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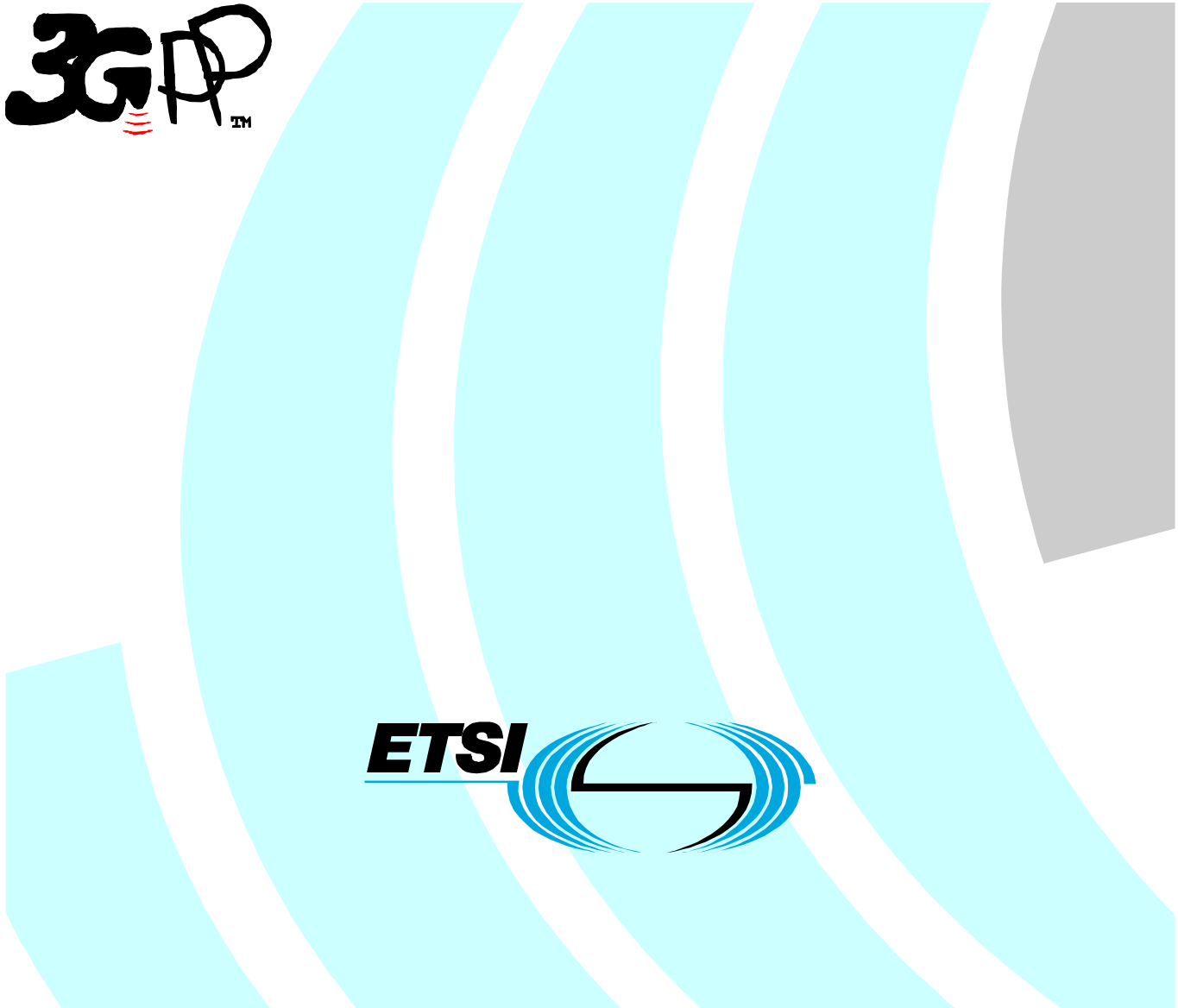
Technical Specification

Universal Mobile Telecommunications System (UMTS);
Requirements for support of
radio resource management (TDD)
(3GPP TS 25.123 version 3.10.0 Release 1999)



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Foreword

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Contents

Foreword

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

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1 Scope

This Technical Specification specifies requirements for support of Radio Resource Management for TDD. These requirements include requirements on measurements in UTRAN and the UE as well as requirements on node dynamic 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] (void)

[2] (void)

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

[4] 3GPP TS 25.104: "UTRAN(BS) FDD; Radio transmission and reception ".

[5] 3GPP TS 25.102: "UTRAN (UE) TDD; Radio transmission and reception ".

[6] 3GPP TS 25.105: "UTRAN (BS) TDD; Radio transmission and reception ".

[7] 3GPP TS 25.303: “Interlayer Procedures in Connected Mode”.

[8] (void)

[9] 3GPP TS 25.142: "Base station conformance testing (TDD)".

[10] (void)

[11] (void)

[12] 3GPP TR 25.922: "RRM Strategies".

[13] 3GPP TS 25.321: “MAC protocol specification”.

[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] 3GPP TS 25.224: "Physical layer procedures (TDD)".

[18] 3GPP TS 25.304: "UE procedures in idle mode".

[19] 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 measuremement of mobile radio equipment characteristics; Sub-part 2: Examples and annexes".

[20] 3GPP TS 05.05: "Radio transmission and reception".

[21] 3GPP TS 05.08: "Radio subsystem link control".

[22] 3GPP TS 05.10: "Radio subsystem synchronization".

[23] 3GPP TS 25.214: "Physical layer procedures (FDD)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purpose of the present document the following definitions apply.

The main general definitions strictly related to the transmission and reception characteristics but important also for this specification 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 P-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.

3.2 Symbols

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

[…] Values included in square bracket must be considered for further studies, because it means that a decision about that value was not taken.

$\frac{DPCH\_E_c}{I_{or}}$	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.
E_c	Average energy per PN chip.
$\frac{\boldsymbol{E_c}}{\boldsymbol{I_{or}}}$	The ratio of the average transmit energy per PN chip for different fields or physical channels to the total transmit power spectral density at the Node B antenna connector.
I_o	The total received power spectral density, including signal and interference, as measured at the UE antenna connector.
$\boldsymbol{I_{oc}}$	The power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized to the chip rate) of a band limited white noise source simulating interference from cells, which are not defined in a test procedure as measured at the UE antenna connector.
$\boldsymbol{I_{or}}$	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.
$\hat{I}_{or}$	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.
$\frac{OCNS\_E_c}{I_{or}}$	The ratio of the average transmit energy per PN chip for the OCNS to the total transmit power spectral density at the Node B antenna connector.
$\frac{PICH\_E_c}{I_{or}}$	The ratio of the average transmit energy per PN chip for the PICH to the total transmit power spectral density at the Node B antenna connector.
$\frac{PCCPCH\_E_c}{I_{or}}$	The ratio of the average transmit energy per PN chip for the PCCPCH to the total transmit power spectral density at the Node B antenna connector.
$\frac{SCH\_E_c}{I_{or}}$	The ratio of the average transmit energy per PN chip for the SCH to the total transmit power spectral density at the Node B antenna connector. 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.

