case.
$T_{\text{TTI}}$	See section 6.4.2. Equals 40 ms in the test case.

This gives a maximum delay of  $(10 + 19.33 + 15 + 40 + 15 + 40)$  ms = 139.33 ms from the beginning of T2, allow 140 ms in the test case.

## A.6.5 (void)

**Table A.6.11: (void)**

**Table A.6.12: (void)**

**Table A.6.13: (void)**

## A.6.6 E-TFC restriction in UE

### A.6.6.1 Test Purpose and Environment

The purpose is to verify the UE stops using a currently used E-TFC when its remaining power margin is not sufficient to support that E-TFC, and resumes using that E-TFC when its remaining power margin is sufficient to support it. This test will verify the general requirement on E-TFC selection in section 6.4.

#### A.6.6.1.1 10ms TTI E-DCH E-TFC restriction testcase

The test will verify the general requirement on E-TFC restriction and recovery in section 6.4 for a 10ms TTI E-DCH Transport Block Size Table 0 [19].



The test parameters are given in Table A.6.14 below. The test consists of 2 time periods, with a time duration of T1 and T2 respectively.

The UE shall be configured to transmit UL DTCH data continuously on the DPCH. An HSDPA radio bearer shall be configured so that the UE transmits ACK and UL HS-DPCCH. An E-DCH radio bearer shall be configured, so that UE is transmitting E-DPCCH and E-DPDCH.

**Table A.6.14: General test parameters**

Parameter	Unit	Value	Comment
UL DPCH configuration		12.2kbps reference measurement channel	
E-DCH Transport Block Size Table		10ms TTI E-DCH Transport Block Size Table 0 according to 25.321 annex B.3	
UL Power Control		On	
Active cell		Cell 1	
Maximum allowed UL TX power	dBm	24	For a class 4 UE maximum allowed TX power can still be signalled as 24dBm however the UE only has capability to transmit 21dBm
Propagation condition		AWGN	
$\beta_d/\beta_c$		9/15	Care needs to be taken to ensure that TFCS with $\beta_d/\beta_c = 9/15$ is always used even during power limited part of the test in T2
$A_{hs}$		2	$\Delta_{ACK}=\Delta_{NACK}=\Delta_{CQI}$
$A_{ec}$		2	
$\beta_{ed,ref}/\beta_c$		5/15	
$L_{ref}$		1	
$K_{ref}$		18	
$\Delta_{harq}$	dB	0	
$PL_{non-max}$		0.52	
E-DCH minimum set E-TFI		0	Makes E-DCH transport block size with index 0 unblockable even in power limited phase
Periodicity for Scheduling Info		Every TTI	Ensures that some data is sent on every TTI even in the power limited phase
E-DCH MAC-d flow maximum number of retransmissions		0	
T1	s	2	
T2	s	2	

The radio conditions in the test shall be sufficient, so that decoding of the TPC commands can be made without errors.

The amount of available user data shall be sufficient to allow E-DCH uplink transmission at the highest possible bit rate with E-DCH TB index 127. It shall also be ensured that sufficient data is made available on the DTCH so that the UE is continuously transmitting on the DPCH.

The test shall be performed in the following way:

**Initial conditions:**

Call is established with DCH, HSDPA and E-DCH radio bearers. An absolute grant with the value 31 is sent on the E-AGCH to give the UE sufficient grants to make use of the maximum possible data rate.

**Before time period T1:**

The UE shall be transmitting at its maximum DPCCH power and the UE uplink E-DPCCH shall indicate use of E-TFCI with index 0.

**During time period T1:**

From the start of T1 the system simulator shall send sufficient consecutive TPC\_cmd= -1 to the UE until the DPCCH power is between 0dBm and 1dBm for a power class 3 UE, or between -4dBm and -3dBm for a power class 4 UE. Within 45ms from the start of T1, the UE uplink E-DPCCH shall indicate use of E-TFCI 127, or the E-TFCI which represents the maximum of the UE's capabilities.

**Before time period T2:**

The UE P<sub>DPCCH</sub> power shall be between 0dBm and 1dBm for a power class 3 UE, or between -4dBm and -3dBm for a power class 4 UE, and the UE uplink E-DPCCH shall indicate either be not transmitted or use of E-TFCI 127, or the E-TFCI which represents the maximum of the UE's capabilities.

**During time period T2:**

The system simulator shall continuously send TPC\_cmd=1 to the UE from the beginning of T2 until the end of T2. Within 45ms from the start of T2, the UE uplink E-DPCCH shall indicate use of E-TFCI with index 0.

NOTE: During this phase the UE may perform DTX of the E-DPCCH in accordance with [18] clause 5.1.2.6.

Time periods T1 and T2 shall be repeated until the necessary statistical confidence is achieved.

**A.6.6.1.1.1 Test Requirements**

During time period T1, uplink power control shall be adjusted so that the UE is able to make use of E-TFC index 127, or the maximum of its capabilities if this is lower.

NOTE: The required headroom to support E-TFC 127 can be calculated using the parameters L<sub>ref</sub>=1, K<sub>ref</sub>=18 and K<sub>127</sub>=20000. This requires {(5006)\*3+12}\*4=60120 before rate matching/ARQ. This can be transmitted on 2xSF/2 codes, so needs equivalent of 4xSF/4 codes, giving L<sub>127</sub>=4.

Substituting into the equation for  $\beta_{ed,j,harq}$  from 25.214:

$$\beta_{ed,j,harq} = \beta_{ed,ref} \sqrt{\frac{L_{e,ref}}{L_{e,j}}} \sqrt{\frac{K_{e,j}}{K_{e,ref}}} \cdot 10^{\left(\frac{\Delta_{harq}}{20}\right)}$$

gives

$$\beta_{ed,j,harq} = 5 * \text{sqrt}(1/4) * \text{sqrt}(20000 / 18) = 83.333$$

For the SF/2 case, the unquantised gain factor  $\beta_{ed,k,j,uq}$  for each of these two codes is according to

$$\beta_{ed,k,j,uq} = \beta_{ed,k,j,uq} = \sqrt{2} \times \beta_{ed,j,harq}$$

$$\beta_{ed,k,j,uq} = \text{sqrt}(2) * 83.333 = 117.85$$

$\beta_{ed,k}$  is set such that  $\beta_{ed,k}/\beta_c$  is the largest quantized value of Table 1B.2 in [3] subclause 4.2.1.3, for which the condition  $\beta_{ed,k} \leq \beta_{ed,k,j,uq}$  holds.

According to 25.213 Table 1B.2 in subclause 4.2.1.3, the corresponding quantised amplitude ratio has index 25, A<sub>ed</sub> =  $\beta_{ed}/\beta_c$  = 106/15 for each of the two SF/2 E-DPCCH codes.

The E-TFC selection MPR for this case from 25.133 table 6.2 corresponds to case 6, or an E-TFC MPR of 0.5dB.

$$\begin{aligned}
 NRPM_j &= (P_{Max_j} - P_{DPCCH} - P_{DPDCH} - P_{HS-DPCCH} - P_{E-DPCCH}) / P_{DPCCH} \\
 &= \frac{P_{Max_j}}{P_{DPCCH}} - \frac{\beta_c^2 + \beta_d^2 + \beta_{ec}^2 + \beta_{hs}^2}{\beta_c^2} \\
 &= \frac{P_{Max_j}}{P_{DPCCH}} - \left( 1 + \frac{\beta_d^2}{\beta_c^2} + A_{ec}^2 + A_{hs}^2 \right)
 \end{aligned}$$

For a power class 3 UE  $P_{Max_j} = 23.5\text{dBm} = 223.87\text{mW}$ , or for a power class 4 UE,  $P_{Max_j} = 20.5\text{dBm} = 112.20\text{mW}$

The inequality for support of E-TFC with index 127 is

$$223.87/P_{DPCCH} - (1 + (9^2/15^2) + 2^2 + 2^2) \geq 106^2/15^2 + 106^2/15^2 \text{ (class 3)}$$

$$112.20/P_{DPCCH} - (1 + (9^2/15^2) + 2^2 + 2^2) \geq 106^2/15^2 + 106^2/15^2 \text{ (class 4)}$$

This is satisfied if  $P_{DPCCH} \leq (223.87/109.23) = 2.04\text{mW} = 3.11\text{dBm}$  for a class 3 UE or  $P_{DPCCH} \leq (112.20/109.23) = 1.03\text{mW} = 0.12\text{dBm}$  for a class 4 UE.

From table 6.0A the accuracy of the  $P_{DPCCH}$  estimate used for E-TFC selection in this scenario is  $\pm 2\text{dB}$  for power class 3 or  $\pm 2.5\text{dB}$  for power class 4. Therefore, for  $P_{DPCCH} \leq 1.11\text{dBm}$  (class 3) or  $-2.38\text{dBm}$  (class 4), the UE shall be able to support E-TFC index 127. Since power control granularity is  $1\text{dB}$ , the UE output power should be maintained so that  $0\text{dBm} \leq P_{DPCCH} \leq 1\text{dBm}$  throughout this phase for a class 3 UE, or so that  $-4\text{dBm} \leq P_{DPCCH} \leq -3\text{dBm}$  throughout this phase for a class 4 UE.

NOTE: Test tolerance may need to be added to further reduce the UE DPCCH power further by RAN5, depending on how accurately tester can set and maintain UE DPCCH power.

NOTE: The required time to start using E-TFC index 127 or the maximum of the UEs capabilities at the beginning of T1, and to start using E-TFC with index 0 at the beginning of T2 can be calculated as follows.

Since TPC commands are received error free by the UE,  $P_{DPCCH}$  shall reach the new power level power within 25 slots =  $16.666\text{ms}$ .

The UE shall have evaluated and started to use the new restriction criteria with  $T_s = (\text{Power level change time} + P_{DPCCH} \text{ filtering period} + \text{E-TFC estimation rate} + \text{Maximum time from RGCH reception to E-TFC transmission})$  from the start of the time period

$$\begin{aligned}
 &= 16.66\text{ms} + 10\text{ms} + 10\text{ms} + 7.53\text{ms} \\
 &= 44.19\text{ms}, \text{ allow } 45\text{ms}
 \end{aligned}$$

The rate of correct tests observed during repeated tests shall be at least 90%.

#### A.6.6.1.2 2ms TTI E-DCH E-TFC restriction testcase

The test will verify the general requirement on E-TFC restriction and recovery in section 6.4 for a 2ms TTI E-DCH Transport Block Size Table 0 [19].

The test parameters are given in Table A.6.15 below. The test consists of 2 time periods, with a time duration of T1 and T2 respectively.

The UE shall be configured to transmit UL DTCH data continuously on the DPCH. An HSDPA radio bearer shall be configured so that the UE transmits ACK and UL HS-DPCCH. An E-DCH radio bearer shall be configured, so that UE is transmitting E-DPCCH and E-DPDCH.

Table A.6.15: General test parameters

Parameter	Unit	Value	Comment
UL DPCH configuration		12.2kbps reference measurement channel	
E-DCH Transport Block Size Table		2ms TTI E-DCH Transport Block Size Table 0 according to 25.321 annex B.1	
UL Power Control		On	
Active cell		Cell 1	
Maximum allowed UL TX power	dBm	24	For a class 4 UE maximum allowed TX power can still be signalled as 24dBm however the UE only has capability to transmit 21dBm
Propagation condition		AWGN	
$\beta_d/\beta_c$		9/15	Care needs to be taken to ensure that TFCS with $\beta_d/\beta_c = 9/15$ is always used even during power limited part of the test in T2
$A_{hs}$		2	$\Delta_{ACK}=\Delta_{NACK}=\Delta_{CQI}$
$A_{ec}$		2	
$\beta_{ed,ref}/\beta_c$		5/15	
$L_{ref}$		1	
$K_{ref}$		18	
$\Delta_{harg}$	dB	0	
$PL_{non-max}$		0.52	
E-DCH minimum set E-TFI		0	Makes E-DCH transport block size with index 0 unblockable even in power limited phase
Periodicity for Scheduling Info		Every TTI	Ensures that some data is sent on every TTI even in the power limited phase
E-DCH MAC-d flow maximum number of retransmissions		0	
T1	s	2	
T2	s	2	

The radio conditions in the test shall be sufficient, so that decoding of the TPC commands can be made without errors.

The amount of available user data shall be sufficient to allow E-DCH uplink transmission at the highest possible bit rate with E-DCH TB index 127. It shall also be ensured that sufficient data is made available on the DTCH so that the UE is continuously transmitting on the DPCH.

The test shall be performed in the following way:

#### Initial conditions:

Call is established with DCH, HSDPA and E-DCH radio bearers. An absolute grant with the value 31 is sent on the E-AGCH to give the UE sufficient grants to make use of the maximum possible data rate.

#### Before time period T1:

The UE shall be transmitting at its maximum DPCCCH power and the UE uplink E-DPCCCH shall indicate use of E-TFCI with index 0.

#### During time period T1:

From the start of T1 the system simulator shall send sufficient consecutive TPC\_cmd= -1 to the UE until the DPCCH power is between 2dBm and 3dBm for a power class 3 UE, or between -1dBm and 0dBm for a power class 4 UE. Within 23ms from the start of T1, the UE uplink E-DPCCH shall indicate use of E-TFCI 127, or the E-TFCI which represents the maximum of the UE's capabilities.

#### Before time period T2:

The UE  $P_{DPCCH}$  power shall be between 2dBm and 3dBm for a power class 3 UE, or between -1dBm and 0dBm for a power class 4 UE, and the UE uplink E-DPCCH shall either be not transmitted or indicate use of E-TFCI 127, or the E-TFCI which represents the maximum of the UE's capabilities.

#### During time period T2:

The system simulator shall continuously send TPC\_cmd=1 to the UE from the beginning of T2 until the end of T2. Within 23ms from the start of T2, the UE uplink E-DPCCH shall indicate use of E-TFCI with index 0.

NOTE: During this phase the UE may perform DTX of the E-DPDCH in accordance with [18] clause 5.1.2.6.

**Time periods T1 and T2 shall be repeated until the necessary statistical confidence is achieved.**

### A.6.6.1.2.1 Test Requirements

During time period T1, uplink power control shall be adjusted so that the UE is able to make use of E-TFC index 127, or the maximum of its capabilities if this is lower.

NOTE: The required headroom to support E-TFC 127 can be calculated using the parameters  $L_{ref}=1$ ,  $K_{ref}=18$  and  $K_{127}=11484$ . This requires  $\{(3836)*3+12\}*3=34560$  bits before rate matching/ARQ. This can be transmitted on  $2xSF/2$  codes and  $2xSF/4$  codes, so needs equivalent of  $6xSF/4$  codes, giving  $L_{127}=6$ .

Substituting into the equation for  $\beta_{ed,j,harq}$  from 25.214:

$$\beta_{ed,j,harq} = \beta_{ed,ref} \sqrt{\frac{L_{e,ref}}{L_{e,j}}} \sqrt{\frac{K_{e,j}}{K_{e,ref}}} \cdot 10^{\left(\frac{\Delta_{harq}}{20}\right)}$$

gives

$$\beta_{ed,j,harq} = 5 * \text{sqrt}(1/6) * \text{sqrt}(11484 / 18) = 51.56$$

For the SF/2 codes, the unquantised gain factor  $\beta_{ed,k,j,uq}$  for each of these two codes is according to  $\beta_{ed,k,j,uq} = \beta_{ed,k,j,harq} \sqrt{2} \times \beta_{ed,j,harq}$

$$\beta_{ed,k,j,uq} = \text{sqrt}(2) * 51.56 = 72.91$$

And for the SF/4 codes, the unquantised gain factor is  $\beta_{ed,k,j,uq} = 51.56$

$\beta_{ed,k}$  is set such that  $\beta_{ed,k}/\beta_c$  is the largest quantized value of Table 1B.2 in [3] subclause 4.2.1.3, for which the condition  $\beta_{ed,k} \leq \beta_{ed,k,j,uq}$  holds.

According to 25.213 Table 1B.2 in subclause 4.2.1.3, the corresponding quantised amplitude ratio are  $A_{ed} = \beta_{ed}/\beta_c = 67/15$  for each of the two SF/2 E-DPDCH codes and  $A_{ed} = \beta_{ed}/\beta_c = 47/15$  for each of the two SF/4 codes

The E-TFC selection MPR for this case from 25.133 table 6.2 is 0.0dB.

$$\begin{aligned} NRPM_j &= \left( P_{Max_j} - P_{DPCCH} - P_{DPDCH} - P_{HS-DPCCH} - P_{E-DPCCH} \right) / P_{DPCCH} \\ &= \frac{P_{Max_j}}{P_{DPCCH}} - \frac{\beta_c^2 + \beta_d^2 + \beta_{ec}^2 + \beta_{hs}^2}{\beta_c^2} \\ &= \frac{P_{Max_j}}{P_{DPCCH}} - \left( 1 + \frac{\beta_d^2}{\beta_c^2} + A_{ec}^2 + A_{hs}^2 \right) \end{aligned}$$

For a power class 3 UE  $P_{Max_j} = 24\text{dBm} = 251.2\text{mW}$ , or for a power class 4 UE,  $P_{Max_j} = 21\text{dBm} = 125.9\text{mW}$

The inequality for support of E-TFC with index 127 is

$$251.2/P_{DPCCH} - (1 + (9^2/15^2) + 2^2 + 2^2) \geq 47^2/15^2 + 47^2/15^2 + 67^2/15^2 + 67^2/15^2 \text{ (class 3)}$$

$$125.9/P_{DPCCH} - (1 + (9^2/15^2) + 2^2 + 2^2) \geq 47^2/15^2 + 47^2/15^2 + 67^2/15^2 + 67^2/15^2 \text{ (class 4)}$$

This is satisfied if  $P_{DPCCH} \leq (251.2/68.9) = 3.64\text{mW} = 5.61\text{dBm}$  for a class 3 UE or  $P_{DPCCH} \leq (125.9/68.9) = 1.82\text{mW} = 2.61\text{dBm}$  for a class 4 UE.

From table 6.0A the accuracy of the Pdpcc estimate used for E-TFC selection in this scenario is  $\pm 2\text{dB}$  for power class 3 or  $\pm 2.5\text{dB}$  for power class 4. Therefore, for  $P_{DPCCH} \leq 3.61\text{dBm}$  (class 3) or  $0.11\text{dBm}$  (class 4), the UE shall be able to support E-TFC index 127. Since power control granularity is  $1\text{dB}$ , the UE output power should be maintained so that  $2\text{dBm} \leq P_{DPCCH} \leq 3\text{dBm}$  throughout this phase for a class 3 UE, or so that  $-1\text{dBm} \leq P_{DPCCH} \leq 0\text{dBm}$  throughout this phase for a class 4 UE.

NOTE: Test tolerance may need to be added to further reduce the UE DPCCH power further by RAN5, depending on how accurately tester can set and maintain UE DPCCH power.

NOTE: The required time to start using E-TFC index 127 or the maximum of the UEs capabilities at the beginning of T1, and to start using E-TFC with index 0 at the beginning of T2 can be calculated as follows.

Since TPC commands are received error free by the UE,  $P_{DPCCH}$  shall reach the new power level power within 20 slots =  $13.33\text{ms}$ .

The UE shall have evaluated and started to use the new restriction criteria with  $T_s = (\text{Power level change time} + \text{Pdpcc filtering period} + \text{E-TFC estimation rate} + \text{Maximum time from RGCH reception to E-TFC transmission})$  from the start of the time period

$$= 13.33\text{ms} + 2\text{ms} + 2\text{ms} + 5.53\text{ms}$$

$$= 22.86\text{ms, allow } 23\text{ms}$$

The rate of correct tests observed during repeated tests shall be at least 90%.

## A.7 Timing and Signalling Characteristics

### A.7.1 UE Transmit Timing

#### A.7.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in section 7.1.2.

For this test two cells on the same frequency are used. Table A.7.1 defines the transmitted signal strengths, the relative timing and the propagation condition used for the two cells.

**Table A.7.1: Test parameters for UE Transmit Timing requirement**

Parameter	Unit	Level
DPCH_Ec/ Ior, Cell 1 and Cell 2	dB	-13.5
CPICH_Ec/ Ior, Cell 1 and Cell 2	dB	-10
PCCPH_Ec/ Ior, Cell 1 and Cell 2	dB	-12
SCH_Ec/ Ior, Cell 1 and Cell 2	dB	-12
PICH_Ec/ Ior, Cell 1 and Cell 2	dB	-15
OCNS_Ec/ Ior, Cell 1 and Cell 2	dB	-1.2
$\hat{I}_{or}$ , Cell 1	dBm/3,84 MHz	-96
$\hat{I}_{or}$ , Cell 2	dBm/3,84 MHz	-99
Information data rate	kbps	12.2
Relative delay of path received from cell 2 with respect to cell 1	$\mu$ s	+/-2
Propagation condition	AWGN	

### A.7.1.2 Test Requirements

For parameters specified in Table A.7.1, the UE initial transmit timing accuracy, the maximum amount of timing change in one adjustment, the minimum and the maximum adjustment rate shall be within the limits defined in section 7.1.2.

The relevant soft handover parameters shall be set such that the UE enters soft handover with cell 1 and cell 2 when both cells are sending a signal. The following sequence of events shall be used to verify that the requirements are met.

- a) After a connection is set up with cell 1, the test system shall verify that the UE transmit timing offset is within  $T_0 \pm 1.5$  chips with respect to the first detected received path (in time) of the downlink DPCCH/DPDCH of cell 1.  $T_0$  is defined in TS 25.211[2].
- b) Test system introduces cell 2 into the test system at delay  $+2 \mu$ s from cell 1.
- c) Test system verifies that cell 2 is added to the active set.
- d) Test system shall verify that the UE transmit timing offset is still within  $T_0 \pm 1.5$  chips with respect to the first detected path (in time) of the downlink DPCCH/DPDCH of cell 1.
- e) Test system switches Tx timing of cell 2 to a delay of  $-2 \mu$ s with respect to cell 1.
- f) Test system verifies cell 2 remains in the active set.
- g) Test system shall verify that the UE transmit timing offset is still within  $T_0 \pm 1.5$  chips with respect to the first detected path (in time) of the downlink DPCCH/DPDCH of cell 1.
- h) Test system stops sending cell 1 signals.
- i) Test system verifies that UE transmit timing adjustment starts no later than the time when the whole active set update message is available at the UE taking the RRC procedure delay into account. The adjustment step size and the adjustment rate shall be according to the requirements in section 7.1.2 until the UE transmit timing offset is within  $T_0 \pm 1.5$  chips with respect to the first detected path (in time) of the downlink DPCCH/DPDCH of cell 2.
- j) Test system shall verify that the UE transmit timing offset stays within  $T_0 \pm 1.5$  chips with respect to the first detected path (in time) of the downlink DPCCH/DPDCH of cell 2.
- k) Test system starts sending cell 1 signal again with its original timing.
- l) Test system verifies that cell 1 is added to the active set.
- m) Test system verifies that the UE transmit timing is still within  $T_0 \pm 1.5$  chips with respect to the first detected path (in time) of the downlink DPCCH/DPDCH of cell 2.
- n) Test system stops sending cell 2 signals.

- o) Test system verifies that UE transmit timing adjustment starts no later than the time when the whole active set update message is available at the UE taking the RRC procedure delay into account. The adjustment step size and the adjustment rate shall be according to the requirements in section 7.1.2 until the UE transmit timing offset is within  $T_0 \pm 1.5$  chips with respect to the first detected path (in time) of the downlink DPCCCH/DPDCH of cell 1.
- p) Test system shall verify that the UE transmit timing offset stays within  $T_0 \pm 1.5$  chips with respect to the first detected path (in time) of the downlink DPCCCH/DPDCH of cell 1.

## A.8 UE Measurements Procedures

### A.8.1 FDD intra frequency measurements

#### A.8.1.1 Event triggered reporting in AWGN propagation conditions

##### A.8.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the requirements in section 8.1.2 and 9.1.

The test parameters are given in Table A.8.1 and A.8.2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A and 1B shall be used. The test consists of three successive time periods, with a time duration of T1, T2 and T3 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

**Table A.8.1: General test parameters for Event triggered reporting in AWGN propagation conditions**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cell		Cell 1	
Reporting range	dB	3	Applicable for event 1A and 1B
Hysteresis	dB	0	
W		1	Applicable for event 1A and 1B
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		24	
T1	s	5	
T2	s	5	
T3	s	5	



**Table A.8.2: Cell specific test parameters for Event triggered reporting in AWGN propagation conditions**

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
CPICH_Ec/Ior	dB	-10			-10		
PCCPCH_Ec/Ior	dB	-12			-12		
SCH_Ec/Ior	dB	-12			-12		
PICH_Ec/Ior	dB	-15			-15		
DPCH_Ec/Ior	dB	Note 1			N/A		
OCNS		Note 2			-0.941		
$\hat{I}_{or}/I_{oc}$	dB	0	6.97	0	-Infinity	5.97	-Infinity
$I_{oc}$	dBm/3,84 MHz	-70					
CPICH_Ec/Io	dB	-13	-13	-13	-Infinity	-14	-Infinity
Propagation Condition		AWGN					
NOTE 1: The DPCH level is controlled by the power control loop							
NOTE 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .							

### A.8.1.1.2 Test Requirements

The UE shall send one Event 1A triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The UE shall send one Event 1B triggered measurement report, with a measurement reporting delay less than 200 ms from the beginning of time period T3.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

## A.8.1.2 Event triggered reporting of multiple neighbours in AWGN propagation condition

### A.8.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of events. This test will partly verify the requirements in section 8.1.2 and 9.1.

The test parameters are given in Table A.8.3 and A.8.4. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A, 1C and 1B shall be used and the periodical reporting of the events is not applied. The test consists of four successive time periods, with a time duration of T1, T2, T3 and T4 respectively. In the initial condition before the time T1 only Cell1 is active.

**Table A.8.3: General test parameters for Event triggered reporting of multiple neighbours in AWGN propagation conditions**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cell		Cell 1	
Reporting range	dB	3	Applicable for event 1A and 1B
Hysteresis	dB	0	
W		1	Applicable for event 1A and 1B
Replacement activation threshold		0	Applicable for event 1C
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		32	
T1	S	10	
T2	S	10	
T3	S	5	
T4	S	10	

**Table A.8.4: Cell specific test parameters for Event triggered reporting of multiple neighbours in AWGN propagation condition**

Parameter	Unit	Cell 1				Cell 2				Cell3			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
CPICH_Ec/I <sub>or</sub>	dB	-10				-10				-10			
PCCPCH_Ec/I <sub>or</sub>	dB	-12				-12				-12			
SCH_Ec/I <sub>or</sub>	dB	-12				-12				-12			
PICH_Ec/I <sub>or</sub>	dB	-15				-15				-15			
DPCH_Ec/I <sub>or</sub>	dB	Note 1				N/A				N/A			
OCNS_Ec/I <sub>or</sub>	dB	Note 2				-0.941				-0.941			
$\hat{I}_{or}/I_{oc}$	dB	6.97	6.93	5.97	6.12	-Inf	9.43	6.97	7.62	5.97	6.93	-Inf	5.62
	$I_{oc}$	dBm/ 3,84 MHz		-85									
CPICH_Ec/I <sub>o</sub>	dB	-13	-16	-14	-15.5	-Inf	-13.5	-13	-14	-14	-16	-Inf	-16
	Propagation Condition	AWGN											
NOTE 1: The DPCH level is controlled by the power control loop													
NOTE 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .													

