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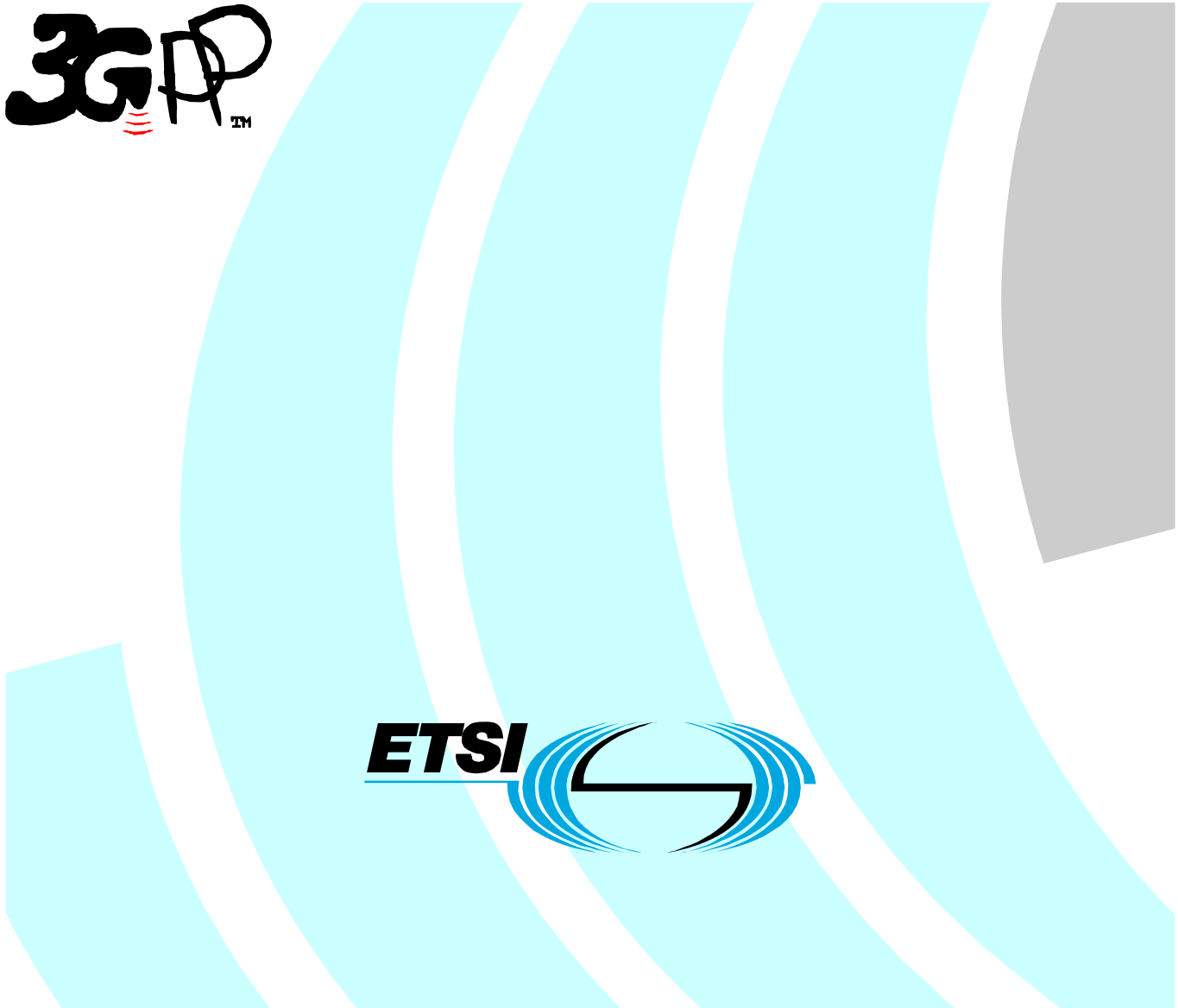
Technical Specification

Universal Mobile Telecommunications System (UMTS);
Requirements for support of
radio resource management (FDD)
(3GPP TS 25.133 version 8.4.0 Release 8)



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Foreword

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Contents

Foreword

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

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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.

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".

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.

Node 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_E_c, E_c, OCNS_E_c and S-CCPCH_E_c) and others defined in terms of PSD (I_o, I_{oc}, I_{or} and $\hat{I}_{or}$). There also exist quantities that are a ratio of energy per chip to PSD (DPCH_E_c/I_{or}, E_c/I_{or} 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.

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.
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.
Ês	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.

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.
Ior	The total transmit power spectral density (integrated in a bandwidth of (1+α) times the chip rate and normalized to the chip rate) of the downlink signal at the Node B antenna connector.
Îor	The received power spectral density (integrated in a bandwidth of (1+α) times the chip rate and normalized to the chip rate) of the downlink signal as measured at the UE antenna connector.
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
$Qoffset_{s,n}$	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
$Thresh_{serving\_high}$	Defined in TS 25.304, subclause 5.2.6.1.5
$Thresh_{serving\_low}$	Defined in TS 25.304, subclause 5.2.6.1.5
$Thresh_{x\_high}$	Defined in TS 25.304, subclause 5.2.6.1.5
$Thresh_{x\_low}$	Defined in TS 25.304, subclause 5.2.6.1.5
$T_{RE\text{-}ESTABLISH\text{-}REQ}$	The RRC Re-establishment delay requirement, the time between the moment when erroneous CRCs are applied, to when the UE starts to send preambles on the PRACH.
Treselection	Defined in TS 25.304, subclause 5.2.6.1.5
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
BER	Bit Error Ratio
BLER	Block Error Ratio
BS	Base Station
CFN	Connection Frame Number
CPICH	Common Pilot Channel
DL	Down link (forward link)
DPCH	Dedicated Physical Channel
DRX	Discontinuous Reception
eNB	E-UTRAN NodeB
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
MBSFN	MBMS over a Single Frequency Network
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
PCCPCH	Primary Common Control Physical Channel
PICH	Paging Indicator Channel
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
QAM	Quadrature Amplitude Modulation
RAT	Radio Access Technology
RNC	Radio Network ControllerRSCP 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.
SFN	System Frame Number
SIR	Signal to Interference ratio
TDD	Time Division Duplex
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

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.

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

When absolute priority reselection is in use, the UE shall search every layer of higher priority at least every $T_{higher\_priority\_search} = (60 * N_{layers})$ seconds, where N_{layers} is the total number of configured higher priority E-UTRA, UTRA FDD and UTRA TDD carrier frequencies and is additionally increased by one if GSM is configured as a higher priority.

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

The UE shall 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 $T_{measureFDD}/2$ (see table 4.1).

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

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 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 measure CPICH Ec/Io and CPICH RSCP at least every $T_{measureFDD}$ (see table 4.1) for intra-frequency cells that are identified and measured according to the measurement rules. $T_{measureFDD}$ 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 $T_{measureFDD}/2$.

The filtering shall be such that the UE shall be capable of evaluating that an intra-frequency cell has become better ranked than the serving cell within $T_{evaluateFDD}$ (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.

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 to 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 the S-value of the UTRA serving cell is greater than $Thresh_{serving\_high}$ then the UE shall search for any higher or equal priority UTRA inter-frequency cells at least every $T_{higher\_priority\_search}$ where $T_{higher\_priority\_search}$ is described in section 4.2.2. If higher priority UTRA cells are found by the higher priority search, they shall be measured at least every $(N_{carrier}-1) * T_{measureFDD,}$. 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.

The UE shall measure CPICH Ec/Io and CPICH RSCP at least every $(N_{carrier}-1) * T_{measureFDD}$ (see table 4.1) for inter-frequency cells that are identified and measured according to the measurement rules. The parameter $N_{carrier}$ is the number of carriers used for FDD cells. 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 $T_{measureFDD}/2$.

If CPICH Ec/Io is used as measurement quantity for cell reselection, 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 $(N_{carrier}-1) * T_{evaluateFDD}$ (see table 4.1) 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 has met the reselection criteria in [1] within 30 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, 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 $(N_{carrier}-1) * T_{evaluateFDD}$ from the moment the inter-frequency cell met the reselection criteria by at least 5 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 hasmet the reselection criteria in [1] within 30 s from the moment the inter-frequency cell met the reselection criteria by at least 5 dB 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 measure P-CCPCH RSCP at least every $N_{carrierTDD} * T_{measureTDD}$ (see table 4.1) for inter-frequency TDD cells that are identified and measured according to the measurement rules. The parameter $N_{carrierTDD}$ 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 $T_{measureTDD}/2$.

The filtering of PCCPCH RSCP shall 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 $N_{carrierTDD} * T_{evaluateTDD}$ 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.

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 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 $T_{measureGSM}$ (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.

If GSM measurements are required by the measurement rules in [1], the UE shall attempt to verify the BSIC at least every 30 seconds for each of the 4 strongest GSM BCCH carriers 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 the S-value of the UTRA serving cell is greater than $Thresh_{serving\_high}$ then

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

If the S-value of the UTRA serving cell is less than or equal to $Thresh_{serving\_high}$ then the UE shall measure, according to the measurement rules defined in [1], at least every $T_{measure,GSM}$ (see table 4.1):

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

Note : If it is concluded that only blacklist, or only whitelist can be used for reselection to GSM then one of these bullets can be deleted.

If the S-value of the UTRA serving cell is greater than $Thresh_{serving\_high}$ 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. When higher priority GSM BCCH carriers are found by the higher priority search, they shall be measured at least every $T_{measure,GSM,}$ and the UE shall decode the BSIC of the GSM BCCH carrier. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection to continuously verify the BSIC of the GSM BCCH carrier every 30s. 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.

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

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

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

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 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 the S-value of the UTRA serving cell is greater than $Thresh_{serving\_high}$ then

- the UE may not search for, or measure E-UTRA layers of lower priority.
- the UE shall search for and measure 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 S-value of the UTRA serving cell is less than or equal to $Thresh_{serving\_high}$ 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 is not reduced and shall be the same as that defined below for a lower priority layers.

The UE shall be able to evaluate whether a new detectable lower priority inter-RAT E-UTRA cell meets the reselection criteria defined in [1] within $K_{carrier}$ * [30] seconds if E-UTRA carrier frequency information is provided in the inter-RAT measurement control system information when Treselection=0. The parameter $K_{carrier}$ is the number of E-UTRA carrier frequencies indicated in the inter-RAT measurement control system information. An inter RAT E-UTRAN cell is considered to be detectable if :

- RSRP $\geq$ -TBD dBm and $\hat{E}s/Iot \geq$ [-3] dB,
- SCH_RP $\geq$ -TBD dBm and SCH $\hat{E}s/Iot$ > [-3] dB.

The UE shall measure RSRP at least every $K_{carrier}$ * $T_{measure,EUTRA_}$as defined in table 4.2 for identified E-UTRA cells.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measureE\text{-}UTRA}$. 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 measurements of each measured E-UTRA 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 least ($K_{carrier}$ * $T_{measure,EUTRA}$)/2.

RSRP 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 be capable of evaluating that the E-UTRA cell has met reselection criterion defined TS 36.304 within $T_{evaluateEUTRA}$ as specified in table 4.2

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 $T_{SI\text{-}EUTRA}$ + [50 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].

$T_{SI\text{-}EUTRA}$ 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: $T_{measureFDD}$, $T_{evaluateFDD}$, $T_{measureTDD}$, $T_{evaluateTDD}$, and $T_{measureGSM}$

DRX cycle length [s]	N_{serv} [number of DRX cycles]	$T_{measureFDD}$ [s] (number of DRX cycles)	$T_{evaluateFDD}$ [s] (number of DRX cycles)	$T_{measureTDD}$ [s] (number of DRX cycles)	$T_{evaluateTDD}$ [s] (number of DRX cycles)	$T_{measureGSM}$ [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: $T_{measureE\text{-}UTRA}$ and $T_{evaluateEUTRA}$

DRX cycle length [s]	$T_{measureE\text{-}UTRA}$ [s] (number of DRX cycles)	$T_{evaluateEUTRA}$ [s] (number of DRX cycles)
0.08	**[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	**[7.68 (3)]**	**[23.04 (9)]**
5.12	**[10.24 (2)]**	**[30.72 (6)]**

In idle mode, UE shall support DRX cycles lengths 0.64, 1.28, 2.56 and 5.12 s, according to [16].

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, [32] E-UTRA cells distributed on up to [TBD] E-UTRA carriers,

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

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 Tmeasure, 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 $T_{MTCH\_interrupt}$

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

Where

TMCCH: 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.

TMTCH: is the uncertainty when reading the MTCH of the serving and target cells while performing cell reselection; TMTCCH can be up to 2 MTCH TTI.

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

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.

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

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].

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 DPCCH 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 DPCCH 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 DPDCH and the time the UE starts transmission of the new uplink DPCCH, 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 $D_{handover}$ 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 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,

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

where,

T_{offset}	Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel
T_{UL}	Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell
F_{SFN}	Equal to 1 if SFN decoding is required and equal to 0 otherwise

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_{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 $D_{handover}$ seconds from the end of the last TTI containing the RRC command, where:

- $D_{handover}$ equals the 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. 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 and the target cell is known to the UE, the interruption time shall be less than $T_{interrupt}$:

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

Where:

T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then T_{search} = 0 ms.