PENALTY_TIME	Defined in TS 25.304
Qhyst	Defined in TS 25.304
$Qoffset_{s,n}$	Defined in TS 25.304
Qqualmin	Defined in TS 25.304
Qrxlevmin	Defined in TS 25.304
Sintersearch	Defined in TS 25.304
Sintrasearch	Defined in TS 25.304
SsearchRAT	Defined in TS 25.304
T1	Time period 1
T2	Time period 2
TEMP_OFFSET	Defined in TS 25.304
Treselection	Defined in TS 25.304
UE_TXPWR_MAX_RACH	Defined in TS 25.304

3.3 Abbreviations

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

ACPR	Adjacent Channel Power Ratio
BER	Bit Error Ratio
BLER	Block Error Ratio
BS	Base Station
CW	Continuous wave (unmodulated signal)
CFN	Connection Frame Number
CPICH	Common Pilot Channel
DL	Downlink (forward link)
DPCH	Dedicated Physical Channel
DRX	Discontinuous Reception
EIRP	Equivalent Isotropic Radiated Power
FDD	Frequency Division Duplex
OCNS	Orthogonal Channel Noise Simulator, a mechanism used to simulate the users or control signals on the other orthogonal channels of a Forward link.
P-CCPCH	Primary Common Control Physical Channel
PICH	Paging Indicator Channel
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PPM	Parts Per Million
RRM	Radio Resource Management
RRC	Radio Resource Control
RSCP	Received Signal Code Power
RSSI	Received Signal Strength Indicator
SCH	Synchronization Channel consisting of Primary and Secondary synchronization channels
SFN	System Frame Number
SIR	Signal to Interference ratio
TDD	Time Division Duplex
TPC	Transmit Power Control
UE	User Equipment
UL	Uplink (reverse link)
UTRA	UMTS Terrestrial Radio Access

3.4 Test tolerances

The requirements given in the present document make no allowance for measurement uncertainty. The test specification 34.122 and 25.142 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

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 TDD 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

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

The UE shall measure the PCCPCH RSCP level of the serving cell and evaluate the cell selection criterion S defined in TS25.304 for the serving cell at least every DRX cycle. The UE shall filter the PCCPCH RSCP measurement of the serving cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureTDD}/2$ (see table 4.1).

If the UE has evaluated in N_{serv} successive measurements 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 the 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 TS25.304.

4.2.2.2 Measurement of intra-frequency cells

The UE shall measure PCCPCH RSCP at least every $T_{measureTDD}$ (see table 4.1) for intra-frequency cells that are identified and measured according to the measurement rules. $T_{measureTDD}$ is defined in Table 4.1. The UE shall filter PCCPCH RSCP measurements of each measured intra-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureTDD}/2$.

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 $T_{evaluateTDD}$ (see table 4.1), from the moment the intra-frequency cell became at least 2 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 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.

4.2.2.3 Measurement of inter-frequency TDD cells

The UE shall measure PCCPCH RSCP at least every $(N_{carrier}-1) * T_{measureTDD}$ (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 TDD cells.. The UE shall filter PCCPCH RSCP measurements of each measured inter-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is 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 cell has become better ranked than the serving cell within $(N_{carrier}-1) * T_{evaluateTDD}$ from the moment the inter-frequency cell became at least 3 dB better than the current serving cell 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 become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least 3 dB better 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 cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

4.2.2.4 Measurement of inter-frequency FDD cells

The UE shall measure the CPICH RSCP and CPICH Ec/Io of each FDD neighbour cell indicated in the measurement control system information of the serving cell, according to the measurement rules defined in TS25.304, at least every $T_{measureFDD}$ (see table 4.1). The UE shall filter CPICH RSCP measurements of each measured inter-frequency cell using at least 2 measurements which are taken so that the time difference between the measurements is at least $T_{measureFDD}/2$.

The filtering of CPICH RSCP shall be such that the UE shall be capable of evaluating that an already identified inter-frequency cell has become better ranked than the serving cell within $N_{carrierFDD} * T_{evaluateFDD}$ from the moment the inter-frequency cell became at least 5 dB better than the current serving cell 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 become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least 5 dB better than the current serving cell provided that Treselection timer is set to zero. The parameter $N_{carrierFDD}$ is the number of carriers used for FDD cells.

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

The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304. If FDD cell has been ranked as the best cell and IE cell_selection_and_reselection-quality_measure is set to CPICH Ec/No, then UE shall perform a second ranking of the FDD cells using CPICH Ec/Io as the measurement quantity, before performing cell re-selection..

4.2.2.5 Measurement of inter-RAT GSM cells

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 TS25.304, at least every $T_{measureGSM}$ (see table 4.1). The UE shall maintain a running average of 4 measurements for each cell. 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 TS25.304, 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 re-selection criteria in TS25.304. 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 can not demodulate the BSIC of that GSM BCCH carrier.

4.2.2.6 Evaluation of cell reselection 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 once every DRX cycle.

UE shall perform cell reselection immediately after the UE has found a better ranked suitable cell, unless less than 1 second has elapsed from the moment the UE started camping on the current serving cell.

4.2.2.7 Maximum interruption time 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 current 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 current 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 shall not exceed T_{SI} + 50 ms. For inter-RAT cell re-selection the interruption time shall not exceed T_{BCCH} + 50 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 TS25.331 for a UTRAN cell.

T_{BCCH} is the maximum time allowed to read BCCH data from a GSM cell as defined in TS05.08.

These requirements assume sufficient radio conditions, so that decoding of system information can be made without errors.

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

DRX cycle length [s]	N_{serv} (number of DRX cycles)	$T_{measureTDD}$ [s] (number of DRX cycles)	$T_{evaluateTDD}$ [s] (number of DRX cycles)	$T_{measureFDD}$ [s] (number of DRX cycles)	$T_{evaluateFDD}$ [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)

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
  - TDD mode cells on maximum 2 additional TDD carriers, and
  - Depending on UE capability, FDD mode cells, distributed on up to 3 FDD carriers, and
- Depending on UE capability, 32 inter RAT GSM cells,

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

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 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 [16].

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 [18]. CELL_FACH, CELL_PCH and URA_PCH states are described in [16].

5.1 TDD/TDD Handover

5.1.1 Introduction

The TDD/TDD handover procedure is initiated from UTRAN with a RRC message that implies a hard handover, as described in [16].

The TDD/TDD handover procedure may cause the UE to change its frequency.

5.1.2 Requirements

5.1.2.1 TDD/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 TDD/TDD handover with the activation time "now" or earlier than $D_{handover}$ 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 $D_{handover}$ 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.

where:

$D_{handover}$ equals the RRC procedure performance value defined in [16] plus the interruption time stated in section 5.1.2.2.

5.1.2.2 Interruption time

The interruption time, i.e. the time between the end of the last TTI containing a transport block on the old DPCH 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 TDD/TDD intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than,

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

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 TDD/TDD handover and equal to 0 otherwise
UC	Equal to 1 if an unknown target cell is indicated in the RRC message implying TDD/TDD handover and equal to 0 otherwise

An intra-frequency or inter-frequency TDD target cell shall be considered as known by the UE if either or both of the following conditions are true:

- the target cell has been measured during the last 5 seconds
- the UE has had a radio link connected to the target cell 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.