### A.8.1.2.2 Test Requirements

- The UE shall send one Event 1A triggered measurement report for Cell3, with a measurement reporting delay less than 800 ms from the beginning of time period T1.
- The UE may send one Event 1C triggered measurement report for Cell3 after the beginning of the time period T1.
- The UE shall send one Event 1C triggered measurement report for Cell2, with a measurement reporting delay less than 800 ms from the beginning of time period T2.
- The UE shall send one Event 1A triggered measurement report for Cell2, with a measurement reporting delay less than 800 ms from the beginning of time period T2.
- The UE shall send one Event 1B triggered measurement report for Cell3, with a measurement reporting delay less than 200 ms from the beginning of time period T3.

- f) The UE shall send one Event 1A triggered measurement report for Cell3, with a measurement reporting delay less than 200 ms from the beginning of time period T4.
- g) The UE may send one Event 1C triggered measurement report for Cell2 after the beginning of the time period T4.
- h) The UE may send one Event 1C triggered measurement report for Cell3 after the beginning of the time period T4.
- i) The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

### A.8.1.3 Event triggered reporting of two detectable neighbours in AWGN propagation condition

#### A.8.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of events. This test will partly verify the requirements in section 8.1.2 and 9.1.

The test parameters are given in Table A.8.5 and A.8.6. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A and 1B shall be used and the periodical reporting of the events is not applied. The test consists of four successive time periods, with a time duration of T1, T2, T3 and T4 respectively. In the initial condition before the time T1 only Cell1 is active.

**Table A.8.5: General test parameters for Event triggered reporting of two detectable neighbours in AWGN propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cell		Cell 1	
Reporting range	dB	3	Applicable for event 1A and 1B
Hysteresis	dB	0	
W		1	Applicable for event 1A and 1B
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		32	
T1	s	10	
T2	s	10	
T3	s	10	
T4	s	10	

**Table A.8.6: Cell specific test parameters for Event triggered reporting of two detectable neighbours in AWGN propagation condition**

Parameter	Unit	Cell 1				Cell 2				Cell3			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
CPICH_Ec/I <sub>or</sub>	dB	-10				-10				-10			
PCCPCH_Ec/I <sub>or</sub>	dB	-12				-12				-12			
SCH_Ec/I <sub>or</sub>	dB	-12				-12				-12			
PICH_Ec/I <sub>or</sub>	dB	-15				-15				-15			
DPCH_Ec/I <sub>or</sub>	dB	Note 1				N/A				N/A			
OCNS_Ec/I <sub>or</sub>	dB	Note 2				-0.941				-0.941			
$\hat{I}_{or}/I_{oc}$	dB	14.55	28.51	14.45	28.51	-Inf	27.51	13.95	21.51	8.05	21.51	13.95	27.51
	$I_{oc}$	dBm/ 3,84 MHz		-85									
CPICH_Ec/I <sub>o</sub>	dB	-11	-13	-14.5	-13	-Inf	-14.0	-15	-20	-17.5	-20	-15	-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 <sub>or</sub>													

### A.8.1.3.2 Test Requirements

- The UE shall send one Event 1A triggered measurement report for Cell2, with a measurement reporting delay less than 800 ms from the beginning of time period T2.
- The UE shall send one Event 1A triggered measurement report for Cell3, with a measurement reporting delay less than 200 ms from the beginning of time period T3.
- The UE shall send one Event 1B triggered measurement report for Cell2, with a measurement reporting delay less than 200 ms from the beginning of time period T4.
- The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2 x TTI<sub>UL DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

## A.8.1.4 Correct reporting of neighbours in fading propagation condition

### A.8.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs sufficient layer 1 filtering of the measurements, see section 9.1, which are the base for the event evaluation. The test is performed in fading propagation conditions. This test will partly verify the requirements in section 8.1.2.

The test parameters are given in Table A.8.7 and A.8.8. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A and Event 1B shall be used. The test consists of two successive time periods, each with a time duration of T1 and T2 respectively.

The TTI of the uplink DCCH shall be 20ms.

**Table A.8.7: General test parameters for correct reporting of neighbours in fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cell		Cell 1	
Reporting range	dB	0	Applicable for event 1A and 1B
Hysteresis	dB	0	
W		1	Applicable for event 1A and 1B
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	120	
Filter coefficient		0	
Monitored cell list size		24	Signalled before time T1.
T1	s	200	
T2	s	201	

**Table A.8.8: Cell specific test parameters for correct reporting of neighbours in fading propagation condition**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
CPICH_Ec/I <sub>or</sub>	dB	-10	-10	-10	-10
PCCPCH_Ec/I <sub>or</sub>	dB	-12	-12	-12	-12
SCH_Ec/I <sub>or</sub>	dB	-12	-12	-12	-12
PICH_Ec/I <sub>or</sub>	dB	-15	-15	-15	-15
DPCH_Ec/I <sub>or</sub>	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	7.29	3.29	3.29	7.29
$I_{oc}$	dBm/3,84 MHz	-70			
CPICH_Ec/I <sub>o</sub>	dB	-12	-16	-16	-12
Propagation Condition	Case 5 as specified in Annex B of TS25.101				
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 <sub>or</sub>					

#### A.8.1.4.2 Test Requirements

- The number of received event 1A reports for Cell 2 during time period T1 shall be less than 60.
- During the first 1 s of time period T2 no event reports shall be counted.
- The number of received event 1B reports counted from 1s after the beginning of time period T2 until the end of time period T2 shall be less than 60.

#### A.8.1.5 Event triggered reporting of multiple neighbour cells in Case 1 fading condition

##### A.8.1.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in Case 1 fading propagation condition. This test will partly verify the requirements in section 8.1.2.

The test parameters are given in Table A.8.8A and A.8.8B below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A shall be used and "CFN-SFN-Observed Time Difference" shall

be reported. 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 invisible cells.

**Table A.8.8A: General test parameters for event triggered reporting in multi-cell pedestrian environment**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cells		Cell2, Cell3, Cell4	
Hysteresis	dB	0	Applicable for event 1A
Time to Trigger	ms	0	Applicable for event 1A
Filter coefficient		0	Applicable for event 1A
Reporting range $R_{1a}$	dB	9	Applicable for event 1A
W		0	Applicable for event 1A
TriggeringCondition		activeSetAndMonitoredSetCells	Applicable for event 1A
Monitored cell list size		32	
T1	s	5	
T2	s	5	

**Table 8.8B: Cell specific test parameters for event triggered reporting in multi-cell pedestrian environment**

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15		-15	
DPCH_Ec/Ior	dB	n.a.		Note 1		Note 1		Note 1	
OCNS_Ec/Ior	dB	-0.941		Note 2		Note 2		Note 2	
$\hat{I}_{or}/I_{oc}$	dB	$-\infty$	1.3	4.3	1.3	4.3	1.3	1.3	4.3
$I_{oc}$	dBm/3,84 MHz	-70							
Propagation Condition		Case 1 (3km/h)							
CPICH_Ec/Io	dB	$-\infty$	-17.6	-14.6	-17.6	-14.6	-17.6	-17.6	-14.6
$\frac{SCH_{-}\hat{E}_{c,maxpath}}{I_o}$	dB	$-\infty$	-20.0	-17.0	-20.0	-17.0	-20.0	-20.0	-17.0
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 equal to $I_{or}$ . NOTE 3: CPICH_Ec/Io and SCH_Ec_maxpath/Io levels have been calculated from other parameters for information purposes. They are not settable themselves.									

### A.8.1.5.2 Test Requirements

The UE shall send one Event 1A triggered measurement report for Cell 1 with a measurement reporting delay less than 800 ms from the beginning of time period T2.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL,DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

## A.8.1.6 Event triggered reporting of multiple neighbour cells in Case 3 fading condition

### A.8.1.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event in Case3 fading propagation condition. This test will partly verify the requirements in section 8.1.2.

The test parameters are given in Table A.8.8C and A.8.8D below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A and 1F shall be used and "CFN-SFN-Observed Time Difference" shall be reported. 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 invisible cells.

**Table A.8.8C: General test parameters for event triggered reporting in multi-cell vehicular environment**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cells		Cell2, Cell3, Cell4	
Hysteresis	dB	0	Applicable for event 1A
Time to Trigger	ms	0	Applicable for event 1A
Filter coefficient		0	Applicable for event 1A and event 1F
Reporting range $R_{1a}$	dB	8	Applicable for event 1A
W		0	Applicable for event 1A
TriggeringCondition		activeSetAndMonitoredSetCells	Applicable for event 1A
Absolute threshold $T_{1f}$	dB	-20	Applicable for event 1F
Time to Trigger	ms	0	Applicable for event 1F
TriggeringCondition		activeSet	Applicable for event 1F
Monitored cell list size		32	
T1	s	5	
T2	s	5	

**Table 8.8D: Cell specific test parameters for event triggered reporting in multi-cell vehicular environment**

Parameter	Unit	Cell 1		Cell 2		Cell 3		Cell 4	
		T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 1		Channel 1	
CPICH_Ec/I <sub>or</sub>	dB	-10		-10		-10		-10	
PCCPCH_Ec/I <sub>or</sub>	dB	-12		-12		-12		-12	
SCH_Ec/I <sub>or</sub>	dB	-9.3		-9.3		-9.3		-9.3	
PICH_Ec/I <sub>or</sub>	dB	-15		-15		-15		-15	
DPCH_Ec/I <sub>or</sub>	dB	n.a.		Note 1		Note 1		Note 1	
OCNS_Ec/I <sub>or</sub>	dB	Note 2		Note 2		Note 2		Note 2	
$\hat{I}_{or}/I_{oc}$	dB	-∞	1.1	3.6	4.6	3.6	4.6	6.6	-∞
$I_{oc}$	dBm/3,84 MHz	-70							
Propagation Condition		Case 3 (120km/h)							
CPICH_Ec/I <sub>o</sub>	dB	-∞	-18.0	-16.5	-14.5	-16.5	-14.5	-13.5	-∞
$\frac{SCH\_E_{c,maxpath}}{I_o}$	dB	-∞	-20.0	-18.5	-16.5	18.5	-16.5	-15.5	-∞
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 equal to I <sub>or</sub> . NOTE 3: CPICH_Ec/I <sub>o</sub> , SCH_Ec_maxpath/I <sub>o</sub> , and I <sub>o</sub> levels have been calculated from other parameters for information purposes. They are not settable themselves.									

### A.8.1.6.2 Test Requirements

The UE shall send an Event 1A triggered measurement report for Cell 1, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The UE shall send an Event 1F triggered measurement report for Cell 4, with a measurement reporting delay less than 200 ms from the beginning of time period T2.

The rate of correct events 1A for Cell1 observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2 x TTI<sub>UL DCCH</sub> higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

### A.8.1.7 Event triggered reporting in AWGN propagation conditions

#### A.8.1.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when UE DRX is active. This test will partly verify the requirements in section 8.1.2 and 9.1, and is applicable to all UE that support DRX in cell DCH state.

The test parameters are given in Table A.8.8A and A.8.8B below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A shall be used. The test consists of two successive time periods, with a time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2.



**Table A.8.8A: General test parameters for Event triggered reporting in AWGN propagation conditions when UE DRX is active**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cell		Cell 1	
Reporting range	dB	3	Applicable for event 1A
Hysteresis	dB	0	
W		1	Applicable for event 1A
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		24	
UE DRX cycle	sub-frames	20	Length of the UE DRX cycle. Note: UE DRX cycle 1 is used.
Inactivity Threshold for UE DRX cycle 1	sub-frames	1	
UE DRX Grant Monitoring	Boolean	FALSE	
E-DCH TTI	ms	2	
UE DTX cycle 1	sub-frames	20	
UE DTX cycle 2	sub-frames	20	
CQI DTX Timer	sub-frames	4	
UE DPCCH burst 1	sub-frames	2	
UE DPCCH burst 2	sub-frames	2	
Inactivity Threshold for UE DTX cycle 2	Number of E-DCH TTIs	1	
UE DTX long preamble length	Number of slots	2	Note: Mandatory Default value is used.
MAC Inactivity Threshold	Number of E-DCH TTIs	Infinity	
Uplink DPCCH slot format		1	
T1	s	5	
T2	s	5	

**Table A.8.8B: Cell specific test parameters for Event triggered reporting in AWGN propagation conditions when UE DRX is active.**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	Note 1		N/A	
HS-PDSCH_Ec/Ior	dB	-10		N/A	
HS-SCCH-1_Ec/Ior	dB	-13		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	0	6.97	-Infinity	5.97
$I_{oc}$	dBm/ 3,84 MHz	-70			
CPICH_Ec/Io	dB	-13	-13	-Infinity	-14
Propagation Condition		AWGN			
NOTE 1: The DPCH level is controlled by the power control loop					
NOTE 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .					
NOTE 3: The UE under test is not continuously scheduled, and shall not be configured to continuously transmit data, to enable it to use DRX and DTX.					

### A.8.1.7.2 Test Requirements

The UE shall send one Event 1A triggered measurement report, with a measurement reporting delay less than 1.5 s from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL,DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

## A.8.2 FDD inter frequency measurements

### A.8.2.1 Correct reporting of neighbours in AWGN propagation condition

#### A.8.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements. The test will partly verify the requirements in section 8.1.2.3.

The test consists of two successive time periods, with a time duration T1 and T2. The test parameters are given in tables A.8.9 and A.8.10 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1A and 2C shall be used. The CPICH Ec/I0 of the best cell on the unused frequency shall be reported together with Event 2C reporting.

**Table A.8.9: General test parameters for Correct reporting of neighbours in AWGN propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode		A.22 set 1	As specified in TS 25.101 section A.5.
Active cell		Cell 1	
Threshold non used frequency	dB	-18	Absolute $E_c/I_0$ threshold for event 2C
Reporting range	dB	4	Applicable for event 1A
Hysteresis	dB	0	
W		1	Applicable for event 1A
W non-used frequency		1	Applicable for event 2C
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		24 on channel 1 16 on channel 2	Measurement control information is sent before the compressed mode pattern starts.
T1	s	5	
T2	s	5	

**Table A.8.10: Cell Specific parameters for Correct reporting of neighbours in AWGN propagation condition**

Parameter	Unit	Cell 1		Cell 2		Cell 3	
		T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 1		Channel 2	
CPICH $E_c/I_0$	dB	-10		-10		-10	
PCCPCH $E_c/I_0$	dB	-12		-12		-12	
SCH $E_c/I_0$	dB	-12		-12		-12	
PICH $E_c/I_0$	dB	-15		-15		-15	
DPCH $E_c/I_0$	dB	Note 1		N/A		N/A	
OCNS		Note 2		-0.941		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	0	5.42	-Infinity	3.92	-1.8	-1.8
$I_{oc}$	dBm/3,84 MHz	-70				-70	
CPICH $E_c/I_0$	dB	-13	-13	-Infinity	-14.5	-14	-14
Propagation Condition		AWGN					
Note 1: The DPCH level is controlled by the power control loop							
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$							

### A.8.2.1.2 Test Requirements

- The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than 3.4 seconds from the beginning of time period T1.
- The UE shall send one Event 1A triggered measurement report, with a measurement reporting delay less than 956.2 ms from the beginning of time period T2. The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

## A.8.2.2 Correct reporting of neighbours in Fading propagation condition

### A.8.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements. The test will partly verify the requirements in section 8.1.2.3. The test parameters are given in Table A.8.11 and A.8.12. In the measurement control information it is indicated to the UE that event-triggered reporting 2C shall be used. The test consists of two successive time periods, each with a time duration of T1 and T2 respectively.

**Table A.8.11: General test parameters for Correct reporting of neighbours in Fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode		A.22 set 2 (TGPL1=12)	As specified in TS 25.101 section A.5.
Active cell		Cell 1	
Absolute Threshold (Ec/N0) for Event 2c	dB	-18	
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		Total 24 8 on frequency Channel 2	Measurement control information is sent before the compressed mode pattern starts.
Propagation Condition		Case 5	As specified in Annex B of TS 25.101.
Frequency offset	ppm	+/- 0.1	Frequency offset between Cell 1 and Cell 2.
T1	s	2	
T2	s	15	

**Table A.8.12: Test parameters for Correct reporting of neighbours in Fading propagation condition**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2	
CPICH_Ec/lor	dB	-10		-10	
PCCPCH_Ec/lor	dB	-12		-12	
SCH_Ec/lor	dB	-12		-12	
PICH_Ec/lor	dB	-15		-15	
DPCH_Ec/lor	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	0		-Infinity	-1.8
$I_{oc}$	dBm/3,84 MHz	-70		-70	
CPICH_Ec/lo	dB	-13		-Infinity	-14
Propagation Condition		Case 5 as specified in Annex B of TS25.101			
Note 1:	The DPCH level is controlled by the power control loop				
Note 2:	The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .				

### A.8.2.2.2 Test Requirements

- The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than 13.5 seconds from the beginning of time period T2.
- The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

### A.8.2.3 Correct reporting of neighbours in fading propagation condition using TGL1=14

#### A.8.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements. The test will partly verify the requirements in section 8.1.2.3. The test parameters are given in Table A.8.12A and A.8.12B. In the measurement control information it is indicated to the UE that event-triggered reporting 2C shall be used. The test consists of two successive time periods, each with time duration of T1 and T2 respectively.

**Table A.8.12A: General test parameters for correct reporting of neighbours in Fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode		A.22 set 4	As specified in TS 25.101 section A.5.
Active cell		Cell 1	
Absolute Threshold (Ec/NO) for Event 2c	dB	-18	
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		Total 24 8 on frequency Channel 2	Measurement control information is sent before the compressed mode pattern starts.
Propagation Condition		Case 5	As specified in Annex B of TS 25.101.
Frequency offset	ppm	+/- 0.1	Frequency offset between Cell 1 and Cell 2.
T1	s	2	
T2	s	2	

**Table A.8.12B: Test parameters for correct reporting of neighbours in Fading propagation condition**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2	
CPICH_Ec/lor	dB	-10		-10	
PCCPCH_Ec/lor	dB	-12		-12	
SCH_Ec/lor	dB	-12		-12	
PICH_Ec/lor	dB	-15		-15	
DPCH_Ec/lor	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	0		-Infinity	-1.8
$I_{oc}$	dBm/3,84 MHz	-70		-70	
CPICH_Ec/lo	dB	-13		-Infinity	-14
Propagation Condition		Case 5 as specified in Annex B of TS25.101			
Note 1: The DPCH level is controlled by the power control loop					
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .					

#### A.8.2.3.2 Test Requirements

- The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than 1.7 seconds from the beginning of time period T2.
- The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

## A.8.2A FDD adjacent frequency measurements

The test cases under A.8.2A are only applicable to UEs that do not require compressed mode to measure cells on a frequency adjacent to the intra-frequency.

### A.8.2A.1 Event triggered reporting in AWGN propagation conditions

#### A.8.2A.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the requirements in section 8.1.2 and 9.1.

The test parameters are given in Table A.8.12C and A.8.12D below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C and 2E shall be used. The test consists of three successive time periods, with a time duration of T1, T2 and T3 respectively. During time duration T1, the UE shall not have any timing information of cell 2.

**Table A.8.12C: General test parameters for Event triggered reporting in AWGN propagation conditions**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cell		Cell 1	
Threshold non used frequency	dB	-17	Absolute $E_c/I_0$ threshold for event 2C and 2E
Hysteresis	dB	0	Applicable for event 2C and 2E
W non-used frequency		0	Applicable for event 2C and 2E
Time to Trigger	Ms	0	Applicable for event 2C and 2E
Filter coefficient		0	Applicable for event 2C and 2E
Monitored cell list size		24 on channel 1 and 2 each	
T1	S	5	
T2	S	5	
T3	S	5	

**Table A.8.12D: Cell specific test parameters for Event triggered reporting in AWGN propagation conditions**

Parameter	Unit	Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1			Channel 2		
CPICH $E_c/I_{or}$	dB	-10			-10		
PCCPCH $E_c/I_{or}$	dB	-12			-12		
SCH $E_c/I_{or}$	dB	-12			-12		
PICH $E_c/I_{or}$	dB	-15			-15		
DPCH $E_c/I_{or}$	dB	Note 1			N/A		
OCNS		Note 2			-0.941		
$\hat{I}_{or}/I_{oc}$	dB	0.02	0.02	0.02	-Infinity	-1.80	-Infinity
$I_{oc}$	dBm/3,84 MHz	-70					
CPICH $E_c/I_0$	dB	-13	-13	-13	-Infinity	-14	-Infinity
Propagation Condition		AWGN					
NOTE 1: The DPCH level is controlled by the power control loop							
NOTE 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .							

### A.8.2A.1.2 Test Requirements

- a) The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2.
- b) The UE shall send one Event 2E triggered measurement report, with a measurement reporting delay less than 200 ms from the beginning of time period T3.
- c) The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

### A.8.2A.2 Event triggered reporting of two detectable neighbours in AWGN propagation condition

#### A.8.2A.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of events. This test will partly verify the requirements in section 8.1.2 and 9.1.

The test parameters are given in Table A.8.12E and A.8.12F. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C and 2E shall be used and the periodical reporting of the events is not applied. The test consists of four successive time periods, with a time duration of T1, T2, T3 and T4 respectively. In the initial condition before the time T1 only Cell1 is active.

**Table A.8.12E: General test parameters for Event triggered reporting of two detectable neighbours in AWGN propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cell		Cell 1	
Threshold non used frequency	dB	-16	Absolute $E_c/I_0$ threshold for event 2C and 2E
Hysteresis	dB	0	Applicable for event 2C and 2E
W non-used frequency		0	Applicable for event 2C and 2E
Time to Trigger	Ms	0	Applicable for event 2C and 2E
Filter coefficient		0	Applicable for event 2C and 2E
Monitored cell list size		32	
T1	S	10	
T2	S	10	
T3	S	10	
T4	S	10	

**Table A.8.12F: Cell specific test parameters for Event triggered reporting of two detectable neighbours in AWGN propagation condition**

Parameter	Unit	Cell 1				Cell 2				Cell 3			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number		Channel 1				Channel 2				Channel 2			
CPICH_Ec/I <sub>or</sub>	dB	-10				-10				-10			
PCCPCH_Ec/I <sub>or</sub>	dB	-12				-12				-12			
SCH_Ec/I <sub>or</sub>	dB	-12				-12				-12			
PICH_Ec/I <sub>or</sub>	dB	-15				-15				-15			
DPCH_Ec/I <sub>or</sub>	dB	Note 1				N/A				N/A			
OCNS_Ec/I <sub>or</sub>	dB	Note 2				-0.941				-0.941			
$\hat{I}_{or}/I_{oc}$	dB	5.87	0.02	5.87	0.02	-Inf	-0.06	20.33	-8.73	-6.65	-6.56	21.93	-12.23
$I_{oc}$	dBm/ 3,84 MHz	-85											
CPICH_Ec/I <sub>o</sub>	dB	-11	-13	-11	-13	-Inf	-13.5	-13.9	-19.5	-17.5	-20	-12.3	-23
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 <sub>or</sub>													

### A.8.2A.2.2 Test Requirements

- The UE may send one Event 2C triggered measurement report for Cell3, with a measurement reporting delay less than 800 ms from the beginning of time period T1, and send one Event 2E triggered measurement report for Cell3, with a measurement reporting delay less than 200ms from the beginning of time period T2.
- The UE shall send one Event 2C triggered measurement report for Cell2, with a measurement reporting delay less than 800 ms from the beginning of time period T2.
- The UE shall send one Event 2C triggered measurement report for Cell3, with a measurement reporting delay less than 200 ms from the beginning of time period T3.
- The UE shall send one Event 2E triggered measurement report for Cell2, with a measurement reporting delay less than 200 ms from the beginning of time period T4.
- The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\ DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

### A.8.2A.3 Correct reporting of neighbours in fading propagation condition

#### A.8.2A.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs sufficient layer 1 filtering of the measurements, see section 9.1, which are the base for the event evaluation. The test is performed in fading propagation conditions. This test will partly verify the requirements in section 8.1.2.

The test parameters are given in Table A.8.12G and A.8.12H. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C and Event 2E shall be used. The test consists of two successive time periods, each with a time duration of T1 and T2 respectively.

The TTI of the uplink DCCH shall be 20ms.



**Table A.8.12G: General test parameters for correct reporting of neighbours in fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Active cell		Cell 1	
Threshold non used frequency for event 2C	dB	-12	Absolute Ec/Io threshold for event 2C
Threshold non used frequency for event 2E	dB	-16	Absolute Ec/Io threshold for event 2E
Hysteresis	dB	0	Applicable for event 2C and 2E
W non-used frequency		0	Applicable for event 2C and 2E
Time to Trigger	ms	120	Applicable for event 2C and 2E
Filter coefficient		0	Applicable for event 2C and 2E
Monitored cell list size		24	Signalled before time T1.
T1	s	200	
T2	s	201	

**Table A.8.12H: Cell specific test parameters for correct reporting of neighbours in fading propagation condition**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2	
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	2.32	-4.74	-4.74	2.32
$I_{oc}$	dBm/3,84 MHz	-70			
CPICH_Ec/Io	dB	-12	-16	-16	-12
Propagation Condition	Case 5 as specified in Annex B of TS25.101				
NOTE 1: The DPCH level is controlled by the power control loop					
NOTE 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$					

### A.8.2A.3.2 Test Requirements

- The number of received event 2C reports for Cell 2 during time period T1 shall be less than 60.
- During the first 1 s of time period T2 no event reports shall be counted.
- The number of received event 2E reports for Cell 2 counted from 1s after the beginning of time period T2 until the end of time period T2 shall be less than 60.

## A.8.2B FDD inter frequency measurements without compressed mode

### A.8.2B.1 Event triggered reporting using enhanced inter-frequency measurements without compressed mode

The test case under A.8.2B.1 is only applicable to a UE that is able to search enhanced inter-frequency measurements without compressed mode according to its measurement capability in the IE “Enhanced inter-frequency measurements without compressed mode” defined in section 10.3.3.21 of TS 25.331 [16].

#### A.8.2B.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of Event 2B when using enhanced inter-frequency measurements without compressed mode. The test will partly verify the requirements for “Enhanced inter-frequency measurements without compressed mode” in section 8.1.2.3.

The test consists of four successive time periods, T1, T2, T3 and T4, respectively. The test parameters are given in tables A.8.2B.1.1-1 and A.8.2B.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2B shall be used. The CPICH  $E_c/I_0$  of the cell on the unused frequency shall be reported together with Event 2B reporting. As part of the preconditions, the UE shall use Channel 1 as the serving HS-DSCH cell and Channel 2 and Channel 3 as the secondary serving HS-DSCH cells.