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

In the interruption requirement a cell is known if

- the cell 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 and 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 message implying handover, the UE shall be ready to start the transmission of the new uplink UpPTS or PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

$D_{handover}$ equals the RRC procedure delay 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 UpPTS or PRACH on E-UTRA. This requirement applies when the UE is not required to perform any synchronisation procedure before transmitting on the new UpPTS or PRACH.

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

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

Where:

T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms

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

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 $T_{reselection}$ is set to 0. Otherwise the Cell reselection delay is increased $T_{reselection}$ 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 and GSM carrier RSSI shall be used for cell re-selection to a GSM 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.

NOTE: In CELL_FACH state, there are no requirements for inter-RAT reselection to an E-UTRAN cell.

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 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

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

where

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

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).

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

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

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

where

$T_{Measurement,Period\ Intra}$ = 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

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

.where

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

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).

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

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

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

where

$T_{Measurement,\ inter}$= 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

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

where

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

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).

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 [16] for a UTRAN cell.

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

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

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

where

$T_{Measurement\ TDD\ inter}$ 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 UTRAN-GSM Cell Reselection

The cell re-selection delay in CELL_FACH state to a GSM cell shall be less than

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

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

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

where

a) For UE requiring measurement occasions.

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

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

where:

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

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

b) For UE not requiring measurement occasions

$T_{identify, GSM}$ = 150 ms

$T_{measurement, GSM}$ = 480 ms

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 $T_{interrupt1}$

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

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).

T_{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 $T_{interrupt2}$

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

where

T_{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 $T_{MTCH\_interrupt}$ 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

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

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

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

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).

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 [16].

T_{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 $T_{interrupt,\ GSM}$

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

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.

5.5.2.3 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 $T_{Measurement\_Period\ Intra}$.

The S-critera detection delay in CELL_FACH state shall be less than:

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

where

$T_{Measurement\_Period\ Intra}$ = 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.

5.6 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, 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 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, 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_{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_{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_{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_{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 $T_{interrupt1}$

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

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 $T_{interrupt2}$

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

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 subframe (2 ms).

The phase reference is the primary CPICH.

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

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

in case that the target cell is known, and

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

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

where

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

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

T_{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.

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.

6.4 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.

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 is 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 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. 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..

E-TFC selection is allowed only in the CELL_DCH state. E-TFC selection is based on the estimated power leftover from TFC selection if the DPDCH is present and from the HS-DPCCH

The UE shall estimate the normalised remaining power margin available for E-TFC selection based on the following equation for E-TFC candidate j

$$NRPM_j = (PMax_j - P_{DPCCH,\,target} - P_{DPDCH} - P_{HS\text{-}DPCCH} - P_{E\text{-}DPCCH,j}) / P_{DPCCH,\,target},$$

where

$PMax_j$ = Maximum UE transmitter power for E-TFC-j as defined in section 6.5

$P_{DPCCH}(t)$ 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 $P_{DPCCH,comp}(t) = P_{DPCCH}(t) \times (N_{pilot,C} / N_{pilot,N})$ else $P_{DPCCH,comp}(t) = P_{DPCCH}(t)$. 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 $P_{DPCCH,comp}(t)$ shall be filtered using a filter period of 3 slotwise estimates of $P_{DPCCH,,comp}(t)$ when the E-DCH TTI is 2ms or 15 slotwise estimates of P_{DPCCH} ,comp when the E-DCH TTI is 10ms to give $P_{DPCCH,filtered.}$The accuracy of the P_{DPCCH} 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 $P_{DPCCH,target} = P_{DPCCH,filtered}$.

If the target E-DCH TTI for which $NRPM_j$ is being evaluated corresponds to a compressed mode frame then $P_{DPCCH,target} = P_{DPCCH,filtered} \times (N_{pilot,N} / N_{pilot,C})$. $N_{pilot,N}$ 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 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}

$P_{HS\text{-}DPCCH}$ = estimated HS-DPCCH transmit power based on the maximum HS-DPCCH gain factor based on $P_{DPCCH,target}$ and the most recent signalled values of Δ_{ACK}, Δ_{NACK} and Δ_{CQI}. If the target E-DCH TTI for 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 $P_{HS\text{-}DPCCH}$

$P_{E\text{-}DPCCH,j}$ = estimated E-DPCCH transmit power for $E\text{-}TFCI_j$. If $E\text{-}TFCI_j$ is smaller than or equal to $E\text{-}TFCI_{ec,boost}$ the estimate is based on $P_{DPCCH,target}$ and the E-DPCCH gain factor calculated using the most recent signalled value of $\Delta_{E\text{-}DPCCH}$. If $E\text{-}TFCI_j$ is greater than $E\text{-}TFCI_{ec,boost}$ the estimate is based on the E-DPCCH gain factor, $\beta_{ec,j}$, which is calculated for $E\text{-}TFCI_j$ 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 $P_{E\text{-}DPCCH}$

NOTE: $P_{DPCCH}(t)$, $PMax_j$, $P_{DPCCH,filt,target}$, P_{DPDCH}, $P_{HS\text{-}DPCCH}$, and $P_{E\text{-}DPCCH}$ are expressed in linear power units

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 bitrate 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 bitrate 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:

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

where:

T_{notify} equals 15 ms, and

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

$T_{L1\ proc}$ equals 15 ms, and

T_{adapt_max} equals $MAX(T_{adapt\_1}, T_{adapt\_2}, ..., T_{adapt\_N})$, and

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

T_{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_{adapt} shall be considered to be equal to 0 ms. For services where either UMTS_AMR2 or UMTS_AMR_WB is used, Tadapt 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 Tadapt equals 20 ms + 40 ms per codec mode switch. E.g. Tadapt equals 60ms if one codec mode switch is necessary and Tadapt equals 140ms if 3 codec mode switches are necessary.

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

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 $NRPM_j$ at the time when all absolute and relative grants relating to the E-DCH TTI under consideration have been received. Using the estimates of $NRPM_j$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$NRPM_j \geq \sum(\beta_{ed,j}/\beta_c)^2$ then $E\text{-}TFC_j$ 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 $NRPM_j \geq \sum(\beta_{ed,C,j}/\beta_{c,C})^2$ then $E\text{-}TFC_j$ can be supported, otherwise it cannot be supported

$\beta_{ed,j}/\beta_c$ and $\beta_{ed,C,j}/\beta_{c,C}$ 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.

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

Maximum UE transmitter power = MIN {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]

The UE shall not exceed the Maximum allowed UL TX Power, as set by the UTRANwith 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 β_c to β_d for all values of β_{hs}	
1	$1/15 \le \beta_c/\beta_d \le 12/15$	0
2	$13/15 \le \beta_c/\beta_d \le 15/8$	1
3	$15/7 \le \beta_c/\beta_d \le 15/0$	2

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

Inputs for E-TFC selection								E-TFC-MPR (dB)
Case	β_c	β_{hs}	β_d	β_{ec}	β_{ed}	E-DPDCH		
						SFmin	Ncodes	
1	>0	0	0	>0	>0	≥4	1	0.25
2	>0	≥0	0	>0	>0	2	4	0.50
3	>0	0	>0	>0	>0	≥4	1	0.75
4	>0	>0	>0	>0	>0	≥4	1	1.50
5	>0	≥0	>0	>0	>0	4	2	0.75
6	>0	≥0	>0	>0	>0	2	2	0.50
NOTE: For inputs {β_c, β_{hs},β_d, β_{ec},β_{ed}, SFmin, Ncodes} not specifed above the E-TFC-MPR (dB) = 0								

6.6 (void)

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 ±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 ±1.5 chips the UE is required to adjust its timing to within ±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 ¼ Chip.

2) The minimum adjustment rate shall be 233ns per second.

3) The maximum adjustment rate shall be ¼ chip per 200ms.

In particular, within any given 800*d ms period, the UE transmit timing shall not change in excess of ±d chip from the timing at the beginning of this 800*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 +/- 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 +/- 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 +/- 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 +/- 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 T3xx, T_{barred}, Treselection, Penalty_time, T_{CRmax}, $T_{CrmaxHyst}$ [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	± 0.1 s
timer value ≥4	± 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 ± 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.

8.1.2 Requirements

8.1.2.1 UE Measurement Capability

In CELL_DCH state 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, [32] E-UTRA cells distributed on up to [TBD] E-UTRA carriers and
- Depending on UE capability, the UE shall be able to monitor up to 16 intra frequency cells during IPDL gaps.

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

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

and the received SCH E_c/I_o is defined as

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

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

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

If DL_DRX_Active = 1 and the UE DRX cycle < 10 subframes, the UE shall be able to identify and decode the SFN of a new detectable cell belonging to the monitored set within $T_{identify\ intra}$ = 800ms.

If DL_DRX_Active = 1 and the UE DRX cycle ≥ 10 subframes, the UE shall be able to identify and decode the SFN of a new detectable cell belonging to the monitored set within $T_{identify\ intra}$ = 1.5s.

A cell shall be considered detectable when

- CPICH Ec/Io ≥ -20 dB if DL_DRX_Active = 0, or CPICH Ec/Io ≥-17dB if DL_DRX_Active=1,
- SCH_Ec/Io ≥ -20 dB if DL_DRX_Active = 0, or SCH Ec/Io ≥-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

$$T_{identify\ detected\ set} = 30s$$

when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -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

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

where

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

and

T_{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_{IPDL}

Search Window Size	T_{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 $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ 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 $Y_{measurement\ intra}$ 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.

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

where

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

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

T_{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.

$T_{basic\_identify\_FDD,\ intra}$ = 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

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

where

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

$T_{4\ IPDLs}$ = 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 ≤ 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 +/-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 enters or leaves the reporting range, 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

$$T_{\text{identify, inter}} = T_{\text{basic identify FDD,inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{Freq} \quad ms$$

A cell shall be considered detectable when

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.3.2 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 accuracy as specified in sub-clause 9.1.1 and 9.1.2 with measurement period given by

$$T_{measurement\ inter} = Max\left\{T_{Measurement\_Period\ Inter}, T_{basic\ measurement\ FDD\ inter} \cdot \frac{T_{Measurement\_Period\ Inter}}{T_{Inter}} \cdot N_{Freq}\right\} ms$$

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 $X_{basic\ measurement\ FDD\ inter}$ inter-frequency cells per FDD frequency of the monitored set or the virtual active set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of $T_{Measurement\_\ Inter.}$

$X_{basic\ measurement\ FDDinter} = 6$

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

$T_{Inter::}$ This is the minimum time that is available for inter frequency measurements , during the period $T_{Measurement\_Period\ inter}$ 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*0.5 ms for implementation margin and after that taking only full slots into account in the calculation.

$T_{basic\_identify\_FDD,inter}$ = 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.

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

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

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, measured without L3 filtering shall be less than $T_{identify\ inter}$ 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 $T_{identify\_inter}$ and then enters or leaves the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Inter}$ provided the timing to that cell has not changed more than +/-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

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

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 Ec/Io ≥ -8 dB and SCH_Ec/Io ≥ -13 dB.

The received P-CCPCH_E_c/I_o is defined as

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

and the received SCH_E_c/I_o is defined as

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

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

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

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 Ec/Io $\geq$ -8 dB and DwPCH_Ec/Io $\geq$ -5 dB. When L3 filtering is used an additional delay can be expected.

The received P-CCPCH E_c/I_o is defined as

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

The received DwPTS E_c/I_o is defined as

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

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

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

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_{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 $T_{identify\ TDD\ inter}$ 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, $T_{Measurement\ Period,\ GSM}$, 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 $T_{re\text{-}confirm\_abort}$ 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 $N_{identify\_abort}$ and $T_{re\text{-}confirm\_abort}$ are defined by higher layers and are signalled to the UE together with the transmission gap pattern sequence. $N_{identify\_abort}$ 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. $T_{re\text{-}confirm\_abort}$

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 [μs]
5	± 500
7	± 1200
10	± 2200
14	± 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 $N_{identify\_abort}$ 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.

$N_{identify\_abort}$ values are given for a set of reference patterns in table 8.7. $T_{identify\_abort}$ is the elapsed time during $N_{identify\_abort}$ 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]	$T_{identify\ abort}$ [s]	$N_{identify\_abort}$ [patterns]
Pattern 1	7	-	undefined	3	1.56	**52**
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	**23**
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 $T_{re\text{-}confirm\_abort}$ 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.

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

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

	TGL1 [slots]	TGL2 [slots]	TGD [slots]	TGPL1 [frames]	$T_{re\text{-}confirm\_abort}$ [s]	$N_{re\text{-}confirm\_abort}$ [patterns]
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 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 $T_{Measurement\ Period,\ GSM}$ (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 $2*T_{Measurement\ Period,\ GSM}$, where $T_{Measurement\ Period,\ GSM}$ 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 FDD and E-UTRAN.

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

TGL1 [slots]	TGL2 [slots]	TGD [slots]	Max TGPL [frames]
[≥9]	-	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 dedicated mode when a [TBD] channel is assigned 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 FDD cell within

$$T_{\text{E-UTRAN FDD}} = T_{\text{Basic\_Identify\_E-UTRAN FDD}} \cdot \frac{T_{\text{Measurement\_Period\_E-UTRAN FDD}}}{T_{\text{Inter}}} \quad ms\ ;$$

If the UE does not need compressed mode to perform E-UTRAN FDD measurements, the UE shall be able to identify a new detectable E-UTRAN FDD cell within $T_{\text{Basic\_Identify\_E-UTRAN FDD}}$ ms.