5.2 TDD/FDD Handover

5.2.1 Introduction

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

5.2.2 Requirements

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

5.2.2.1 TDD/FDD 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 TDD/FDD handover with the activation time "now" or earlier than $D_{handover}$ 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 $D_{handover}$ 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.

where:

$D_{handover}$ equals the RRC procedure performance value as defined in [16] 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 end of the last TTI containing a transport block on the old DPCH and the time the UE starts transmission of the new uplink DPCCH, is dependent on whether the target cell is known for the UE or not.

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

$$T_{interrupt} = T_{offset} + 40 + 50*KC + 150*UC \text{ ms}$$

where,

T_{offset}	Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell.
KC	Equal to 1 if a known target cell is indicated in the RRC message implying TDD/FDD handover and equal to 0 otherwise
UC	Equal to 1 if an unknown target cell is indicated in the RRC message implying TDD/FDD handover and equal to 0 otherwise

An inter-frequency FDD 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 phase reference is the Primary CPICH.

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.

Note that the requirements in this section assume that N312 has the smallest possible value, i.e. only one in-sync indication as described in [23] is required.

5.3 TDD/GSM Handover

5.3.1 Introduction

The purpose of inter-RAT handover from UTRAN TDD to GSM is to transfer a connection between the UE and UTRAN TDD to GSM. The handover procedure is initiated from UTRAN with a RRC message (HANDOVER FROM UTRAN COMMAND)as is described in [16].

5.3.2 Requirements

The requirements in this section shall apply to UEs supporting TDD and GSM.

5.3.2.1 TDD/GSM handover delay

The RRC procedure performance value for the RRC HANDOVER FROM UTRAN COMMAND shall be 50 ms.

If the activation time is used in the RRC HANDOVER FROM UTRAN COMMAND, it corresponds to the CFN of the UTRAN channel.

When the UE receives a RRC HANDOVER FROM UTRAN COMMAND with the activation time "now" or earlier than t $D_{handover}$ seconds from the end of the last TTI containing the RRC command, the UE shall be ready to transmit as specified in [22] on the new channel of the new RAT within $D_{handover}$ seconds from the end of last TTI containing the RRC command.

If the access is delayed to an indicated activation time later than $D_{handover}$ seconds from the end of the last TTI containing the RRC command, the UE shall be ready to transmit as specified in [22] on the new channel of the new RAT at the designated activation time.

where:

$D_{handover}$ equals the RRC procedure performance value 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 DPCH and the time the UE is ready to transmit on the new channel of the new RAT, is dependent on whether the UE has synchonised to the target cell or not before receiving the RRC HANDOVER FROM UTRAN COMMAND.

The interruption time for the purpose of TDD/GSM handover shall be less than the value in Table 5.1.

Table 5.1: TDD/GSM 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

The requirements in Table 5.1 for the case where the UE has not synchronised to the GSM target cell before receiving the RRC HANDOVER FROM UTRAN COMMAND shall apply only if the signal quality of the GSM target 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 Cell Re-selection in Cell_FACH

5.4.1 Introduction

The UE shall evaluate the cell re-selection criteria specified in [18], based on radio measurements and if a better cell is found that cell is selected.

5.4.2 Requirements

The cell re-selection delays specified below are applicable when the RRC parameter $T_{reselection}$ is set to 0. Otherwise the Cell reselection delay is increased by $T_{reselection}$ s.

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

5.4.2.1 Cell re-selection delay

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 RACH.

For UTRA FDD, 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 the preambles on the PRACH for sending RRC CELL UPDATE message to the UTRAN.

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.

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

5.4.2.1.1 Intra-frequency cell re-selection

The cell re-selection delay in CELL_FACH state for intra frequency TDD cells 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} is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure performance value 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 $T_{identify,intra}$, the cell re-selection delay in CELL_FACH state to an intra-frequency TDD cell shall be less than,

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

where

$T_{measurement\ period\ intra}$ is specified in 8.4.2.2.2.

5.4.2.1.2 Inter-frequency cell re-selection

The cell re-selection delay in CELL_FACH state for inter-frequency TDD cells 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} is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure performance value 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 $T_{identify,inter}$, the cell re-selection delay in CELL_FACH state to an inter-frequency TDD cell shall be less than,

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

where

$T_{measurement\ inter}$ is specified in 8.4.2.3.2.

5.4.2.1.3 TDD-FDD cell re-selection

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

The cell re-selection delay in CELL_FACH state to an inter-frequency FDD cells shall be less than:

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

where

$T_{identify,,FDD\ inter}$ 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 performance value 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 $T_{identify\ FDD\ inter}$, the cell re-selection delay in CELL_FACH state to an inter-frequency FDD cell shall be less than,

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

where

$T_{measurement\ FDD\ inter}$ is specified in 8.4.2.4.1.

5.4.2.1.4 Inter-RAT cell re-selection

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

The cell re-selection delay in CELL_FACH state for inter-RAT cells shall be less than:

$$T_{reselection,GSM} = T_{identify,GSM} + T_{Measurement\_GSM} + T_{SI}$$

where

$T_{identify,GSM}$ = Is the worst case time for identification of one previously not identified GSM cell and is specified in TS25.225 Annex A.

T_{SI} = Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell.

$T_{Measurement,\_GSM}$ is the worst case time for measuring one previously identified GSM carrier.

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

where:

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

$N_{GSM\ carrier\ RSSI}$ can be derived from the values in table 8.7 section 8.4.2.5.1.

5.4.2.2 Interruption time

For UTRA 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 to the UTRAN on the RACH.

For UTRA FDD, 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 sending preambles on the PRACH for sending the RRC CELL UPDATE message to the UTRAN.

For GSM, 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 sending the random access in the target cell of the new RAT.

The requirements on interruption time in this section shall apply only if the signal quality of the serving cell is sufficient to allow decoding of the FACH during cell-re-selection.

5.4.2.2.1 TDD-TDD cell re-selection

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

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

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

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

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 performance value of system information blocks defined in [16].

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

5.4.2.2.2 TDD-FDD cell re-selection

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

In case of cell re-selection to an inter-frequency FDD cell and when the UE does not need measurement occasions to perform inter-frequency FDD measurements, the interruption time shall be less than,

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

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

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

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 performance value of system information blocks defined in [16].

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

5.4.2.2.3 TDD-GSM cell re-selection

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

In case of cell re-selection to an inter-RAT cell, the interruption time shall be less than,

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

where

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

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

5.4.2.3 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 P-CCPCH 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

$T_{measurement\ period\ intra}$ is specified in 8.4.2.2.2.

5.5 Cell Re-selection in Cell_PCH

5.5.1 Introduction

The UE shall evaluate the cell re-selection criteria specified in [18], based on radio measurements, and if a better cell is found that cell is selected.