**Table A.8.2B.1.1-1: General test parameters for correct reporting of enhanced inter-frequency measurements without compressed mode**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Primary Serving HS-DSCH Cell		Channel 1	
Secondary Serving HS-DSCH Cell		Channel 2, Channel 3	
Absolute threshold ( $E_c/I_0$ ) used frequency	dB	-13	Absolute $E_c/I_0$ threshold for event 2B
Absolute threshold ( $E_c/I_0$ ) non used frequency	dB	-13	Absolute $E_c/I_0$ threshold for event 2B
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Propagation Condition	Cell 1	AWGN	
	Cell 2	Case 5	See Annex B of TS 25.101
	Cell 3	Case 5	See Annex B of TS 25.101
DL_DRX_Active		0	Downlink DRX is not used
T1	s	5	
T2	s	2	
T3	s	4	
T4	s	1	

**Table A.8.2B.1.1-2: Cell Specific parameters for correct reporting of enhanced inter-frequency measurements without compressed mode**

Parameter	Unit	Cell 1				Cell 2				Cell 3			
		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number		Channel 1				Channel 2				Channel 3			
CPICH_Ec/I <sub>or</sub>	dB	-10				-10				-10			
PCCPCH_Ec/I <sub>or</sub>	dB	-12				-12				-12			
SCH_Ec/I <sub>or</sub>	dB	-12				-12				-12			
PICH_Ec/I <sub>or</sub>	dB	-15				-15				-15			
DPCH_Ec/I <sub>or</sub>	dB	Note 1				N/A				N/A			
OCNS		Note 2				-0.941				-0.941			
$\hat{I}_{or}/I_{oc}$	dB	5.87	-4.74	5.87	-4.74	-Inf	5.87	-4.74	5.87	-Inf	5.87	-4.74	5.87
$I_{oc}$	dBm/3.84 MHz	-70											
SCH_Ec/I <sub>o</sub>	dB	-13	-18	-13	-18	-Inf	-13	-18	-13	-Inf	-13	-18	-13
CPICH_Ec/I <sub>o</sub>	dB	-11	-16	-11	-16	-Inf	-11	-16	-11	-Inf	-11	-16	-11
Propagation Condition		AWGN				Case 5				Case 5			
Note 1: The DPCH level is controlled by the power control loop													
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$													

### A.8.2B.1.2 Test Requirements

- The UE shall send one Event 2B triggered measurement report each for both Cell 2 and Cell 3 with a measurement reporting delay less than 800 ms from the beginning of time period T2.
- The UE shall send one Event 2B triggered measurement report each for both Cell 2 and Cell 3 with a measurement reporting delay less than 200 ms from the beginning of time period T4.
- The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events and cells in T2 and T4.

### A.8.2B.2 Event triggered reporting of inter frequency measurements without compressed mode for MC-HSDPA

The test case under A.8.2B.2 is only applicable to a UE that is able perform inter-frequency measurements without compressed mode for MC-HSDPA connections according to its measurement capability in the IE "Inter-frequency measurements on configured carriers without compressed mode" defined in section 10.3.3.21 of TS 25.331 [16].

#### A.8.2B.2.1 Test Purpose and Environment

The purpose of this test is to partly verify the requirements for UEs that does not need compressed mode to measure cells on configured carrier frequencies corresponding to secondary serving HS-DSCH. The requirements consist of packet loss requirements specified in section 5.15 and new cell identification time and CPICH measurement period requirements specified in 8.1.2.3 and applicable sub-clauses.

The test scenario comprises two cells, with cell 1 on carrier frequency  $f_1$  being the serving HS-DSCH cell and cell 2 on carrier frequency  $f_2$  being the secondary serving HS-DSCH cell. The activation status of cell 2 is deactivated. Both  $f_1$  and  $f_2$  are within the same frequency band for the UE supporting DC-HSDPA, 4C-HSDPA or 8C-HSDPA. For the UE capable of DB-DC-HSDPA the frequencies  $f_1$  and  $f_2$  are in different frequency bands. DL DRX is not configured. No compressed mode pattern shall be configured in the test.

The test consists of 2 successive time periods, T1 and T2 respectively. The test parameters are given in tables A.8.2B.2.1-1 and A.8.2B.2.1-2 below.

In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used and that the monitored set consists of 6 cells including the secondary serving HS-DSCH cell. The measurement quantity is CPICH Ec/No.

For the verification of packet loss rate requirements the UE shall be continuously scheduled with HS-DSCH data on the serving HS-DSCH cell during the test.

**Table A.8.2B.2.1-1: General test parameters for Event triggered reporting of inter frequency measurements without compressed mode for MC-HSDPA**

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control			On	
HSDPA parameters			Fixed Reference Channel Definition H-Set 1, with QPSK modulation only	As specified in TS 25.101 section A.7.1.1
Primary serving HS-DSCH Cell			Channel 1	
Secondary serving HS-DSCH Cell			Channel 2	
Absolute threshold (Ec/ I <sub>o</sub> ) non used frequency		dB	-13	Absolute Ec/ I <sub>o</sub> threshold for event 2C
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
Monitored cell list size			6	List of cells on f2 including secondary serving HS-DSCH cell
Propagation Condition	Cell 1		AWGN	
	Cell 2		Case 5	See Annex B of TS 25.101
DL_DRX_Active			0	Downlink DRX is not used
T1		s	5	
T2		s	10	

**Table A.8.2B.2.1-2: Cell Specific parameters for Event triggered reporting of inter frequency measurements without compressed mode for MC-HSDPA**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2	
CPICH_Ec/I <sub>o</sub>	dB	-10		-10	
PCCPCH_Ec/I <sub>o</sub>	dB	-12		-12	
SCH_Ec/I <sub>o</sub>	dB	-12		-12	
PICH_Ec/I <sub>o</sub>	dB	-15		-15	
DPCH_Ec/I <sub>o</sub>	dB	Note 1		N/A	
HS-PDSCH_Ec/I <sub>o</sub>	dB	-7		N/A	
HS-SCCH-1_Ec/I <sub>o</sub>	dB	-15		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	10	10	-Inf	5.87
$I_{oc}$	dBm/3.84 MHz	-70			
SCH_Ec/I <sub>o</sub>	dB	-12.4	-12.4	-Inf	-13
CPICH_Ec/I <sub>o</sub>	dB	-10.4	-10.4	-Inf	-11
Propagation Condition		AWGN		Case 5	
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 <sub>or</sub>					

### A.8.2B.2.2 Test Requirements

- a) The UE shall send one Event 2C triggered measurement report for Cell 2 within a measurement reporting delay less than 2200 ms from the beginning of time period T2.

- b) From the beginning of T2 until the measurement report is received by the system simulator during T2, at least 95% of all ACK/NACKs corresponding to HS-DSCH transmitted by the primary serving HS-DSCH cell to the UE shall be detected by the system simulator.

NOTE 1: The probability of passing both test requirements (a) and (b) simultaneously shall be at least 90%.

NOTE 2: The test requirements on probability of not sending ACK/NACK is not applicable for DB-DC-HSDPA.

NOTE 3: The test requirements on receiving at least 95% of all ACK/NACKs during T2 take into account 4% packet loss requirements specified in section 5.15 and 1% mis-detection of HS-SCCH when there is no interruption on the reception of Cell 1.

## A.8.2C FDD detected set measurements

### A.8.2C.1 Event triggered reporting of interfrequency detected set measurements with compressed mode

The test case under A.8.2C.1 is only applicable to a UE that is able to support inter frequency detected set CPICH measurements.

#### A.8.2C.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency detected set cell measurements. The test will partly verify the requirements in section 8.1.2.3.

The test consists of four successive time periods, T1, T2, T3 and T4 respectively. The test parameters are given in tables A.8.2C.1.1-1 and A.8.2C.1.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2B shall be used. The CPICH  $E_c/I_o$  of the cell on the unused frequency shall be reported together with Event 2B reporting. Cell 2 shall not be included in the monitored cell list.

**Table A.8.2C.1.1-1: General test parameters for correct reporting of inter-frequency detected cell with compressed mode**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode		Table A.22, set 4	As specified in TS 25.101 section A.5.
Active cell		Cell 1	On used frequency (RF Channel 1)
Neighbor cell		Cell 2	Non-used frequency (RF Channel 2)
Absolute threshold ( $E_c/I_o$ ) used frequency		-13	Absolute $E_c/I_o$ threshold for event 2B
Absolute threshold ( $E_c/I_o$ ) non used frequency	dB	-13	Absolute $E_c/I_o$ threshold for event 2B
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Propagation Condition	Cell 1	AWGN	
	Cell 2	Case 5	See Annex B of TS 25.101
DL DRX Active		0	Downlink DRX is not used
T1	s	5	
T2	s	40	
T3	s	4	
T4	s	1	

**Table A.8.2C.1.1-2: Cell Specific parameters for correct reporting of inter-frequency detected cell with compressed mode**

Parameter	Unit	Cell 1				Cell 2			
		T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number		Channel 1				Channel 2			
CPICH_Ec/I <sub>or</sub>	dB	-10				-10			
PCCPCH_Ec/I <sub>or</sub>	dB	-12				-12			
SCH_Ec/I <sub>or</sub>	dB	-12				-12			
PICH_Ec/I <sub>or</sub>	dB	-15				-15			
DPCH_Ec/I <sub>or</sub>	dB	Note 1				N/A			
OCNS		Note 2				-0.941			
$\hat{I}_{or}/I_{oc}$	dB	5.87	-4.74	5.87	-4.74	-Inf	5.87	-4.74	5.87
$I_{oc}$	dBm/3,84 MHz	-70							
SCH_Ec/I <sub>o</sub>	dB	-13	-18	-13	-18	-Inf	-13	-18	-13
CPICH_Ec/I <sub>o</sub>	dB	-11	-16	-11	-16	-Inf	-11	-16	-11
Propagation Condition		AWGN				Case 5			
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 <sub>or</sub>									

### A.8.2C.1.2 Test Requirements

- The UE shall send one Event 2B triggered measurement report with the IE “Detected Set Trigger” set, with a measurement reporting delay less than 30 seconds from the beginning of time period T2.
- The UE shall send one Event 2B triggered measurement report, with a measurement reporting delay less than 480 ms from the beginning of time period T4.
- The UE shall not send event triggered measurement reports as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events in T2 and T4.

### A.8.2C.2 Event triggered reporting of inter frequency detected set measurements without compressed mode

The test case under A.8.2C.1 is only applicable to a UE that is able to support inter frequency detected set CPICH measurements and to search inter-frequency measurements without compressed mode according to its measurement capability in the IE “Adjacent Frequency measurements without compressed mode”, the IE “Inter-band Frequency measurements without compressed mode”, or the IE “Enhanced inter-frequency measurements without compressed mode” defined in section 10.3.3.21 of TS 25.331 [16].

#### A.8.2C.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency detected set cell measurements. The test will partly verify the requirements in section 8.1.2.3.

The test consists of four successive time periods T1, T2, T3 and T4. The test parameters are given in tables A.8.2C.2.1-1 and A.8.2C.2.1-2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2B shall be used. The CPICH Ec/I<sub>o</sub> of the cell on the unused frequency shall be reported together with Event 2B reporting. Cell 2 shall not be included in the monitored cell list.

**Table A.8.2C.2.1-1: General test parameters for correct reporting of inter-frequency detected cell without compressed mode**

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control			On	
Active cell			Cell 1	
Neighbor cell			Cell 2	
Absolute threshold (Ec/Io) used frequency		dB	-13	Absolute Ec/Io threshold for event 2B
Absolute threshold (Ec/Io) non used frequency		dB	-13	Absolute Ec/Io threshold for event 2B
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
Propagation Condition	Cell 1		AWGN	
	Cell 2		Case 5	See Annex B of TS 25.101
DL_DRX_Active			0	Downlink DRX is not used
T1		s	5	
T2		s	40	
T3		s	4	
T4		s	1	

**Table A.8.2C.2.1-2: Cell Specific parameters for correct reporting of inter-frequency detected cell without compressed mode**

Parameter	Unit	Cell 1				Cell 2			
		T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number		Channel 1				Channel 2			
CPICH_Ec/Ior	dB	-10				-10			
PCCPCH_Ec/Ior	dB	-12				-12			
SCH_Ec/Ior	dB	-12				-12			
PICH_Ec/Ior	dB	-15				-15			
DPCH_Ec/Ior	dB	Note 1				N/A			
OCNS		Note 2				-0.941			
$\hat{I}_{or}/I_{oc}$	dB	5.87	-4.74	5.87	-4.74	-Inf	5.87	-4.74	5.87
$I_{oc}$	dBm/3.84 MHz	-70							
SCH_Ec/Io	dB	-13	-18	-13	-18	-Inf	-13	-18	-13
CPICH_Ec/Io	dB	-11	-16	-11	-16	-Inf	-11	-16	-11
Propagation Condition		AWGN				Case 5			
Note 1: The DPCH level is controlled by the power control loop									
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$									

## A.8.2D Correct reporting of neighbours in AWGN propagation condition with an increased number of carriers and reduced performance group configured

### A.8.2D.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements. The test will partly verify the requirements in section 8.1.2.3.

The test consists of two successive time periods, with a time duration T1 and T2. The test parameters are given in tables A.8.2D.1-1, A.8.2D.1-2 and A.8.2D.1-3 below. In the measurement control information it is indicated to the UE that

event-triggered reporting with Event 1A and 2C shall be used. The CPICH Ec/I0 of the best cell on the unused frequency shall be reported together with Event 2C reporting.

**Table A.8.2D.1-1: General test parameters for Correct reporting of neighbours in AWGN propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode		A.22 set 1	As specified in TS 25.101 section A.5.
Active cell		Cell 1	
Threshold non used frequency	dB	-18	Absolute Ec/I0 threshold for event 2C
Reporting range	dB	4	Applicable for event 1A
Hysteresis	dB	0	
W		1	Applicable for event 1A
W non-used frequency		1	Applicable for event 2C
Reporting deactivation threshold		0	Applicable for event 1A
Time to Trigger	ms	0	
Filter coefficient		0	
Reduced performance group scaling factor		8	
UE configured UTRA RF Channel Number		1, 2,3,4,5,6	Serving cell and five UTRA FDD interfrequency carrier frequencies are used in the UE neighbour cell list. Frequencies 4,5,6 are indicated to have reduced performance
Test equipment configuration		Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6	
Monitored cell list size		24 on channel 1 4 on channel 2 4 on channel 3 4 on channel 4 4 on channel 5 4 on channel 6	Measurement control information is sent before the compressed mode pattern starts.
T1	s	5	
T2	s	90	



**Table A.8.2D.1-2: Cell Specific parameters for Correct reporting of neighbours in AWGN propagation condition (cell 1, 2)**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Randomly selected from channel 2,3 such that cell 2 is in the normal performance group	
CPICH_Ec/lor	dB	-10		-10	
PCCPCH_Ec/lor	dB	-12		-12	
SCH_Ec/lor	dB	-12		-12	
PICH_Ec/lor	dB	-15		-15	
DPCH_Ec/lor	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-0.02	-0.02	-Inf	-1.8
$I_{oc}$	dBm/3,84 MHz	-70			
CPICH_Ec/lo	dB	-13	-13	-Inf	-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 $I_{or}$					

**Table A.8.2D.1-3: Cell Specific parameters for Correct reporting of neighbours in AWGN propagation condition (cell 3, 4)**

Parameter	Unit	Cell 3		Cell 4	
		T1	T2	T1	T2
UTRA RF Channel Number		Randomly selected from channel 4,5,6 such that cell 3 is in the reduced performance group		Randomly selected from channel 4,5,6 such that cell 4 is in the reduced performance group	
CPICH_Ec/lor	dB	-10		-10	
PCCPCH_Ec/lor	dB	-12		-12	
SCH_Ec/lor	dB	-12		-12	
PICH_Ec/lor	dB	-15		-15	
DPCH_Ec/lor	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Inf	-1.8	-Inf	-1.8
$I_{oc}$	dBm/3,84 MHz	-70			
CPICH_Ec/lo	dB	-Inf	-14	-Inf	-14
Propagation Condition	AWGN				
Note 1: The DPCH level is controlled by the power control loop					
Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$					

### A.8.2D.2 Test Requirements

- a) The UE shall send one Event 2C triggered measurement report for cell 2, with a measurement reporting delay less than 6.8 seconds from the beginning of time period T2.
- b) The UE shall send one Event 2C triggered measurement report for cell 3, with a measurement reporting delay less than 81.6 seconds from the beginning of time period T2.

- c) The UE shall send one Event 2C triggered measurement report for cell 4, with a measurement reporting delay less than 81.6 seconds from the beginning of time period T2.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

### A.8.2C.2.2 Test Requirements

- a) The UE shall send one Event 2B triggered measurement report with the IE “Detected Set Trigger” set, with a measurement reporting delay less than 30 seconds from the beginning of time period T2.
- b) The UE shall send one Event 2B triggered measurement report, with a measurement reporting delay less than 200 ms from the beginning of time period T4.
- c) The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% for each of the events in T2 and T4.

## A.8.2E Correct reporting of neighbours in AWGN propagation condition (Increased UE carrier monitoring without reduced performance group configured)

### A.8.2E.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements for increased UE carrier monitoring without reduced performance group configured. The test will partly verify the requirements in section 8.1.2.3.

The test consists of two successive time periods, with a time duration T1 and T2. The test parameters are given in tables A.8.2E.1-1, A.8.2E.1-2 and A.8.2E.1-3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used. The CPICH Ec/I0 of the best cell on the unused frequency shall be reported together with Event 2C reporting. No scaling factor is configured in this Cell1.

**Table A.8.2E.1-1: General test parameters for correct reporting of neighbours in AWGN propagation condition (without reduced performance group configured)**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode		A.22 set 1	As specified in TS 25.101 section A.5.
Active cell		Cell 1	
Threshold non used frequency	dB	-18	Absolute $E_c/I_0$ threshold for event 2C
Hysteresis	dB	0	
W non-used frequency		1	Applicable for event 2C
Time to Trigger	ms	0	
Filter coefficient		0	
Scaling Factor		-	As specified in 25.331
UE configured UTRA RF Channel Number		1, 2,3,4,5,6	Serving cell and five UTRA FDD interfrequency carrier frequencies are used in the UE neighbour cell list. All frequencies are indicated to have normal performance.
Test equipment configuration		Cell 1 uses UTRA RF channel number 1 Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 2,3,4,5,6	
Monitored cell list size		24 on channel 1 4 on channel 2 4 on channel 3 4 on channel 4 4 on channel 5 4 on channel 6	Measurement control information is sent before the compressed mode pattern starts.
T1	s	5	
T2	s	20	

**Table A.8.2E.1-2: Cell 1 and cell 2 specific parameters for correct reporting of neighbours in AWGN propagation condition (without reduced performance group configured)**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Randomly selected from channel 2,3,4,5,6.	
CPICH $E_c/I_{or}$	dB	-10		-10	
PCCPCH $E_c/I_{or}$	dB	-12		-12	
SCH $E_c/I_{or}$	dB	-12		-12	
PICH $E_c/I_{or}$	dB	-15		-15	
DPCH $E_c/I_{or}$	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-0.02	-0.02	-Inf	-1.8
$I_{oc}$	dBm/3,84 MHz	-70			
CPICH $E_c/I_o$	dB	-13	-13	-Inf	-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 $I_{or}$					

**Table A.8.2E.1-3: Cell 3 and cell 4 specific parameters for correct reporting of neighbours in AWGN propagation condition (without reduced performance group configured)**

Parameter	Unit	Cell 3		Cell 4	
		T1	T2	T1	T2
UTRA RF Channel Number		Randomly selected from channel 2,3,4,5,6.		Randomly selected from channel 2,3,4,5,6.	
CPICH_Ec/I <sub>or</sub>	dB	-10		-10	
PCCPCH_Ec/I <sub>or</sub>	dB	-12		-12	
SCH_Ec/I <sub>or</sub>	dB	-12		-12	
PICH_Ec/I <sub>or</sub>	dB	-15		-15	
DPCH_Ec/I <sub>or</sub>	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	-Inf	-1.8	-Inf	-1.8
$I_{oc}$	dBm/3,84 MHz	-70			
CPICH_Ec/I <sub>o</sub>	dB	-Inf	-14	-Inf	-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 <sub>or</sub>					

## A.8.2E.2 Test Requirements

- The UE shall send one Event 2C triggered measurement report for cell 2, with a measurement reporting delay less than  $17 = 50 * (480/7.05) * 1 * 5$  seconds from the beginning of time period T2.
- The UE shall send one Event 2C triggered measurement report for cell 3, with a measurement reporting delay less than 17 seconds from the beginning of time period T2.
- The UE shall send one Event 2C triggered measurement report for cell 4, with a measurement reporting delay less than 17 seconds from the beginning of time period T2.

Measurement reporting delay can be expressed as:

$$T_{\text{measurement\_inter}} = \text{Max} \left\{ T_{\text{Measurement\_Period Inter}}, T_{\text{basic measurement FDD inter}} \cdot \frac{T_{\text{Measurement\_Period Inter}}}{T_{\text{Inter}}} \cdot K_n \cdot N_{\text{freq},n} \right\} \text{ms}$$

which is described in section 8.1.2.3.2.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

NOTE:  $K_n=1$

## A.8.3 (void)

**Table A.8.13: (void)**

**Table A.8.14: (void)**

**Table A.5.14A: (void)**

**Table A.8.14B: (void)**

**Table A.8.14C: (void)**

**Table A.8.14D: (void)**

## A.8.4 GSM measurements

### A.8.4.1 Correct reporting of GSM neighbours in AWGN propagation condition

#### A.8.4.1.1 Test Purpose and Environment

The purpose of these tests is to verify that the UE makes correct reporting of an event when doing inter-RAT GSM measurements. The test will partly verify the requirements in section 8.1.2.5. The requirements are also applicable for a UE not requiring compressed mode, in which case no compressed mode pattern should be sent for the parameters specified in table A8.15.

The test consists of three successive time periods, with a time duration T1, T2 and T3. The test parameters are given in tables A.8.15, A.8.16 and A.8.17 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 3B and 3C shall be used.

## A.8.4.1.1.1 Test 1. With BSIC verification required

**Table A.8.15: General test parameters for Correct reporting of GSM neighbours in AWGN propagation condition, Test 1**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns			Only applicable for UE requiring compressed mode patterns
- GSM carrier RSSI measurement		DL Compressed mode reference pattern 2 in Set 2	As specified in table A.22 TS 25.101 section A.5
- GSM Initial BSIC identification		Pattern 2	As specified in section 8.1.2.5.2.1 table 8.7.
Active cell		Cell 1	
Inter-RAT measurement quantity		GSM Carrier RSSI	
BSIC verification required		required	
Threshold other system	dBm	-80	Absolute GSM carrier RSSI threshold for event 3B and 3C.
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		24 FDD neighbours on Channel 1 6 GSM neighbours including ARFCN 1	Measurement control information is sent before the compressed mode patterns starts.
N Identify abort		66	Taken from table 8.7.
T1	s	5	
T2	s	7	
T3	s	5	

**Table A.8.16: Cell specific test parameters for Correct reporting of GSM neighbours in AWGN propagation condition (cell 1)**

Parameter	Unit	Cell 1
		T1, T2, T3
UTRA RF Channel Number		Channel 1
CPICH_Ec/I <sub>or</sub>	dB	-10
PCCPCH_Ec/I <sub>or</sub>	dB	-12
SCH_Ec/I <sub>or</sub>	dB	-12
PICH_Ec/I <sub>or</sub>	dB	-15
DPCH_Ec/I <sub>or</sub>	dB	Note 1
OCNS		Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
$I_{oc}$	dBm/ 3,84 MHz	-85
CPICH_Ec/I <sub>o</sub>	dB	-13
Propagation Condition		AWGN
Note 1: The DPCH level is controlled by the power control loop. Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I <sub>or</sub> .		

**Table A.8.17: Cell specific test parameters for Correct reporting of GSM neighbours in AWGN propagation condition (cell 2)**

Parameter	Unit	Cell 2		
		T1	T2	T3
Absolute RF Channel Number		ARFCN 1		
RXLEV	dBm	-Infinity	-75	-85

## A.8.4.1.1.2 Test 2: Without BSIC verification required

**Table A.8.18: General test parameters for Correct reporting of GSM neighbours in AWGN propagation condition, Test 2**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns - GSM carrier RSSI measurement		DL Compressed mode reference pattern 2 in Set 2	Only applicable for UE requiring compressed mode patterns  As specified in table A.22 TS 25.101 section A.5
Active cell		Cell 1	
Inter-RAT measurement quantity		GSM Carrier RSSI	
BSIC verification required		not required	
Threshold other system	dBm	-80	Absolute GSM carrier RSSI threshold for event 3B and 3C.
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		24 FDD neighbours on Channel 1 6 GSM neighbours including ARFCN 1	Measurement control information is sent before the compressed mode patterns starts.
T1	s	5	
T2	s	2	
T3	s	5	

**Table A.8.19: Cell specific test parameters for Correct reporting of GSM neighbours in AWGN propagation condition (cell 1)**

Parameter	Unit	Cell 1
		T1, T2, T3
UTRA RF Channel Number		Channel 1
CPICH_Ec/I <sub>or</sub>	dB	-10
PCCPCH_Ec/I <sub>or</sub>	dB	-12
SCH_Ec/I <sub>or</sub>	dB	-12
PICH_Ec/I <sub>or</sub>	dB	-15
DPCH_Ec/I <sub>or</sub>	dB	Note 1
OCNS		Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
$I_{oc}$	dBm/ 3,84 MHz	-85
CPICH_Ec/I <sub>o</sub>	dB	-13
Propagation Condition		AWGN
NOTE 1: The DPCH level is controlled by the power control loop.		
NOTE 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I <sub>or</sub> .		

**Table A.8.20: Cell specific test parameters for Correct reporting of GSM neighbours in AWGN propagation condition (cell 2)**

Parameter	Unit	Cell 2		
		T1	T2	T3
Absolute RF Channel Number		ARFCN 1		
RXLEV	dBm	-Infinity	-75	-85

### A.8.4.1.2 Test Requirements

#### A.8.4.1.2.1 TEST 1 With BSIC verification required

The UE shall send one Event 3C triggered measurement report for Cell2, with a measurement reporting delay less than 6.24 s from the beginning of time period T2.

The UE shall send one Event 3B triggered measurement report for Cell2, with a measurement reporting delay less than 960 ms from the beginning of time period T3.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

#### A.8.4.1.2.2 TEST 2 Without BSIC verification required

The UE shall send one Event 3C triggered measurement report for Cell2, with a measurement reporting delay less than 960 ms from the beginning of time period T2.

The UE shall send one Event 3B triggered measurement report for Cell2, with a measurement reporting delay less than 960 ms from the beginning of time period T3.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.



## A.8.5 Combined Interfrequency and GSM measurements

### A.8.5.1 Correct reporting of neighbours in AWGN propagation condition

#### A.8.5.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency and GSM measurements. The test will partly verify the requirements in section 8.1.2.3 and 8.1.2.5. The requirements are also applicable for a UE not requiring compressed mode for inter-frequency or inter-RAT GSM measurements. In case a UE is not requiring compressed mode for inter-frequency measurements no compressed mode pattern with measurement purpose "FDD measurement" should be sent and in case a UE is not requiring compressed mode for inter-RAT GSM measurements no compressed mode pattern with measurement purpose "GSM carrier RSSI measurements", "GSM Initial BSIC identification" and "GSM BSIC re-confirmation" should be sent for the parameters specified in table A8.21.

The test consists of five successive time periods, with a time duration T1, T2, T3, T4 and T5. The test parameters are given in tables A.8.21, A.8.22 and A.8.23 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2B and 3A shall be used as well as periodic reporting with period 4s.