Where:

$T_{E\text{-}UTRAN}$: This is the minimum time that is available for inter frequency measurements during the measurement period $T_{Measurement\_Period\_E\text{-}UTRAN\_FDD}$ with an arbitrarily chosen timing. The minimum time per compressed mode gap is calculated by assuming 2*0.5 ms for implementation margin.

$T_{Basic\_Identify\_Inter}$ = TBD

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

An E-UTRAN FDD cell shall be considered detectable when

- RSRP ≥ -TBD dBm and Ês/Iot > TBD,
- SCH RP ≥ -TBD dBm and SCHÊs/Iot > [TBD] dB.

Editor"s note:These quantities may need to be defined.

8.1.2.6.2 E-UTRAN RSRP and RSRQ measurement period

When compressed mode gaps are scheduled for E-UTRAN FDD 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 with measurement period of 480 x N_{Freq} ms where N_{Freq} is the number of FDD frequencies indicated in the E-UTRAN measurement control information.

The UE shall be capable of performing RSRP measurements of at least 4 E-UTRAN cells per E-UTRAN FDD frequency for up to E-UTRAN FDD frequencies.

8.1.2.6.3 Periodic reporting

Editor"s note:The text in this subclause needs to be added.

8.1.2.6.4 Event-triggered periodic reporting

Editor"s note:The text in this subclause needs to be added.

8.1.2.6.5 Event Triggered reporting

Editor"s note:The text in this subclause needs to be added.

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 [11]. 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. For the measurement categories: Intra-frequency, Inter frequency, Inter frequency (virtual active set), and Inter-RAT the UE need not support more than 18 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	8	
Inter-frequency	6	
Inter-frequency, virtual active set	4	
Inter-RAT GERAN	4	Only applicable for UE with this capability
Inter-RAT E-UTRAN	[TBD]	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.

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 enhanced uplink is not used. The requirements for cell re-selection are split in FDD intra frequency, FDD inter frequency, TDD and GSM 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.

NOTE: In CELL_FACH state, there are no requirements for measurements of inter-RAT E-UTRAN cells.

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.
- 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 and GSM 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 three parameters are defined:

N_{FDD} is 0 or 1. If there are inter-frequency FDD cells in the neighbour list 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 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, N_{GSM}=*1*, otherwise N_{GSM}=0.

The measurement time T_{meas} is then defined as

$$T_{meas} = \left[\left(N_{FDD} + N_{TDD} + N_{GSM}\right) \cdot \mathrm{N}_{\mathrm{TTI}} \cdot \mathrm{M\_REP} \cdot 10\right] \mathrm{ms}$$

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} * 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 NTTI 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 NTTI * 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_{meas} on each of the modes and systems, FDD inter frequency cells, TDD inter frequency cells and GSM carriers for which the corresponding parameter N_{FDD}, N_{TDD} and N_{GSM} is set to 1.

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

$$T_{identify,intra} = Max\left\{800, Ceil\left\{\frac{T_{basic\ identify\ FDD,intra}}{N_{TTI}\cdot(M\_REP-1)\cdot 10}\right\}\cdot N_{TTI}\cdot M\_REP\cdot 10\right\}\ ms$$

where

$T_{basic\_identify\_FDD,\ intra}$ is specified in section 8.1.2.2.2,

N_{TTI} and M_REP is specified in section 8.4.2.1.

A cell shall be considered detectable when

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -20 dB for at least one channel tap and SCH_Ec/Ior 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

$$T_{identify,IPDL}=Max\{T_{Measerement\_Period\ Intra},T_{IPDL}\}\ ms$$

where

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

and

T_{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_{IPDL}

Search Window Size	T_{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 $Y_{measurement\ intra}$ strongest cells , where $Y_{measurement\ intra}$ 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 $Y_{measurement\ intra}$ 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.

$$Y_{measurement\ intra} = Floor\left\{ X_{basic\ measurement\ FDD} \cdot \frac{T_{Measurement\_Period\ Intra} - Ceil\left\{ \frac{T_{Measurement\_Period\ Intra}}{N_{TTI} \cdot M\_REP \cdot 10\ ms} \right\} \cdot N_{TTI} \cdot 10\ ms}{T_{Measurement\_Period\ Intra}} \right\} \text{ cells}$$

where

$X_{basic\ measurement\ FDD}$ is specified in section 8.1.2.2.2,

$T_{Measurement\_Period\ Intra}$ is specified in section 8.1.2.2.2,

M_REP and N_{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

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

where

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

and

$T_{4\ IPDLs}$ = 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 the UE shall continuously measure identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.

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

$$T_{identify,\ inter} = Ceil\left\{\frac{T_{basic\ identify\ FDD\ inter}}{T_{Inter\ FACH}}\right\} \cdot T_{meas} \cdot N_{Freq,FDD} \quad ms$$

where

$T_{basic\_identify\_FDD,inter}$ is specified in 8.1.2.3.2.

$N_{Freq,FDD}$: Number of FDD frequencies in the Inter-frequency cell info list

T_{Meas} and M_REP are specified in 8.4.2.1.

$T_{Inter\ FACH}$ = (N_{TTI}*10 - 2*0.5) ms

A cell shall be considered detectable when

- CPICH Ec/Io $\geq$ -20 dB,
- SCH_Ec/Io $\geq$ -17 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

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

$$T_{measurement\ inter} = Max\left\{T_{Measurement\_Period\ Inter}, 2 \cdot T_{meas}, Ceil\left\{\frac{T_{basic\ measurement\ FDD\ inter}}{T_{Inter\ FACH}}\right\} \cdot T_{meas} \cdot N_{Freq,FDD}\right\} \text{ ms}$$

where

$T_{basic\_measurement\_FDD,inter}$ is specified in section 8.1.2.3.2.

$T_{Measurement\_Period\ Inter}$ is specified in section 8.1.2.3.2.

T_{Meas} is specified in section 8.4.2.1.

$N_{Freq,FDD}$ and $T_{Inter\ FACH}$ are specified in section 8.4.2.3.1

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.

8.4.2.4.1 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

$$T_{\text{identify, TDD}} = Max\left\{5000, Ceil\left\{\frac{T_{\text{basic identify TDD inter}}}{T_{\text{Inter FACH}}}\right\} \cdot T_{\text{meas}} \cdot N_{Freq,TDD}\right\} \text{ ms}$$

where

$T_{\text{basic\_identify\_TDD,inter}}$ = 800ms

$N_{\text{Freq,TDD}}$: Number of TDD frequencies indicated in the Inter-frequency cell info list

T_{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-CCPCH_Ec/Io ≥ -8 dB and SCH_Ec/Io ≥ -13 dB.

The received P-CCPCH_E_c/I_o is defined as

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

and the received SCH_E_c/I_o is defined as

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

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

$$T_{\text{identify, TDD}} = Max\left\{5000, Ceil\left\{\frac{T_{\text{basic identify TDD inter}}}{T_{\text{Inter FACH}}}\right\} \cdot T_{\text{meas}} \cdot N_{Freq,TDD}\right\} \text{ ms}$$

where

$T_{basic\_identify\_TDD,inter}$ = 800ms

$N_{Freq,TDD}$: Number of TDD frequencies indicated in the inter-frequency cell info list

T_{Meas} is specified in section 8.4.2.1.

$T_{Inter\ FACH}$ 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-CCPCH Ec/Io $\geq$ -8 dB and DwPCH_Ec/Io $\geq$ -5 dB.

The received P-CCPCH E_c/I_o is defined as

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

The received DwPTS E_c/I_o is defined as

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

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

$$T_{measurement\ TDD} = Max\left\{T_{Measurement\_Period\ TDD\ inter}, 2\cdot T_{meas}, Ceil\left\{\frac{T_{basic\ measurement\ TDD\ inter}}{T_{Inter\ FACH}}\right\}\cdot T_{meas}\cdot N_{Freq,TDD}\right\}$$

where

$T_{basic\_measurement\_TDD\ inter}$= 50 ms.

$T_{Measurement\_Period\ TDD\ inter}$ is specified in section 8.1.2.4.2.

T_{Meas} is specified in section 8.4.2.1.

$T_{Inter\ FACH}$ is specified in section 8.4.2.3.1

$N_{Freq,TDD:}$ 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 $X_{basic\ measurement\ TDD\ inter}$ 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 $T_{Measurement\ TDD}$.

$X_{basic\ measurement\ TDD\ inter}$ 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.

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, $N_{GSM\ carrier\ RSSI}$.
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 $T_{re\text{-}confirm\_GSM}$ seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified".

$T_{re\text{-}confirm\_GSM}$ indicates the maximum time allowed for the re-confirmation of the BSIC of one GSM cell in the BSIC re-confirmation procedure 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 [μs]
1	± 4100
2	± 9100
4	± 19100
8	± 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 $T_{identify, GSM}$ 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.

$T_{identify\_GSM}$ is given for the combinations of T_{meas} and N_{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_meas (ms)	N_TTI=1 frame $T_{identify,GSM}$(ms)	N_TTI=2 frames $T_{identify,GSM}$(ms)	N_TTI=4 frames $T_{identify,GSM}$(ms)	N_TTI=8 frames $T_{identify,GSM}$(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.

$T_{re\text{-}confirm\_GSM}$ is given for the combinations of T_{meas} and N_{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 $T_{re\text{-}confirm\ GSM}$ 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_meas (ms)	N_TTI=1 frame $T_{re\text{-}confirm,GSM}$ (ms)	N_TTI=2 frames $T_{re\text{-}confirm,GSM}$ (ms)	N_TTI=4 frames $T_{re\text{-}confirm,GSM}$ (ms)	N_TTI=8 frames $T_{re\text{-}confirm,GSM}$ (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.			

8.4a 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 and GSM 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.

NOTE: In CELL_FACH state, there are no requirements for measurements of inter-RAT E-UTRAN cells.

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

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 and GSM 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.

8.4.a2.2 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.

8.4.a2.2.1 Identification of a new cell

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

$$T_{identify,intra} = Max\left\{300, ceil\left\{\frac{T_{basic\ identify\ FDD,\ intra\_HS\text{-}DSCH\text{-}DRX}}{T_{on}}\right\}T_{DRX\_Cycle}\right\}\ ms$$

where

$T_{basic\ identify\ FDD,\ intra\_HS\text{-}DSCH\text{-}DRX}$ is 300ms

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)

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

$$T_{Measurement\_Period\ Intra} = Max\left\{200, ceil\left\{\frac{200}{T_{on}}\right\}T_{DRX\_Cycle}\right\}ms$$

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 $T_{Measurent\_Period,Intra}$.

where

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)

8.4.a2.2.3 RACH reporting

Reporting measurements in the measurement reports sent on the RACH shall meet the requirements in section 9.

8.4.a2.3 FDD inter frequency measurements

In the CELL_FACH state when DRX is being performed by the UE, the UE shall continuously measure identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.

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

$$T_{identify,\ inter} = Ceil\left\{\frac{T_{basic\ identify\ FDD\ inter}}{T_{Inter\ FACH,DRX}}\right\}\cdot T_{scale}\cdot T_{DRX\_Cycle}\cdot N_{Freq,FDD} \quad ms$$

where

$T_{basic\_identify\_FDD,inter}$ is specified in 8.1.2.3.2.

$N_{Freq,FDD}$: Number of FDD frequencies in the Inter-frequency cell info list

$T_{Inter\ FACH,DRX}$ = Min(***HS-DSCH DRX cycle$_{FACH}$ - HS-DSCH Rx burst$_{FACH}$, HS-DSCH Rx burst$_{FACH}$***)- 2*0.5ms [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)

$T_{scale} = N_{FDD} + N_{TDD} + N_{GSM}$

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.2.3.2 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

$$T_{measurement\ inter} = Max\left\{T_{Measurement\_Period,\ Inter}, Ceil\left\{\frac{T_{basic\_measurement\_FDD,\ inter}}{T_{Inter\ FACH,\ DRX}}\right\} \cdot T_{scale} \cdot T_{DRX\_Cycle} \cdot N_{Freq,FDD}\right\} \text{ ms}$$

where

$N_{Freq,FDD}$: Number of FDD frequencies in the Inter-frequency cell info list

$T_{Measurement\_Period\ Inter}$ is specified in section 8.1.2.3.2.

$T_{Inter\ FACH,DRX}$ = Min(***HS-DSCH DRX cycle$_{FACH}$ - HS-DSCH Rx burst$_{FACH}$, HS-DSCH Rx burst$_{FACH}$***)- 2*0.5ms [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)

The UE shall be capable of performing CPICH measurements for $X_{basic\ measurement\ FDD\ inter}$ 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 $T_{Measurement\_\ Inter.}$

$X_{basic\ measurement\ FDDinter}$ is defined in section 8.1.2.3.2

$T_{scale} = N_{FDD} + N_{TDD} + N_{GSM}$

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.

8.4.2.4.1 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

$$T_{identify,\ TDD} = Max\left\{5000, Ceil\left\{\frac{T_{basic\ identify\ TDD\ inter}}{T_{Inter\ FACH,DRX}}\right\} \cdot T_{scale} \cdot T_{DRX\_Cycle} \cdot N_{Freq,TDD}\right\} \text{ ms}$$

Where

$T_{basic\_identify\_TDD,inter}$ = 800ms

$N_{Freq,TDD}$: Number of TDD frequencies indicated in the Inter-frequency cell info list

$T_{Inter\ FACH,DRX}$ = Min(***HS-DSCH DRX cycle$_{FACH}$ - HS-DSCH Rx burst$_{FACH}$, HS-DSCH Rx burst$_{FACH\ n}$***)- 2*0.5ms [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)

$T_{scale} = N_{FDD} + N_{TDD} + N_{GSM}$

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

An inter-frequency TDD cell shall be considered detectable when P-CCPCH_Ec/Io ≥ -8 dB and SCH_Ec/Io ≥ -13 dB.