5.5.2 Requirements

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

5.6 Cell Re-selection in URA_PCH

5.6.1 Introduction

The UE shall evaluate the cell re-selection criteria specified in [18], 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 URA_PCH state are the same as for cell re-selection in idle mode, see section 4.2. The UE shall support all DRX cycle lengths in table 4.1, according to [16].

5.7 RACH reporting

5.7.1 Introduction

The network may request the UE to report on RACH P-CCPCH RSCP 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.

5.7.2 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 not 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.

6 void

6A RRC Connection Control

6A.1 RRC re-establishment

6A.1.1 Introduction

RRC connection re-establishment is needed, when a UE in CELL_DCH state loses radio connection due to radio link failure. The procedure when a radio link failure occurs in CELL_DCH state is specified in [16].

6A.1.2 Requirements

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

When the UE is in CELL_DCH state, the UE shall be capable of sending a RRC CELL UPDATE message using the cause value "radio link failure" within $T_{RE-ESTABLISH}$ seconds from when the radio link failure occurred.

$T_{RE-ESTABLISH}$ equals the RRC procedure performance value $T_{RRC-RE-ESTABLISH}$ according to [16] plus the UE re-establishment delay $T_{UE-RE-ESTABLISH-REQ}$ specified in 6A.1.2.1.

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

6A.1.2.1 UE re-establishment delay requirement

For UTRA TDD, the UE re-establishment delay ($T_{UE-RE-ESTABLISH-REQ}$ is defined as the time between the moment when radio link failure is considered by the UE to when the UE starts sending the RRC CELL UPDATE message to the UTRAN on RACH.

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

- the UE has had a radio link connected to the cell during the last 5 seconds
- the cell has been measured by the UE during the last 5 seconds

In case that the target cell is known by the UE, the UE re-establishment delay shall be less than

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

In case that the target cell is not known by the UE, the UE re-establishment delay shall be less than,

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

where,

$T_{SEARCH\ -KNOWN}$ Equal to 100 ms, the time it takes for the UE to search for the known target cell

$T_{SEARCH\ -UNKNOWN}$ Equal to 800 ms, the time it takes for the UE to search for the unknown target cell

T_{SI} The time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure performance value of system information blocks defined in [16] for a UTRAN cell.

NF The number of different frequencies in the previous (old) monitored set.

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

6A.2 Transport format combination selection in UE

6A.2.1 Introduction

When the UE estimates that a certain TFC would require more power than the maximum transmit power, it shall limit the usage of transport format combinations for the assigned transport format combination set. This in order to make it possible for the network operator to maximise the coverage. The transport format combination selection in UE is described in [13].

6A.2.2 Requirements

The UE shall continuously evaluate based on the *Elimination*, *Recovery* and *Blocking* criteria defined below, how TFCs can be used for the purpose of TFC selection. The evaluation shall be performed using the estimated UE transmit power of a given CCTrCH in its associated timeslots.

In the case of a single CCTrCH or multiple CCTrCHs having mutually exclusive timeslot assignments, the UE shall consider the *Elimination* criterion for a given TFC of a CCTrCH to be fulfilled if, for 3 successive frames, the estimated UE transmit power is greater than the Maximum UE transmitter power for at least one timeslot associated with the CCTrCH in each frame.

In the case of multiple CCTrCHs not having mutually exclusive timeslot assignments, if for a given CCTrCH for 3 successive frames the estimated UE transmit power is greater than the Maximum UE transmitter power for at least one timeslot associated with the CCTrCH in each frame, the UE shall consider the *Elimination* criterion for a given TFC to be fulfilled if the use of this TFC will cause the estimated UE transmit power to continue to be greater than the Maximum UE transmitter power in at least one timeslot associated with the CCTrCH.

In the case of multi-frame operation of UL Physical Channels, the UE shall only consider active frames for the evaluation of the *Elimination* criterion.

If the *Elimination* criterion for a given TFC is fulfilled, 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 fulfilled.

The UE shall not consider the *Recovery* criterion for a given TFC to be fulfilled until the use of this TFC will not cause the estimated UE transmit power to be greater than the Maximum UE transmitter power for all UL timeslots associated with the TFC for a minimum of 3 successive frames..

In the case of multi-frame operation of UL Physical Channels, the UE shall only consider active frames for the evaluation of the *Recovery* criterion.

If the *Recovery* criterion for a given TFC is fulfilled, 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 fulfilled.

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 35 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. Table 6A.1 defines T_{adapt} times for different services. For services where no codec is used T_{adapt} shall be considered to be equal to 0 ms.

Table 6A.1: T_{adapt}

Service	T_{adapt} [ms]
UMTS AMR	40
UMTS AMR 2	60

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

The Maximum UE transmitter power is defined as follows

Maximum UE transmitter power = MIN(Maximum allowed UL TX Power, UE maximum transmit power)

where

Maximum allowed UL TX Power is set by UTRAN and defined in [16], and

UE maximum transmit power is defined by the UE power class, and specified in [5].

6A.3 Maximum allowed UL TX Power

6A.3.1 Introduction

UTRAN may limit the power the UE is using on the uplink by setting the maximum allowed UL TX power IE defined in [16].

6A.3.2 Requirements

For each measurement period, the UE shall with the use of the UE transmitted power measurement, estimate if it has reached the Maximum allowed UL TX Power or not. With tolerances as defined for the UE transmitted power measurement accuracy (section 9.1.2.1), the UE output power shall not exceed the Maximum allowed UL TX Power, as set by the UTRAN.

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 UL Power Control in [5].

7 Timing characteristics

7.1 Timing Advance (TA) requirements

7.1.1 Introduction

The timing advance is initiated from UTRAN with an RRC message that implies an adjustement of the timing advance, see TS 25.331 section 8.6.6.26.

To update timing advance of a UE, the UTRAN measures RX Timing deviation. The measurements are defined in TS 25.225 and measurement accuracies are specified in section 9.

7.1.2 Requirements

7.1.2.1 Timing Advance adjustement accuracy

The UE shall adjust the timing of its transmissions with an accuracy better than or equal to ±0.5 chip to the signalled timing advance value.

7.1.2.2 Timing Advance adjustement delay

The UE shall adjust the timing of its transmission at the designated activation time, when the indicated activation time is later than D_{TA} msec from the end of the last TTI containing the RRC message implying an adjustement of the timing advance.

D_{TA} equals the RRC procedure delay of the RRC message implying an adjustement of the timing advance as defined in TS25.331 section 13.5.

7.2 Cell synchronization accuracy

7.2.1 Definition

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

7.2.2 Minimum requirements

The cell synchronization accuracy shall be better than or equal to 3μs.

7.3 UE Transmit Timing

7.3.1 Definition

UE transmit timing is defined as the frame start time of uplink transmissions relative to the downlink frame timing at zero propagation delay with timing advance turned off. The reference point for UE transmit timing shall be the antenna connector. This is applicable for the AWGN propagation condition. In the case of multi-path fading conditions, the reference point for UE transmit timing shall be the first significant path of the received PCCPCH.

7.3.2 Minimum Requirement

The UE transmit timing error shall be within 0 to +3 chips for the AWGN propagation condition.