**Table A.8.21: General test parameters for Correct reporting of neighbours in AWGN propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode			Only applicable for UE requiring compressed mode patterns.
Interfrequency measurements		DL compressed mode reference pattern 3, set 1	As specified in table A.22A TS 25.101 section A.5
- GSM carrier RSSI measurement		DL compressed mode reference pattern 3, set 2	As specified in table A.22A TS 25.101 section A.5
- GSM Initial BSIC identification		DL compressed mode reference pattern 3, set 3	As specified in table A.22A TS 25.101 section A.5
- GSM BSIC reconfirmation		DL compressed mode reference pattern 3, set 4	As specified in table A.22A TS 25.101 section A.5
Active cell		Cell 1	
Inter-RAT measurement quantity		GSM Carrier RSSI	
BSIC verification required		required	
Absolute Threshold (Ec/N0) used frequency	dB	-15	Ec/Io threshold for Event 2B and 3A
Absolute Threshold (Ec/N0) used for a not used frequency	dB	-15	Ec/Io threshold for Event 2B
Threshold other system	dBm	-80	Absolute GSM carrier RSSI threshold for event 3A.
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		Total 24 FDD neighbours 8 on frequency Channel 2 6 GSM neighbours including ARFCN 1	Measurement control information is sent before the compressed mode pattern starts.
Propagation Condition		AWGN	
T1	s	1	
T2	s	4	
T3	s	1	
T4	s	8	
T5	s	15	

**Table A.8.22: Cell Specific parameters for Correct reporting of neighbours in AWGN propagation condition**

Parameter	Unit	Cell 1					Cell 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
UTRA RF Channel Number		Channel 1					Channel 2				
CPICH_Ec/I <sub>or</sub>	dB	-10					-10				
PCCPCH_Ec/I <sub>or</sub>	dB	-12					-12				
SCH_Ec/I <sub>or</sub>	dB	-12					-12				
PICH_Ec/I <sub>or</sub>	dB	-15					-15				
DPCH_Ec/I <sub>or</sub>		Note 1			N/A		N/A		Note 1		
OCNS	dB	Note 2			-0,941		-0,941		Note 2		
$\hat{I}_{or}/I_{oc}$	dB	0	-8			-Infinity	-13	-13	-8	-8	
$I_{oc}$	dB / 3,84 MHz	-60									
CPICH_Ec/I <sub>o</sub>	dB	-13	-18,6			-Infinity	-13	-13	-18.6	-18.6	

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<sub>or</sub>

**Table A.8.23: Cell specific test parameters for Correct reporting of GSM neighbours in AWGN propagation condition (cell 3)**

Parameter	Unit	Cell 3				
		T1	T2	T3	T4	T5
Absolute RF Channel Number		ARFCN 1				
RXLEV	dBm	-Infinity			-75	
GSM BSIC		N/A			Valid	Not valid

### A.8.5.1.2 Test Requirements

The UE shall send one Event 2B triggered measurement report for Cell2, with a measurement reporting delay less than 3.5 s from the beginning of time period T2.

A handover to cell 2 is signalled to the UE well before end of time period T3.

The UE shall send one Event 3A triggered measurement report for Cell3, with a measurement reporting delay less than 6.24 s from the beginning of time period T4.

The UE shall indicate that the BSIC of the GSM carrier is not verified in a periodic report sent before 9.04 seconds have passed since the start of time period T5.

NOTE: The delay for interfrequency cell detection is equal to:

$$T_{\text{identify, inter}} = T_{\text{basic identify FDD, inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{\text{Freq}} \text{ ms} = 3.3 \text{ s}$$

where:

$T_{\text{basic identify FDD, inter}}$  is specified in 8.1.2.3.2 as 300 ms

$T_{\text{Measurement Period, Inter}}$  is specified in 8.1.2.3.2 as 480 ms

and

$T_{\text{Inter}}$  is specified in 8.1.2.3.2 as 6 gaps of length 11 slots each, 44 ms

NOTE: The delay for interRAT cell detection is equal to 6.24 s.

The event triggered measurement reporting delay:  $2 * T_{\text{Measurement Period, GSM}} = 2 * 480\text{ms} = 960\text{ms}$ .

BSIC verification:  $T_{\text{identify abort}} 5.28 \text{ s}$ .

## A.8.5A CSG Proximity Indication Testing Case for UTRAN FDD – FDD Inter frequency

Note : The test case in this section forms the basis for a signalling test for CSG proximity detection.

### A.8.5A.1 Test Purpose and Environment

The purpose of this test is to verify the UE has implemented properly the feature for indicating that the UE is entering or leaving the proximity of one or more CSG member cells based on proximity detection with an autonomous search function as defined by the requirements in Section 6.7.

The test case consists of three successive segments: Test Preparation, Negative Test, and Positive Test. The test scenario comprises of three UTRAN FDD cells on different carriers. Cell 1 represents the serving cell in the proximity of the CSG cell, Cell 2 the CSG cell and Cell 3 the serving cell not in the proximity of the CSG cell. The description of the test procedure is shown in Table A.8.5A-1. The general test parameters and cell specific test parameters are presented in Table A.8.5A-2 and Table A.8.5A-3 respectively.

**Table A.8.5A-1: Description of the test procedures**

Parameter	Cell Status	Comment
<b>Test Preparation</b>		
Initial Condition	Cell 1 is active	Clean up the UE memory to be free from previously stored cell information for proximity detection. Turn on the UE and allow sufficient time for the UE to reselect to Cell 1.
Time duration T1	Cell 1 and Cell 2 are active	Turn on Cell 2 at the start of T1. Perform manual CSG selection towards Cell 2. The UE is expected to store necessary information for later proximity detection.
End condition		Turn off the UE. Turn off Cell 1 and Cell 2.
<b>Negative Test</b>		
Initial Condition	Cell 3 is active	Turn on Cell 3. Turn on the UE and set up the UE in connected mode with Cell 3
Time duration T2	Cell 3 is active	Configure the UE with proximity indication control by sending the Measurement Control message to enable CSG Proximity detection at the start of T2. The UE is not expected to report “entering” proximity in the negative test.
End condition		Turn off the UE. Turn off Cell 3.
<b>Positive Test</b>		
Initial Condition	Cell 1 is active	Turn on Cell 1. Turn on the UE and set up the UE in connected mode with Cell 1
Time duration T3	Cell 1 and Cell 2 are active	Turn on Cell 2 at the start of T3. Configure the UE with proximity indication control by sending the Measurement Control message to enable CSG Proximity at the start of T3. The UE is expected to report “entering” proximity before end of T3.
Time duration T4	Cell 1 is active and Cell 3 are active	Turn off Cell 2 and turn on Cell 3 at the start of T4. Hand the UE over <sup>Note 1</sup> from Cell 1 to Cell 3 . (Note: The UE may report “leaving” proximity in T4. In this case, there is no need to proceed to the next step.).
Time duration T5	Cell 3 are active	Turn off Cell 1 at the start of T5. The procedures in T4 and T5 together simulate the situation that UE leaves the proximity of the CSG cell. The UE is expected to report “leaving” proximity before end of T5..
End condition		Turn off the UE. Turn off Cell 1 and Cell 3.
Note 1: The handover from Cell 1 to Cell 3 must preserve the proximity configuration (i.e. must involve neither SR-VCC handover, nor SRNS relocation, as described in [16])		

**Table A.8.5A-2: General test parameters for UTRAN FDD-FDD inter frequency cell proximity indication test case**

Parameter		Unit	Value	Comment
DCH parameters			DL and UL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1 and A.2.1
Power Control			On	
Target quality value on DTCH		BLER	0.001	
Compressed mode			A.22 set 1	As specified in TS 25.101 section A.5.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 1	Handover to cell 2 is not requested
Threshold non used frequency		dB	-18	Absolute $E_c/I_0$ threshold for event 2C
Hysteresis		dB	0	
W non-used frequency			1	Applicable for event 2C
Time to Trigger		Ms	0	
Filter coefficient			0	
SIB3_REP		Frames	32	Applicable for cell 2 SIB3 scheduling
SIB3_SEG_COUNT			1	Applicable for cell 2 SIB3 scheduling
CSG id (of cell 2)			Set to any non-empty value	
CSG Indicator (of cell 2)			Set to TRUE	
UE whitelist			Include Cell 2	
Monitored cell list size			24 on channel 1 16 on channel 2	Measurement control information is sent before the compressed mode pattern starts.
Time duration T1		s	[10]	Defined to give enough time for the UE to complete the registration to Cell 2.
Time duration T2		s	[360]	Defined to be longer enough to see whether the UE will report enter "proximity" indication.
Time duration T3 <sup>Note 1</sup>		s	[<=360]	The time duration for a UE to report enters "proximity" when the UE is near a CSG cell.
Time duration T4 <sup>Note 1</sup>		s	[<=360]	The time duration for a UE to be handed over to Cell 3.
Time duration T5 <sup>Note 1</sup>		s	[<=360]	The time duration for a UE to report leaving "proximity" when the UE is no longer near a CSG cell.
<p>Note 1: The maximum allowed time duration for the UE to decide either entering or leaving "proximity" is 360s. To reduce test time, T3 may end once UE reports entering "proximity", T4 may end once the UE is handed over to Cell 3 and T5 may end once UE reports leaving "proximity".</p> <p>Note 2: The test case assumes an environment where CSG proximity detection results not being impact by non-3GPP signals, such as GPS and WiFi. When the test case is being executed, the UE may ignore any radio signals which are not provided by the test setup which it would otherwise use in proximity estimation.</p>				

**Table A.8.5A-3: Cell specific test parameters for UTRAN FDD-FDD inter frequency cell proximity indication test case (Cell 1 and Cell 2)**

Parameter	Unit	Cell 1					Cell 2				
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
UARFCN <sup>Note1</sup>		Channel 1					Channel 2				
CSG indicator		False					True	N/A	True	N/A	N/A
Primary scrambling code <sup>Note1</sup>		1	1	1	1	1	2	N/A	2	N/A	N/A
CSG identity		Not sent					Sent	N/A	Sent	N/A	N/A
BW <sub>channel</sub>	MHz	10					10				
CPICH_Ec/Ior	dB	-10					[-6]				
PCCPCH_Ec/Ior	dB	-12					[-8]				
CPICH_Ec/Io	dB	-13					[-9]				
SCH_Ec/Ior	dB	-15					[-11]				
PICH_Ec/Ior	dB	-15					[-11]				
DPCH_Ec/Ior	dB	Note 2	N/A	Note 2	Note 2	N/A	Note 2	N/A	Note 2	N/A	N/A
$\hat{I}_{or}/I_{oc}$	dB	0	-inf	0	0	-inf	-1.8	-inf	-1.8	-inf	-inf
$I_{oc}$	dBm/3.84 MHz	-70					-70				
OCNS		Note 3	N/A	Note 3	Note 3	N/A	-0.941	N/A	-0.941	N/A	N/A
Propagation Condition		AWGN					AWGN				
Note 1: For this requirement to be applicable, and scrambling code for cell 1 and cell 2 shall be unchanged from when the CSG cell was visited previously Note 2: The DPCH level is controlled by the power control loop Note 3: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .											

**Table A.8.5A-4: Cell specific test parameters for UTRAN FDD-FDD inter frequency cell proximity indication test case (Cell 3)**

Parameter	Unit	Cell 3				
		T1	T2	T3	T4	T5
UARFCN <sup>Note1</sup>		Channel 1				
CSG indicator		False				
Primary scrambling code <sup>Note1</sup>		3	3	3	3	3
CSG identity		Not Sent				
BW <sub>channel</sub>	MHz	10				
CPICH_Ec/Ior	dB	-10				
PCCPCH_Ec/Ior	dB	-12				
CPICH_Ec/Io	dB	-13				
SCH_Ec/Ior	dB	-15				
PICH_Ec/Ior	dB	-15				
DPCH_Ec/Ior	dB	N/A	N/A	N/A	Note 2	Note 2
$\hat{I}_{or}/I_{oc}$	dB	-inf	-inf	-inf	2	2
$I_{oc}$	dBm/3.84 MHz	-70				
OCNS		N/A	N/A	N/A	Note 3	Note 3
Propagation Condition		AWGN				
Note 1: For this requirement to be applicable, and scrambling code for cell 1 and cell 2 shall be unchanged from when the CSG cell was visited previously Note 2: The DPCH level is controlled by the power control loop Note 3: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .						

## A.8.5A.2 Test Requirements

The UE shall not send an “entering” proximity indication in T2 during Negative Test.

The UE shall send an “entering” proximity indication in T3 and send a “leaving” proximity indication in T4 or T5 during Positive Test.

## A.8.6 E-UTRAN Measurements

### A.8.6.1 Correct reporting of E-UTRAN FDD neighbours in fading propagation condition in CELL\_DCH

#### A.8.6.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing measurements on E-UTRAN FDD cells. The test will partly verify the requirements in section 8.1.2.6.

The test consists of three successive time periods, with time duration T1, T2 and T3. The test parameters are given in tables A.8.24, A.8.25 and A.8.26. In the measurement control information it is indicated to the UE that event-triggered reporting with Events 3B and 3C shall be used.

**Table A.8.24: General test parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1. This is for UTRAN FDD
Power Control		On	This is relevant for UTRAN FDD
Compressed mode pattern		Pattern 2; Set 4	As specified in table A.22 in section A.5 in TS 25.101.
Inter-RAT (E-UTRAN FDD) measurement quantity		RSRP	
Active cell		Cell 1	Cell 1 is on UTRA RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on E-UTRA RF channel number 1
Threshold other system (E-UTRAN FDD)	dBm	-95	Absolute threshold for triggering events 3b and 3c
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used
E-UTRA Channel Bandwidth ( $BW_{\text{channel}}$ )	MHz	10	
Monitored UTRA FDD cell list size		24	UTRA cells on UTRA RF channel 1 provided in the cell list. Measurement control information is sent before the compressed mode pattern starts.
T1	s	5	
T2	s	4	
T3	s	4	

**TableA.8.25: Cell Specific parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition (cell # 1)**

Parameter	Unit	Cell 1		
		T1	T2	T3
UTRA RF Channel Number		Channel 1		
CPICH_Ec/I <sub>or</sub>	dB	-10		
PCCPCH_Ec/I <sub>or</sub>	dB	-12		
SCH_Ec/I <sub>or</sub>	dB	-12		
PICH_Ec/I <sub>or</sub>	dB	-15		
DPCH_Ec/I <sub>or</sub>	dB	Note 1		
OCNS		Note 2		
$\hat{I}_{or}/I_{oc}$	dB	0	0	0
$I_{oc}$	dBm/3.84 MHz	-70		
CPICH_Ec/I <sub>o</sub>	dB	-13	-13	-13
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 <sub>or</sub> .				
Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.				

**TableA.8.26: Cell Specific parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition (cell # 2)**

Parameter	Unit	Cell 2		
		T1	T2	T3
E-UTRA RF Channel Number			1	
BW <sub>channel</sub>	MHz		10	
OCNG Pattern defined in A.3.2.1.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB			
B <sup>Note 1</sup>	dB			
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz		-100	
$\hat{E}_s/N_{oc}$	dB	-Infinity	16	-4
$\hat{E}_s/I_{ot}$	dB	-Infinity	16	-4
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104
I <sub>o</sub> <sup>Note 3</sup>	dBm/9 MHz	-72.22	-56.11	-70.76
Propagation Condition		ETU70 (Note 4)		
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and I<sub>o</sub> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>				

### A.8.6.1.2 Test Requirements

If the UE needs compressed mode to perform E-UTRAN measurements:

The UE shall send one Event 3C triggered measurement report for cell 2, with a measurement reporting delay less than 2.65 seconds from the beginning of time period T2.

The UE shall send one Event 3B triggered measurement report for cell 2, with a measurement reporting delay less than 480 ms from the beginning of time period T3.

If the UE does not need compressed mode to perform E-UTRAN measurements:

The UE shall send one Event 3C triggered measurement report for cell 2, with a measurement reporting delay less than 480 ms from the beginning of time period T2.

The UE shall send one Event 3B triggered measurement report for cell 2, with a measurement reporting delay less than 480 ms from the beginning of time period T3.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.



The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

## A.8.6.2 Correct reporting of E-UTRAN TDD neighbours in fading propagation condition in CELL\_DCH

### A.8.6.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing measurements on E-UTRAN TDD cells. The test will partly verify the requirements in section 8.1.2.6.

The test consists of three successive time periods, with time duration T1, T2 and T3. The test parameters are given in tables A.8.27, A.8.28 and A.29. In the measurement control information it is indicated to the UE that event-triggered reporting with Events 3B and 3C shall be used.

**Table A.8.27: General test parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1. This is for UTRAN FDD
Power Control		On	This is relevant for UTRAN FDD
Compressed mode pattern		Pattern 2; Set 4	As specified in table A.22 in section A.5 in TS 25.101.
Inter-RAT (E-UTRAN TDD) measurement quantity		RSRP	
Active cell		Cell 1	Cell 1 is on UTRA RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on E-UTRA RF channel number 1
Threshold other system (E-UTRAN TDD)	dBm	-95	Absolute threshold for triggering events 3b and 3c
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used
E-UTRA Channel Bandwidth ( $BW_{\text{channel}}$ )	MHz	10	
Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211. This is for E-UTRAN TDD
Uplink-downlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211. This is for E-UTRAN TDD
Monitored UTRA FDD cell list size		24	UTRA cells on UTRA RF channel 1 provided in the cell list. Measurement control information is sent before the compressed mode pattern starts.
T1	s	5	
T2	s	4	
T3	s	4	

**Table A.8.28: Cell Specific parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition (cell # 1)**

Parameter	Unit	Cell 1		
		T1	T2	T3
UTRA RF Channel Number		Channel 1		
CPICH_Ec/I <sub>or</sub>	dB	-10		
PCCPCH_Ec/I <sub>or</sub>	dB	-12		
SCH_Ec/I <sub>or</sub>	dB	-12		
PICH_Ec/I <sub>or</sub>	dB	-15		
DPCH_Ec/I <sub>or</sub>	dB	Note 1		
OCNS		Note 2		
$\hat{I}_{or}/I_{oc}$	dB	0	0	0
$I_{oc}$	dBm/3.84 MHz	-70		
CPICH_Ec/I <sub>o</sub>	dB	-13	-13	-13
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 <sub>or</sub> .				
Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.				

**TableA.8.29: Cell Specific parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition (cell # 2)**

Parameter	Unit	Cell 2		
		T1	T2	T3
E-UTRA RF Channel Number			1	
BW <sub>channel</sub>	MHz		10	
OCNG Pattern defined in A.3.2.2.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB			
B <sup>Note 1</sup>	dB			
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz		-100	
$\hat{E}_s/N_{oc}$	dB	-Infinity	16	-4
$\hat{E}_s/I_{ot}$	dB	-Infinity	16	-4
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104
I <sub>o</sub> <sup>Note 3</sup>	dBm/9 MHz	-72.22	-56.11	-70.76
Propagation Condition			ETU70 (Note 4)	
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and I<sub>o</sub> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>				

### A.8.6.2.2 Test Requirements

If the UE needs compressed mode to perform E-UTRAN measurements:

The UE shall send one Event 3C triggered measurement report for cell 2, with a measurement reporting delay less than 2.65 seconds from the beginning of time period T2.

The UE shall send one Event 3B triggered measurement report for cell 2, with a measurement reporting delay less than 480 ms from the beginning of time period T3.

If the UE does not need compressed mode to perform E-UTRAN measurements:

The UE shall send one Event 3C triggered measurement report for cell 2, with a measurement reporting delay less than 480 ms from the beginning of time period T2.

The UE shall send one Event 3B triggered measurement report for cell 2, with a measurement reporting delay less than 480 ms from the beginning of time period T3.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

### A.8.6.3 Correct reporting of E-UTRAN FDD neighbours in fading propagation condition in CELL\_FACH

#### A.8.6.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing network configured measurements on E-UTRAN FDD cells in CELL\_FACH. The test will partly verify the requirements in section 8.4a.2.6.3.

The test consists of two successive time periods, with time duration T1, T2. The test parameters are given in tables A.8.29A, A.8.29B and A.8.29C. In the measurement control information it is indicated to the UE that event-triggered reporting shall be used. CELL\_FACH with discontinuous HS-DSCH reception should be configured.

**Table A.8.29A: General test parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition**

Parameter	Unit	Value	Comment
Report criteria			Event triggered
Inter-RAT (E-UTRAN FDD) measurement quantity		RSRP	
Active cell		Cell 1	Cell 1 is on UTRA RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on E-UTRA RF channel number 1
Reporting Threshold	dBm	-95	
HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	Length of the DRX cycle
HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
T321	s	0.1	Number of seconds until the DRX cycle is initiated
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
T1	s	20	During T1, cell 2 shall be powered off, and during the off time its 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	

**TableA.8.29B: Cell Specific parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition (cell # 1)**

Parameter	Unit	Cell 1	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
HS-PDSCH_Ec/Ior (Note 3)	dB	-10	
HS-SCCH1_Ec/Ior (Note 3)	dB	-13	
OCNS		Note 1	
$\hat{I}_{or}/I_{oc}$	dB	0	0
$I_{oc}$	dBm/3.84 MHz	-70	
CPICH_Ec/Io	dB	-13	-13
Inter-frequency FDD measurement indicator		FALSE	
Inter-frequency TDD measurement indicator		FALSE	
Inter-RAT measurement indicators		Included	
Propagation Condition		Case 5 (Note 2)	
Note 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .			
Note 2: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			

**TableA.8.29C: Cell Specific parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition (cell # 2)**

Parameter	Unit	Cell 2	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{\text{channel}}$	MHz	10	
OCNG Pattern defined in A.3.2.1.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz		
$\hat{E}_s / N_{oc}$	dB	-Infinity	16
$\hat{E}_s / I_{ot}$	dB	-Infinity	16
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84
$I_o$ <sup>Note 3</sup>	dBm/9 MHz	-72.22	-56.11
Propagation Condition		ETU70 (Note 4)	
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>			

### A.8.6.3.2 Test Requirements

The measurement delay is defined as the time from the beginning of period T2 and the moment at which the UE starts to send preambles on the PRACH to send the MEASUREMENT REPORT message.

The measurement delay shall be less than 5 seconds

NOTE: The measurement delay can be expressed as:  $T_{\text{identify,E-UTRAN}} + T_{\text{RA}}$ , where:

$T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

$T_{\text{identify,E-UTRAN}}$  = Time to identify an E-UTRA cell, as defined in section 8.4a.2.6.1

## A.8.6.4 Correct reporting of E-UTRAN TDD neighbours in fading propagation condition

### A.8.6.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing network configured measurements on E-UTRAN TDD cells in CELL\_FACH. The test will partly verify the requirements in section 8.4a.2.6.3.

The test consists of two successive time periods, with time duration T1, T2. The test parameters are given in tables A.8.27, A.8.28 and A.29. In the measurement control information it is indicated to the UE that event-triggered reporting shall be used. CELL\_FACH with discontinuous HS-DSCH reception.

**Table A.8.29D: General test parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition.**

Parameter	Unit	Value	Comment
Report criteria			Event triggered
Inter-RAT (E-UTRAN TDD) measurement quantity		RSRP	
Active cell		Cell 1	Cell 1 is on UTRA RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on E-UTRA RF channel number 1
HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	Length of the DRX cycle
HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
T321	s	0.1	Number of seconds until the DRX cycle is initiated
Reporting Threshold	dBm	-95	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used
E-UTRA Channel Bandwidth (BW <sub>channel</sub> )	MHz	10	
Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211. This is for E-UTRAN TDD
Uplink-downlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211. This is for E-UTRAN TDD
T1	s	20	During T1, cell 2 shall be powered off, and during the off time its 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	

**TableA.8.29F: Cell Specific parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition (cell # 1)**

Parameter	Unit	Cell 1	
		T1	T2
UTRA RF Channel Number		Channel 1	
CPICH_Ec/I <sub>or</sub>	dB	-10	
PCCPCH_Ec/I <sub>or</sub>	dB	-12	
SCH_Ec/I <sub>or</sub>	dB	-12	
PICH_Ec/I <sub>or</sub>	dB	-15	
HS-PDSCH_Ec/I <sub>or</sub> (Note 3)	dB	-10	
HS-SCCH1_Ec/I <sub>or</sub> (Note 3)	dB	-13	
OCNS		Note 1	
$\hat{I}_{or}/I_{oc}$	dB	0	0
$I_{oc}$	dBm/3.84 MHz	-70	
Inter-frequency FDD measurement indicator		FALSE	
Inter-frequency TDD measurement indicator		FALSE	
Inter-RAT measurement indicators		Included	
>RAT type		E-UTRA	
CPICH_Ec/I <sub>o</sub>	dB	-13	-13
Propagation Condition		Case 5 (Note 2)	
Note 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I <sub>or</sub> .			
Note 2: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.			



**TableA.8.29G: Cell Specific parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition (cell # 2)**

Parameter	Unit	Cell 2	
		T1	T2
E-UTRA RF Channel Number		1	
$BW_{\text{channel}}$	MHz	10	
OCNG Pattern defined in A.3.2.2.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB		
OCNG_RB <sup>Note 1</sup>	dB		
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz		
$\hat{E}_s / N_{oc}$	dB	-Infinity	16
$\hat{E}_s / I_{ot}$	dB	-Infinity	16
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84
$I_o$ <sup>Note 3</sup>	dBm/9 MHz	-72.22	-56.11
Propagation Condition		ETU70 (Note 4)	
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>			

#### A.8.6.4.2 Test Requirements

The measurement delay is defined as the time from the beginning of period T2 and the moment at which the UE starts to send preambles on the PRACH to send the MEASUREMENT REPORT message.

The measurement delay shall be less than 5 seconds.

NOTE: The measurement delay can be expressed as:  $T_{\text{identify,E-UTRAN}} + T_{\text{RA}}$ , where:

$T_{\text{RA}}$  is a delay is caused by the physical random access procedure described in TS 25.214 section 6.1. A persistence value is assumed to be 1 in this test case and therefore  $T_{\text{RA}}$  in this test case is 40 ms.

$T_{\text{identify,E-UTRAN}}$  = Time to identify an E-UTRA cell, as defined in section 8.4a.2.6.1.

## A.8.6.5 Correct reporting of E-UTRAN FDD neighbours in fading propagation condition in CELL\_DCH for Increased Carrier Monitoring with reduced performance group configured

### A.8.6.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing measurements on E-UTRAN FDD cells. The test will partly verify the requirements in section 8.1.2.6.

The test consists of three successive time periods, with time duration T1, T2 and T3. The test parameters are given in tables A.8.24A, A.8.25A, A.8.25A and A.8.26AA. In the measurement control information it is indicated to the UE that event-triggered reporting with Events 3B and 3C shall be used.

**Table A.8.24A: General test parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1. This is for UTRAN FDD
Power Control		On	This is relevant for UTRAN FDD
Compressed mode pattern		Pattern 2; Set 4	As specified in table A.22 in section A.5 in TS 25.101.
Inter-RAT (E-UTRAN FDD) measurement quantity		RSRP	
Active cell		Cell 1	Cell 1 is on UTRA RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on E-UTRA RF channel number 1
Threshold other system (E-UTRAN FDD)	dBm	-95	Absolute threshold for triggering events 3b and 3c
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Reduced performance group scaling factor		8	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used
E-UTRA RF Channel Number		1,2,3,4,5,6,7,8	Eight E-UTRA FDD inter-RAT carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 are indicated to have reduced performance
Test equipment configuration		UTRA Cell 1 uses UTRA RF channel number 1 E-UTRA Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 1,2,3,4,5,6,7,8	
E-UTRA Channel Bandwidth ( $BW_{\text{channel}}$ )	MHz	10	
Monitored UTRA FDD cell list size		24	UTRA cells on UTRA RF channel 1 provided in the cell list. Measurement control information is sent before the compressed mode pattern starts.
T1	s	10	
T2	s	100	
T3	s	20	

**TableA.8.25A: Cell Specific parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition (cell # 1)**

Parameter	Unit	Cell 1		
		T1	T2	T3
UTRA RF Channel Number		Channel 1		
CPICH_Ec/I <sub>or</sub>	dB	-10		
PCCPCH_Ec/I <sub>or</sub>	dB	-12		
SCH_Ec/I <sub>or</sub>	dB	-12		
PICH_Ec/I <sub>or</sub>	dB	-15		
DPCH_Ec/I <sub>or</sub>	dB	Note 1		
OCNS		Note 2		
$\hat{I}_{or}/I_{oc}$	dB	0	0	0
$I_{oc}$	dBm/3.84 MHz	-70		
CPICH_Ec/I <sub>o</sub>	dB	-13	-13	-13
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 <sub>or</sub> .				
Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.				