The received P-CCPCH_E_c/I_o is defined as

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

and the received SCH_E_c/I_o is defined as

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

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

$$T_{identify,\ TDD} = Max\left\{5000, Ceil\left\{\frac{T_{basic\ identify\ TDD\ inter}}{T_{Inter\ FACH,DRX}}\right\}\cdot T_{scale}\cdot T_{DRX\_Cycle}\cdot N_{Freq,TDD}\right\}\ \text{ms}$$

where

$T_{basic\_identify\_TDD,inter}$ = 800ms

$N_{Freq,TDD}$: Number of TDD frequencies indicated in the Inter-frequency cell info list

$T_{Measurement\_Period\ TDD\ inter}$ is specified in section 8.1.2.4.2

$T_{Inter\ FACH,DRX}$ = Min(***HS-DSCH DRX cycle$_{FACH}$ - HS-DSCH Rx burst$_{FACH}$, HS-DSCH Rx burst$_{FACH}$***)- 2*0.5ms [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)

$T_{scale} = N_{FDD} + N_{TDD} + N_{GSM}$

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

A cell shall be considered detectable when P-CCPCH Ec/Io ≥ -8 dB and DwPCH_Ec/Io ≥ -5 dB.

The received P-CCPCH E_c/I_o is defined as

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

The received DwPTS E_c/I_o is defined as

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

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

$$T_{measurement,TDD} = Max\left\{T_{Measurement\_Period,\ Inter}, Ceil\left\{\frac{T_{basic\_measurement\_TDD,\ inter}}{T_{Inter\ FACH,\ DRX}}\right\}\cdot T_{scale}\cdot T_{DRX\_Cycle}\cdot N_{Freq,FDD}\right\}$$

where

$N_{Freq,TDD}$: Number of TDD frequencies in the Inter-frequency cell info list

$T_{Measurement\_Period\ Inter}$ is specified in section 8.1.2.3.2.

$T_{Inter\ FACH,DRX}$ = Min(***HS-DSCH DRX cycle$_{FACH}$*** - ***HS-DSCH Rx burst$_{FACH}$***, ***HS-DSCH Rx burst$_{FACH}$***)- 2*0.5ms [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)

$T_{scale} = N_{FDD} + N_{TDD} + N_{GSM}$

The UE shall be capable of performing P-CCPCH RSCP measurements for $X_{basic\ measurement\ TDD\ inter}$ 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 $T_{Measurement\ TDD}$.

$X_{basic\ measurement\ TDD\ inter}$ is defined in section 8.1.2.4.2

8.4a.2.5 GSM measurements when HS-DSCH discontinuous reception is ongoing

Note : Further study is required for GSM measurements when DRX is active, especially regarding BSIC identification and reconfirmation

8.4a.2.5.1 GSM carrier RSSI

8.4a.2.5.2 BSIC verification

8.4a.2.5.2.1 Initial BSIC identification

8.4a.2.5.2.2 BSIC re-confirmation

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_{cat}	Note
Traffic volume measurements	2	

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 Io 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.
- 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.

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$|_{dBm}$ ≥ -114 dBm for Bands I, IV, VI and X,

CPICH_RSCP1$|_{dBm}$ ≥ -113 dBm for Band IX,

CPICH_RSCP1$|_{dBm}$ ≥ -112 dBm for Bands II, V, VII and XI,

CPICH_RSCP1$|_{dBm}$ ≥ -111 dBm for Band III, VIII, XII, XIII and XIV.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \leq 20dB$$

Table 9.1: CPICH_RSCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
CPICH_RSCP	dBm	± 6	± 9	-94...-70	-92…-70	-91…-70	-93...-70
	dBm	± 8	± 11	-70...-50	-70…-50	-70…-50	-70...-50

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$|_{dBm}$ ≥ -114 dBm for Bands I, IV, VI and X,

CPICH_RSCP1,2$|_{dBm}$ ≥ -113 dBm for Band IX,

CPICH_RSCP1,2$|_{dBm}$ ≥ -112 dBm for Bands II, V, VII and XI,

CPICH_RSCP1,2$|_{dBm}$ ≥ -111 dBm for Band III, VIII, XII, XIII and XIV.

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left| \left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \le 20dB$$

Table 9.2: CPICH_RSCP Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
CPICH_RSCP	dBm	± 3	± 3	-94...-50	-92…-50	-91…-50	-93...-50

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$|_{dBm}$ ≥ -114 dBm if CPICH_RSCP1 is on Bands I, IV, VI and X,

CPICH_RSCP1$|_{dBm}$ ≥ -113 dBm if CPICH_RSCP1 is on Band IX,

CPICH_RSCP1$|_{dBm}$ ≥ -112 dBm if CPICH_RSCP1 is on Bands II, V, VII and XI,

CPICH_RSCP1$|_{dBm}$ ≥ -111 dBm if CPICH_RSCP1 is on Band III, VIII, XII, XIII and XIV

CPICH_RSCP2$|_{dBm}$ ≥ -114 dBm if CPICH_RSCP2 is on Bands I, IV, VI and X,

CPICH_RSCP2$|_{dBm}$ ≥ -113 dBm if CPICH_RSCP2 is on Band IX,

CPICH_RSCP2$|_{dBm}$ ≥ -112 dBm if CPICH_RSCP2 is on Bands II, V, VII and XI,

CPICH_RSCP2$|_{dBm}$ ≥ -111 dBm if CPICH_RSCP2 is on Band III, VIII, XII, XIII and XIV

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

| Channel 1_Io$|_{dBm/3,84\ MHz}$ -Channel 2_Io$|_{dBm/3,84\ MHz}$ | ≤ 20 dB.

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left| \left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \le 20dB$$

Table 9.3: CPICH_RSCP Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	CPICH_RSCP is on Band I, IV, VI and X	CPICH_RSCP is on Band II, V, VII and XI	CPICH_RSCP is on Band III, VIII, XII, XIII and XIV	CPICH_RSCP is on Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
CPICH_RSCP	dBm	± 6	± 6	-94...-50	-92…-50	-91…-50	-93...-50

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$|_{\text{dBm}}$ ≥ -114 dBm for Bands I, IV, VI, and X,

CPICH_RSCP1$|_{\text{dBm}}$ ≥ -113 dBm for Band IX,

CPICH_RSCP1$|_{\text{dBm}}$ ≥ -112 dBm for Bands II, V, VII and XI,

CPICH_RSCP1$|_{\text{dBm}}$ ≥ -111 dBm for Band III,VIII, XII, XIII and XIV.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \leq 20dB$$

Table 9.5: CPICH_Ec/Io Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50	-92…-50	-91…-50	-93...-50

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:

$CPICH\_RSCP1,2|_{dBm} \geq$ -114 dBm for Bands I, IV, VI and X,

$CPICH\_RSCP1,2|_{dBm} \geq$ -113 dBm for Band IX

$CPICH\_RSCP1,2|_{dBm} \geq$ -112 dBm for Bands II, V, VII and XI,

$CPICH\_RSCP1,2|_{dBm} \geq$ -111 dBm for Band III, VIII, XII, XIII and XIV.

$$\left| CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm} \right| \leq 20dB$$

$$\left(\frac{I_o}{\hat{I}_{or}} \right)\Bigg|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)\Bigg|_{in\ dB} \leq 20dB$$

Table 9.6: CPICH_Ec/Io Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
The lower of the CPICH_Ec/Io from cell1 and cell2	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50	-92…-50	-91…-50	-93...-50

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:

$CPICH\_RSCP1|_{dBm} \geq -114$ dBm for Bands I, IV, VI and X,

$CPICH\_RSCP1|_{dBm} \geq -113$ dBm for Band IX,

$CPICH\_RSCP1|_{dBm} \geq -112$ dBm for Bands II, V, VII and XI,

$CPICH\_RSCP1|_{dBm} \geq -111$ dBm for Band III, XII, XIII and XIV.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \leq 20dB$$

Table 9.7: CPICH_Ec/Io Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	Band I, IV VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50	-92…-50	-91…-50	-93...-50

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:

$CPICH\_RSCP1|_{dBm} \geq -114$ dBm if CPICH_RSCP1 is on Bands I, IV, VI and X,

$CPICH\_RSCP1|_{dBm} \geq -113$ dBm if CPICH_RSCP1 is on Band IX,

$CPICH\_RSCP1|_{dBm} \geq -112$ dBm if CPICH_RSCP1 is on Bands II, V, VII and XI,

$CPICH\_RSCP1|_{dBm} \geq -111$ dBm if CPICH_RSCP1 is on Band III, VIII, XII, XIII and XIV,

$CPICH\_RSCP2|_{dBm} \geq -114$ dBm if CPICH_RSCP2 is on Bands I, IV, VI and X,

$CPICH\_RSCP2|_{dBm} \geq -113$ dBm if CPICH_RSCP2 is on Band IX,

CPICH_RSCP2$|_{dBm}$ ≥ -112 dBm if CPICH_RSCP2 is on Bands II, V, VII and XI,

CPICH_RSCP2$|_{dBm}$ ≥ -111 dBm if CPICH_RSCP2 is on Band III, VIII, XII, XIII and XIV.

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

| Channel 1_Io$|_{dBm/3,84\ MHz}$ -Channel 2_Io$|_{dBm/3,84\ MHz}$ | ≤ 20 dB.

$$\left. \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left. \left(\frac{CPICH\_E_c}{I_{or}} \right) \right|_{in\ dB} \le 20dB$$

Table 9.8: CPICH_Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	CPICH_Ec/Io is on Band I, IV, VI and X	CPICH_Ec/Io is on Band II, V, VII and XI	CPICH_Ec/Io is on Band III, VIII, XII, XIII and XIV	CPICH_Ec/Io is on Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
The lower of the CPICH_Ec/Io from cell1 and cell2	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50	-92…-50	-91…-50	-93...-50

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	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
UTRA Carrier RSSI	dBm	± 4	± 7	-94...-70	-92…-70	-91…-70	-93...-70
	dBm	± 6	± 9	-70...-50	-70…-50	-70…-50	-70...-50

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:

$| \text{Channel 1\_Io}|_{\text{dBm}} - \text{Channel 2\_Io}|_{\text{dBm}} | < 20$ dB.

Table 9.11: UTRA Carrier RSSI Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions			
		Normal condition	Extreme condition	UTRA Carrier RSSI is on Band I, IV, VI and X	UTRA Carrier RSSI is on Band II, V, VII and XI	UTRA Carrier RSSI is on Band III, VIII, XII, XIII and XIV	UTRA Carrier RSSI is on Band IX
				Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
UTRA Carrier RSSI	dBm	± 7	± 11	-94...-50	-92…-50	-91…-50	-93...-50

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.

9.1.5 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	-∞ < Log10(Transport channel BLER) < -4.03	-
BLER_LOG _02	-4.03 ≤ Log10(Transport channel BLER) < -3.965	-
BLER_LOG _03	-3.965 ≤ Log10(Transport channel BLER) < -3.9	-
…	…	…
BLER_LOG _61	-0.195 ≤ Log10(Transport channel BLER) < -0.13	-
BLER_LOG _62	-0.13 ≤ Log10(Transport channel BLER) < -0.065	-
BLER_LOG _63	-0.065 ≤ Log10(Transport channel BLER) ≤ 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 DPCCH 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.
MIN(Measured quantity value) + MIN(Accuracy)
<= UE transmitted Power <
Max (Measured quantity value) + MAX(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:

$CPICH\_RSCP1,2|_{dBm} \geq$ -114 dBm for Bands I, IV, VI and X,

$CPICH\_RSCP1,2|_{dBm} \geq$ -113 dBm for Band IX,

$CPICH\_RSCP1,2|_{dBm} \geq$ -112 dBm for Bands II, V, VII and XI,

$CPICH\_RSCP1,2|_{dBm} \geq$ -111 dBm for Band III, VIII, XII, XIII and XIV.

$$\left| CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm} \right| \leq 20dB$$

$$\left. \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left. \left(\frac{CPICH\_E_c}{I_{or}} \right) \right|_{in\ dB} \leq 20dB$$

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{P-CCPCH\_E_c}{I_{or}}\right)\right|_{in\ dB}$$ is low enough to ensure successful SFN decoding.