8 UE Measurements Procedures

8.1 Measurements 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 TDD intra frequency, TDD inter frequency, FDD and GSM measurements. These measurements may be used by the UTRAN, e.g. for handover decisions. The measurements are defined in TS 25.225, 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. For the description of the idle intervals see TS 25.225, Annex A.

8.1.2 Requirements

8.1.2.1 UE Measurement Capability

The UE shall be able to monitor up to:

- 32 intra frequency TDD cells (including serving cell), and
- 32 inter frequency cells, including
  - TDD mode cells distributed on up to 2 additional TDD carriers and
  - Depending on UE capability, FDD mode cells, distributed on up to 3 FDD carriers.
- Depending on UE capability, 32 inter RAT GSM cells.

Performance requirements for different types of measurements and different number of cells are defined in the following sections.

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

8.1.2.2 TDD 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 [16]. Intra frequency measurements can be performed (simultaneously to data reception from the active cell) in all time slots not allocated to transmission nor the time used for inter frequency measurements.

8.1.2.2.1 Identification of a new cell

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

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

8.1.2.2.2 UE P-CCPCH RSCP measurement capability

In the CELL_DCH state the measurement period for intra frequency P-CCPCH RSCP measurements is 200 ms. When no inter frequency measurement is scheduled, the UE shall be capable of performing P-CCPCH RSCP measurements for 6 identified intra-frequency cells of the monitored set, and the UE physical layer shall be capable of reporting these measurements to higher layers with the measurement period of 200 ms. When inter-frequency measurements are required by the network, the UE shall be capable of performing P-CCPCH RSCP measurements for at least $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ is defined in the following equation. The detectable cells, that were not measured during that measurement period, shall be measured in the following measurement periods. The measurement accuracy for all measured cells shall be as specified in the section 9.

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

whereby function Floor(x) takes the integer part of x.

$X_{basic\ measurement\ TDD}$ = 6 (cells)

$T_{Measurement\_Period,\ Intra}$ = 200 ms. The measurement period for Intra frequency P-CCPCH RSCP measurements.

T_{Intra}: This is the minimum time (representing a time corresponding to an integer number of full slots) that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. It is assumed for the requirement that the slot allocation allows measurement windows to be of minimum duration necessary to perform the measurements.

$T_{basic\_identify\_TDD,\ intra}$ = 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 TDD cell is defined. (side conditions are defined in subclause 8.1.2.6).

8.1.2.2.2A Timeslot ISCP measurement capability

In the CELL_DCH state the measurement period for intra frequency Timeslot ISCP measurements on arbitrary DL timeslots, including Beacon timeslots is 400 ms. When no inter frequency measurement is scheduled, the UE shall be capable of performing Timeslot ISCP measurements for a total of 10 different combinations of an arbitrary DL timeslot and an intra-frequency cell [16], including the current serving cell. The UE physical layer shall be capable of reporting Timeslot ISCP measurements to higher layers with the measurement period of 400 ms.

When inter-frequency measurements are required by the network, the UE shall be capable of performing Timeslot ISCP measurements for at least $Y_{measurement\ intra\ ISCP}$ different combinations, where $Y_{measurement\ intra\ ISCP}$ is defined in the following equation. Any Timeslot ISCP measurement that could not be performed during that measurement period, shall be measured in the following measurement periods. The measurement accuracy of the Timeslot ISCP measurement shall be as specified in the section 9.

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

whereby function Floor(x) takes the integer part of x.

- $X_{basic\ measurement\ ISCP}$ = 10 (combinations of an arbitrary DL timeslot and an intra-frequency cell)
- $T_{Measurement\_Period,\ Intra,\ ISCP}$ = 400 ms. The measurement period for Intra frequency Timeslot ISCP measurements.
- T_{Intra}: This is the minimum time (representing a time corresponding to an integer number of full slots) that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing. It is assumed for the requirement that the slot allocation allows measurement windows to be of minimum duration necessary to perform the measurements.

8.1.2.2.3 Periodic Reporting

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

8.1.2.2.4 Event-triggered Periodic Reporting

Reported measurements 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 8.1.2.2.5 Event Triggered Reporting.

8.1.2.2.5 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 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 the monitored set, measured without L3 filtering shall be less than $T_{identify\ intra}$ defined in Section 8.1.2.2.1. When L3 filtering is used an additional delay can be expected.

If a cell, belonging to the monitored set, has been detectable at least for the time period $T_{identify\ intra}$ and then enters the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ when the L3 filter has not been used and the UE P-CCPCH measurement capabilities of section 8.1.2.2.2 are valid.

8.1.2.3 TDD inter frequency measurements

When signalled by the network during CELL_DCH state, the UE shall continuously measure detected inter frequency cells and search for new inter frequency cells indicated in the measurement control information.

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

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

8.1.2.3.2 P-CCPCH RSCP measurement period

When TDD inter frequency measurements are scheduled, the UE physical layer shall be capable of reporting P-CCPCH RSCP measurements to higher layers with measurement accuracy as specified in section 9 and with measurement period given by

$$T_{\text{measurement inter}} = Max\left\{480, T_{\text{basic measurement TDD inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{Freq}\right\} ms$$

In case of a dual receiver UE, the measurement period for inter frequency P-CCPCH RSCP measurements is 480 ms.

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

$T_{\text{Inter:}}$This is the minimum time (representing a time corresponding to an integer number of full slots) available for inter frequency measurements during the period $T_{\text{Measurement\_Period inter}}$ with an arbitrarily chosen timing. The minimum time depends on the channel allocation and is calculated by assuming 2*0.5 ms for implementation margin (for the description of the idle intervals see Annex A of 25.225). It is assumed for the requirement that the slot allocation allows measurement windows in the idle periods to be of minimum duration necessary to perform the measurements.

$T_{\text{basic\_identify\_TDD,inter}}$ = 800 ms. This is the time period used in the inter frequency equation where the maximum allowed time for the UE to identify a new TDD cell is defined. (side conditions are defined in subclause 8.1.2.6).

$T_{\text{basic\_measurement\_TDD inter}}$ = 50 ms. This is the time period used in the equation for defining the measurement period for inter frequency P-CCPCH RSCP measurements.

N_{Freq}: number of TDD frequencies indicated in the interfrequency measurement control information.

8.1.2.3.3 Periodic Reporting

Reported measurements in periodically triggered 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 8.1.2.3.4 Event Triggered Reporting.

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 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 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 the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Inter}$ when the L3 filter has not been used.

8.1.2.4 FDD measurements

The requirements in this section apply only to UE supporting both TDD and FDD mode.

In the CELL_DCH state when FDD inter frequency measurements are scheduled the UE shall continuously measure detected inter frequency FDD cells and search for new inter frequency cells indicated in the measurement control information.

The UE shall be capable of measuring the requested measurement quantity of at least 32 cells on a maximum of 3 frequencies.