**TableA.8.26A: Cell Specific parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition (cell # 2)**

Parameter	Unit	Cell 2		
		T1	T2	T3

E-UTRA RF Channel Number		Randomly selected from channel 1,2,3,4 such that cell 2 is in the normal performance group		
$BW_{channel}$	MHz	10		
OCNG Pattern defined in A.3.2.1.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz	-100		
$\hat{E}_s / N_{oc}$	dB	-Infinity	16	-4
$\hat{E}_s / I_{ot}$	dB	-Infinity	16	-4
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104
$I_o$ <sup>Note 3</sup>	dBm/9 MHz	-72.22	-56.11	-70.76
Propagation Condition		ETU70 (Note 4)		
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>				

**TableA.8.26AA: Cell Specific parameters for correct reporting of E-UTRAN FDD neighbours in fading propagation condition (cell # 3 and cell # 4)**

Parameter	Unit	Cell 3			Cell 4		
		T1	T2	T2	T1	T2	T2

E-UTRA RF Channel Number		Randomly selected from channel 5,6,7,8 such that cell 3 is in the reduced performance group	Randomly selected from channel 5,6,7,8 such that cell 4 is in the reduced performance group				
$BW_{channel}$	MHz	10	10				
OCNG Pattern defined in A.3.2.1.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz	-100	-100				
$\hat{E}_s / N_{oc}$	dB	-Infinity	16	-4	-Infinity	16	-4
$\hat{E}_s / I_{ot}$	dB	-Infinity	16	-4	-Infinity	16	-4
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-	-Infinity	-84	-104
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-	-Infinity	-84	-104
$I_o$ <sup>Note 3</sup>	dBm/9 MHz	-72.22	-	-	-72.22	-	-
			56.1	70.7		56.11	70.7
			1	6			6
Propagation Condition		ETU70 (Note 4)			ETU70 (Note 4)		
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>							

### A.8.6.5.2 Test Requirements

If the UE needs compressed mode to perform E-UTRAN measurements:

- The UE shall send one Event 3C triggered measurement report for cell 2, with a measurement reporting delay less than 12.12 seconds from the beginning of time period T2.
- The UE shall send one Event 3C triggered measurement report for cell 3, with a measurement reporting delay less than 84.8 seconds from the beginning of time period T2.
- The UE shall send one Event 3C triggered measurement report for cell 4, with a measurement reporting delay less than 84.8 seconds from the beginning of time period T2.
- The UE shall send one Event 3B triggered measurement report for cell 2, with a measurement reporting delay less than 2.195 s from the beginning of time period T3.
- The UE shall send one Event 3B triggered measurement report for cell 3, with a measurement reporting delay less than 15.36 s from the beginning of time period T3.

- The UE shall send one Event 3B triggered measurement report for cell 4, with a measurement reporting delay less than 15.36 s from the beginning of time period T3.

If the UE does not need compressed mode to perform E-UTRAN measurements:

- The UE shall send one Event 3C triggered measurement report for cell 2, with a measurement reporting delay less than 480 ms from the beginning of time period T2.
- The UE shall send one Event 3C triggered measurement report for cell 3, with a measurement reporting delay less than 480 ms from the beginning of time period T2.
- The UE shall send one Event 3C triggered measurement report for cell 4, with a measurement reporting delay less than 480 ms from the beginning of time period T2.
- The UE shall send one Event 3B triggered measurement report for cell 2, with a measurement reporting delay less than 2.195 s from the beginning of time period T3.
- The UE shall send one Event 3B triggered measurement report for cell 3, with a measurement reporting delay less than 15.36 s from the beginning of time period T3.
- The UE shall send one Event 3B triggered measurement report for cell 4, with a measurement reporting delay less than 15.36 s from the beginning of time period T3.
- The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

## A.8.6.6 Correct reporting of E-UTRAN TDD neighbours in fading propagation condition in CELL\_DCH for Increased Carrier Monitoring with reduced performance group configured

### A.8.6.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing measurements on E-UTRAN TDD cells. The test will partly verify the requirements in section 8.1.2.6.

The test consists of three successive time periods, with time duration T1, T2 and T3. The test parameters are given in tables A.8.27A, A.8.28A, A.8.29A and A.8.29AA. In the measurement control information it is indicated to the UE that event-triggered reporting with Events 3B and 3C shall be used.

**Table A.8.27A: General test parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1. This is for UTRAN TDD
Power Control		On	This is relevant for UTRAN TDD
Compressed mode pattern		Pattern 2; Set 4	As specified in table A.22 in section A.5 in TS 25.101.
Inter-RAT (E-UTRAN TDD) measurement quantity		RSRP	
Active cell		Cell 1	Cell 1 is on UTRA RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on E-UTRA RF channel number 1
Threshold other system (E-UTRAN TDD)	dBm	-95	Absolute threshold for triggering events 3b and 3c
Hysteresis	dB	0	
Time to Trigger	ms	0	
Filter coefficient		0	
Reduced performance group scaling factor		8	
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used
E-UTRA RF Channel Number		1,2,3,4,5,6,7,8	Eight E-UTRA TDD inter-RAT carrier frequencies are used in the UE neighbour cell list. Frequencies 5,6,7,8 are indicated to have reduced performance
Test equipment configuration		UTRA Cell 1 uses UTRA RF channel number 1 E-UTRA Cells 2,3,4 are randomly selected to use different frequencies selected from frequencies 1,2,3,4,5,6,7,8	
E-UTRA Channel Bandwidth ( $BW_{channel}$ )	MHz	10	
Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211. This is for E-UTRAN TDD
Uplink-downlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211. This is for E-UTRAN TDD
Monitored UTRA TDD cell list size		24	UTRA cells on UTRA RF channel 1 provided in the cell list. Measurement control information is sent before the compressed mode pattern starts.
T1	ms	10	
T2	ms	100	
T3	ms	20	

**TableA.8.28A: Cell Specific parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition (cell # 1)**

Parameter	Unit	Cell 1		
		T1	T2	T3
UTRA RF Channel Number		Channel 1		
CPICH_Ec/I <sub>or</sub>	dB	-10		
PCCPCH_Ec/I <sub>or</sub>	dB	-12		
SCH_Ec/I <sub>or</sub>	dB	-12		
PICH_Ec/I <sub>or</sub>	dB	-15		
DPCH_Ec/I <sub>or</sub>	dB	Note 1		
OCNS		Note 2		
$\hat{I}_{or}/I_{oc}$	dB	0	0	0
$I_{oc}$	dBm/3.84 MHz	-70		
CPICH_Ec/I <sub>o</sub>	dB	-13	-13	-13
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 <sub>or</sub> .				
Note 3: Case 5 propagation conditions are defined in Annex A of 3GPP TS 25.101.				

**TableA.8.29A: Cell Specific parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition (cell # 2)**

Parameter	Unit	Cell 2		
		T1	T2	T3



E-UTRA RF Channel Number		Randomly selected from channel 1,2,3,4 such that cell 2 is in the normal performance group		
$BW_{channel}$	MHz	10		
OCNG Pattern defined in A.3.2.2.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB			
OCNG_RB <sup>Note 1</sup>	dB			
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz	-100		
$\hat{E}_s / N_{oc}$	dB	-Infinity	16	-4
$\hat{E}_s / I_{ot}$	dB	-Infinity	16	-4
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104
$I_o$ <sup>Note 3</sup>	dBm/9 MHz	-72.22	-56.11	-70.76
Propagation Condition		ETU70 (Note 4)		
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>				

**TableA.8.29AA: Cell Specific parameters for correct reporting of E-UTRAN TDD neighbours in fading propagation condition (cell # 3 and cell # 4)**

Parameter	Unit	Cell 3			Cell 4		
		T1	T2	T3	T1	T2	T3

E-UTRA RF Channel Number		Randomly selected from channel 5,6,7,8 such that cell 3 is in the reduced performance group			Randomly selected from channel 5,6,7,8 such that cell 4 is in the reduced performance group		
$BW_{channel}$	MHz	10			10		
OCNG Pattern defined in A.3.2.2.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB						
OCNG_RB <sup>Note 1</sup>	dB						
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz						
$\hat{E}_s / N_{oc}$	dB	-Infinity	16	-4	-Infinity	16	-4
$\hat{E}_s / I_{ot}$	dB	-Infinity	16	-4	-Infinity	16	-4
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104	-Infinity	-84	-104
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-84	-104	-Infinity	-84	-104
$I_o$ <sup>Note 3</sup>	dBm/9 MHz	-72.2 2	-56.11	-70.7 6	-72.2 2	-56.1 1	-70.7 6
Propagation Condition		ETU70 (Note 4)			ETU70 (Note 4)		
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>							

### A.8.6.6.2 Test Requirements

If the UE needs compressed mode to perform E-UTRAN measurements:

- The UE shall send one Event 3C triggered measurement report for cell 2, with a measurement reporting delay less than 12.12 s from the beginning of time period T2.
- The UE shall send one Event 3C triggered measurement report for cell 3, with a measurement reporting delay less than 84.8 s from the beginning of time period T2.
- The UE shall send one Event 3C triggered measurement report for cell 4, with a measurement reporting delay less than 84.8 s from the beginning of time period T2.
- The UE shall send one Event 3B triggered measurement report for cell 2, with a measurement reporting delay less than 2.195 s from the beginning of time period T3.

- The UE shall send one Event 3B triggered measurement report for cell 3, with a measurement reporting delay less than 15.36 s from the beginning of time period T3.
- The UE shall send one Event 3B triggered measurement report for cell 4, with a measurement reporting delay less than 15.36 s from the beginning of time period T3.

If the UE does not need compressed mode to perform E-UTRAN measurements:

- The UE shall send one Event 3C triggered measurement report for cell 2, with a measurement reporting delay less than 480 ms from the beginning of time period T2.
- The UE shall send one Event 3C triggered measurement report for cell 3, with a measurement reporting delay less than 480 ms from the beginning of time period T2.
- The UE shall send one Event 3C triggered measurement report for cell 4, with a measurement reporting delay less than 480 ms from the beginning of time period T2.
- The UE shall send one Event 3B triggered measurement report for cell 2, with a measurement reporting delay less than 2.195 s from the beginning of time period T3.
- The UE shall send one Event 3B triggered measurement report for cell 3, with a measurement reporting delay less than 15.36 s from the beginning of time period T3.
- The UE shall send one Event 3B triggered measurement report for cell 4, with a measurement reporting delay less than 15.36 s from the beginning of time period T3.
- The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to  $2 \times TTI_{UL\_DCCH}$  higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

## A.8.7 Combined Interfrequency and E-UTRAN measurements

### A.8.7.1 Correct reporting of E-UTRA FDD neighbours in fading propagation condition

#### A.8.7.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency and E-UTRAN FDD measurements. The test will partly verify the requirements in section 8.1.2.3 and 8.1.2.6. The requirements are also applicable for a UE not requiring compressed mode for inter-frequency or inter-RAT E-UTRAN FDD measurements. In case a UE is not requiring compressed mode for inter-frequency measurements no compressed mode pattern with measurement purpose "FDD measurement" should be sent and in case a UE is not requiring compressed mode for inter-RAT E-UTRAN measurements no compressed mode pattern with measurement purpose "E-UTRAN measurements" should be sent for the parameters specified in table A8.30.

The test consists of two successive time periods, with time durations T1 and T2. The test parameters are given in tables A.8.30, A.8.31 and A.8.32 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2B and 3A shall be used.

**Table A.8.30: General test parameters for Correct reporting of neighbours in Fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode			Only applicable for UE requiring compressed mode patterns.
Interfrequency measurements		DL compressed mode reference pattern 2, set 5	As specified in table A.22 TS 25.101 section A.5
E-UTRAN measurement		DL compressed mode reference pattern 2, set 5	As specified in table A.22 TS 25.101 section A.5
Active cell		Cell 1	
Inter-RAT measurement quantity		E-UTRAN RSRP	
Absolute Threshold (Ec/N0) used frequency	dB	-9	Ec/N0 threshold for Event 2b and 3a
Absolute Threshold (Ec/N0) used for a not used frequency	dB	-18	Ec/IN0 threshold for Event 2b
Threshold other system	dBm	-96	Absolute E-UTRA RSRP threshold for event 3a.
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		Total 24 FDD neighbours 8 on frequency Channel 2	Measurement control information is sent before the compressed mode pattern starts.
T1	s	≥1	
T2	s	10	

**Table A.8.31: Cell Specific parameters for Correct reporting of neighbours in Fading propagation condition**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2	
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	0		-Infinity	-1.8
$I_{oc}$	dBm/3,84 MHz	-70		-70	
CPICH_Ec/Io	dB	-13		-Infinity	-14
Propagation Condition		AWGN		Case 5 as specified in Annex B of TS25.101	
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 Ior					

**Table A.8.32: Cell specific test parameters for Correct reporting of E-UTRAN FDD neighbours in fading propagation condition (cell 3)**

Parameter	Unit	Cell 3			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in A.3.2.1.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz			-98	
$\hat{E}_s / N_{oc}$	dB			-Infinity	13
$\hat{E}_s / I_{ot}$	dB	-Infinity	13		
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-85		
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-85		
$I_o$ <sup>Note 3</sup>	dBm/9 MH	-70.22	-57.01		
Propagation Condition		ETU70 (Note 4)			
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>					

### A.8.7.1.2 Test Requirements

The UE shall send one Event 2B triggered measurement report for Cell2, with a measurement reporting delay less than 5.14 s from the beginning of time period T2.

The UE shall send one Event 3A triggered measurement report for Cell3, with a measurement reporting delay less than 8.23 s from the beginning of time period T2.

NOTE: The delay for interfrequency cell detection is equal to:

$$T_{\text{identify, inter}} = T_{\text{basic identify FDD, inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{\text{Freq}} \text{ ms} = 5143 \text{ ms}$$

where:

$T_{\text{basic identify FDD, inter}}$  is specified in 8.1.2.3.2 as 300 ms

$T_{\text{Measurement Period, Inter}}$  is specified in 8.1.2.3.2 as 480 ms

and

$T_{\text{Inter}}$  is specified in 8.1.2.3.2 as 6 gaps of length 7 slots each, 28 ms

NOTE: The delay for interRAT cell detection is equal to:

$$T_{\text{Identify,E-UTRAN}} = N_{\text{freq,E-UTRA}} \cdot T_{\text{Basic_Identify_E-UTRAN}} \cdot \frac{480}{T_{\text{E-UTRAN}}} \text{ ms} = 8229 \text{ ms}$$

where:

$T_{\text{Basic_Identify_E-UTRAN}}$  is specified in 8.1.2.6 as 480 ms

and

$T_{\text{E-UTRAN}}$  is specified in 8.1.2.6 as 6 gaps of length 7 slots each, 28 ms

## A.8.7.2 Correct reporting of E-UTRA TDD neighbours in fading propagation condition

### A.8.7.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency and E-UTRAN TDD measurements. The test will partly verify the requirements in section 8.1.2.3 and 8.1.2.6. The requirements are also applicable for a UE not requiring compressed mode for inter-frequency or inter-RAT E-UTRAN TDD measurements. In case a UE is not requiring compressed mode for inter-frequency measurements no compressed mode pattern with measurement purpose "FDD measurement" should be sent and in case a UE is not requiring compressed mode for inter-RAT E-UTRAN measurements no compressed mode pattern with measurement purpose "E-UTRAN measurements" should be sent for the parameters specified in table A8.33.

The test consists of two successive time periods, with time durations T1 and T2. The test parameters are given in tables A.8.33, A.8.34 and A.8.35 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2B and 3A shall be used.

**Table A.8.33: General test parameters for Correct reporting of neighbours in Fading propagation condition**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Compressed mode			Only applicable for UE requiring compressed mode patterns.
Interfrequency measurements		DL compressed mode reference pattern 2, set 5	As specified in table A.22 TS 25.101 section A.5
E-UTRAN measurement		DL compressed mode reference pattern 2, set 5	As specified in table A.22 TS 25.101 section A.5
Active cell		Cell 1	
Inter-RAT measurement quantity		E-UTRAN RSRP	
Absolute Threshold (Ec/N0) used frequency	dB	-9	Ec/N0 threshold for Event 2b and 3a
Absolute Threshold (Ec/N0) used for a not used frequency	dB	-18	Ec/IN0 threshold for Event 2b
Threshold other system	dBm	-96	Absolute E-UTRA RSRP threshold for event 3a.
Time to Trigger	ms	0	
Filter coefficient		0	
Monitored cell list size		Total 24 FDD neighbours 8 on frequency Channel 2	Measurement control information is sent before the compressed mode pattern starts.
T1	s	≥1	
T2	s	10	

**Table A.8.31: Cell Specific parameters for Correct reporting of neighbours in Fading propagation condition**

Parameter	Unit	Cell 1		Cell 2	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1		Channel 2	
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	Note 1		N/A	
OCNS		Note 2		-0.941	
$\hat{I}_{or}/I_{oc}$	dB	0		-Infinity	-1.8
$I_{oc}$	dBm/3,84 MHz	-70		-70	
CPICH_Ec/Io	dB	-13		-Infinity	-14
Propagation Condition		AWGN		Case 5 as specified in Annex B of TS25.101	
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 Ior					

**Table A.8.32: Cell specific test parameters for Correct reporting of E-UTRAN TDD neighbours in fading propagation condition (cell 3)**

Parameter	Unit	Cell 3			
		T1	T2		
E-UTRA RF Channel Number		1			
BW <sub>channel</sub>	MHz	10			
OCNG Pattern defined in A.3.2.2.2 in 3GPP TS 36.133 (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 <sup>Note 1</sup>	dB				
OCNG_RB <sup>Note 1</sup>	dB				
$N_{oc}$ <sup>Note 2</sup>	dBm/15 kHz			-98	
$\hat{E}_s / N_{oc}$	dB			-Infinity	13
$\hat{E}_s / I_{ot}$	dB	-Infinity	13		
RSRP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-85		
SCH_RP <sup>Note 3</sup>	dBm/15 kHz	-Infinity	-85		
$I_o$ <sup>Note 3</sup>	dBm/9 MHz	-70.22	-57.01		
Propagation Condition		ETU70 (Note 4)			
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. OCNG patterns are specified in annex A 3.2 of 3GPP TS 36.133.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, SCH_RP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: ETU70 propagation conditions are specified in Annex B.2 of 3GPP TS 36.101.</p>					

### A.8.7.2.2 Test Requirements

The UE shall send one Event 2B triggered measurement report for Cell2, with a measurement reporting delay less than 5.14 s from the beginning of time period T2.

The UE shall send one Event 3A triggered measurement report for Cell3, with a measurement reporting delay less than 8.23 s from the beginning of time period T2.

NOTE: The delay for interfrequency cell detection is equal to:

$$T_{\text{identify, inter}} = T_{\text{basic identify FDD, inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{\text{Freq}} \text{ ms} = 5143 \text{ ms}$$

where:

$T_{\text{basic identify FDD, inter}}$  is specified in 8.1.2.3.2 as 300 ms

$T_{\text{Measurement Period, Inter}}$  is specified in 8.1.2.3.2 as 480 ms



and

$T_{\text{Inter}}$  is specified in 8.1.2.3.2 as 6 gaps of length 7 slots each, 28 ms

NOTE: The delay for interRAT cell detection is equal to:

$$T_{\text{Identify,E-UTRAN}} = N_{\text{freq,E-UTRA}} \cdot T_{\text{Basic_Identify_E-UTRAN}} \cdot \frac{480}{T_{\text{E-UTRAN}}} \text{ ms} = 8229 \text{ ms}$$

where:

$T_{\text{Basic_Identify_E-UTRAN}}$  is specified in 8.1.2.6 as 480 ms

and

$T_{\text{E-UTRAN}}$  is specified in 8.1.2.6 as 6 gaps of length 7 slots each, 28 ms

## A.9 Measurement Performance Requirements

Unless explicitly stated:

- Reported measurements shall be within defined range in 90 % of the cases.
- Measurement channel is 12.2 kbps as defined in TS 25.101 annex A, sub-clause A.3.1. This measurement channel is used both in active cell and cells to be measured.
- Physical channels used as defined in TS 25.101 annex C.
- Cell 1 is the active cell when in CELL\_DCH state.
- Single task reporting.
- Power control is active.

### A.9.1 Measurement Performance for UE

#### A.9.1.1 CPICH RSCP

##### A.9.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH RSCP measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.1.

##### A.9.1.1.1.1 Intra frequency test parameters

In this case all cells are on the same frequency. Both CPICH RSCP intra frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.1.

Table A.9.1: CPICH RSCP Intra frequency test parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number			Channel 1		Channel 1		Channel 1	
CPICH_Ec/lor		dB	-10		-10		-10	
PCCPCH_Ec/lor		dB	-12		-12		-12	
SCH_Ec/lor		dB	-12		-12		-12	
PICH_Ec/lor		dB	-15		-15		-15	
DPCH_Ec/lor		dB	-15	-	-15	-	-15	-
OCNS_Ec/lor		dB	-1.11	-0.94	-1.11	-0.94	-1.11	-0.94
loc	Band I, IV, VI, X, XI, XIX, XXI	dBm/3,84 MHz	-77.54		-59.98	-97.47		
	Band II, V, VII					-95.47		
	Band XXV, XXVI					-93.97 (Note 3)		
	Band III, VIII, XII, XIII, XIV, XX, XXII					-94.47		
	Band IX (Note 2)					-96.47		
lor/loc		dB	4	0	9	0	0	-6.53
CPICH RSCP, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm	-83.5	-87.5	-60.98	-69.88	-107.47	-114.0
	Band II, V, VII						-105.47	-112
	Band XXV, XXVI						-103.97 (Note 3)	-110.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII						-104.47	-111
	Band IX (Note 2)						-106.47	-113
lo, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/3,84 MHz	-71		-50	-94		
	Band II, V, VII					-92		
	Band XXV, XXVI					-90.5 (Note 3)		
	Band III, VIII, XII, XIII, XIV, XX, XXII					-91		
	Band IX (Note 2)					-93		
Propagation condition		-	AWGN		AWGN		AWGN	
NOTE 1: CPICH RSCP and lo levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.								
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.								
NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.								
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.								

#### A.9.1.1.1.2 Inter frequency test parameters

In this case both cells are on different frequencies and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22. CPICH RSCP inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.2.

Table A.9.2: CPICH RSCP Inter frequency tests parameters

Parameter		Unit	Test 1		Test 2	
			Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number			Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior		dB	-10		-10	
PCCPCH_Ec/Ior		dB	-12		-12	
SCH_Ec/Ior		dB	-12		-12	
PICH_Ec/Ior		dB	-15		-15	
DPCH_Ec/Ior		dB	-15	-	-15	-
OCNS_Ec/Ior		dB	-1.11	-0.94	-1.11	-0.94
Ior	Band I, IV, VI, X, XI, XIX, XXI	dBm/3,84 MHz	-60.00	-60.00	-84.00	-94.46
	Band II, V, VII				-82.00	-92.46
	Band XXV, XXVI				-80.5 (Note 3)	-90.96 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII				-81.00	-91.46
	Band IX (Note 2)				-83.00	-93.46
Ior/Ioc		dB	9.54	9.54	0	-9.54
CPICH RSCP, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm	-60.46	-60.46	-94.0	-114.0
	Band II, V, VII				-92.0	-112.0
	Band XXV, XXVI				-90.5 (Note 3)	-110.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII				-91.0	-111.0
	Band IX (Note 2)				-93.0	-113.0
Io, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/3,84 MHz	-50.00	-50.00	-81.0	-94.0
	Band II, V, VII				-79.0	-92.0
	Band XXV, XXVI				-77.5 (Note 3)	-90.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII				-78.0	-91.0
	Band IX (Note 2)				-80.0	-93.0
Propagation condition		-	AWGN		AWGN	
NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.						
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.						
NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.						
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for test 2 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.						

### A.9.1.1.2 Test Requirements

The CPICH RSCP measurement accuracy shall meet the requirements in section 9.1.1.

### A.9.1.2 CPICH Ec/Io

#### A.9.1.2.1 Test Purpose and Environment

*The purpose of this test is to verify that the CPICH Ec/Io measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.2.*

##### A.9.1.2.1.1 Intra frequency test parameters

In this case all cells are in the same frequency. Both CPICH Ec/Io absolute and relative accuracy requirements are tested by using test parameters in Table A.9.3

**Table A.9.3: CPICH Ec/Io Intra frequency test parameters**

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number			Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior		dB	-10		-10		-10	
PCCPCH_Ec/Ior		dB	-12		-12		-12	
SCH_Ec/Ior		dB	-12		-12		-12	
PICH_Ec/Ior		dB	-15		-15		-15	
DPCH_Ec/Ior		dB	-15	-	-15	-	-6	-
OCNS_Ec/Ior		dB	-1.11	-0.94	-1.11	-0.94	.256	-0.94
Ioc	Band I, IV, VI, X, XI, XIX, XXI	dBm/ 3,84 MHz	-56.98		-89.07		-94.98	
	Band II, V, VII						-92.98	
	Band XXV, XXVI						-91.48 (Note 3)	
	Band III, VIII, XII, XIII, XIV, XX, XXII						-91.98	
	Band IX (Note 2)						-93.98	
Ior/Ioc		dB	3.0	3.0	-2.9	-2.9	-9.0	-9.0
CPICH Ec/Io, Note 1		dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/3,84 MHz	-50		-86		-94	
	Band II, V, VII						-92	
	Band XXV, XXVI						-90.5 (Note 3)	
	Band III, VIII, XII, XIII, XIV, XX, XXII						-91	
	Band IX (Note 2)						-93	
Propagation condition		-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.								
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.								
NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.								
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.								

**A.9.1.2.1.2 Inter frequency test parameters**

In this case both cells are in different frequency and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22. CPICH Ec/Io inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.4.

Table A.9.4: CPICH Ec/Io Inter frequency tests parameters

Parameter		Unit	Test 1		Test 2		Test 3	
			Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number			Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior		dB	-10		-10		-10	
PCCPCH_Ec/Ior		dB	-12		-12		-12	
SCH_Ec/Ior		dB	-12		-12		-12	
PICH_Ec/Ior		dB	-15		-15		-15	
DPCH_Ec/Ior		dB	-15	-	-6	-	-6	-
OCNS_Ec/Ior		dB	-1.11	-0.94	-2.56	-0.94	-2.56	-0.94
Ior	Band I, IV, VI, X, XI, XIX, XXI	dBm/ 3,84 MHz	-52.22	-52.22	-87.27	-87.27	-94.46	-94.46
	Band II, V, VII						-92.46	-92.46
	Band XXV, XXVI						-90.96 (Note 3)	-90.96 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII						-91.46	-91.46
	Band IX (Note 2)						-93.46	-93.46
Ior/Ioc	dB	-1.75	-1.75	-4.7	-4.7	-9.54	-9.54	
CPICH Ec/Io, Note 1		dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/3, 84 MHz	-50	-50	-86	-86	-94	-94
	Band II, V, VII						-92.0	-92.0
	Band XXV, XXVI						-90.5 (Note 3)	-90.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII						-91.0	-91.0
	Band IX (Note 2)						-93	-93
Propagation condition		-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.								
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.								
NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.								
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.								