Table 9.16

Parameter	Unit	Accuracy [chip]	Conditions			
			Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
			Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
SFN-CFN observed time difference	chip	± 1	-94...-50	-92…-50	-91…-50	-93…-50

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$|_{\text{dBm}}$ ≥ -114 dBm if CPICH_RSCP1 is on Bands I, IV, VI and X,

CPICH_RSCP1$|_{\text{dBm}}$ ≥ -113 dBm if CPICH_RSCP1 is on Band IX,

CPICH_RSCP1$|_{\text{dBm}}$ ≥ -112 dBm if CPICH_RSCP1 is on Bands II, V, VII and XI,

CPICH_RSCP1$|_{\text{dBm}}$ ≥ -111 dBm if CPICH_RSCP1 is on Band III, VIII, XII, XIII and XIV,

CPICH_RSCP2$|_{\text{dBm}}$ ≥ -114 dBm if CPICH_RSCP2 is on Bands I, IV, VI and X,

CPICH_RSCP2$|_{\text{dBm}}$ ≥ -113 dBm if CPICH_RSCP2 is on Band IX,

CPICH_RSCP2$|_{\text{dBm}}$ ≥ -112 dBm if CPICH_RSCP2 is on Bands II, V, VII and XI

CPICH_RSCP2$|_{\text{dBm}}$ ≥ -111 dBm if CPICH_RSCP2 is on Band III, VIII, XII, XIII and XIV

$$\left|CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm}\right| \le 20dB,$$

| Channel 1_Io$|_{\text{dBm/3,84 MHz}}$ -Channel 2_Io$|_{\text{dBm/3,84 MHz}}$ | ≤ 20 dB,

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \le 20dB.$$

Table 9.17

Parameter	Unit	Accuracy [chip]	Conditions			
			SFN-CFN observed time difference is on Band I, IV, VI and X	SFN-CFN observed time difference is on Band II, V, VII and XI	SFN-CFN observed time difference is on Band III, VIII, XII, XIII and XIV	SFN-CFN observed time difference is on Band IX
			Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
SFN-CFN observed time difference	chip	± 1	-94...-50	-92…-50	-91…-50	-93…-50

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 ≤ SFN-CFN observed time difference < 1	chip
SFN-CFN_TIME _0000001	1 ≤ SFN-CFN observed time difference < 2	chip
SFN-CFN_TIME _0000002	2 ≤ SFN-CFN observed time difference < 3	chip
…	…	…
SFN-CFN_TIME _9830397	9830397 ≤ SFN-CFN observed time difference < 9830398	chip
SFN-CFN_TIME _9830398	9830398 ≤ SFN-CFN observed time difference < 980399	chip
SFN-CFN_TIME _9830399	9830399 ≤ 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:

$CPICH\_RSCP1|_{dBm} \geq$ -114 dBm if CPICH_RSCP1 is on Bands I, IV, VI and X,

$CPICH\_RSCP1|_{dBm} \geq$ -113 dBm if CPICH_RSCP1 is on Band IX,

$CPICH\_RSCP1|_{dBm} \geq$ -112 dBm if CPICH_RSCP1 is on Band II, V, VII and XI,

$CPICH\_RSCP1|_{dBm} \geq$ -111 dBm if CPICH_RSCP1 is on Band III, VIII, XII, XIII and XIV,

$CPICH\_RSCP2|_{dBm} \geq$ -114 dBm if CPICH_RSCP2 is on Bands I, IV, VI and X,

$CPICH\_RSCP2|_{dBm} \geq$ -113 dBm if CPICH_RSCP2 is on Band IX,

$CPICH\_RSCP2|_{dBm} \geq$ -112 dBm if CPICH_RSCP2 is on Band II, V, VII and XI,

$CPICH\_RSCP2|_{dBm} \geq$ -111 dBm if CPICH_RSCP2 is on Band III, VIII, XII, XIII and XIV,

$$\left| CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm} \right| \leq 20dB,$$

$$\left. \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left. \left(\frac{CPICH\_E_c}{I_{or}} \right) \right|_{in\ dB} \leq 20dB,$$

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

is low enough to ensure successful SFN decoding.

Table 9.19

Parameter	Unit	Accuracy [chip]	Conditions			
			SFN-SFN observed time difference type1 is on Band I, IV, VI and X	SFN-SFN observed time difference type1 is on Band II, V, VII and XI	SFN-SFN observed time difference type1 is on Band III, VIII, XII, XIII and XIV	SFN-SFN observed time difference type1 is on Band IX
			Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
SFN-SFN observed time difference type1	chip	± 1	-94...-50	-92…-50	-91…-50	-93…-50

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 < 980399	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:

$CPICH\_RSCP1,2|_{dBm} \geq$ -114 dBm for Bands I, IV, VI and X

$CPICH\_RSCP1,2|_{dBm} \geq$ -113 dBm for Band IX,

$CPICH\_RSCP1,2|_{dBm} \geq$ -112 dBm for Band II, V, VII and XI,

$CPICH\_RSCP1,2|_{dBm} \geq$ -111 dBm for Band III, VIII, XII, XIII and XIV.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \leq 20dB$$

Table 9.21

Parameter	Unit	Accuracy [chip]	Conditions			
			Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
			Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
SFN-SFN observed time difference type2	chip	± 0.5	-94...-50	-92…-50	-91…-50	-93...-50

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_RSCP1,2$|_{dBm}$ ≥ -114 dBm for Bands I, IV, VI and X,

CPICH_RSCP1,2$|_{dBm}$ ≥ -113 dBm for Band IX.

CPICH_RSCP1,2$|_{dBm}$ ≥ -112 dBm for Bands II, V, VII and XI,

CPICH_RSCP1,2$|_{dBm}$ ≥ -111 dBm for Band III, VIII, XII, XIII and XIV.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \leq 20dB$$

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_RSCPx,y$|_{dBm}$ ≥ -114 dBm.

$$\left.\frac{I_{o\_idle\_period}}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{CPICH\_E_c}{I_{or}}\right)\right|_{in\ dB} \leq 20dB\,,$$

where *x* and *y* represent cells measured using idle periods and $I_{o\_idle\text{-}period}$ 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	Unit	Accuracy [chip]	Conditions			
			Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
			Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
SFN-SFN observed time difference type 2	chip	± 0.5	-94...-50	-92…-50	-91…-50	-93...-50

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$|_{dBm}$ ≥ -114 dBm if CPICH_RSCP1 is on Bands I, IV, VI and X,

CPICH_RSCP1$|_{dBm}$ ≥ -113 dBm if CPICH_RSCP1 is on Band IX,

CPICH_RSCP1$|_{dBm}$ ≥ -112 dBm if CPICH_RSCP1 is on Bands II, V, VII and XI,

CPICH_RSCP1$|_{dBm}$ ≥ -111 dBm if CPICH_RSCP1 is on Band III, VIII, XII, XIII and XIV,

CPICH_RSCP2$|_{dBm}$ ≥ -114 dBm if CPICH_RSCP2 is on Bands I, IV, VI and X,

CPICH_RSCP2$|_{dBm}$ ≥ -113 dBm if CPICH_RSCP2 is on for Band IX,

CPICH_RSCP2$|_{dBm}$ ≥ -112 dBm if CPICH_RSCP2 is on for Bands II, V, VII and XI,

CPICH_RSCP2$|_{dBm}$ ≥ -111 dBm if CPICH_RSCP2 is on for Band III, VIII, XII, XIII and XIV,

| Channel 1_Io$|_{dBm}$ -Channel 2_Io$|_{dBm}$ | ≤ 20 dB,

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left| \left(\frac{CPICH\_E_c}{I_{or}} \right) \right|_{in\ dB} \leq 20dB .$$

Table 9.23

Parameter	Unit	Accuracy [chip]	Conditions			
			SFN-SFN observed time difference type 2 is on Band I, IV, VI and X	SFN-SFN observed time difference type 2 is on Band II, V, VII and XI	SFN-SFN observed time difference type 2 is on Band III, VIII, XII, XIII and XIV	SFN-SFN observed time difference type 2 is on Band IX
			Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
SFN-SFN observed time difference type 2	chip	± 1	-94...-50	-92…-50	-91…-50	-93...-50

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	Unit	Accuracy [chip]	Conditions			
			Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
			Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
UE RX-TX time difference	chip	± 1.5	-94...-50	-92…-50	-91…-50	-93...-50

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	Unit	Accuracy [chip]	Conditions			
			Band I, IV, VI and X	Band II, V, VII and XI	Band III, VIII, XII, XIII and XIV	Band IX
			Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]	Io [dBm/3,84 MHz]
UE RX-TX time difference	chip	± 1.0	-94...-50	-92…-50	-91…-50	-93...-50

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 9.31is valid under the following conditions:

P-CCPCH_RSCP ≥ -102 dBm.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left.\left(\frac{P-CCPCH\_E_c}{I_{or}}\right)\right|_{in\ dB} \leq 8dB$$

Table 9.31: P-CCPCH_RSCP Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal conditions	Extreme conditions	Io [dBm/3,84 MHz]
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 Ec/Io ≥ -8 dB

Table 9.31A: P-CCPCH_RSCP Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal conditions	Extreme conditions	Io [dBm/1.28 MHz]
P-CCPCH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 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 ≤ PCCPCH RSCP< -114	dBm
PCCPCH_RSCP_LEV _02	-114 ≤ PCCPCH RSCP< -113	dBm
PCCPCH_RSCP_LEV _03	-113 ≤ PCCPCH RSCP< -112	dBm
…	…	…
PCCPCH_RSCP_LEV _89	-27 ≤ PCCPCH RSCP< -26	dBm
PCCPCH_RSCP_LEV _90	-26 ≤ PCCPCH RSCP< -25	dBm
PCCPCH_RSCP_LEV _91	-25 ≤ 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_37158911999998	2322431999999.8750 ≤ UE GPS timing of Cell Frames for UE positioning < 2322431999999.9375	chip
GPS_TIME_37158911999999	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.

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 ≤ UPH < 1
UE_POWER_HEADROOM_1	1 ≤ UPH < 2
UE_POWER_HEADROOM_2	2 ≤ UPH < 3
UE_POWER_HEADROOM_3	3 ≤ UPH < 4
UE_POWER_HEADROOM_4	4 ≤ UPH < 5
UE_POWER_HEADROOM_5	5 ≤ UPH < 6
UE_POWER_HEADROOM_6	6 ≤ UPH < 7
UE_POWER_HEADROOM_7	7 ≤ UPH < 8
UE_POWER_HEADROOM_8	8 ≤ UPH < 9
UE_POWER_HEADROOM_9	9 ≤ UPH < 10
UE_POWER_HEADROOM_10	10 ≤ UPH < 11
UE_POWER_HEADROOM_11	11 ≤ UPH < 12
UE_POWER_HEADROOM_12	12 ≤ UPH < 13
UE_POWER_HEADROOM_13	13 ≤ UPH < 14
UE_POWER_HEADROOM_14	14 ≤ UPH < 15
UE_POWER_HEADROOM_15	15 ≤ UPH < 16
UE_POWER_HEADROOM_16	16 ≤ UPH < 17
UE_POWER_HEADROOM_17	17 ≤ UPH < 18
UE_POWER_HEADROOM_18	18 ≤ UPH < 19
UE_POWER_HEADROOM_19	19 ≤ UPH < 20
UE_POWER_HEADROOM_20	20 ≤ UPH < 21
UE_POWER_HEADROOM_21	21 ≤ UPH < 22
UE_POWER_HEADROOM_22	22 ≤ UPH < 23
UE_POWER_HEADROOM_23	23 ≤ UPH < 24
UE_POWER_HEADROOM_24	24 ≤ UPH < 25
UE_POWER_HEADROOM_25	25 ≤ UPH < 26
UE_POWER_HEADROOM_26	26 ≤ UPH < 27
UE_POWER_HEADROOM_27	27 ≤ UPH < 28
UE_POWER_HEADROOM_28	28 ≤ UPH < 29
UE_POWER_HEADROOM_29	29 ≤ UPH < 30
UE_POWER_HEADROOM_30	30 ≤ UPH < 31
UE_POWER_HEADROOM_31	UPH ≥ 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.	

9.2 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
			Iob [dBm/3,84 MHz]	
Iob	dBm/3,84 MHz	± 4	-103.. -74	Wide area BS
Iob	dBm/3,84 MHz	± 4	-93.. -64	Medium Range BS
Iob	dBm/3,84 MHz	± 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
			Iob [dBm/3,84 MHz]	
Iob	dBm/3,84 MHz	± 0.5	-103.. -74 AND for changes ≤ ±9.0 dB	Wide area BS
Iob	dBm/3,84 MHz	± 0.5	-93.. -64 AND for changes ≤ ±9.0 dB	Medium Range BS
Iob	dBm/3,84 MHz	± 0.5	-89.. -60 AND for changes <= ±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 ≤ RTWP < -111.9	dBm
RTWP_LEV _002	-111.9 ≤ RTWP < -111.8	dBm
…	…	…
RTWP_LEV _619	-50.2 ≤ RTWP < -50.1	dBm
RTWP_LEV _620	-50.1 ≤ RTWP < -50.0	dBm
RTWP_LEV _621	-50.0 ≤ 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	± 3	For -7<SIR<20 dB when Iob > -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	SIR < -11.0	dB
UTRAN_SIR_01	-11.0 ≤ SIR < -10.5	dB
UTRAN_SIR_02	-10.5 ≤ SIR < -10.0	dB
…	…	…
UTRAN_SIR_61	19.0 ≤ SIR < 19.5	dB
UTRAN_SIR_62	19.5 ≤ SIR < 20.0	dB
UTRAN_SIR_63	20.0 ≤ SIR	dB

9.2.3 SIR_{error}

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_{error} is calculated from SIR and SIR_{target}, see TS 25.215.

9.2.3.1 Accuracy requirement

Table 9.40

Parameter	Accuracy	Range
SIR_{error}	± 3 dB	The accuracy requirement for SIR_{error} is valid for SIR within the guaranteed accuarcy range specified in section 9.2.2.

NOTE: The accuracy requirement for SIR_{error} is the same as for the SIR measurement specified in section 9.2.2. SIR_{error} is calculated from SIR and SIR_{target}, see TS 25.215.