8.1.2.4.1 Identification of a new cell

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

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

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

8.1.2.4.2 Measurement period

When FDD inter frequency measurements are scheduled, the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9 with measurement period given by

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

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

$T_{FDD\ inter::}$ This is the minimum time as full slots that is available for inter frequency measurements, during the period $T_{Measurement\_Period\ FDD\ inter}$ with an arbitrarily chosen timing. The minimum time depends on the channel allocation and is calculated by assuming 2*0.5 ms for implementation margin (for the description of the idle intervals see Annex A of 25.225). It is assumed for the requirement that the slot allocation allows measurement windows in the idle periods to be of minimum duration necessary to perform the measurements.

$T_{basic\_identify\_FDD,inter}$ = 800 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.

8.1.2.4.3 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 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 uncertanty is twice the TTI of the uplink DCCH.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify FDD inter}}$ defined in Section 8.1.2.4.1. When L3 filtering is used an additional delay can be expected.If a cell has been detectable at least for the time period $T_{\text{identify\_FDD inter}}$ and then enters the reporting range, the event triggered measurement reporting delay shall be less than $T_{\text{Measurement\_Period FDD Inter}}$ 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.

8.1.2.5 GSM measurements

The requirements in this section applies only to UE supporting TDD and GSM.

When signalled by UTRAN during CELL_DCH state, the UE shall continuously measure GSM cells and search for new GSM cells given in the monitored set.

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

If BSIC verified is requested for a GSM cell the UE shall only report measurement quantities for that GSM cell with a BSIC “verified” according to section 8.1.2.5.2 "BSIC verification". If BSIC verification is not required for a GSM cell the UE shall report measurement quantities for that GSM cell irrespectively if the BSIC has been verified or not verified according to section 8.1.2.5.2 "BSIC verification".

If the UE does not need to perform GSM measurements in the idle intervals only, the requirements of handover measurements in TS 05.08 shall apply.

8.1.2.5.1 GSM carrier RSSI

An UE supporting GSM measurements shall be able to measure GSM carrier RSSI levels of GSM cells from the monitored set with acquisition speed defined in table 8.1. In the CELL_DCH 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 05.08, when the given measurement time allows the UE to the take at least 3 GSM carrier RSSI samples per GSM carrier in the monitored set during the measurement period.

Table 8.1

Idle Interval Length (slots)	Number of GSM carrier RSSI measurements
3	1
4	2
5	3
7	6
10	10
13	14

For the description of the idle intervals see Annex A of 25.225.
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.

8.1.2.5.2 BSIC verification

The procedure for BSIC verification on a GSM cell can be divided into the following two tasks:

1) 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 TDD and GSM cell. The UE shall trigger the initial BSIC identification within the available idle intervals as specified in TS 25.225, Annex A (Fig. A.1). The requirements for Initial BSIC identification can be found in section8.1.2.5.2.1, "Initial BSIC identification"

2) 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 idle intervals as specified in TS 25.225, Annex A (Fig. A.1). The requirements for Initial BSIC identification can be found in section 8.1.2.5.2.2, "BSIC re-confirmation"

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.

The BSIC of a GSM cell is considered to be "verified" if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification) and from that moment the BSIC shall be re-confirmed at least once every $T_{\text{re-confirm abort}}$ seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified". The time requirement for initial BSIC identification, $T_{\text{identify abort}}$, and the BSIC re-confirmation interval $T_{\text{re-confirm abort}}$ can be found in the sections below.

The worst-case time for identification of one previously not identified GSM cell measurement is specified in TS 25.225, Annex A.

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 05.05.

8.1.2.5.2.1 Initial BSIC identification

This measurement is performed in the idle intervals as specified in TS 25.225, Annex A (Fig. A.1).

For GSM cells that are requested with BSIC verified the UE shall attempt to decode the SCH on the BCCH carrier of the8 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.If the BSIC of a GSM BCCH carrier has been successfully decoded the UE shall immediately continue BSIC identification with the next GSM BCCH carrier, in signal strength order, with unknown BSIC. The GSM cell for which the BSIC has been successfully identified shall be moved to the BSIC re-confirmation procedure.

If the UE has not successfully decoded the BSIC of the GSM BCCH carrier within $T_{\text{identify abort}}$, the UE shall abort the BSIC decoding attempts for that GSM BCCH carrier. The UE shall continue to try to perform BSIC decoding of the next GSM BCCH carrierin signal strength order. The GSM BCCH carrierfor which the BSIC decoding failed shall not be re-considered for BSIC decoding until BSIC decoding attempts have been made for all the rest of the 8 strongest GSM BCCH carriers in the monitored set with unknown BSIC.

The UE shall be able to perform initial BSIC decoding on one new GSM BCCH carrier within the time specified in Annex A in TS 25.225.

When N new GSM cells are to be BSIC identified the time is changed to $N * T_{\text{identify abort}}$, with

$T_{\text{identify abort}}$ = 5000 ms. This is the time necessary to identify one new GSM cell. It is assumed for the requirement that the slot allocation allows measurement windows in the idle periods to be of minimum duration necessary to perform the measurements.

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 at least 8 identified GSM cells. Initial timing information is obtained from the initial BSIC decoding. The timing information shall be updated every time the BSIC is decoded.

If more than one BSIC can be decoded within the same measurement window given by the idle intervals, 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 BCCH carrier within $T_{re\text{-}confirm\_abort}$ seconds, the UE shall abort the BSIC re-confirmation attempts for that GSM BCCH carrier. The GSM BCCH carrier shall be treated as a new GSM BCCH carrier with unidentified BSIC and the GSM BCCH carrier shall be moved to the initial BSIC decoding 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.

This measurement shall be based on the idle intervals as specified in TS 25.225, Annex A (Fig. A.1).The time requirement for BSIC re-confirmation is specified in Annex A in TS 25.225.

$T_{re\text{-}confirm\ abort}$ =5000 ms. This is the BSIC reconfirmation interval.

It is assumed for the requirement that the slot allocation allows measurement windows in the idle periods to be of minimum duration necessary to perform the measurements.

8.1.2.6 TDD Synchronisation to new cells

Time for synchronisation to new cell is defined as the time from when the cell appears until the time when the cell is reported in a RRC message to the network. The time needed to synchronise depends on the level of the received signal and is different for inter and intra frequency cells.

These time limits are used in the requirements for the measurements in paragraph 8.1.2 as well as preconditions in paragraph 9.

The requirements given for by $T_{basic\ identify\ TDD,\ intra}$ and by $T_{basic\ identify\ TDD,\ inter}$ are valid under the following side conditions:

$$\left.\left(\frac{P-CCPCH\_E_c}{I_o}\right)\right|_{in\ dB} \geq -8dB$$

$$\left.\left(\frac{SCH\_E_c}{I_o}\right)\right|_{in\ dB} \geq -13dB$$

where the received P-CCPCH E_c/I_o is defined as

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

and the received SCH E_c/I_o is defined as

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

and SCH_Ec/Ior is equally divided between primary synchronisation code and the sum of all secondary synchronisation codes, where the secondary synchronisation codes are also equally divided.

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 [14], the measurement model is defined in [15] and measurement accuracies are specified

in section 9. Control of measurement reporting is specified in [16]. Idle intervals for the purpose of measurements are described in [14].

8.2.2 Requirements

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

The UE shall be able to perform parallel measurements according to table 8.2.