### A.9.1.2.2 Test Requirements

The CPICH Ec/Io measurement accuracy shall meet the requirements in section 9.1.2. In case of the absolute intra-frequency CPICH\_Ec/Io measurement and relative inter-frequency CPICH\_Ec/Io measurement accuracy test cases the effect of assumed thermal noise and noise generated in the receiver (-99 dBm for frequency bands I, IV, VI, X, XI, XIX and XXI; -98 dBm for frequency band IX, -97dBm for frequency bands II, V and VII; -95.5dBm for frequency band XXV and XXVI; and -96dBm for frequency band III) shall be added into the required accuracy. The test requirements for the absolute intra-frequency CPICH\_Ec/Io measurement are defined in Section 9.1.2 as shown in Table A.9.4A. The test requirements for the relative inter-frequency CPICH\_Ec/Io measurement are defined in Section 9.1.2 as shown in Table A.9.4B.

Table A.9.4A: CPICH\_Ec/Io Intra-frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3,84 MHz]
CPICH_Ec/Io	dB	-2.7...1.5 for $-14 \leq \text{CPICH Ec/Io}$ -3.2...2 for $-16 \leq \text{CPICH Ec/Io} < -14$ -4.2...3 for $-20 \leq \text{CPICH Ec/Io} < -16$	-4.2...3	-94...-87(Band I, IV, VI, X, XI, XIX, XXI) -92...-85 (Band II, V, VII) -90.5...-83.5 (Band XXV, XXVI (Note 2)) -91...-84 (Band III, VIII, XII, XIII, XIV, XX, XXII) 93...-86 (Band IX (Note 1))
		$\pm 1.5$ for $-14 \leq \text{CPICH Ec/Io}$ $\pm 2$ for $-16 \leq \text{CPICH Ec/Io} < -14$ $\pm 3$ for $-20 \leq \text{CPICH Ec/Io} < -16$	$\pm 3$	-87...-50(Band I, IV, VI, X, XI, XIX, XXI) -85...-50 (Band II, V, VII) -83.5...-50 (Band XXV, XXVI (Note 2)) -84...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -86...-50 (Band IX (Note 1))
NOTE1: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE				
NOTE 2: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies..				

Table A.9.4B: CPICH\_Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	$\pm 2.7$ for $-14 \leq \text{CPICH Ec/Io}$ $\pm 3.2$ for $-16 \leq \text{CPICH Ec/Io} < -14$ $\pm 4.2$ for $-20 \leq \text{CPICH Ec/Io} < -16$	$\pm 4.2$	-94...-87(Band I, IV, VI, X, XI, XIX, XXI) -92...-85 (Band II, V, VII) -90.5...-84.5 (Band XXV, XXVI (Note 2)) -91...-84 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-86 (Band IX (Note 1))
		$\pm 1.5$ for $-14 \leq \text{CPICH Ec/Io}$ $\pm 2$ for $-16 \leq \text{CPICH Ec/Io} < -14$ $\pm 3$ for $-20 \leq \text{CPICH Ec/Io} < -16$	$\pm 3$	-87...-50 (Band I, IV, VI, X, XI, XIX, XXI) -85...-50 (Band II, V, VII) -83.5...-50 (Band XXV, XXVI (Note 2)) -84...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -86...-50 (Band IX (Note 1))
NOTE 1: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.				
NOTE 2: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				

### A.9.1.3 UTRA Carrier RSSI

#### A.9.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UTRA Carrier RSSI measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.3. In this case all cells are in different frequencies and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22. UTRA Carrier RSSI accuracy requirements are tested by using test parameters in Table A.9.5 for absolute accuracy and Table A.9.5.1 for relative accuracy. In the relative accuracy test, UTRA carrier RSSI measurements of neighbour cell 2 and neighbour cell 3 are reported to serving cell 1.

Table A.9.5: UTRA Carrier RSSI Inter 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
UTRA RF Channel number			Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior		dB	-10		-10		-10	
PCCPCH_Ec/Ior		dB	-12		-12		-12	
SCH_Ec/Ior		dB	-12		-12		-12	
PICH_Ec/Ior		dB	-15		-15		-15	
DPCH_Ec/Ior		dB	-15	-	-6	-	-6	-
OCNS_Ec/Ior		dB	-1.11	-0.94	-2.56	-0.94	-2.56	-0.94
Ior	Band I, IV, VI, X, XI, XIX, XXI	dBm/ 3,84 MHz	-52.22	-52.22	-70.27	-70.27	-94.46	-94.46
	Band II, V, VII						-92.46	-92.46
	Band XXV, XXVI						-90.96 (Note 3)	-90.96 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII						-91.46	-91.46
	Band IX (Note 2)						-93.46	-93.46
Ior/Ioc		dB	-1.75	-1.75	-4.7	-4.7	-9.54	-9.54
CPICH Ec/Io, Note 1		dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/ 3,84 MHz	-50	-50	-69	-69	-94	-94
	Band II, V, VII						-92	-92
	Band XXV, XXVI						-90.5 (Note 3)	-90.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII						-91	-91
	Band IX (Note 2)						-93	-93
Propagation condition		-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.								
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.								
NOTE 3: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.								
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.								

Table A.9.5.1: UTRA Carrier RSSI Inter frequency relative accuracy test parameters

Parameter		Unit	Test 1			Test 2			Test 3		
			Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2	Cell 3
UTRA RF Channel number			Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3
CPICH_Ec/Ior		dB		-10			-10			-10	
PCCPCH_Ec/Ior		dB		-12			-12			-12	
SCH_Ec/Ior		dB		-12			-12			-12	
PICH_Ec/Ior		dB		-15			-15			-15	
DPCH_Ec/Ior		dB	-15	-	-	-6	-	-	-6	-	-
OCNS_Ec/Ior		dB	-1.11	-0.94	-0.94	-2.56	-0.94	-0.94	-2.56	-0.94	-0.94
Ior/loc	Band I, IV, VI, X, XI, XIX, XXI	dBm/ 3,84 MHz	-52.23	-52.23	-71.23	-91.27	-91.27	-81.27	-94.45	-94.45	-75.45
	Band II, V, VII								-92.45	-92.45	-73.45
	Band XXV, XXVI								-90.95 (Note 3)	-90.95 (Note 3)	-71.95 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII								-91.45	-91.45	-72.45
	Band IX (Note 3)								-93.45	-93.45	-74.45
Ior/loc		dB	-1.75	-1.75	-1.75	-4.7	-4.7	-4.7	-9.54	-9.54	-9.54
CPICH Ec/Io, Note 1		dBm	-14.0	-14.0	-14.0	-16.0	-16.0	-16.0	-20.0	-20.0	-20.0
Io, Note 1	Band I, IV, VI, X, XI, XIX, XXI	dBm/ 3,84 MHz	-50 (Note 2)	-50	-69	-90 (Note 2)	-90	-80	-94 (Note 2)	-94	-75
	Band II, V, VII								-92 (Note 2)	-92	-73
	Band XXV, XXVI								-90.5 (Note 2, 3)	-90.5 (Note 3)	-71.5 (Note 3)
	Band III, VIII, XII, XIII, XIV, XX, XXII								-91 (Note 2)	-91	-72
	Band IX (Note 3)								-93 (Note 2)	-93	-74
Propagation condition		AWGN									
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.											
NOTE 2: Io levels are not reported by the UE on cell 1.											
NOTE 3: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.											
NOTE 4: The test parameter is modified by -1.5 dB when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.											
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose Cell 2 or Cell 3 in between the tests.											

### A.9.1.3.2 Test Requirements

The UTRA Carrier RSSI measurement accuracy shall meet the requirements in section 9.1.3. The effect of assumed thermal noise and noise generated in the receiver (-99 dBm for frequency bands I, IV, VI, X, XI, XIX, XXI; -98 dBm for frequency band IX; -97dBm for frequency bands II, V, VII; -95.5dBm for frequency band XXV, XXVI; and -96dBm for frequency band III, VIII, XII, XIII, XIV, XX, XXII) shall be added into the required accuracy defined in Section 9.1.3 as shown in Table A.9.5A and in Table A.9.5A1.



**Table A.9.5A: UTRA Carrier RSSI absolute accuracy**

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3,84 MHz]
UTRA Carrier RSSI	dBm	±4 (Note 1)	±7 (Note 1)	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 3)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 2))
	dBm	±6	±9	-70...-50

NOTE 1: Impact from RF noise floor is test case dependent and has not been considered. Noise floor shall be considered in RAN WG5 test case.

NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

NOTE 3: The condition is -92...-70 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

**Table A.9.5A1: UTRA Carrier RSSI relative accuracy**

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3,84 MHz]
UTRA Carrier RSSI	dBm	±7 (Note 1)	±11 (Note 1)	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 3)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))
	dBm	±7 (Note 1)	±11 (Note 1)	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 3)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))

NOTE 1: Impact from RF noise floor is test case dependent and has not been considered. Noise floor shall be considered in RAN WG5 test case.

NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.

NOTE 3: The condition is -92...-50 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.

## A.9.1.3A GSM Carrier RSSI

### A.9.1.3A.1 Test Purpose and Environment

The purpose of this test is to verify that the GSM Carrier RSSI measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.4.

In the test in Cell\_DCH state compressed mode with purpose "GSM Carrier RSSI Measurement" is applied to measure on GSM. The gap length is 7, detailed definition is in TS 25.101 annex A.5. Table A.9.5AA defines the limits of signal strengths and code powers on the UMTS FDD cell, where the requirement is applicable. In the measurement control information it is indicated to the UE that periodic reporting of the GSM RSSI measurement.

The limits of the GSM test parameters are defined in [21].

**Table A.9.5AA: General GSM Carrier RSSI test parameters**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
<b>Target quality value on DTCH</b>	<b>BLER</b>	<b>0.01</b>	
Compressed mode patterns - GSM carrier RSSI measurement		Compressed mode reference pattern 2 Set 2	As specified in table A.22 TS 25.101 section A.5
Inter-RAT measurement quantity		GSM Carrier RSSI	
BSIC verification required		Not required	
Monitored cell list size		6 GSM neighbours including ARFCN 1	Measurement control information is sent before the compressed mode patterns starts.

**Table A.9.5B: Cell specific GSM Carrier RSSI test parameters**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
$\bar{I}_{or/loc}$	dB	-1
$I_{oc}$	dBm/ 3,84 MHz	-70
Propagation condition	-	AWGN

### A.9.1.3A.2 Test Requirements

The GSM Carrier RSSI measurement accuracy shall meet the requirements in section 9.1.4.

The rate of correct measurements observed during repeated tests shall be at least 90%.

### A.9.1.3B Transport channel BLER

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.5 exists.

### A.9.1.3C UE transmitted power

#### A.9.1.3C.1 Test Purpose and Environment

The purpose of this test is to verify that the UE transmitted power measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.6.

The test parameters are given in Table A.9.5C and A.9.5D below. In the measurement control information it shall be indicated to the UE that periodic reporting of the UE transmitted power measurement shall be used.

**Table A.9.5C: General test parameters for UE transmitted power**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		Off	

**Table A.9.5D: Cell Specific parameters for UE transmitted power**

Parameter	Unit	Cell 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	-3
OCNS	dB	-5.2
$\hat{I}_{or}/I_{oc}$	dB	0
$I_{oc}$	dBm/3,84 MHz	-70
CPICH_Ec/Io	dB	-13
Propagation Condition		AWGN

### A.9.1.3C.1.1 Test procedure

- 1) Set the UE power and Maximum allowed UL TX power to the maximum power for that UE power class.
- 2) Send continuously during the entire test Up power control commands to the UE.
- 3) Check the UE reported value
- 4) Map the UE reported value to accuracy requirement and define the test limits
- 5) Measure the output power of the UE. The output power shall be averaged over one timeslot.
- 6) Check that measured power is within the defined limits.
- 7) Decrease the Maximum allowed UL TX power with 1 dB and signal the new value to the UE.
- 8) Repeat from step 3) until the entire specified range for the UE transmitted power measurement has been tested, i.e. the accuracy requirement for the UE transmitted power measurement is specified 10dB below the maximum power for the UE power class.

### A.9.1.3C.2 Test Requirements

The UE transmitted power measurement accuracy shall meet the requirements in section 9.1.6.

The rate of correct measurements observed during repeated tests shall be at least 90%.

## A.9.1.4 SFN-CFN observed time difference

### A.9.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the SFN-CFN observed time difference measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.7.

#### A.9.1.4.1.1 Intra frequency test parameters

During the test the timing difference between Cell 1 and 2 can be set to value from 0...9830399 chips.

In this case all cells are in the same frequency. Table A.9.6 defines the limits of signal strengths and code powers, where the requirements are applicable.

Table A.9.6: SFN-CFN observed time difference Intra frequency test parameters

Parameter		Unit	Cell 1	Cell 2
UTRA RF Channel number			Channel 1	Channel 1
CPICH_Ec/Ior		dB	-10	-10
PCCPCH_Ec/Ior		dB	-12	-12
SCH_Ec/Ior		dB	-12	-12
PICH_Ec/Ior		dB	-15	-15
DPCH_Ec/Ior		dB	-15	-15
OCNS		dB	-1.11	-1.11
Ior/Ioc		dB	10.5	10.5
Ioc		dBm/ 3,84 MHz	$I_o - 13.7 \text{ dB} = I_{oc}$ , Note 1	$I_o - 13.7 \text{ dB} = I_{oc}$ , Note 1
Range 1	I <sub>o</sub>	dBm/3,84 MHz	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 3)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 2))	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 3)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 2))
Range 2		dBm/3,84 MHz	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 4)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 4)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))
Propagation condition		-	AWGN	
NOTE 1: <i>I<sub>oc</sub></i> level shall be adjusted according the total signal power spectral density <i>I<sub>o</sub></i> at receiver input and the geometry factor <i>I<sub>or</sub>/I<sub>oc</sub></i> .				
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.				
NOTE 3: The condition is -92...-70 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				
NOTE 4: The condition is -92...-50 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				

#### A.9.1.4.1.2 Inter frequency test parameters

During the test the timing difference between Cell 1 and 2 can be set to value from 0...9830399 chips.

In this test case both cells are in different frequency and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22. Table A.9.7 defines the limits of signal strengths and code powers, where the requirement is applicable.

Table A.9.7: SFN-CFN observed time difference Inter frequency tests parameters

Parameter		Unit	Cell 1	Cell 2
UTRA RF Channel number			Channel 1	Channel 2
CPICH_Ec/lor		dB	-10	-10
PCCPCH_Ec/lor		dB	-12	-12
SCH_Ec/lor		dB	-12	-12
PICH_Ec/lor		dB	-15	-15
DPCH_Ec/lor		dB	-15	-15
OCNS		dB	-1.11	-1.11
$\hat{I}_{or}/I_{oc}$		dB	10.1	10.1
$I_{oc}$		dBm/ 3,84 MHz	$I_{oc} - 10.6 \text{ dB} = I_{oc}$ , Note 1	$I_{oc} - 10.6 \text{ dB} = I_{oc}$ , Note 1
Range 1	$I_{oc}$	dBm/ 3,84 MHz	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 3)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 2))	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 3)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 2))
Range 2			-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 4)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 4)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))
Propagation condition		-	AWGN	
NOTE 1: $I_{oc}$ level shall be adjusted in each carrier frequency according the total signal power spectral density $I_{oc}$ at receiver input and the geometry factor $\hat{I}_{or}/I_{oc}$ .				
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.				
NOTE 3: The condition is -92...-70 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				
NOTE 4: The condition is -92...-50 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				

#### A.9.1.4.2 Test Requirements

The SFN-CFN observed time difference measurement accuracy shall meet the requirements in section 9.1.7.

#### A.9.1.5 SFN-SFN observed time difference

##### A.9.1.5.1 SFN-SFN observed time difference type 1

###### A.9.1.5.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SFN-SFN observed time difference type 1 measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.8.1.

During the test the timing difference between Cell 1 and 2 can be set to value from 0...9830399 chips.

In this case all cells are in the same frequency. Table A.9.8 defines the limits of signal strengths and code powers, where the requirements are applicable.

**Table A.9.8: SFN-SFN observed time difference type 1 Intra frequency test parameters**

Parameter	Unit	Cell 1	Cell 2	
UTRA RF Channel number		Channel 1	Channel 1	
CPICH_Ec/Ior	dB	-10	-10	
PCCPCH_Ec/Ior	dB	-12	-12	
SCH_Ec/Ior	dB	-12	-12	
PICH_Ec/Ior	dB	-15	-15	
S-CCPCH_Ec/Ior	dB	-12	-12	
OCNS	dB	-1.29	-1.29	
Ior/Ioc	dB	10.5	10.5	
Ioc	dBm/ 3,84 MHz	$I_o - 13.7 \text{ dB} = I_{oc}$ , Note 1	$I_o - 13.7 \text{ dB} = I_{oc}$ , Note 1	
Range 1	I <sub>o</sub>	dBm/3,84 MHz	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 3)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 2))	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 3)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 2))
Range 2			-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 4)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 4)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))
Propagation condition		-	AWGN	
NOTE 1: <i>I<sub>oc</sub></i> level shall be adjusted according to the total signal power spectral density <i>I<sub>o</sub></i> at receiver input and the geometry factor <i>I<sub>or</sub>/I<sub>oc</sub></i> .				
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.				
NOTE 3: The condition is -92...-70 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				
NOTE 4: The condition is -92...-50 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				

**A.9.1.5.1.2 Test Requirements**

The SFN-SFN observed time difference type 1 measurement accuracy shall meet the requirements in section 9.1.8.1

**A.9.1.5.2 SFN-SFN observed time difference type 2 without IPDL period active**

**A.9.1.5.2.1 Test Purpose and Environment**

The purpose of this test is to verify that the SFN-SFN observed time difference type 2 measurement accuracy without IPDL period active is within the specified limits. This test will verify the requirements in section 9.1.8.2.

During the test the time difference between Cell 1 and 2 can be set to value from -1279.75 to 1280 chips.

In this case all cells are in the same frequency. Table A.9.9 defines the limits of signal strengths and code powers, where the requirements are applicable.

**Table A.9.9: SFN-SFN observed time difference type 2 Intra frequency test parameters**

Parameter		Unit	Cell 1	Cell 2
UTRA RF Channel number			Channel 1	Channel 1
CPICH_Ec/lor		dB	-10	-10
PCCPCH_Ec/lor		dB	-12	-12
SCH_Ec/lor		dB	-12	-12
PICH_Ec/lor		dB	-15	-15
DPCH_Ec/lor		dB	-15	-15
OCNS		dB	-1.11	-1.11
lor/loc		dB	10.5	10.5
loc		dBm/ 3,84 MHz	$lo - 13.7 \text{ dB} = loc$ , Note 1	$lo - 13.7 \text{ dB} = loc$ , Note 1
CPICH_Ec/lo, Note 2		dB	-13.2	-13.2
Range 1	lo	dBm/3,84 MHz	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 4)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 3))	-94...-70 (Band I, IV, VI, X, XI, XIX, XXI) -92...-70 (Band II, V, VII) -90.5...-70 (Band XXV, XXVI (Note 4)) -91...-70 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-70 (Band IX (Note 3))
Range 2			-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 5)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 3))	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 5)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 3))
NOTE 1: <i>loc</i> level shall be adjusted according the total signal power spectral density <i>lo</i> at receiver input and the geometry factor <i>lor/loc</i> .				
NOTE 2: <i>lo</i> and CPICH Ec/ <i>lo</i> levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.				
NOTE 3: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.				
NOTE 4: The condition is -92...-70 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				
NOTE 5: The condition is -92...-50 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.				

**A.9.1.5.2.2 Test Requirements**

The SFN-SFN observed time difference type 2 measurement accuracy shall meet the requirements in section 9.1.8.2

**A.9.1.5.3 SFN-SFN observed time difference type 2 with IPDL period active**

**A.9.1.5.3.1 Test Purpose and Environment**

This requirement is valid only for UEs supporting IPDL measurements.

The purpose of this test is to verify that the SFN-SFN observed time difference type 2 measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.8.2.

During the test the time difference between Cell 1 and 2 shall be set according to the assistance data defined in table A.9.10A.

In this case all cells are in the same frequency. Table A.9.10 defines the limits of signal strengths and code powers, where the requirements are applicable.

**Table A.9.10: SFN-SFN observed time difference type 2 Intra frequency test parameters**

Parameter	Unit	Cell 1		Cell 2	
		No idle period	Idle period in Cell 1	No idle period	Idle period in Cell 1
UTRA RF Channel number		Channel 1	Channel 1	Channel 1	Channel 1
CPICH_Ec/Ior	dB	-10	-10	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12	-12	-12
SCH_Ec/Ior	dB	-12	-12	-12	-12
PICH_Ec/Ior	dB	-15	-15	-15	-15
DPCH_Ec/Ior	dB	-15	-15	-	-
OCNS	dB	-1.11	-1.11	-0.94	-0.94
Ior/Ioc	dB	10.5	-24.5	-6	-6
Ioc	dBm/ 3,84 MHz	-80			
Io, Note 1	dBm/3,84 MHz	-69.04	-79.01	-69.04	-79.01
CPICH_Ec/Io, Note 1	dB	-10.46	-35.49	-26.96	-16.99
Propagation condition	-	AWGN			
NOTE 1: Io and CPICH Ec/Io levels have been calculated from other parameters for information purposes. They are is not settable parameters themselves.					

When verifying the SFN-SFN observed time difference type 2 intra frequency measurement accuracy with IPDL period active the idle period parameters in table A.9.10A shall be used.

**Table A.9.10A: SFN-SFN observed time difference type 2 assistance data test parameters**

Parameter	Unit	Cell 1
Search Window Size	Chips	80
IP_Status	-	Continuous
IP_Spacing	Frames	10
IP_Lenght	Symbols	10
IP_Offset	frame	NA
Seed	integer	13
Burst_Start		NA
Burst_Length		NA
Burst_Freq		NA

NOTE: The total signal power spectral density  $I_o$  will change only downwards during BS transmission gap.

#### A.9.1.5.3.2 Test Requirements

The SFN-SFN observed time difference type 2 measurement accuracy shall meet the requirements in section 9.1.8.2

### A.9.1.6 UE Rx-Tx time difference

#### A.9.1.6.1 UE Rx-Tx time difference type 1

##### A.9.1.6.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE Rx-Tx time difference type 1 measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.9.1

The connection is started using cell 1, then cell 2 is added to the active set so that cell 1 is the timing reference. During the test the downlink DPCH time difference between Cell 1 and 2 can be set to any value from -148 to 148 chips.

Table A.9.11 defines the limits of signal strengths and code powers, where the requirements are applicable.



**Table A.9.11: UE Rx-Tx time difference type 1 intra frequency test parameters**

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
Downlink DPCH timing	Chips	Timing reference	From reference timing -148 to reference timing+148
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Ior/Ioc	dB	10.5	10.5
Ioc	dBm/3,84 MHz	Io -13.7 dB = Ioc, Note 1	Io-13.7 dB = Ioc, Note 1
Io	dBm/3,84 MHz	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 3)) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI (Note 3)) -93...-50 (Band IX (Note 2))
Propagation condition	-	AWGN	
NOTE 1: Ioc level shall be adjusted according the total signal power spectral density Io at receiver input and the geometry factor Ior/Ioc.			
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.			
NOTE 3: The condition is -92...-50 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.			

#### A.9.1.6.1.2 Test Requirements

The UE Rx-Tx time difference type 1 measurement accuracy measured for cell 2 shall meet the requirements in section 9.1.9.1.

#### A.9.1.6.2 UE Rx-Tx time difference type 2

##### A.9.1.6.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE Rx-Tx time difference type 2 measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.9.2.

The connection is started using cell 1, then cell 2 is added to the active set so that cell 1 is the timing reference. During the test the downlink DPCH time difference between Cell 1 and 2 can be set to any value from -148 to 148 chips.

Table A.9.12 defines the limits of signal strengths and code powers, where the requirements are applicable.

**Table A.9.12: UE Rx-Tx time difference type 2 intra frequency test parameters**

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
Downlink DPCH timing	Chips	Timing reference	From reference timing -148 to reference timing+148
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
$\hat{I}_{or}/I_{oc}$	dB	10.5	10.5
$I_{oc}$	dBm/ 3,84 MHz	$I_{oc} - 10.9 \text{ dB} = I_{oc}$ , Note 1	$I_{oc} - 13.7 \text{ dB} = I_{oc}$ , Note 1
$I_{o}$	dBm/ 3,84 MHz	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))	-94...-50 (Band I, IV, VI, X, XI, XIX, XXI) -92...-50 (Band II, V, VII) -90.5...-50 (Band XXV, XXVI) -91...-50 (Band III, VIII, XII, XIII, XIV, XX, XXII) -93...-50 (Band IX (Note 2))
Propagation condition	-	AWGN	
NOTE 1: $I_{oc}$ level shall be adjusted according the total signal power spectral density $I_{o}$ at receiver input and the geometry factor $\hat{I}_{or}/I_{oc}$ .			
NOTE 2: For the UE which supports both Band III and Band IX operating frequencies, the measurement performance requirements for Band III shall apply to the multi-band UE.			
NOTE 3: The condition is -92...-50 dBm/3.84 MHz when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.			

#### A.9.1.6.2.2 Test Requirements

The UE Rx-Tx time difference type 2 measurement accuracy measured for cell 2 shall meet the requirements in section 9.1.9.2.

#### A.9.1.7 (void)

#### A.9.1.8 (void)

**Table A.9.13: (void)**

**Table A.9.14: (void)**

### A.9.1.9 UE Transmission Power Headroom

#### A.9.1.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE transmission power headroom measurement report accuracy is within the specified limits. This test will verify the requirements in section 9.1.13.4.

The test parameters are given in Table A.9.15A and Table A.9.15B. In the Scheduling Information configuration for the E-DCH, it shall be indicated to the UE that it shall periodically report Scheduling Information, which contains UPH measurement every E-DCH TTI. During the test the system simulator shall not send any scheduling grant to the UE. An HSDPA radio bearer shall be configured.

**Table A.9.15A: General test parameters for UE transmission power headroom**

Parameter	Unit	Value	Comment
DL DCH configuration		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
E-DCH TTI	ms	10	
E-DCH configuration		10 ms TTI E-DCH Transport Block Size	Table 0 in TS 25.321 section B.3
DL Power Control		Off	
Active cell		Cell1	
$\beta_{ec}/\beta_c$		5/15	
$\beta_{ed\_ref}/\beta_c$		5/15	
$A_{hs}$		5/15	$\Delta_{ACK} = \Delta_{NACK} = \Delta_{CQI}$
Reference E-TFCI index		0	Table 0 in TS 25.321 section B.3

**Table A.9.15B: Cell Specific parameters for UE transmission power headroom**

Parameter	Unit	Cell 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	-10
HS-SCCH_Ec/Ior	dB	-8
HS-PDSCH_Ec/Ior	dB	-3
E-AGCH_Ec/Io	dB	DTX
E-HICH_Ec/Io	dB	DTX
E-RGCH_Ec/Io	dB	DTX
OCNS	dB	Note 1
$\hat{I}_{or}$	dBm/3,84 MHz	-70
Note 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ .		

#### A.9.1.9.1.1 Test Procedure

- 1) Set the maximum allowed uplink transmit power ( $P_{max}$ ) to the maximum power for that UE power class.
- 2) Use uplink power control commands to set the UE DPCCH power to a level ( $P$ ) where the UE power headroom is at least 31dB.
- 3) Measure the power transmitted by the UE on DPCCH every time slot. The DPCCH output power shall be averaged over 100 ms.
- 4) The total measured output power of the UE shall be averaged over 100 ms.
- 5) Estimate the reference UE transmission power headroom as the difference between the maximum allowed uplink transmit power ( $P_{max}$ ) and the average DPCCH power measured in step 3.
- 6) Check the UE reported value of UE transmission power headroom.
- 7) Check the accuracy limits according to table 9.34B for the total output power measured in step 4).
- 8) The difference between the reported UPH in step 6) and estimated reference UPH in step 5) shall be within the accuracy limits obtained in step 7).
- 9) Increase the variable  $P$  by 1 dB.
- 10) Repeat from step 2) until the UPH is tested over the entire dynamic range.