9.2.3.2 SIR_{error} measurement report mapping

The reporting range for SIR_{error} 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 ≤ SIR_{error} < -30.5	dB
UTRAN_SIR_ERROR_002	-30.5 ≤ SIR_{error} < -30.0	dB
…	…	…
UTRAN_SIR_ERROR_062	-0.5 ≤ SIR_{error} < 0.0	dB
UTRAN_SIR_ERROR_063	0.0 ≤ SIR_{error} < 0.5	dB
…	…	…
UTRAN_SIR_ERROR_123	30.0 ≤ SIR_{error} < 30.5	dB
UTRAN_SIR_ERROR_124	30.5 ≤ SIR_{error} < 31.0	dB
UTRAN_SIR_ERROR_125	31.0 ≤ 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
Ptot	%	± 5	For 5% ≤ Transmitted carrier power ≤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 < Transmitted carrier power ≤ 1	%
UTRAN_TX_POWER _002	1 < Transmitted carrier power ≤ 2	%
UTRAN_TX_POWER _003	2 < Transmitted carrier power ≤ 3	%
…	…	…
UTRAN_TX_POWER _098	97 < Transmitted carrier power ≤ 98	%
UTRAN_TX_POWER _099	98 < Transmitted carrier power ≤ 99	%
UTRAN_TX_POWER _100	99 < Transmitted carrier power ≤ 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
Pcode	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	± 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 ≤ Transmitted code power < -9.5	dBm
UTRAN_CODE_POWER _011	-9.5 ≤ Transmitted code power < -9.0	dBm
UTRAN_CODE_POWER _012	-9.0 ≤ Transmitted code power < -8.5	dBm
…	…	…
UTRAN_CODE_POWER _120	45.0 ≤ Transmitted code power < 45.5	dBm
UTRAN_CODE_POWER _121	45.5 ≤ Transmitted code power < 46.0	dBm
UTRAN_CODE_POWER _122	46.0 ≤ 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 ≤ 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	-∞ < Log10(Physical channel BER) < -2.06375	-
PhCh_BER_LOG_002	-2.06375≤ Log10(Physical channel BER) < -2.055625	-
PhCh_BER_LOG_003	-2.055625 ≤ Log10(Physical channel BER) < -2.0475	-
…	…	…
PhCh_BER_LOG_253	-0.024375 ≤ Log10(Physical channel BER) < -0.01625	-
PhCh_BER_LOG_254	-0.01625 ≤ Log10(Physical channel BER) < -0.008125	-
PhCh_BER_LOG_255	-0.008125 ≤ Log10(Physical channel BER) ≤ 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 ≤ Round trip time < 876.0625	chip
RT_TIME_0002	876.0625 ≤ Round trip time < 876.1250	chip
RT_TIME_0003	876.1250 ≤ Round trip time < 876.1875	chip
…	…	…
RT_TIME_32764	2922.6875 ≤ Round trip time < 2923.7500	chip
RT_TIME_32765	2923.7500 ≤ Round trip time < 2923.8125	chip
RT_TIME_32766	2923.8125 ≤ Round trip time < 2923.8750	chip
RT_TIME_32767	2923.8750 ≤ 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 ≤ Round trip time < 2923.9375	chip
RT_TIME_32768	2923.9375 ≤ Round trip time < 2924.0000	chip
RT_TIME_32769	2924.0000 ≤ Round trip time < 2924.0625	chip
RT_TIME_32770	2924.0625 ≤ Round trip time < 2924.1250	chip
RT_TIME_32771	2924.1250 ≤ Round trip time < 2924.1875	chip
…	…	…
RT_TIME_103038	7315.8125 ≤ Round trip time < 7315.8750	chip
RT_TIME_103039	7315.8750 ≤ Round trip time < 7315.9375	chip
RT_TIME_103040	7315.9375 ≤ Round trip time < 7316.0000	chip
RT_TIME_103041	7316.0000 ≤ 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 1/3rd with any amount of repetition or a maximum of 25% puncturing: for absolute BER value ≤ 15% Convolutional coding 1/2 with any amount of repetition or no puncturing: for absolute BER value ≤ 15% Turbo coding 1/3rd with any amount of repetition or a maximum of 20% puncturing: for absolute BER value ≤ 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	-∞ < Log10(Transport channel BER) < -2.06375	-
TrCh_BER_LOG_002	-2.06375≤ Log10(Transport channel BER) < -2.055625	-
TrCh_BER_LOG_003	-2.055625 ≤ Log10(Transport channel BER) < -2.0475	-
…	…	…
TrCh_BER_LOG_253	-0.024375 ≤ Log10(Transport channel BER) < -0.01625	-
TrCh_BER_LOG_254	-0.01625 ≤ Log10(Transport channel BER) < -0.008125	-
TrCh_BER_LOG_255	-0.008125 ≤ Log10(Transport channel BER) ≤ 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_00000000000000	UTRAN GPS timing of Cell Frames for UE positioning < 0.0625	chip
GPS_TIME_00000000000001	0.0625 ≤ UTRAN GPS timing of Cell Frames for UE positioning < 0.1250	chip
GPS_TIME_00000000000002	0.1250 ≤ UTRAN GPS timing of Cell Frames for UE positioning < 0.1875	chip
…	…	…
GPS_TIME_37158911999997	2322431999999.8125 ≤ UTRAN GPS timing of Cell Frames for UE positioning < 2322431999999.8750	chip
GPS_TIME_37158911999998	2322431999999.8750 ≤ UTRAN GPS timing of Cell Frames for UE positioning < 2322431999999.9375	chip
GPS_TIME_37158911999999	2322431999999.9375 ≤ 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^{-1}.
- 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 ≤ PRACH Propagation delay < 768	chip
PROP_DELAY_256	768 ≤ PRACH Propagation delay < 771	chip
PROP_DELAY_257	771 ≤ PRACH Propagation delay < 774	chip
PROP_DELAY_258	774 ≤ PRACH Propagation delay < 777	chip
…	…	…
PROP_DELAY_1020	3060 ≤ PRACH Propagation delay < 3063	chip
PROP_DELAY_1021	3063 ≤ PRACH Propagation delay < 3066	chip
PROP_DELAY_1022	3066 ≤ PRACH Propagation delay < 3069	chip
PROP_DELAY_1023	3069 ≤ 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_PREAMPLE_000	Acknowledged PRACH preambles = 0	-
ACK_PRACH_PREAMPLE_001	Acknowledged PRACH preambles = 1	-
ACK_PRACH_PREAMPLE_002	Acknowledged PRACH preambles = 2	-
…	…	…
ACK_PRACH_PREAMPLE_237	Acknowledged PRACH preambles = 237	-
ACK_PRACH_PREAMPLE_238	Acknowledged PRACH preambles = 238	-
ACK_PRACH_PREAMPLE_239	Acknowledged PRACH preambles = 239	-
ACK_PRACH_PREAMPLE_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 ≤ SFN-SFN observed time difference < -19199.9375	chip
SFN-SFN_TIME _00001	-19199.9375 ≤ SFN-SFN observed time difference < -19199.8750	chip
…	…	…
SFN-SFN_TIME _614398	19199.8750 ≤ SFN-SFN observed time difference < 19199.9375	chip
SFN-SFN_TIME _614399	19199.9375 ≤ SFN-SFN observed time difference ≤ 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
Ptot	%	± 5	For 5% ≤ Transmitted carrier power of all codes not used for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH or E-HICH transmission ≤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 < DL Transmission Branch Load ≤ 1	%
branch_load _002	1 < DL Transmission Branch Load ≤ 2	%
branch_load _003	2 < DL Transmission Branch Load ≤ 3	%
…	…	…
branch_load _098	97 < DL Transmission Branch Load ≤ 98	%
branch_load _099	98 < DL Transmission Branch Load ≤ 99	%
branch_load _100	99 < DL Transmission Branch Load ≤ 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	± 3	For -15 dB ≤ RSEPS ≤ 0 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	RSEPS < -15.0	dB
RSEPS _LEV _001	-15.0 ≤ RSEPS < -14.9	dB
RSEPS _LEV _002	-14.9 ≤ RSEPS < -14.8	dB
…	…	…
RSEPS _LEV _149	-0.2 ≤ RSEPS < -0.1	dB
RSEPS _LEV _150	-0.1 ≤ RSEPS < 0	dB
RSEPS _LEV _151	0 ≤ RSEPS	dB

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.

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 +/-3.29σ if the probability of failing a "good DUT" in a single test is to be kept at 0.1%. It is more reasonable to set the limit tighter and test the DUT by counting the rate of measurements that are within he 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.

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 spectal 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 $Ioc_{,n}$ shall be the same as the noise spectral density Ioc specified for testing a UE with a single antenna connector.

A.4 Idle Mode

A.4.1 (void)

A.4.2 Cell Re-Selection

Two scenarios are considered:

- Scenario 1: Single carrier case
- Scenario 2: Multi carrier case

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_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_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
$Qoffset2_{s,n}$	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

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: $T_{evaluateFDD} + T_{SI}$,

where:

$T_{evaluateFDD}$ 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.4.2.2 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/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 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	
$Qoffset2_{s,n}$	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.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: $T_{evaluateFDD} + T_{SI}$,

where:

$T_{evaluateFDD}$ 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.4.3 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/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	0	-5
I_{oc}	dBm/3,84 MHz	-70	
CPICH_Ec/Io	dB	-13	-16.2
CPICH_RSCP	dBm	-80	-85
Propagation Condition		AWGN	
Cell_selection_and_ reselection_quality_measure		CPICH E_c/N_0	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
$Qoffset1_{s,n}$	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	s	0	
$Ssearch_{RAT}$	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	
RXLEV	**dBm**	-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 s + $T_{BCCH,}$ where T_{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* $T_{measureGSM}$ + T_{BCCH}, where:

$T_{measureGSM}$ See Table 4.1 in section 4.2.2.

T_{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 s + T_{BCCH}, allow 26 s + T_{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/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	20	-9
I_{oc}	dBm/3,84 MHz	-81	
CPICH_Ec/Io	dB	-10.0	-19.5
CPICH_RSCP	dBm	-70	-100
Propagation Condition		AWGN	
Cell_selection_and_ reselection_quality_measure		CPICH E_c/N_0	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
$Qoffset1_{s,n}$	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	s	0	
$Ssearch_{RAT}$	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 s + $T_{BCCH,}$ where T_{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: Max(3* $T_{measureFDD}$, $T_{measureGSM}$+DRX cycle length) + T_{BCCH}, where:

$T_{measureFDD}$ See Table 4.1 in section 4.2.2.

$T_{measureGSM}$ See Table 4.1 in section 4.2.2.

DRX cycle length 1.28s see Table A.4.7.A

T_{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 s + T_{BCCH}, allow 7.7 s + T_{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/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	40	10
I_{oc}	dBm/3,84 MHz	-100	
CPICH_Ec/Io	dB	-10.0	-10.4
CPICH_RSCP	dBm	-70	-100
Propagation Condition		AWGN	
Cell_selection_and_ reselection_quality_measure		CPICH E_c/N_0	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
$Qoffset1_{s,n}$	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	s	0	
$Ssearch_{RAT}$	dB	0	
SHCS,RATm	dB	25	
$S_{limit,SearchRAT}$	dB	0	
Penalty_time	s	0 (default value)	
HCS_PRIO		0 (default value)	
Qhcs		0 (default value)	
T_{Crmax}	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 s + $T_{BCCH,}$ where T_{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 s + $T_{measureGSM}$+DRX cycle length + T_{BCCH}, where:

$T_{measureFDD}$ See Table 4.1 in section 4.2.2.

$T_{measureGSM}$ See Table 4.1 in section 4.2.2.

DRX cycle length 1.28s see Table A.4.7D

T_{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 s + T_{BCCH}, allow 37.7 s + T_{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	
$Qoffset1_{s,n}$	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			
DL timeslot number		**0**		**8**	
		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_t_{offset}	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			
$Qoffset2_{s,n}$	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	
$Qoffset1_{s,n}$	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			
DL timeslot number		**0**		**DwPTs**	
		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			
$Qoffset1_{s,n}$	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:

$$T_{evaluateTDD} + T_{SI}$$

where:

$T_{evaluateTDD}$ 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.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 ±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±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/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	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/Io	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 DPCCH to Cell 2 less than 190 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

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/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	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/Io	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_{or}. 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 DPCCH 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/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.5.0F: 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:

$T_{Handover\ delay}$ = 90 ms (Table 5.2) + T_{offset} + T_{UL}

T_{offset} : Equal to 4.65 ms, GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

T_{UL}: Equal to 4.65 ms, the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame.

This gives a total of 99.3 ms, allow 100 ms in the test case.

A.5.5 Cell Re-selection in CELL_FACH

A.5.5.1 One frequency present in neighbour list

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 #I	-	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 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	dBm	21		21		21		21		21		21	
Qoffset $2_{s,n}$	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:

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

where:

$T_{Measurement\_Period\ Intra}$ is specified in 8.4.2.2.2 as 200 ms in this case.

T_{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 1.55 s, allow 1.6 s in the test case.

A.5.5.2 Two frequencies present in the neighbour list

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 #I	-	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	½
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/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	-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/Io	dB	-15	-13	-13	-15	-20		-20		-20		-20	
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	dBm	21		21		21		21		21		21	
$Qoffset2_{s,n}$	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	
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-reselection 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:

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

where:

$T_{\text{measurement inter}}$is specified in 8.4.2.3.2 as 480 ms in this case.