In addition to the requirements in table 8.2 a UE in CELL_DCH state shall, also be able to measure and report the quantities according to section 8.1.

Table 8.2: Parallel measurement requirements

Measurement quantity	Number of parallel measurements possible to request from the UE	Note
Transport channel BLER	1 per Transport Channel	
UE transmitted power	1 per UL timeslot	
SFN-SFN observed time difference type 2	1	
UE GPS Timing of Cell Frames for UP	1	Only applicable for UE with this capability

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.

The UE can be requested to make measurements under different measurement identity numbers. With each identity number there may be associated multiple number of events. The purpose of this section is to set some limits on the number of different reporting criteria the UE may be requested to track in parallel.

8.3.2 Requirements

In this section reporting criteria can be either event triggered reporting criteria or periodic reporting criteria.

The UE shall be able to support in parallel per category up to E_{cat} reporting criteria according to Table 8.6.

For the measurement categories: Intra-frequency, Inter frequency and Inter-RAT the UE need not support more than 14 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.

For the measurement category Intra-frequency the UE shall support at least 2 reporting criteria for event type 1G and at least 4 reporting criteria for an arbitrary combination of event types 1H and 1I.

Table 8.6: Requirements for reporting criteria per measurement category

Measurement category	E_{cat}	Note
Intra-frequency	6	Applicable for periodic reporting or TDD events (1G-1I).
Inter-frequency	6	Applicable for periodic reporting or Event 2A-2F
Inter-RAT	4	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

8.4.1 Introduction

This section contains requirements on the UE regarding measurement reporting in CELL_FACH state. The measurements are defined in TS 25.225, 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. For the description of the idle intervals see TS 25.225, Annex A.

8.4.2 Requirements

8.4.2.1 UE Measurement Capability

The UE shall be able to monitor up to

- 32 intra frequency TDD cells (including serving cell), and
- 32 inter frequency cells, including
    - TDD mode cells distributed on up to 2 additional TDD carriers and
    - Depending on UE capability, FDD mode cells, distributed on up to 3 FDD carriers.
- Depending on UE capability, 32 inter RAT GSM cells.

The requirements in section 9 on P-CCPCH 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 and idle intervals as described in TS 25.225 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 time during the measurement occasions and idle intervals 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.

The UE is required to measure periodically once every time period T_{meas} on each of the modes and systems, FDD interfrequency cells, TDD interfrequency cells and GSM carriers, for which the corresponding parameter N_{FDD}, N_{TDD} and N_{GSM} is set to 1, within the measurement time T_{meas}

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

where the following parameters are defined:

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

N_{FDD} = 0 or 1. If the UE is capable of FDD and there are FDD cells in the neighbour list N_{FDD}=*1* otherwise N_{FDD}=0.

N_{GSM} = 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.

M_REP is the Measurement Occasion cycle length in number of frames as specified in TS 25.331.

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.

8.4.2.2 TDD intra frequency measurements

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. Intra frequency measurements can be performed (simultaneously to data reception from the active cell) in all time slots not allocated to transmission nor the time used for inter frequency measurements.

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

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

8.4.2.2.2 UE P-CCPCH RSCP measurement capability

In the CELL_FACH state the measurement period for intra frequency P-CCPCH RSCP measurements is 200 ms. When no inter frequency measurement is scheduled, the UE shall be capable of performing P-CCPCH RSCP measurements for 6 identified intra-frequency cells of the monitored set, and the UE physical layer shall be capable of reporting these measurements to higher layers with the measurement period of 200 ms. When inter-frequency measurements are required by the network, the UE shall be capable of performing P-CCPCH RSCP measurements for the $Y_{measurement\ intra}$ strongest cells , where $Y_{measurement\ intra}$ is defined in the following equation. The detectable cells, that were not measured during that measurement period, shall be measured in the following measurement periods. The measurement accuracy for all measured cells shall be as specified in the section 9.

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

whereby function Floor(x) takes the integer part of x.

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

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

T_{Intra}: is specified in section 8.1.2.2.2

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

8.4.2.2.3 void

8.4.2.2.4 void

8.4.2.2.5 Timeslot ISCP measurement capability

In the CELL_FACH state the measurement period for intra frequency Timeslot ISCP measurements on arbitrary DL timeslots, including Beacon timeslots is 400 ms. When no inter frequency measurement is scheduled, the UE shall be capable of performing Timeslot ISCP measurements on the current serving cell for 10 arbitrary DL timeslots. The UE physical layer shall be capable of reporting Timeslot ISCP measurements to higher layers with the measurement period of 400 ms.

When inter-frequency measurements are required by the network, the UE shall be capable of performing Timeslot ISCP measurements on the current serving for at least $Y_{measurement\ intra\ ISCP}$ arbitrary DL timeslots, where $Y_{measurement\ intra\ ISCP}$ is defined in the following equation. Any Timeslot ISCP measurement that could not be performed during that measurement period, shall be measured in the following measurement periods. The measurement accuracy of the Timeslot ISCP measurement shall be as specified in the section 9.

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

whereby function Floor(x) takes the integer part of x,

- $X_{basic\ measurement\ ISCP}$ = 10 (arbitrary DL timeslots of the current serving cell)

- $T_{Measurement\_Period,\ Intra,\ ISCP}$ is specified in section 8.1.2.2.6,
- T_{Intra} is specified in section 8.1.2.2.6.

8.4.2.2.6 RACH reporting

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

8.4.2.3 TDD inter frequency measurements

When signalled by the network during CELL_FACH state, the UE shall continuously measure detected 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

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

8.4.2.3.2 P-CCPCH RSCP measurement period

When TDD inter frequency measurements are scheduled, the UE physical layer shall be capable of reporting P-CCPCH RSCP measurements to higher layers with measurement accuracy as specified in section 9 with measurement period given by

$$T_{measurement\ \ inter} = Max\left\{480, T_{basic\ measurement\ TDD\ inter} \cdot \frac{T_{Measurement\ \ Period,\ Inter}}{T_{Inter\ FACH}} \cdot N_{Freq}\right\} ms$$

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

$T_{Inter\ FACH}$: This is the minimum time as full slots that is available for the inter frequency P-CCPCH RSCP measurements during the period $T_{Measurement\_Period\ inter}$ with an arbitrarily chosen timing. The minimum time depends on the channel allocation and on measurement occasions during CELL_FACH state and is calculated by assuming 2*0.5 ms for implementation margin (for the description of the idle intervals see Annex A of 25.225 and for definition of measurement occasions during CELL_FACH state given by M_REP and TTI see TS 25.331). It is assumed for the requirement that the slot allocation allows measurement windows in the idle periods to be of minimum duration necessary to perform the measurements. During the measurement occasions for CELL_FACH state the UE shall measure primarily cells that can not be measured in the idle intervalls.

$T_{basic\_identify\_TDD,inter}$ is specified in section 8.1.2.3.2

$T_{basic\_measurement\_TDD\ inter}$ is specified in section 8.1.2.3.2

N_{Freq} is specified in section 8.1.2.3.2

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

8.4.2.3.3 Periodic Reporting

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

8.4.2.3.4 Event Triggered Reporting

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

In CELL_FACH event triggered reporting can only be set for Traffic Volume measurements defined in TS 25.331.