#### A.9.1.9.2 Test Requirements

The UE transmission power headroom measurement report accuracy shall meet the requirements in section 9.1.13.4.

The rate of correct measurements observed during repeated tests shall be at least 90%.

## A.9.1.10 E-UTRAN FDD RSRP absolute accuracy (CELL\_DCH)

### A.9.1.10.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD RSRP measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4a.

The test is carried out in Cell\_DCH state using a compressed mode pattern with purpose “E-UTRAN Measurement”. The compressed mode pattern repeats every 80 ms and uses a gap length of 10 slots. Further details are found in TS 25.101 annex A.5.

Tables A.9.1.10.1-1 and A.9.1.10.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN FDD RSRP is indicated to the UE. The E-UTRAN FDD test parameters are given in Table A.9.1.10.1-3.

**Table A.9.1.10.1-1: General UTRAN test parameters for E-UTRAN FDD RSRP measurements**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns - E-UTRAN measurement		Compressed mode reference pattern 2 Set 5	As specified in table A.22 TS 25.101 section A.5
Inter-RAT measurement quantity		E-UTRAN FDD RSRP	
Monitored cell list size		1 E-UTRAN FDD neighbour cell	Measurement control information is sent before the compressed mode pattern starts.

**Table A.9.1.10.1-2: Cell specific UTRAN test parameters for E-UTRAN FDD RSRP measurements**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
CPICH_Ec/lor	dB	-10
PCCPCH_Ec/lor	dB	-12
SCH_Ec/lor	dB	-12
PICH_Ec/lor	dB	-15
DCH_Ec/lor	dB	Note 1
OCNS_Ec/lor	dB	Note 2
lor/loc	dB	-1
loc	dBm/ 3.84 MHz	-70
CPICH_Ec/lo	dB	-13.54
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 lor.	

**Table A.9.1.10.1-3: E-UTRAN FDD RSRP test parameters**

Parameter	Unit	Test 1	Test 2
		Cell 2	Cell 2

$BW_{channel}$	MHz	10	10				
Measurement bandwidth	$n_{PRB}$	22—27	22—27				
PDCCH/PCFICH/PHICH Reference measurement channel as defined in TS 36.133 A.3.1.2.1		R.6 FDD	R.6 FDD				
OCNG Pattern as defined in TS 36.133 A.3.2.1.2		OP.2 FDD	OP.2 FDD				
PBCH_RA	dB	0	0				
PBCH_RB							
PSS_RA							
SSS_RA							
PCFICH_RB							
PHICH_RA							
PHICH_RB							
PDCCH_RA							
PDCCH_RB							
PDSCH_RA							
PDSCH_RB							
OCNG_RA <sup>Note1</sup>							
OCNG_RB <sup>Note1</sup>							
$N_{oc}$ <sup>Note2</sup>				Band group FDD_A	dBm/15 kHz	-88.65	-117
				Band groups FDD_B1 and FDD_B2 (Note 7)			-116.5
	Band groups FDD_E and FDD_F (Note 5)	-115					
	Band group FDD_H	-113.5					
	Band group FDD_D	-115.5					
	Band group FDD_G	-114					
	Band group FDD_C	-116					
$\hat{E}_s / I_{ot}$	dB	10	-4				
RSRP <sup>Note3</sup>	Band group FDD_A	dBm/15 kHz	-78.65	-121			
	Band groups FDD_B1 and FDD_B2 (Note 7)			-120.5			
	Band groups FDD_E and FDD_F (Note 5)			-119			
	Band group FDD_H			-117.5			
	Band group FDD_D			-119.5			
	Band group FDD_G			-118			
	Band group FDD_C			-120			
$I_o$ <sup>Note3</sup>	Band group FDD_A	dBm/9 MHz	-49.5	-87.76			
	Band groups FDD_B1 and FDD_B2 (Note 7)			-87.26			
	Band groups FDD_E and FDD_F (Note 5)			-85.76			
	Band group FDD_H			-84.26			
	Band group FDD_D			-86.26			
	Bands group FDD_G			-84.76			
	Band group FDD_C.			-86.76			
$\hat{E}_s / N_{oc}$	dB	10	-4				
Propagation condition	-	AWGN	AWGN				

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 3:	RSRP and I <sub>o</sub> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	For Band 26 in band group FDD_F, the tests shall be performed with the assigned E-UTRA channel bandwidth within 865-894.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	For Band 74 in band group FDD_B2, the tests shall be performed with the assigned E-UTRA channel bandwidth within 1475.9-1510.9 MHz.

### A.9.1.10.2 Test Requirements

The E-UTRAN FDD RSRP absolute measurement accuracy shall meet the requirements in section 9.1.4a.

### A.9.1.11 E-UTRAN TDD RSRP Absolute Accuracy (CELL\_DCH)

#### A.9.1.11.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD RSRP measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4a.

The test is carried out in Cell\_DCH state using a compressed mode pattern with purpose “E-UTRAN Measurement”. The compressed mode pattern repeats every 80 ms and uses a gap length of 10 slots. Further details are found in table A.22 in annex A.5 of 3GPP TS 25.101.

Tables A.9.1.11.1-1 and A.9.1.11.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN TDD RSRP is indicated to the UE. The E-UTRAN TDD test parameters are given in Table A.9.1.11.1-3.

**Table A.9.1.11.1-1: General test parameters for E-UTRAN TDD RSRP absolute accuracy tests**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in 3GPP TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns - E-UTRAN measurement		Compressed mode reference pattern 2 Set 5	As specified in table A.22 3GPP TS 25.101 section A.5
Inter-RAT measurement quantity		E-UTRAN TDD RSRP	
Monitored cell list size		1 E-UTRAN TDD neighbour cell	Measurement control information is sent before the compressed mode pattern starts.

**Table A.9.1.11.1-2: UTRAN FDD cell specific test parameters for E-UTRAN TDD RSRP absolute accuracy tests**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
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
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
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 Ior.		



**Table A.9.1.11.1-3: E-UTRAN TDD cell specific test parameters for E-UTRAN TDD RSRP absolute accuracy tests**

Parameter		Unit	Test 1	Test 2
			Cell 2	Cell 2
E-UTRA RF Channel Number			1	1
$BW_{channel}$		MHz	10	10
Special subframe configuration <sup>Note1</sup>			6	6
Uplink-downlink configuration <sup>Note1</sup>			1	1
Measurement bandwidth		$n_{PRB}$	22–27	22–27
PDCCH/PCFICH/PHICH Reference measurement channel as defined in TS 36.133 A.3.1.2.2			R.6 TDD	R.6 TDD
OCNG Pattern as defined in TS 36.133 A.3.2.2.2			OP.2 TDD	OP.2 TDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA <sup>Note2</sup>				
OCNG_RB <sup>Note2</sup>				
$N_{oc}$ <sup>Note3</sup>	Band group TDD_A			
	Band group TDD_C	-116		
	Band group TDD_E	-115		
$\hat{E}_s / I_{ot}$		dB	10	-4
RSRP <sup>Note4</sup>	Band group TDD_A	dBm/15 kHz	-78.65	-121
	Band group TDD_C			-120
	Band group TDD_E			-119
$I_o$ <sup>Note4</sup>	Band group TDD_A	dBm/9 MHz	-49.5	-87.76
	Band group TDD_C			-86.76
	Band group TDD_E			-85.76
$\hat{E}_s / N_{oc}$		dB	10	-4
Propagation condition		-	AWGN	AWGN
<p>Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.</p> <p>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.</p> <p>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 <math>N_{oc}</math> to be fulfilled.</p> <p>Note 4: RSRP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</p> <p>Note 6: E-UTRA operating band groups are as defined in Section 3.5.</p>				

**A.9.1.11.2 Test Requirements**

The E-UTRAN TDD RSRP absolute measurement accuracy shall meet the requirements in section 9.1.4a.

## A.9.1.12 E-UTRA FDD RSRQ absolute accuracy (CELL\_DCH)

### A.9.1.12.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD RSRQ measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4b.

The test is carried out in Cell\_DCH state using a compressed mode pattern with purpose “E-UTRAN Measurement”. The compressed mode pattern repeats every 80 ms and uses a gap length of 10 slots. Further details are found in TS 25.101 annex A.5.

Tables A.9.1.12.1-1 and A.9.1.12.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN RSRQ is indicated to the UE. The E-UTRAN FDD test parameters are given in Table A.9.1.12.1-3.

**Table A.9.1.12.1-1: General UTRAN test parameters for E-UTRAN FDD RSRQ measurements**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns - E-UTRAN measurement		Compressed mode reference pattern 2 Set 5	As specified in table A.22 TS 25.101 section A.5
Inter-RAT measurement quantity		E-UTRAN FDD RSRQ	
Monitored cell list size		1 E-UTRAN FDD neighbour cell	Measurement control information is sent before the compressed mode pattern starts.

**Table A.9.1.12.1-2: Cell specific UTRAN test parameters for E-UTRAN FDD RSRQ measurements**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
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
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
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 Ior.		

**Table A.9.1.12.1-3: E-UTRAN FDD RSRQ test parameters**

Parameter	Unit	Test 1	Test 2	Test 3
		Cell 2	Cell 2	Cell 2

$BW_{channel}$	MHz	10	10	10	
Measurement bandwidth	$n_{PRB}$	22—27	22—27	22—27	
PDCCH/PCFICH/PHICH Reference measurement channel as defined in TS 36.133 A.3.1.2.1		R.6 FDD	R.6 FDD	R.6 FDD	
OCNG Pattern as defined in TS 36.133 A.3.2.1.2		OP.2 FDD	OP.2 FDD	OP.2 FDD	
PBCH_RA	dB	0	0	0	
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note1</sup>					
OCNG_RB <sup>Note1</sup>					
$N_{oc}$ <sup>Note2</sup>					Band group FDD_A
	Band groups FDD_B1 and FDD_B2 (Note 7)	-119			
	Band groups FDD_E and FDD_F (Note 5)	-117.50			
	Band group FDD_H	-116			
	Band group FDD_D	-118			
	Band group FDD_G	-116.50			
	Band group FDD_C .	-118.50			
$\hat{E}_s / I_{ot}$	dB	-1.75	-4.0	-4.0	
RSRP <sup>Note3</sup>	Band group FDD_A	dBm/15 kHz	-81.75	-108.70	-123.50
	Band groups FDD_B1 and FDD_B2 (Note 7)				-123
	Band groups FDD_E and FDD_F (Note 5)				-121.50
	Band group FDD_H				-120
	Band group FDD_D				-122
	Band group FDD_G				-120.50
	Band group FDD_ .				-122.50
RSRQ <sup>Note3</sup>	Band group FDD_A	dB	-14.76	-16.25	-16.25
	Band groups FDD_B1 and FDD_B2 (Note 7)				
	Band groups FDD_H, FDD_E and FDD_F				
	Band group FDD_G				
$I_o$ <sup>Note3</sup>	Band group FDD_C	dBm/9 MHz	-50	-75.46	-90.26
	Band groups FDD_A				-89.76
	Band groups FDD_B1 and FDD_B2 (Note 7)				-88.26
	Band groups FDD_E and FDD_F (Note 5)				-86.76
	Band group FDD_H				-88.76
	Band group FDD_D				-87.26
	Band group FDD_G				-89.26
$\hat{E}_s / N_{oc}$	dB	-1.75	-4.0	-4.0	
Propagation condition	-	AWGN	AWGN	AWGN	

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{oc}$ to be fulfilled.
Note 3:	RSRQ, RSRP and $I_0$ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
Note 4:	RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
Note 5:	For Band 26, the tests shall be performed with the assigned E-UTRA channel bandwidth within 865-894.
Note 6:	E-UTRA operating band groups are as defined in Section 3.5.
Note 7:	For Band 74, the tests shall be performed with the assigned E-UTRA channel bandwidth within 1475.9-1510.9 MHz.

### A.9.1.12.2 Test Requirements

The E-UTRAN FDD RSRQ absolute measurement accuracy shall meet the requirements in section 9.1.4b.

## A.9.1.13 E-UTRAN TDD RSRQ Absolute Accuracy (CELL\_DCH)

### A.9.1.13.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD RSRQ measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4b.

The test is carried out in Cell\_DCH state using a compressed mode pattern with purpose "E-UTRAN Measurement". The compressed mode pattern repeats every 80 ms and uses a gap length of 10 slots. Further details are found in table A.22 in annex A.5 of 3GPP TS 25.101.

Tables A.9.1.13.1-1 and A.9.1.13.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN TDD RSRQ is indicated to the UE. The E-UTRAN TDD test parameters are given in Table A.9.1.13.1-3.

**Table A.9.1.13.1-1: General test parameters for E-UTRAN TDD RSRQ absolute accuracy tests**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in 3GPP TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns - E-UTRAN measurement		Compressed mode reference pattern 2 Set 5	As specified in table A.22 3GPP TS 25.101 section A.5
Inter-RAT measurement quantity		E-UTRAN TDD RSRQ	
Monitored cell list size		1 E-UTRAN TDD neighbour cell	Measurement control information is sent before the compressed mode pattern starts.

**Table A.9.1.13.1-2: UTRAN FDD cell specific test parameters for E-UTRAN TDD RSRQ absolute accuracy tests**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
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
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
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 Ior.		

**Table A.9.1.13.1-3: E-UTRAN TDD cell specific test parameters for E-UTRAN TDD RSRQ absolute accuracy tests**

Parameter	Unit	Test 1	Test 2	Test 3	
		Cell 2	Cell 2	Cell 2	
E-UTRA RF Channel Number		1	1	1	
$BW_{channel}$	MHz	10	10	10	
Special subframe configuration <sup>Note1</sup>		6	6	6	
Uplink-downlink configuration <sup>Note1</sup>		1	1	1	
Measurement bandwidth	$n_{PRB}$	22–27	22–27	22–27	
PDCCH/PCFICH/PHICH Reference measurement channel as defined in 3GPP TS 36.133 A.3.1.2.2.		R.6 TDD	R.6 TDD	R.6 TDD	
OCNG Pattern as defined in 3GPP TS 36.133 A.3.2.2.2.		OP.2 TDD	OP.2 TDD	OP.2 TDD	
PBCH_RA	dB	0	0	0	
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note2</sup>					
OCNG_RB <sup>Note2</sup>					
$N_{oc}$ <sup>Note3</sup>					Band group TDD_A
	Band group TDD_C	-118.50			
	Band group TDD_E	-117.50			
$\hat{E}_s / I_{ot}$		-1.75	-4.0	-4.0	
RSRP <sup>Note4</sup>	Band group TDD_A	dBm/15 kHz	-81.75	-108.70	-123.50
	Band group TDD_C				-122.50
	Band group TDD_E				-121.50
RSRQ <sup>Note4</sup>	Band groups TDD_A, TDD_C and TDD_E	dB	-14.76	-16.25	-16.25
$I_o$ <sup>Note4</sup>	Band group TDD_A	dBm/9 MHz	-50	-75.46	-90.26
	Band group TDD_C				-89.26
	Band group TDD_E				-88.26
$\hat{E}_s / N_{oc}$		-1.75	-4.0	-4.0	
Propagation condition	-	AWGN	AWGN	AWGN	
<p>Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.</p> <p>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.</p> <p>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 <math>N_{oc}</math> to be fulfilled.</p> <p>Note 4: RSRQ, RSRP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</p> <p>Note 6: E-UTRA operating band groups are as defined in Section 3.5.</p>					

**A.9.1.13.2 Test Requirements**

The E-UTRAN TDD RSRQ absolute measurement accuracy shall meet the requirements in section 9.1.4b.

## A.9.1.14 E-UTRAN FDD RSRP Absolute Accuracy for 5 MHz Bandwidth

### A.9.1.14.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD RSRP measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4a.

The test is carried out in Cell\_DCH state using a compressed mode pattern with purpose “E-UTRAN Measurement”. The compressed mode pattern repeats every 80 ms and uses a gap length of 10 slots. Further details are found in TS 25.101 annex A.5.

Tables A.9.1.14.1-1 and A.9.1.14.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN FDD RSRP is indicated to the UE. The E-UTRAN FDD test parameters are given in Table A.9.1.14.1-3.

**Table A.9.1.14.1-1: General UTRAN test parameters for E-UTRAN FDD RSRP measurements for 5 MHz bandwidth**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns for E-UTRAN measurement		Compressed mode reference pattern 2 Set 5	As specified in table A.22 TS 25.101 section A.5
Active cell		Cell 1	UTRA FDD cell 1 on UTRA RF channel number 1
Neighbour cell		Cell 2	E-UTRAN FDD cell 2 on E-UTRA RF channel number 1
Inter-RAT measurement quantity		E-UTRAN FDD RSRP	
Monitored cell list size		1 E-UTRAN FDD neighbour cell	Measurement control information is sent before the compressed mode pattern starts.

**Table A.9.1.14.1-2: Cell specific UTRAN test parameters for E-UTRAN FDD RSRP measurements for 5 MHz bandwidth**

Parameter	Unit	Cell 1
UTRA RF channel number	-	Channel 1
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
HS-PDSCH_Ec/Ior	dB	-10
HS-SCCH_Ec/Ior	dB	-13
OCNS_Ec/Ior	dB	Note 2
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
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 Ior.		



Table A.9.1.14.1-3: E-UTRAN FDD RSRP test parameters for 5 MHz bandwidth

Parameter		Unit	Test 1	Test 2
			Cell 2	Cell 2
E-UTRA RF channel number			1	1
$BW_{\text{channel}}$		MHz	5	5
Measurement bandwidth		$n_{\text{PRB}}$	10—15	10—15
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.11 FDD	R.11 FDD
OCNG Patterns defined in A.3.2.1.16 (OP.16 FDD)			OP.16 FDD	OP.16 FDD
PBCH_RA		dB	0	0
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA				
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RANote1				
OCNG_RBNote				
$N_{oc}$ Note2	Band group FDD_N			
$\hat{E}_s/I_{ot}$		dB	10	-4
RSRP <sup>Note3</sup>	Band group FDD_N	dBm/15 kHz	-75.65	-114.5
$I_o$ <sup>Note3</sup>	Band group FDD_N	dBm/4.5 MHz	-50.46	-84.27
$\hat{E}_s/N_{oc}$		dB	10	-4
Propagation condition		-	AWGN	AWGN
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</p> <p>Note 5: E-UTRA operating band groups are as defined in Section 3.5.</p>				

### A.9.1.14.2 Test Requirements

The E-UTRAN FDD RSRP absolute measurement accuracy shall meet the requirements in section 9.1.4a.

### A.9.1.15 E-UTRA FDD RSRQ Absolute Accuracy for 5 MHz Bandwidth

#### A.9.1.15.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD RSRQ measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4b.

The test is carried out in Cell\_DCH state using a compressed mode pattern with purpose “E-UTRAN Measurement”. The compressed mode pattern repeats every 80 ms and uses a gap length of 10 slots. Further details are found in TS 25.101 annex A.5.

Tables A.9.1.15.1-1 and A.9.1.15.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN RSRQ is indicated to the UE. The E-UTRAN FDD test parameters are given in Table A.9.1.15.1-3.

**Table A.9.1.15.1-1: General UTRAN test parameters for E-UTRAN FDD RSRQ measurements for 5 MHz bandwidth**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns for E-UTRAN measurement		Compressed mode reference pattern 2 Set 5	As specified in table A.22 TS 25.101 section A.5
Active cell		Cell 1	UTRA FDD cell 1 on UTRA RF channel number 1
Neighbour cell		Cell 2	E-UTRAN FDD cell 2 on E-UTRA RF channel number 1
Inter-RAT measurement quantity		E-UTRAN FDD RSRQ	
Monitored cell list size		1 E-UTRAN FDD neighbour cell	Measurement control information is sent before the compressed mode pattern starts.

**Table A.9.1.15.1-2: Cell specific UTRAN test parameters for E-UTRAN FDD RSRQ measurements for 5 MHz bandwidth**

Parameter	Unit	Cell 1
UTRA RF channel number	-	Channel 1
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
HS-PDSCH_Ec/Ior	dB	-10
HS-SCCH_Ec/Ior	dB	-13
OCNS_Ec/Ior	dB	Note 2
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
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 Ior.		

Table A.9.1.15.1-3: E-UTRAN FDD RSRQ test parameters for 5 MHz bandwidth

Parameter		Unit	Test 1	Test 2	Test 3
			Cell 2	Cell 2	Cell 2
E-UTRA RF channel number			1	1	1
$BW_{\text{channel}}$		MHz	5	5	5
Measurement bandwidth		$n_{PRB}$	10—15	10—15	10—15
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1			R.11 FDD	R.11 FDD	R.11 FDD
OCNG Patterns defined in A.3.2.1.16 (OP.16 FDD)			OP.16 FDD	OP.16 FDD	OP.16 FDD
PBCH_RA		dB	0	0	0
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB					
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA <sup>Note1</sup>					
OCNG_RB <sup>Note1</sup>					
$N_{oc}$ <sup>Note2</sup>	Band group FDD_N				
$\hat{E}_s / I_{ot}$		dB	-1.75	-4.00	-4.00
RSRP <sup>Note3</sup>	Band group FDD_N	dBm/15 kHz	-78.75	-105.70	-117
RSRQ <sup>Note3</sup>	Band group FDD_N	dB	-14.76	-16.25	-16.25
$I_o$ <sup>Note3</sup>	Band group FDD_N	dBm/4.5 MHz	-50.01	-75.47	-86.77
$\hat{E}_s / N_{oc}$		dB	-1.75	-4.0	-4.0
Propagation condition		-	AWGN	AWGN	AWGN
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRP, RSRQ and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</p> <p>Note 5: E-UTRA operating band groups are as defined in Section 3.5.</p>					

### A.9.1.15.2 Test Requirements

The E-UTRAN FDD RSRQ absolute measurement accuracy shall meet the requirements in section 9.1.4b.

## A.9.1.16 E-UTRAN FDD RSRP absolute accuracy (CELL\_FACH)

### A.9.1.16.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD RSRP measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4a.

The test is carried out in Cell\_FACH state using HS-DSCH DRX.

Tables A.9.1.16.1-1 and A.9.1.16.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN FDD RSRP is indicated to the UE. The E-UTRAN FDD test parameters are given in Table A.9.1.16.1-3.

**Table A.9.1.16.1-1: General UTRAN test parameters for E-UTRAN FDD RSRP measurements**

Parameter	Unit	Value	Comment
HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	Length of the DRX cycle
HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
T321	s	0.1	Number of seconds until the DRX cycle is initiated
Report criteria		Periodic	
Inter-RAT measurement quantity		E-UTRAN FDD RSRP	
Monitored cell list size		1 E-UTRAN FDD neighbour cell	

**Table A.9.1.16.1-2: Cell specific UTRAN test parameters for E-UTRAN FDD RSRP measurements**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH_Ec/Ior	dB	-10
HS-SCCH_Ec/Ior	dB	-13
OCNS_Ec/Ior	dB	Note 1
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
Propagation condition	-	AWGN
Note 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior.		

Table A.9.1.16.1-3: E-UTRAN FDD RSRP test parameters

Parameter	Unit	Cell 2
$BW_{\text{channel}}$	MHz	10
Measurement bandwidth	$n_{PRB}$	22–27
PDCCH/PCFICH/PHICH Reference measurement channel as defined in TS 36.133 A.3.1.2.1		R.6 FDD
OCNG Pattern as defined in TS 36.133 A.3.2.1.2		OP.2 FDD
PBCH_RA	dB	0
PBCH_RB		
PSS_RA		
SSS_RA		
PCFICH_RB		
PHICH_RA		
PHICH_RB		
PDCCH_RA		
PDCCH_RB		
PDSCH_RA		
PDSCH_RB		
OCNG_RA <sup>Note1</sup>		
OCNG_RB <sup>Note1</sup>		
$N_{oc}$ <sup>Note2</sup>		
$\hat{E}_s / I_{ot}$	dB	10
RSRP <sup>Note3</sup>	dBm/15 kHz	-78.65
$I_o$ <sup>Note3</sup>	dBm/9 MHz	-49.5
$\hat{E}_s / N_{oc}$	dB	10
Propagation condition	-	AWGN
<p>Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.</p> <p>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.</p> <p>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 <math>N_{oc}</math> to be fulfilled.</p> <p>Note 4: RSRQ, RSRP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</p>		

### A.9.1.16.2 Test Requirements

The E-UTRAN FDD RSRP absolute measurement accuracy shall meet the requirements in section 9.1.4a.

### A.9.1.17 E-UTRAN TDD RSRP Absolute Accuracy (CELL\_FACH)

#### A.9.1.17.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD RSRP measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4a.

The test is carried out in Cell\_FACH state using HS-DSCH DRX.

Tables A.9.1.17.1-1 and A.9.1.17.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN TDD RSRP is indicated to the UE. The E-UTRAN TDD test parameters are given in Table A.9.1.17.1-3.

**Table A.9.1.17.1-1: General test parameters for E-UTRAN TDD RSRP absolute accuracy tests**

Parameter	Unit	Value	Comment
HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	Length of the DRX cycle
HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
T321	s	0.1	Number of seconds until the DRX cycle is initiated
Report criteria		Periodic	
Inter-RAT measurement quantity		E-UTRAN TDD RSRP	
Monitored cell list size		1 E-UTRAN TDD neighbour cell	

**Table A.9.1.17.1-2: UTRAN FDD cell specific test parameters for E-UTRAN TDD RSRP absolute accuracy tests**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
CPICH_Ec/lor	dB	-10
PCCPCH_Ec/lor	dB	-12
SCH_Ec/lor	dB	-12
PICH_Ec/lor	dB	-15
HS-PDSCH_Ec/lor	dB	-10
HS-SCCH_Ec/lor	dB	-13
OCNS_Ec/lor	dB	Note 1
lor/loc	dB	-1
loc	dBm/ 3.84 MHz	-70
CPICH_Ec/lo	dB	-13.54
Propagation condition	-	AWGN
Note 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to lor.		

**Table A.9.1.17.1-3: E-UTRAN TDD cell specific test parameters for E-UTRAN TDD RSRP absolute accuracy tests**

Parameter	Unit	Cell 2
E-UTRA RF Channel Number		1
$BW_{\text{channel}}$	MHz	10
Special subframe configuration <sup>Note1</sup>		6
Uplink-downlink configuration <sup>Note1</sup>		1
Measurement bandwidth	$n_{PRB}$	22–27
PDCCH/PCFICH/PHICH Reference measurement channel as defined in TS 36.133 A.3.1.2.2		R.6 TDD
OCNG Pattern as defined in TS 36.133 A.3.2.2.2		OP.2 TDD
PBCH_RA	dB	0
PBCH_RB		
PSS_RA		
SSS_RA		
PCFICH_RB		
PHICH_RA		
PHICH_RB		
PDCCH_RA		
PDCCH_RB		
PDSCH_RA		
PDSCH_RB		
OCNG_RA <sup>Note2</sup>		
OCNG_RB <sup>Note2</sup>		
$N_{oc}$ <sup>Note3</sup>		
$\hat{E}_s / I_{ot}$	dB	10
RSRP <sup>Note4</sup>	dBm/15 kHz	-78.65
$I_o$ <sup>Note4</sup>	dBm/9 MHz	-49.5
$\hat{E}_s / N_{oc}$	dB	10
Propagation condition	-	AWGN
<p>Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.</p> <p>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.</p> <p>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 <math>N_{oc}</math> to be fulfilled.</p> <p>Note 4: RSRP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 5: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</p>		

### A.9.1.17.2 Test Requirements

The E-UTRAN TDD RSRP absolute measurement accuracy shall meet the requirements in section 9.1.4a.