T_{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.5.5.3 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 #I	-	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	½
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/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
S-CCPCH_Ec/Ior	dB	-12	
OCNS_Ec/Ior	dB	-1.295	
$\hat{I}_{or}/I_{oc}$	dB	0	-5
I_{oc}	dBm/3, 84 MHz	-70	
CPICH_Ec/Io	dB	-13	-16.2
CPICH_RSCP	dBm	-80	-85
Propagation Condition		AWGN	
Cell_selection_and_reselection_quality_measure		CPICH Ec/Io	
Qqualmin	dB	-20	
Qrxlevmin	dBm	-115	
UE_TXPWR_MAX_RACH	dBm	21	
$Qoffset1_{s,n}$	dB	C1, C2: 0	
Qhyst1	dB	0	
Treselection	s	0	
$Ssearch_{RAT}$	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-reselection 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

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

where:

$T_{identify,GSM}$ Specified in 8.4.2.5.2.1, here it is 2880 ms

$T_{measurement,GSM}$ Specified in 5.5.2.1.4, here it is 640 ms

T_{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_{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.5.5.4 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
MBMS preferred frequency layer				**Not used**
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 #I	-	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 #I	-	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/3,84 MHz	-70					
CPICH_Ec/Io	dB	- infinity	-15	-13	-13	-13	-16.2
Propagation Condition		AWGN					
Cell_selection_ and_reselection_ quality_measure		CPICH E_c/N_0			CPICH E_c/N_0		
Qqualmin	dB	-20			-20		
Qrxlevmin	dBm	-115			-115		
UE_TXPWR_ MAX_RACH	dBm	21			21		
$Qoffset2_{s,n}$	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-reselection 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:

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

where:

$T_{Measuremnt, inter}$ Specified in 8.4.2.3.2 as 480ms

$T_{identify, inter}$i 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_{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.

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.5.6 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_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	dBm	21		21		21		21		21		21	
$Qoffset2_{s,n}$	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	

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: $T_{evaluateFDD} + T_{SI}$,

where:

$T_{evaluateFDD:}$ See section 5.6.2.

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.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 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	dBm	21		21		21		21		21		21	
$Qoffset2_{s,n}$	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: $T_{evaluateFDD} + T_{SI}$,

where:

$T_{evaluateFDD}$: See section 5.6.2.

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.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, A5.8B, 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 #I	-	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/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.			-6,8		
OCNS_Ec/Ior	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/Io	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_c/N_0			CPICH E_c/N_0		
Qqualmin	dB	-20			-20		
Qrxlevmin	dBm	-115			-115		
UE_TXPWR_ MAX_RACH	dBm	21			21		
$Qoffset2_{s,n}$	dB	C1, C2: 0			C2, C1: 0		
Qhyst2	dB	0			0		
$Qoffset1_{s,n}$	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 Ior.							

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 s + $T_{BCCH,}$ where T_{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: Max(3* $T_{measureFDD}$, $T_{measureGSM}$+DRX cycle length) + T_{BCCH}, where:

$T_{measureFDD}$ See Table 4.1 in section 4.2.2.

$T_{measureGSM}$ See Table 4.1 in section 4.2.2.

DRX cycle length 160mss see Table A.4.7.A

T_{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 s + T_{BCCH}, allow 2.75 s + T_{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_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	dBm	21		21		21		21		21		21	
$Qoffset2_{s,n}$	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	

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: $T_{evaluateFDD} + T_{SI}$,

where:

$T_{evaluateFDD}$: See section 5.7.2.

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.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/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 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	dBm	21		21		21		21		21		21	
$Qoffset2_{s,n}$	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.5.7.2.2 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: $T_{evaluateFDD} + T_{SI}$,

where:

$T_{evaluateFDD}$: See section 5.7.2.

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.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.5YY: 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 ±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_{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 $T_{interrupt1}=T_{IU}+22$ ms=24 ms.

The total delay D_{cell_change}=50 + 24 ms = 74 ms

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_{SI}	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_{SI} 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_{SI}	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_{SI} 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 $T_{RE\text{-}ESTABLISH}$ 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

$$T_{RE\text{-}ESTABLISH} = T_{RRC\text{-}RE\text{-}ESTABLISH} + T_{UE\text{-}RE\text{-}ESTABLISH\text{-}REQ\text{-}KNOWN}.$$

where

$T_{RRC\text{-}RE\text{-}ESTABLISH}=160ms+(N_{313}-1)*10ms+T_{313}$

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

$N_{313}=20$

$T_{313}=0s$

$T_{search}=100ms$

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

$$T_{RE\text{-}ESTABLISH} = T_{RRC\text{-}RE\text{-}ESTABLISH} + T_{UE\text{-}RE\text{-}ESTABLISH\text{-}REQ\text{-}UNKNOWN}.$$

where

$T_{RRC\text{-}RE\text{-}ESTABLISH}$=160ms+($N_{313}$-1)*10ms+$T_{313}$

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

N_{313}=20

T_{313}=0s

T_{search}=800ms

NF is the number of different frequencies in the monitored set. 3 frequencies are assumed in this test case.

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 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 p-m)	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

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 continously 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 beacuse 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.6.4.2 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 begining of T2 can be expressed as:

$$T_{ramp} + T_{detect\_block} + T_{notify} + T_{modify} + T_{L1\_proc} + T_{align\_TTI}$$

where:

T_{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_{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 *Elimination* 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 *Elimination* criterion is performed and the last slot needed for triggering the *Elimination* criterion on L1, T_{detect_block} becomes 15 slots +14 slots =19.33 ms.

T_{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_{modify} Equal to $MAX(T_{adapt\_max}, T_{TTI}) = MAX(0, 40)=40ms$

T_{adapt_max} Equals to 0ms for the case without codec.

T_{L1_proc} Equals 15ms.

T_{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_{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	
β_d/β_C		9/15	Care needs to be taken to ensure that TFCS with β_d/β_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	
Δ_{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 -3dBm and -2dBm 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_{DPCCH} power shall be between 0dBm and 1dBm for a power class 3 UE, or between -3dBm and -2dBm for a power class 4 UE, and 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.

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-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.6.6.1.1.1 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_{ref}=1, K_{ref}=18 and K_{127}=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_{127}=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 * sqrt (1/4) * 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

$$\beta_{ed,k,j,uq} = \beta_{ed,k,j,uq} = \sqrt{2} \times \beta_{ed,j,harq}$$

$\beta_{ed,k,j,uq}$= 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 $\beta_{ed,k} \le \beta_{ed,k,j,uq}$ holds.

According to 25.213 Table 1B.2 in subclause 4.2.1.3, the corresponding quantised amplitude ratio has index 25, $A_{ed} = \beta_{ed}/\beta_c$= 106/15 for each of the two SF/2 E-DPDCH 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.

$$NRPM_j = \left(PMax_j - P_{DPCCH} - P_{DPDCH} - P_{HS-DPCCH} - P_{E-DPCCH}\right) / P_{DPCCH}$$

$$= \frac{PMax_j}{P_{DPCCH}} - \frac{\beta_c^2 + \beta_d^2 + \beta_{ec}^2 + \beta_{hs}^2}{\beta_c^2}$$

$$= \frac{PMax_j}{P_{DPCCH}} - \left(1 + \frac{\beta_d^2}{\beta_c^2} + A_{ec}^2 + A_{hs}^2\right)$$

For a power class 3 UE $PMax_j$ = 23.5dBm = 223.87mW, or for a power class 4 UE, $PMax_j$ = 20.5dBm = 112.20mW

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 $P_{DPCCH} \leq (223.87/109.23) = 2.04mW = 3.11dBm$ for a class 3 UE or $P_{DPCCH} \leq (112.20/109.23) = 1.03mW = 0.12dBm$ for a class 4 UE

From table 6.0A the accuracy of the Pdpcch estimate used for E-TFC selection in this scenario is ±2dB for power class 3 or ±2.5dB for power class 4. Therefore, for $P_{DPCCH} \leq 1.11dBm$ (class 3) or -2.38dBm (class 4), the UE shall be able to support E-TFC index 127. Since power control granularity is 1dB, the UE output power should be maintained so that $0dBm \leq P_{DPCCH} \leq 1dBm$ throughout this phase for a class 3 UE, or so that $-3dBm \leq P_{DPCCH} \leq -2dBm$ 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 cababilites 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 = 16.666ms.

The UE shall have evaluated and started to use the new restriction criteria with T_s = (Power level change time + P_{DPCCH} filtering period + E-TFC estimation rate + Maximum time from RGCH reception to E-TFC transmission) from the start of the time period

$$= 16.66ms + 10ms + 10ms + 7.53ms$$

$$= 44.19ms, \text{ allow } 45ms$$

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	
β_d/β_C		9/15	Care needs to be taken to ensure that TFCS with β_d/β_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	
Δ_{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 3dBm and 4dBm for a power class 3 UE, or between 0dBm and 1dBm 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 3dBm and 4dBm for a power class 3 UE, or between 0dBm and 1dBm for a power class 4 UE, and 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.

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

$$\beta ed,j,harq = 5 * sqrt\ (1/6) * sqrt\ (11484 / 18) = 51.56$$

For the SF/2 codes, the unquantised gain factor $\beta_{ed,k,j,uq}$ for each of these two codes is according to $\beta_{ed,k,j,uq} = \beta_{ed,k,j,uq} = \sqrt{2} \times \beta_{ed,j,harq}$

$$\beta ed,k,j,uq = sqrt(2) * 51.56 = 72.91$$

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 $\beta_{ed,k} \le \beta_{ed,k,j,uq}$ 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.

$$NRPM_j = \left(PMax_j - P_{DPCCH} - P_{DPDCH} - P_{HS-DPCCH} - P_{E-DPCCH}\right) / P_{DPCCH}$$

$$= \frac{PMax_j}{P_{DPCCH}} - \frac{\beta_c^2 + \beta_d^2 + \beta_{ec}^2 + \beta_{hs}^2}{\beta_c^2}$$

$$= \frac{PMax_j}{P_{DPCCH}} - \left(1 + \frac{\beta_d^2}{\beta_c^2} + A_{ec}^2 + A_{hs}^2\right)$$

For a power class 3 UE $PMax_j$ = 24dBm = 251.2mW, or for a power class 4 UE, $PMax_j$ = 21dBm = 125.9mW

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 $P_{DPCCH} \leq (251.2/68.9) = 3.64mW = 5.61dBm$ for a class 3 UE or $P_{DPCCH} \leq (125.9/68.9) = 1.82mW = 2.61dBm$ for a class 4 UE

From table 6.0A the accuracy of the Pdpcch estimate used for E-TFC selection in this scenario is ±2dB for power class 3 or ±2.5dB for power class 4. Therefore, for $P_{DPCCH} \leq 3.61dBm$ (class 3) or 0.11dBm (class 4), the UE shall be able to support E-TFC index 127. Since power control granularity is 1dB, the UE output power should be maintained so that $3dBm \leq P_{DPCCH} \leq 4dBm$ throughout this phase for a class 3 UE, or so that $0dBm \leq P_{DPCCH} \leq 1dBm$ 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 cababilites 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 = 13.33ms.

The UE shall have evaluated and started to use the new restriction criteria with T_s = (Power level change time + Pdpcch filtering period + E-TFC estimation rate + Maximum time from RGCH reception to E-TFC transmission) from the start of the time period

= 13.33ms + 2ms + 2ms + 5.53ms

= 22.86ms, allow 23ms

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	μs	+/-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 +/- 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 μs 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 +/- 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 μs 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 +/- 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 +/- 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 +/- 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 +/- 1.5chips 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 +/- 1.5 chips with respect to the first detected path (in time) of the downlink DPCCH/DPDCH of cell 1.

p) Test system shall verify that the UE transmit timing offset stays within T_0 +/- 1.5 chips with respect to the first detected path (in time) of the downlink DPCCH/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 x $TTI_{UL\ DCCH}$ 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/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	Note 1				N/A				N/A			
OCNS_Ec/Ior	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/Io	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

a) 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.

b) The UE may send one Event 1C triggered measurement report for Cell3 after the beginning of the time period T1.

c) 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.

d) 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.

e) 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 x $TTI_{UL\ DCCH}$ 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/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	Note 1				N/A				N/A			
OCNS_Ec/Ior	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/Io	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_{or}

A.8.1.3.2 Test Requirements

a) 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.

b) 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.

c) 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.

d) 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 $TTI_{UL\ DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in the UL DCCH.