## A.9.1.18 E-UTRA FDD RSRQ absolute accuracy (CELL\_FACH)

### A.9.1.18.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD RSRQ measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4b.

The test is carried out in Cell\_FACH state with HS-DSCH DRX activated.

Tables A.9.1.18.1-1 and A.9.1.18.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN RSRQ is indicated to the UE. The E-UTRAN FDD test parameters are given in Table A.9.1.18.1-3.

**Table A.9.1.18.1-1: General UTRAN test parameters for E-UTRAN FDD RSRQ measurements**

Parameter	Unit	Value	Comment
HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	Length of the DRX cycle
HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
T321	s	0.1	Number of seconds until the DRX cycle is initiated
Report criteria		Periodic	
Inter-RAT measurement quantity		E-UTRAN FDD RSRQ	
Monitored cell list size		1 E-UTRAN FDD neighbour cell	

**Table A.9.1.18.1-2: Cell specific UTRAN test parameters for E-UTRAN FDD RSRQ measurements**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
OCNS_Ec/Ior	dB	Note 1
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
Propagation condition	-	AWGN
Note 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior.		



Table A.9.1.18.1-3: E-UTRAN FDD RSRQ test parameters

Parameter	Unit	Test 1
		Cell 2
$BW_{\text{channel}}$	MHz	10
Measurement bandwidth	$n_{PRB}$	22–27
PDCCH/PCFICH/PHICH Reference measurement channel as defined in TS 36.133 A.3.1.2.1		R.6 FDD
OCNG Pattern as defined in TS 36.133 A.3.2.1.2		OP.2 FDD
PBCH_RA	dB	0
PBCH_RB		
PSS_RA		
SSS_RA		
PCFICH_RB		
PHICH_RA		
PHICH_RB		
PDCCH_RA		
PDCCH_RB		
PDSCH_RA		
PDSCH_RB		
OCNG_RA <sup>Note1</sup>		
OCNG_RB <sup>Note1</sup>		
$N_{oc}$ <sup>Note2</sup>		
$\hat{E}_s / I_{ot}$	dB	-1.75
RSRP <sup>Note3</sup>	dBm/15 kHz	-81.75
RSRQ <sup>Note3</sup>	dB	-14.76
$I_o$ <sup>Note3</sup>	dBm/9 MHz	-50
$\hat{E}_s / N_{oc}$	dB	-1.75
Propagation condition	-	AWGN
<p>Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.</p> <p>Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for <math>N_{oc}</math> to be fulfilled.</p> <p>Note 3: RSRQ, RSRP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 4: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</p> <p>Note 5: For Band 26, the tests shall be performed with the assigned E-UTRA channel bandwidth within 865-894.</p>		

### A.9.1.18.2 Test Requirements

The E-UTRAN FDD RSRQ absolute measurement accuracy shall meet the requirements in section 9.1.4b.

### A.9.1.19 E-UTRAN TDD RSRQ Absolute Accuracy (CELL\_FACH)

#### A.9.1.19.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD RSRQ measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4b.

The test is carried out in Cell\_FACH state with HS-DSCH DRX activated.

Tables A.9.1.19.1-1 and A.9.1.19.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN TDD RSRQ is indicated to the UE. The E-UTRAN TDD test parameters are given in Table A.9.1.19.1-3.

**Table A.9.1.19.1-1: General test parameters for E-UTRAN TDD RSRQ absolute accuracy tests**

Parameter	Unit	Value	Comment
HS-DSCH DRX cycle <sub>FACH</sub>	frames	8	Length of the DRX cycle
HS-DSCH Rx burst <sub>FACH</sub>	frames	1	On time during DRX cycle
T321	s	0.1	Number of seconds until the DRX cycle is initiated
Report criteria		Periodic	
Inter-RAT measurement quantity		E-UTRAN TDD RSRQ	
Monitored cell list size		1 E-UTRAN TDD neighbour cell	

**Table A.9.1.19.1-2: UTRAN FDD cell specific test parameters for E-UTRAN TDD RSRQ absolute accuracy tests**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
CPICH_Ec/lor	dB	-10
PCCPCH_Ec/lor	dB	-12
SCH_Ec/lor	dB	-12
PICH_Ec/lor	dB	-15
OCNS_Ec/lor	dB	Note 1
lor/loc	dB	-1
loc	dBm/ 3.84 MHz	-70
CPICH_Ec/lo	dB	-13.54
Propagation condition	-	AWGN
Note 1: The power of the OCNS channel that is added shall make the total power from the cell to be equal to lor.		

**Table A.9.1.19.1-3: E-UTRAN TDD cell specific test parameters for E-UTRAN TDD RSRQ absolute accuracy tests**

Parameter	Unit	Test 1
		Cell 2

E-UTRA RF Channel Number		1
$BW_{\text{channel}}$	MHz	10
Special subframe configuration <sup>Note1</sup>		6
Uplink-downlink configuration <sup>Note1</sup>		1
Measurement bandwidth	$n_{PRB}$	22–27
PDCCH/PCFICH/PHICH Reference measurement channel as defined in 3GPP TS 36.133 A.3.1.2.2.		R.6 TDD
OCNG Pattern as defined in 3GPP TS 36.133 A.3.2.2.2.		OP.2 TDD
PBCH_RA	dB	0
PBCH_RB		
PSS_RA		
SSS_RA		
PCFICH_RB		
PHICH_RA		
PHICH_RB		
PDCCH_RA		
PDCCH_RB		
PDSCH_RA		
PDSCH_RB		
OCNG_RA <sup>Note2</sup>		
OCNG_RB <sup>Note2</sup>		
$N_{oc}$ <sup>Note3</sup>		
$\hat{E}_s / I_{ot}$	dB	-1.75
RSRP <sup>Note4</sup>	dBm/15 kHz	-81.75
RSRQ <sup>Note4</sup>	dB	-14.76
$I_o$ <sup>Note4</sup>	dBm/9 MHz	-50
$\hat{E}_s / N_{oc}$	dB	-1.75
Propagation condition	-	AWGN
<p>Note 1: For special subframe and uplink-downlink configurations see Tables 4.2-1 and 4.2-2 in 3GPP TS 36.211.</p> <p>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.</p> <p>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 <math>N_{oc}</math> to be fulfilled.</p> <p>Note 4: RSRQ, RSRP and <math>I_o</math> levels have been derived from other parameters for information purposes. They are not settable parameters themselves.</p> <p>Note 5: RSRP and RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.</p>		

### A.9.1.19.2 Test Requirements

The E-UTRAN TDD RSRQ absolute measurement accuracy shall meet the requirements in section 9.1.4b.

## A.9.1.20 E-UTRA FDD WB-RSRQ Absolute Accuracy (CELL\_DCH)

### A.9.1.20.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN FDD WB-RSRQ measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4c.

The test is carried out in Cell\_DCH state using a compressed mode pattern with purpose “E-UTRAN Measurement”. The compressed mode pattern repeats every 80 ms and uses a gap length of 10 slots. Further details are found in annex A.5 of TS 25.101 [3].

Tables A.9.1.20.1-1 and A.9.1.20.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN WB-RSRQ is indicated to the UE. The measurement control message received by the UE shall also contain the IE “Wideband RSRQ measurements” and “Measurement Bandwidth” defined in TS 25.331 [16].

The E-UTRAN FDD test parameters are given in Table A.9.1.20.1-3.

**Table A.9.1.20.1-1: General UTRAN test parameters for E-UTRAN FDD WB-RSRQ measurements**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in section A.3.1 of TS 25.101 [3]
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns for E-UTRAN measurement		Compressed mode reference pattern 2 Set 5	As specified in table A.22, section A.5 of TS 25.101 [3]
Inter-RAT measurement quantity		E-UTRAN FDD WB-RSRQ	
Monitored cell list size		1 E-UTRAN FDD neighbour cell	Measurement control information is sent before the compressed mode pattern starts.

**Table A.9.1.20.1-2: Cell specific UTRAN test parameters for E-UTRAN FDD WB-RSRQ measurements**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
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
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
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 Ior.		

Table A.9.1.20.1-3: E-UTRAN FDD WB-RSRQ test parameters

Parameter		Unit	Test	
			Cell 1	Cell 2
E-UTRA RF Channel Number			1	
$BW_{channel}$		MHz	10	
Antenna Configuration			1x2	
PBCH_RA		dB	0	
PBCH_RB			0	
PSS_RA			0	
SSS_RA			0	
PCFICH_RB			-∞	
PHICH_RA			-∞	
PHICH_RB			-∞	
PDCCH_RA			-∞	
PDCCH_RB			-∞	
PDSCH_RA			-∞	
PDSCH_RB			-∞	
OCNG_RA <sup>Note1</sup>			-∞	
OCNG_RB <sup>Note1</sup>			-∞	
<i>Measurement Bandwidth</i> in TS 25.331 [16]			RB	50
PDSCH Reference measurement channel defined in A.3.1.1.1 of TS 36.133 [24].			N/A	
PDSCH allocation		$n_{PRB}$	N/A	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1 of TS 36.133 [24].			N/A	
OCNG Patterns defined in A.3.2.1 of TS 36.133 [24].			N/A	
$I_{ot}$ <sup>Note2</sup>	bandwidth	$n_{PRB}$	0-21, 28-49	22-27
		dBm/15 kHz	-87	-110
$\hat{E}_s / I_{ot}$	bandwidth	$n_{PRB}$	0-21, 28-49	22-27
		dB	-3	20
RSRP <sup>Note3</sup>		dBm/15 kHz	-90	
WB-RSRQ <sub>0</sub> <sup>Note3</sup> in subframe 0		dB	-13.68	
WB-RSRQ <sub>1</sub> <sup>Note3</sup> in subframe ≠ 0		dB	-13.63	
$I_o$ <sup>Note3</sup> in symbol 0, 4, 11 of subframe 0		dBm/ 9 MHz	-82.38	
$I_o$ <sup>Note3</sup> in symbol 7 of subframe 0		dBm/ 9 MHz	-82.20	
$I_o$ <sup>Note3</sup> in symbol 0, 4, 7, 11 of subframes ≠ 0		dBm/ 9 MHz	-82.38	
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 not specified in the test, assumed to be constant over time and modelled as noise.
- Note 3: RSRP, WB-RSRQ and  $I_o$  levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The stated values represent the weighted average over the *Measurement Bandwidth*, and the WB-RSRQ values assume averaging over symbols 0, 4, 7 and 11 of the subframe.
- Note 4: RSRP and WB-RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: This test case is applicable to all FDD frequency bands except band 31.

### A.9.1.20.2 Test Requirements

The E-UTRAN FDD WB-RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.4c, compared with WB-RSRQ<sub>0</sub> or WB-RSRQ<sub>1</sub>.

## A.9.1.21 E-UTRA TDD WB-RSRQ Absolute Accuracy (CELL\_DCH)

### A.9.1.21.1 Test Purpose and Environment

The purpose of this test is to verify that the E-UTRAN TDD WB-RSRQ measurement absolute accuracy is within the specified limits. This test will verify the requirements in section 9.1.4c.

The test is carried out in Cell\_DCH state using a compressed mode pattern with purpose “E-UTRAN Measurement”. The compressed mode pattern repeats every 80 ms and uses a gap length of 10 slots. Further details are found in annex A.5 of TS 25.101 [3].

Tables A.9.1.21.1-1 and A.9.1.21.1-2 define the limits of signal strengths and code powers on the UTRA FDD cell where the requirement is applicable. In the measurement control information periodic reporting of E-UTRAN WB-RSRQ is indicated to the UE. The measurement control message received by the UE shall also contain the IE “Wideband RSRQ measurements” and “Measurement Bandwidth” defined in TS 25.331 [16].

The E-UTRAN TDD test parameters are given in Table A.9.1.21.1-3.

**Table A.9.1.21.1-1: General UTRAN test parameters for E-UTRAN TDD WB-RSRQ measurements**

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in section A.3.1 of TS 25.101 [3]
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns for E-UTRAN measurement		Compressed mode reference pattern 2 Set 5	As specified in table A.22, section A.5 of TS 25.101 [3]
Inter-RAT measurement quantity		E-UTRAN TDD WB-RSRQ	
Monitored cell list size		1 E-UTRAN TDD neighbour cell	Measurement control information is sent before the compressed mode pattern starts.

**Table A.9.1.21.1-2: Cell specific UTRAN test parameters for E-UTRAN TDD WB-RSRQ measurements**

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
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
Ior/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
CPICH_Ec/Io	dB	-13.54
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 Ior.		

Table A.9.1.21.1-3: E-UTRAN TDD WB-RSRQ test parameters

Parameter	Unit	Test 1		
		Cell 2		
E-UTRA RF Channel Number		1		
BW <sub>channel</sub>	MHz	10		
Special subframe configuration <sup>Note1</sup>		6		
Uplink-downlink configuration <sup>Note1</sup>		1		
Antenna Configuration		1x2		
PBCH_RA	dB	0		
PBCH_RB		0		
PSS_RA		0		
SSS_RA		0		
PCFICH_RB		-∞		
PHICH_RA		-∞		
PHICH_RB		-∞		
PDCCH_RA		-∞		
PDCCH_RB		-∞		
PDSCH_RA		-∞		
PDSCH_RB		-∞		
OCNG_RA <sup>Note2</sup>		-∞		
OCNG_RB <sup>Note2</sup>		-∞		
Measurement Bandwidth in TS 25.331 [16]		RB	50	
PDSCH Reference measurement channel defined in A.3.1.1.2 of TS 36.133 [24].			N/A	
PDSCH allocation		$n_{PRB}$	N/A	
PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.2 of TS 36.133 [24].		N/A		
OCNG Patterns defined in A.3.2.2 of TS 36.133 [24].		N/A		
$I_{ot}$ <sup>Note3</sup>	bandwidth	$n_{PRB}$	0-21, 28-49	22-27
			dBm/15 kHz	-87
$\hat{E}_s / I_{ot}$	bandwidth	$n_{PRB}$	0-21, 28-49	22-27
			dB	-3
RSRP <sup>Note4</sup>	dBm/15 kHz	-90		
WB-RSRQ <sub>0</sub> <sup>Note4</sup> in subframe 0	dB	-13.68		
WB-RSRQ <sub>1</sub> <sup>Note4</sup> in subframe ≠ 0	dB	-13.63		
Io <sup>Note4</sup> in symbol 0, 4, 11 of subframe 0	dBm/ 9 MHz	-82.38		
Io <sup>Note4</sup> in symbol 7 of subframe 0	dBm/ 9 MHz	-82.20		
Io <sup>Note4</sup> in symbol 0, 4, 7, 11 of subframes ≠ 0	dBm/ 9 MHz	-82.38		
Propagation condition	-	AWGN		

Note 1: Special subframe and uplink-downlink configurations are defined in Tables 4.2-1 and 4.2-2 of TS 36.211 [29].

Note 2: OCNG shall be used such that Cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: Interference from other cells not specified in the test, assumed to be constant over time and modelled as noise.

Note 4: RSRP, WB-RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. The stated values represent the weighted average over the *Measurement Bandwidth*, and the WB-RSRQ values assume averaging over symbols 0, 4, 7 and 11 of the subframe.

Note 5: RSRP and WB-RSRQ minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

### A.9.1.21.2 Test Requirements

The E-UTRAN TDD WB-RSRQ measurement accuracy for cell 2 shall fulfil the requirements in Section 9.1.4c, compared with WB-RSRQ<sub>0</sub> or WB-RSRQ<sub>1</sub>.

## Annex B (normative): Conditions for RRM requirements applicability for operating bands

### B.1. Conditions for Idle mode tasks

#### B.1.1. Conditions for measurements of inter-RAT E-UTRA cells

This section defines the inter-RAT E-UTRA RSRP,  $\text{RSRP}_{\hat{E}s/Iot}$ ,  $\text{SCH\_RP}$  and  $\text{SCH}_{\hat{E}s/Iot}$  applicable for a corresponding operating band.

The conditions for measurements of inter-RAT E-UTRA cells are defined in Table B.1.1-1

**Table B.1.1-1: Conditions for measurements of inter-RAT E-UTRA cells**

Conditions					
Band groups conditions	C	Parameters			
		$\text{RSRP}_{\text{dBm}} \geq$	$\text{SCH\_RP}_{\text{dBm}} \geq$	$\text{RSRP}_{\hat{E}s/Iot} \geq$	$\text{SCH}_{\hat{E}s/Iot} \geq$
FDD_A, TDD_A		-124 dBm	-124 dBm	-4 dB	-4dB
FDD_B1, FDD_B2		-123.5 dBm (Note 2)	-123.5 dBm (Note 2)		
FDD_C, TDD_C		-123 dBm	-123 dBm		
FDD_E, TDD_E		-122 dBm	-122 dBm		
FDD_G		-121 dBm	-121 dBm		
FDD_H		-120.5 dBm	-120.5 dBm		
FDD_F		-121.5 dBm (Note 1)	-121.5 dBm (Note 1)		
FDD_D		-122.5 dBm	-122.5 dBm		
Note 1:	The condition is -122 dBm when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.				
Note 2:	For Band 74, the condition is -124 dBm when the carrier frequency of the assigned E-UTRA channel bandwidth is within 1475.9-1510.9 MHz.				

### B.2. Conditions for UE Measurements Procedures

#### B.2.1. Conditions for E-UTRAN measurements

This section defines the E-UTRAN RSRP,  $\text{RSRP}_{\hat{E}s/Iot}$ ,  $\text{SCH\_RP}$  and  $\text{SCH}_{\hat{E}s/Iot}$  applicable for a corresponding operating band.

The conditions for E-UTRAN measurements are defined in Table B.2.1-1.

**Table B.2.1-1: Conditions for E-UTRAN measurements**

Conditions



Band groups conditions C	Parameters			
	RSRP <sub>dBm</sub> ≥	SCH_RP <sub>dBm</sub> ≥	RSRP $\hat{E}_s/\text{lot} \geq$	SCH $\hat{E}_s/\text{lot} \geq$
FDD_A, TDD_A	-125 dBm	-125 dBm	-4 dB	-4dB
FDD_B1, FDD_B2	-124.5 dBm (Note 2)	-124.5 dBm (Note 2)		
FDD_C, TDD_C	-124 dBm	-124 dBm		
FDD_E, TDD_E	-123 dBm	-123 dBm		
FDD_G	-122 dBm	-122 dBm		
FDD_H	-121.5 dBm	-121.5 dBm		
FDD_F	-122.5 dBm (Note 1)	-122.5 dBm (Note 1)		
FDD_D	-123.5 dBm	-123.5 dBm		
Note 1: The condition is -123 dBm when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. Note 2: For Band 74, the condition is -125 dBm when the carrier frequency of the assigned E-UTRA channel bandwidth is within 1475.9-1510.9 MHz.				

## B.3. Conditions for Measurement Performance for UE

### B.3.1. Conditions for intra frequency CPICH RSCP measurements accuracy

This section defines the intra frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for measurements accuracy of intra-frequency CPICH RSCP are defined in Table B.3.1-1

**Table B.3.1-1: Conditions for measurements of intra-frequency CPICH RSCP**

Parameter	Conditions				
	Bands	Bands	Bands	Bands	Bands
	I, IV, VI, X, XI, XIX, XXI, XXXII	IX	II, V, VII	III, VIII, XII, XIII, XIV, XX, XXII	XXV, XXVI
CPICH RSCP1 <sub>dBm</sub> ≥	-114 dBm	-113 dBm	-112 dBm	-111 dBm	-110.5dBm (Note 1)
Note 1: The condition is -112 dBm when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.					

### B.3.2. Conditions for intra frequency CPICH RSCP relative measurements accuracy

This section defines the intra frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for relative measurements accuracy of intra-frequency CPICH RSCP are defined in Table B.3.2-1

**Table B.3.2-1: Conditions for relative measurements of intra-frequency CPICH RSCP**

Parameter	Conditions				
	Bands	Bands	Bands	Bands	Bands
	I, IV, VI, X, XI, XIX, XXI, XXXII	IX	II, V, VII	III, VIII, XII, XIII, XIV, XX, XXII	XXV, XXVI
<b>CPICH RSCP<sub>1,2</sub>[dBm] ≥</b>	-114 dBm	-113 dBm	-112 dBm	-111 dBm	-110.5dBm (Note 1)
Note 1: The condition is -112 dBm when the carrier frequency of the assigned UTRA channel is within 869-894 MHz for the UE which supports both Band V and Band XXVI operating frequencies.					

### B.3.3. Conditions for inter frequency CPICH RSCP relative measurements accuracy

This section defines the inter frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for relative measurements accuracy of inter-frequency CPICH RSCP are defined in Table B.3.2-1.

### B.3.4. Conditions for intra frequency CPICH Ec/Io measurements accuracy

This section defines the intra frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for measurements accuracy of intra-frequency CPICH Ec/Io are defined in Table B.3.1-1.

### B.3.5. Conditions for intra frequency CPICH Ec/Io relative measurements accuracy

This section defines the intra frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for measurements accuracy of intra-frequency CPICH Ec/Io are defined in Table B.3.2-1.

### B.3.6. Conditions for inter frequency CPICH Ec/Io measurements accuracy

This section defines the inter frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for measurements accuracy of inter-frequency CPICH Ec/Io are defined in Table B.3.1-1.

### B.3.7. Conditions for inter frequency CPICH Ec/Io relative measurements accuracy

This section defines the inter frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for measurements accuracy of inter-frequency CPICH Ec/Io are defined in Table B.3.2-1.

### B.3.8. Conditions for intra frequency SFN-SFN observed time difference

This section defines the intra frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for intra-frequency SFN-SFN observed time difference are defined in Table B.3.2-1.

### B.3.9. Conditions for inter frequency SFN-SFN observed time difference

This section defines the inter frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for inter-frequency SFN-SFN observed time difference are defined in Table B.3.2-1.

### B.3.10. Conditions for SFN-SFN observed time difference type 1

This section defines the CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for SFN-SFN observed time difference type 1 are defined in Table B.3.2-1.

### B.3.11. Conditions for intra frequency SFN-SFN observed time difference type 2 without or with IPDL period active

This section defines the intra frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for intra-frequency SFN-SFN observed time difference type 2 without or with IPDL period active are defined in Table B.3.2-1.

### B.3.12. Conditions for inter frequency SFN-SFN observed time difference type 2

This section defines the inter frequency CPICH RSCP applicable for a corresponding operating band.

The CPICH RSCP conditions for inter-frequency SFN-SFN observed time difference type 2 without or with IPDL period active are defined in Table B.3.2-1.

## B.4. Conditions for UTRAN Connected mode mobility

### B.4.1. Conditions for identification of a new CGI of inter-RAT E-UTRA cell with autonomous gaps

This section defines the E-UTRAN  $SCH\_RP|_{dBm}$  and  $SCH \hat{E}s/lot$  applicable for a corresponding operating band.

The conditions for E-UTRAN measurements are defined in Table B.4.1-1

**Table B.4.1-1: Conditions for identification of a new CGI of inter-RAT E-UTRA cell with autonomous gaps**

Conditions		
E-UTRA band group	Parameter	
		$SCH\_RP _{dBm} \geq$

<b>FDD_A, TDD_A</b>	-125 dBm	-4 dB
<b>FDD_B1, FDD_B2</b>	-124.5 dBm (Note 2)	
<b>FDD_C, TDD_C</b>	-124 dBm	
<b>FDD_E, TDD_E</b>	-123 dBm	
<b>FDD_G</b>	-122 dBm	
<b>FDD_H</b>	-121.5 dBm	
<b>FDD_F</b>	-122.5 dBm (Note 1)	
<b>FDD_D</b>	-123.5 dBm	
<p>Note 1: The condition is -123 dBm when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.</p> <p>Note 2: For Band 74, the condition is -125 dBm when the carrier frequency of the assigned E-UTRA channel bandwidth is within 1475.9-1510.9 MHz.</p>		

## Annex C (informative): Change History

Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
	RP-37					Rel-8 version created based on v7.9.0	8.0.0
	RP-37	RP-070658	0916		B	Introduction of UMTS1500 requirements (Rel-8)	8.0.0
	RP-38	RP-070933	0922		A	Title change for test case in Annex A.5.4.4	8.1.0
	RP-38	RP-070933	0925	1	A	Removal of square brackets in cell identification test case	8.1.0
	RP-38	RP-070934	0919	1	A	Addition of E-DPCCH boosting to ETFC restriction requirements	8.1.0
	RP-39	RP-080119	0929		A	Correction to Annex A.5.5.4	8.2.0
	RP-39	RP-080124	0926		B	Introduction of UMTS700 requirements	8.2.0
	RP-40	RP-080321	0936		A	Correction to A.5.5.4 and A.5.6.3	8.3.0
	RP-40	RP-080325	0937		B	Updates of TS25.133 to include requirements for UTRA to E-UTRA mobility	8.3.0
	RP-41	RP-080637	941	1	F	Updates of TS25.133 requirements for UTRA to E-UTRA mobility	8.4.0
	RP-41	RP-080637	946		F	Updates of TS25.133 to include requirements for UTRA to E-UTRA mobility	8.4.0
	RP-41	RP-080626	943		A	Modification of new cell identification time (intra-frequency) when UE DRX is enabled	8.4.0
	RP-41	RP-080630	953		A	Correction of UTRAN to GSM reselection Scenario 3	8.4.0
	RP-41	RP-080627	947	1	B	Performance requirements for mobility for Enhanced Uplink for CELL_FACH state and Enhanced UE DRX	8.4.0
	RP-41	RP-080627	945		F	RRC re-establishment requirements	8.4.0
	RP-42	RP-080938	962	1	F	E-UTRA Changes for 25.133	8.5.0
	RP-42	RP-080947	959		F	UE Transmission Power Headroom definition for E-DCH in CELL_FACH	8.5.0
	RP-42	RP-080949	960	1	B	UE interruption time requirement for Enhanced Serving Cell Change Procedure	8.5.0
	RP-42	RP-081102	958	2	B	Introduction of UE Measurement Capability for frequency adjacent to intra-frequency	8.5.0
	RP-43	RP-090167	968		A	Correction to RRM PRACH test case "Correct behaviour when reaching maximum transmit power"	8.6.0
	RP-43	RP-090167	977		A	Correction to RRM E-TFC restriction test cases A.6.6.1.1 and A.6.6.1.2	8.6.0
	RP-43	RP-090189	969	1	F	Test case of UTRA FDD-E-UTRA FDD cell reselection when E-UTRA FDD is of higher priority	8.6.0
	RP-43	RP-090190	965	1	F	E-UTRA Changes for 25.133	8.6.0
	RP-43	RP-090190	971	2	F	25.133 CR measurement rule for absolute priority based inter-frequency cells.	8.6.0
	RP-43	RP-090196	964		F	Testcase for Enhanced Serving HS-DSCH cell change	8.6.0
	RP-43	RP-090196	973		F	Correction to mobility requirements for enhanced UE DRX	8.6.0
	RP-43	RP-090196	974		F	Initial E-TFC restriction for enhanced uplink in cell FACH	8.6.0
	RP-43	RP-090370	979	3	F	Addition of UTRA FDD-E-UTRA FDD cell reselection test case when E-UTRA FDD is of lower priority	8.6.0
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2018-12	RAN#82	RP-182376	1439	-	B	CR to 25.133: Introduction of Band 53	16.0.0

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# History

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