A.8.1.4 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/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	7.29	3.29	3.29	7.29
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.8.1.4.2 Test Requirements

a) The number of received event 1A reports for Cell 2 during time period T1 shall be less than 60.

b) During the first 1 s of time period T2 no event reports shall be counted.

c) 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 Case1 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	-∞	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	-∞	-17.6	-14.6	-17.6	-14.6	-17.6	-17.6	-14.6
$\frac{SCH\_\hat{E}_{c,\text{maxpath}}}{I_o}$	dB	-∞	-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 x $TTI_{UL\ DCCH}$ 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/Ior	dB	-10		-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12		-12	
SCH_Ec/Ior	dB	-9.3		-9.3		-9.3		-9.3	
PICH_Ec/Ior	dB	-15		-15		-15		-15	
DPCH_Ec/Ior	dB	n.a.		Note 1		Note 1		Note 1	
OCNS_Ec/Ior	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/Io	dB	-∞	-18.0	-16.5	-14.5	-16.5	-14.5	-13.5	-∞
$\frac{SCH\_\hat{E}_{c,\max path}}{I_o}$	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_{or}. NOTE 3: CPICH_Ec/Io, SCH_Ec_maxpath/Io, and I_o 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 $TTI_{UL\ DCCH}$ 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 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	
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	

TableA.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_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	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_Ec/Io	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

a) 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.

b) 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 x $TTI_{UL\ DCCH}$ 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/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	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

a) 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.

b) 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/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	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/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	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

a) 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.

b) 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.8.3 (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 - GSM carrier RSSI measurement - GSM Initial BSIC identification		 DL Compressed mode reference pattern 2 in Set 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.
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/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
DPCH_Ec/Ior	dB	Note 1
OCNS		Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
I_{oc}	dBm/ 3,84 MHz	-85
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.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/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
DPCH_Ec/Ior	dB	Note 1
OCNS		Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
I_{oc}	dBm/ 3,84 MHz	-85
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.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 Interfrequency measurements - GSM carrier RSSI measurement - GSM Initial BSIC identification - GSM BSIC reconfirmation		 DL compressed mode reference pattern 3, set 1 DL compressed mode reference pattern 3, set 2 DL compressed mode reference pattern 3, set 3 DL compressed mode reference pattern 3, set 4	Only applicable for UE requiring compressed mode patterns. As specified in table A.22A TS 25.101 section A.5 As specified in table A.22A TS 25.101 section A.5 As specified in table A.22A TS 25.101 section A.5 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	5	
T3		8	
T4		15	

TableA.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/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		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/Io	dB	-13	-18,6	-Infinity	-13	-13	-18.6	-18.6	CPICH_Ec/Io	dB	-13
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.8.23: 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:

$$T_{\text{identify, inter}} = T_{\text{basic identify FDD,inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{Freq} \text{ ms} = 3.3 \text{ s}$$

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_{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: $2*T_{Measurement\ Period,\ GSM}$ = 2* 480ms =960ms.

BSIC verification: $T_{identify\ abort}$5.28 s.

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/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	-	-15	-
OCNS_Ec/Ior		dB	-1.11	-0.94	-1.11	-0.94	-1.11	-0.94
Ioc	Band I, IV, VI, X	dBm/3,84 MHz	-77.54		-59.98		-97.47	
	Band II, V, VII, XI						-95.47	
	Band III, VIII, XII, XIII, XIV						-94.47	
	Band IX (Note 2)						-96.47	
Îor/Ioc		dB	4	0	9	0	0	-6.53
CPICH RSCP, Note 1	Band I, IV, VI, X	dBm	-83.5	-87.5	-60.98	-69.88	-107.47	-114.0
	Band II, V, VII, XI						-105.47	-112
	Band III, VIII, XII, XIII, XIV						-104.47	-111
	Band IX (Note 2)						-106.47	-113
Io, Note 1	Band I, IV, VI, X	dBm/3,84 MHz	-71		-50		-94	
	Band II, V, VII, XI						-92	
	Band III, VIII						-91	
	Band IX (Note 2)						-93	
Propagation condition		-	AWGN		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.								
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
Ioc	Band I, IV, VI, X	dBm/3,84 MHz	-60.00	-60.00	-84.00	-94.46
	Band II, V, VII, XI				-82.00	-92.46
	Band III, VIII, XII, XIII, XIV				-81.00	-91.46
	Band IX (Note 2)				-83.00	-93.46
Îor/Ioc		dB	9.54	9.54	0	-9.54
CPICH RSCP, Note 1	Band I, IV, VI, X	dBm	-60.46	-60.46	-94.0	-114.0
	Band II, V, VII, XI				-92.0	-112.0
	Band III, VIII, XII, XIII, XIV				-91.0	-111.0
	Band IX (Note 2)				-93.0	-113.0
Io, Note 1	Band I, IV, VI, X	dBm/3,84 MHz	-50.00	-50.00	-81.0	-94.0
	Band II, V, VII, XI				-79.0	-92.0
	Band III, VIII, XII, XIII, XIV				-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.						
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	.2.56	-0.94
Ioc	Band I, IV, VI, X	dBm/ 3,84 MHz	-56.98		-89.07		-94.98	
	Band II, V, VII, XI						-92.98	
	Band III, VIII, XII, XIII, XIV						-91.98	
	Band IX (Note 2)						-93.98	
Îor/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	dBm/3,84 MHz	-50		-86		-94	
	Band II, V, VII, XI						-92	
	Band III, VIII, XII, XIII, XIV						-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.								
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
Ioc	Band I, IV, VI, X	dBm/ 3,84 MHz	-52.22	-52.22	-87.27	-87.27	-94.46	-94.46
	Band II, V, VII, XI						-92.46	-92.46
	Band III, VIII, XII, XIII, XIV						-91.46	-91.46
	Band IX (Note 2)						-93.46	-93.46
Îor/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	dBm/3, 84 MHz	-50	-50	-86	-86	-94	-94
	Band II, V, VII, XI						-92.0	-92.0
	Band III, VIII, XII, XIII, XIV						-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.								
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 and X; -98 dBm for frequency band IX, -97dBm for frequency bands II, V, VII and XI; 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 ≤ CPICH Ec/Io -3.2…2 for -16 ≤ CPICH Ec/Io < -14 -4.2…3 for -20 ≤ CPICH Ec/Io < -16	-4.2…3	-94...-87(Band I, IV, VI, X) -92…-85 (Band II, V, VII, XI) -91…-84 (Band III, VIII, XII, XIII, XIV) 93…-86 (Band IX (Note 1))
		± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-87...-50(Band I, IV, VI, X) -85…-50 (Band II, V, VII, XI) -84…-50 (Band III, VIII, XII, XIII, XIV) -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.				

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	±2.7 for -14 ≤ CPICH Ec/Io ±3.2 for -16 ≤ CPICH Ec/Io < -14 ±4.2 for -20 ≤ CPICH Ec/Io < -16	± 4.2	-94...-87(Band I, IV, VI, X) -92…-85 (Band II, V, VII, XI) -91…-84 (Band III, VIII, XII, XIII, XIV) -93…-86 (Band IX (Note 1))
		± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-87...-50 (Band I, IV, VI, X) -85…-50 (Band II, V, VII, XI) -84…-50 (Band III, VIII, XII, XIII, XIV) -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.				

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
Ioc	Band I, IV,VI, X	dBm/ 3,84 MHz	-52.22	-52.22	-70.27	-70.27	-94.46	-94.46
	Band II, V, VII, XI						-92.46	-92.46
	Band III, VIII, XII, XIII, XIV						-91.46	-91.46
	Band IX (Note 2)						-93.46	-93.46
Îor/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	dBm/ 3,84 MHz	-50	-50	-69	-69	-94	-94
	Band II, V, VII, XI						-92	-92
	Band III, VIII, XII, XIII, XIV						-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.								
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	Cell3	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
Ioc	Band I, IV,VI, X	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, XI								-92.45	-92.45	-73.45
	Band III, VIII, XII, XIII, XIV								-91.45	-91.45	-72.45
	Band IX (Note 3)								-93.45	-93.45	-74.45
Îor/Ioc		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	dBm/ 3,84 MHz	-50 (Note 2)	-50	-69	-90 (Note 2)	-90	-80	-94 (Note 2)	-94	-75
	Band II, V, VII, XI								-92 (Note 2)	-92	-73
	Band III, VIII, XII, XIII, XIV								-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.

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; -98 dBm for frequency band IX; -97dBm for frequency bands II,V, VII, XI; and -96dBm for frequency band III, VIII, XII, XIII, XIV) 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) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -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.

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) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -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.				

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	
Target quality value on DTCH	**BLER**	**0.01**	
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
Îor/Ioc	dB	-1
Ioc	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
Îor/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
Range 1	Io	dBm/3,84 MHz	-94…-70 (Band I, IV, VI) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -93…-70 (Band IX (Note 2))	-94…-70(Band I, IV, VI, X) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -93…-70 (Band IX (Note 2))
Range 2			-94…-50 (Band I, IV, VI) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -93…-50 (Band IX (Note 2))	-94…-50 (Band I, IV, VI, X) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -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 *Îor/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.

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/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
Î or/Ioc		dB	10.1	10.1
Ioc		dBm/ 3,84 MHz	*Io -10.6 dB = Ioc,* Note 1	*Io -10.6 dB = Ioc,* Note 1
Range 1	Io	dBm/ 3,84 MHz	-94…-70 (Band I, IV, VI) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -93…-70 (Band IX (Note 2))	-94…-70 (Band I, IV, VI, X) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -93…-70 (Band IX (Note 2))
Range 2			-94…-50 (Band I, IV, VI) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII) -93…-50 (Band IX (Note 2))	-94…-50 (Band I, IV, VI, X) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII) -93…-50 (Band IX (Note 2))
Propagation condition		-	AWGN	
NOTE 1: *Ioc* level shall be adjusted in each carrier frequency according the total signal power spectral density *Io* at receiver input and the geometry factor *Î or/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.				

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
Îor/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
Range 1	Io	dBm/3,84 MHz	-94…-70 (Band I, IV, VI) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -93…-70 (Band IX (Note 2))	-94…-70 (Band I, IV, VI, X) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -93…-70 (Band IX (Note 2))
Range 2			-94…-50 (Band I, IV, VI) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -93…-50 (Band IX (Note 2))	-94…-50 (Band I, IV, VI, X) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -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 *Îor/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.

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/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
Îor/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
CPICH_Ec/Io, Note 2		dB	-13.2	-13.2
Range 1	Io	dBm/3,84 MHz	-94…-70 (Band I, IV, VI) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -93…-70 (Band IX (Note 3))	-94…-70 (Band I, IV, VI, X) -92…-70 (Band II, V, VII, XI) -91…-70 (Band III, VIII, XII, XIII, XIV) -93…-70 (Band IX (Note 3))
Range 2			-94…-50 (Band I, IV, VI) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -93…-50 (Band IX (Note 3))	-94…-50 (Band I, IV, VI, X) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -93…-50 (Band IX (Note 3))

NOTE 1: *Ioc* level shall be adjusted according the total signal power spectral density *Io* at receiver input and the geometry factor *Îor/Ioc*.
NOTE 2: Io and CPICH Ec/Io 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.

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	
Time		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
Îor/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 *Io* 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
Îor/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) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -93…-50 (Band IX (Note 2))	-94…-50 (Band I, IV, VI, X) -91…-50 (Band III, VIII, XII, XIII, XIV) -92…-50 (Band II, V, VII, XI) -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 *Îor/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.

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
Îor/Ioc	dB	10.5	10.5
Ioc	dBm/ 3,84 MHz	Io -10.9 dB = Ioc, Note 1	Io-13.7 dB = Ioc, Note 1
Io	dBm/ 3,84 MHz	-94…-50 (Band I, IV, VI, X) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -93…-50 (Band IX (Note 2))	-94…-50 (Band I, IV, VI, X) -92…-50 (Band II, V, VII, XI) -91…-50 (Band III, VIII, XII, XIII, XIV) -93…-50 (Band IX (Note 2))
Propagation condition	-	AWGN	

NOTE1: Ioc level shall be adjusted according the total signal power spectral density Io at receiver input and the geometry factor Îor/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.

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	
β_{ec}/β_c		5/15	
β_{ed_ref}/β_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%.

Annex B (informative): Change History

TSG	Doc	CR	R	Title	Cat	Curr	New	Work Item
RP-37				Rel-8 version created based on v7.9.0			8.0.0	
RP-37	RP-070658	0916		Introduction of UMTS1500 requirements (Rel-8)	B	7.9.0	8.0.0	RInImp8-UMTS1500
RP-38	RP-070933	0922		Title change for test case in Annex A.5.4.4	A	8.0.0	8.1.0	TEI6
RP-38	RP-070933	0925	1	Removal of square brackets in cell identification test case	A	8.0.0	8.1.0	TEI6
RP-38	RP-070934	0919	1	Addition of E-DPCCH boosting to ETFC restriction requirements	A	8.0.0	8.1.0	RANimp-16QamUplink
RP-39	RP-080119	0929		Correction to Annex A.5.5.4	A	8.1.0	8.2.0	TEI6
RP-39	RP-080124	0926		Introduction of UMTS700 requirements	B	8.1.0	8.2.0	RInImp8-UMTS700
RP-40	RP-080321	0936		Correction to A.5.5.4 and A.5.6.3	A	8.2.0	8.3.0	TEI6
RP-40	RP-080325	0937		Updates of TS25.133 to include requirements for UTRA to E-UTRA mobility	B	8.2.0	8.3.0	LTE-RF
RP-41	RP-080637	941	1	Updates of TS25.133 requirements for UTRA to E-UTRA mobility	F	8.3.0	8.4.0	LTE-RF
RP-41	RP-080637	946		Updates of TS25.133 to include requirements for UTRA to E-UTRA mobility	F	8.3.0	8.4.0	LTE-RF
RP-41	RP-080626	943		Modification of new cell identification time (intra-frequency) when UE DRX is enabled	A	8.3.0	8.4.0	RANimp-CPC
RP-41	RP-080630	953		Correction of UTRAN to GSM relection Scenario 3	A	8.3.0	8.4.0	TEI6
RP-41	RP-080627	947	1	Performance requirements for mobility for Enhanced Uplink for CELL_FACH state and Enhanced UE DRX	B	8.3.0	8.4.0	RANimp-UplinkEnhState
RP-41	RP-080627	945		RRC re-establishment requirements	F	8.3.0	8.4.0	TEI8

History

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