8.4.2.4 FDD measurements

The requirements in this section apply only to UE supporting both TDD and FDD mode.

In the CELL_FACH state when FDD inter frequency measurements are scheduled the UE shall continuously measure detected inter frequency FDD cells and search for new inter frequency cells indicated in the measurement control information.

The UE shall be capable of measuring the requested measurement quantity of at least 32 cells on a maximum of 3 frequencies.

8.4.2.4.1 Identification of a new cell

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

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

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

8.4.2.4.2 Measurement period

When FDD inter frequency measurements are scheduled, the UE physical layer shall be capable of reporting measurements to higher layers with measurement accuracy as specified in sub-clause 9 with measurement period given by

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

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

$T_{\text{Inter FACH}}$: is specified in section 8.4.2.3.2

$T_{\text{basic\_identify\_FDD,inter}}$ is specified in section 8.1.2.4.2

$T_{\text{basic\_measurement\_FDD inter}}$ is specified in section 8.1.2.4.2.

N_{Freq} is specified in section 8.1.2.4.2

8.4.2.4.3 Periodic Reporting

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

8.4.2.4.4 Event Triggered Reporting

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

In CELL_FACH event triggered reporting can only be set for Traffic Volume measurements defined in TS 25.331.

8.4.2.5 GSM measurements

The requirements in this section applies only to UE supporting TDD and GSM.

When signalled by UTRAN during CELL_FACH state, the UE shall continuously measure GSM cells and search for new GSM cells given in the monitored set.

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

If BSIC verified is requested for a GSM cell the UE shall only report measurement quantities for that GSM cell with a BSIC "verified". If BSIC verification is not required for a GSM cell the UE shall report measurement quantities for that GSM cell irrespectively if the BSIC has been verified or not verified.

The measurement windows due to idle intervals and measurements occasions used for GSM measurements shall be scheduled 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 windows between GSM carrier RSSI measurements and GSM BSIC reconfirmation is up to the UE.

For the UE performing GSM measurements, the requirements in GSM 05.08 shall apply.

8.4.2.5.1 GSM carrier RSSI

An UE supporting GSM measurements shall meet the minimum number of GSM carrier RSSI measurements specified in table 8.7. 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 05.08, 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 8.7

Measurement Window Length (slots)	Number of GSM carrier RSSI measurements.
3	1
4	2
5	3
7	6
10	10
13	14
15	16
30	32
60	64
120	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. 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.

8.4.2.5.2 BSIC verification

The procedure for BSIC verification on a GSM cell can be divided into the following two tasks:

1) 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 TDD and GSM cell. The UE shall trigger the initial BSIC identification within 50% of the available measurement windows. The requirements for Initial BSIC identification can be found in section 8.4.2.5.2.1, "Initial BSIC identification"

2) 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 windows. The requirements for Initial BSIC identification can be found in section 8.4.2.5.2.2, "BSIC re-confirmation"

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.

The BSIC of a GSM cell is considered to be "verified" if the UE has decoded the SCH of the BCCH carrier and identified the BSIC at least one time (initial BSIC identification) and from that moment the BSIC shall be re-confirmed at least once every 6 times $T_{\text{re-confirm abort}}$ seconds. Otherwise the BSIC of the GSM cell is considered as "non-verified".

The time requirement for initial BSIC identification, $T_{identify\ abort}$, and the BSIC re-confirmation interval $T_{re\text{-}confirm\ abort}$ can be found in the sections below.

The worst-case time for identification of one previously not identified GSM cell measurement is specified in TS 25.225, Annex A.

The UE shall be able to perform BSIC verification at levels down to the reference sensitivity level or reference interference levels as specified in GSM 05.05.

8.4.2.5.2.1 Initial BSIC identification

This measurement is performed in the measurement windows as described in 8.4.2.5.

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.

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 identified the BSIC of the GSM BCCH carrier within $T_{identify\ abort}$, 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 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.

The UE shall be able to perform initial BSIC identification on one new GSM cell within the time specified in Annex A in TS 25.225.

When N new GSM cells are to be BSIC identified the time is changed to $N * T_{identify\ abort}$, with

$T_{identify\ abort}$ is specified in section 8.1.2.5.

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 8 identified GSM cells. Initial timing information is obtained from the initial BSIC identification. The timing information shall be updated every time the BSIC is decoded.

For each measurement window allocated for GSM BSIC reconfirmation as described in 8.4.2.5, the UE shall attempt to decode the BSIC falling within the effective idle interval duration. If more than one BSIC can be decoded within the same measurement window, 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 8.4.2.5.2.1. The UE shall be able to make BSIC re-confirmation attempts for the 8 strongest GSM cells in the monitored list.

The time requirement for BSIC re-confirmation is specified in Annex A in TS 25.225.

$T_{re\text{-}confirm\ abort}$ is specified in section 8.1.2.5.

It is assumed for the requirement that the measurement windows possible due to higher layer parameters are of minimum duration necessary to perform the measurements.

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 8.8: Requirements for reporting criteria per measurement category

Measurement category	E_{cat}	Note
Traffic volume measurements	2 + (2 per Transport Channel)	

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 complete list of measurements is specified in 3GPP TS 25.302 "Services Provided by Physical Layer". The physical layer measurements for TDD are described and defined in 3GPP TS 25.225 "Physical layer – Measurements (TDD)". In this clause for TDD, per each measurement the relevant requirements on performance in terms of accuracy are reported.

The accuracy requirements in this clause are applicable for AWGN radio propagation conditions.

Unless explicitly stated,

- Reported measurements shall be within defined range in 90 % of the cases.
- Measurement channel is 12,2 kbps as defined in 3GPP TS 25.102 annex A. This measurement channel is used both in active cell and cells to be measured.
- Physical channels used as defined in 3GPP TS 25.102 annex A.
- All requirements are defined when UE is in a CELL_DCH or CELL_FACH stage. The difference between modes are the reporting delay. Some of the measurements are not requested to be reported in both stages.
- Single task reporting.
- Power control is active.

9.1 Measurements performance for UE

The requirements in this clause are applicable for a UE:

- in state CELL_DCH and 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.

9.1.1 Performance for UE measurements in downlink (RX)

9.1.1.1 P-CCPCH RSCP (TDD)

The measurement period for CELL_DCH state and CELL_FACH state can be found in section 8.

The accuracy requirements in table 9.1 are valid under the following conditions:

P-CCPCH RSCP ≥ -102 dBm.

The received signal levels on SCH and P-CCPCH are according the requirements in paragraph 8.1.2.6

9.1.1.1.1 Absolute accuracy requirements

Table 9.1 P-CCPCH_RSCP absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3.84 MHz]
P-CCPCH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-70...-50

9.1.1.1.2 Relative accuracy requirements

The P-CCPCH_RSCP intra-frequency relative accuracy is defined as the P-CCPCH_RSCP measured from one cell compared to the P-CCPCH_RSCP measured from another cell on the same frequency.

The accuracy requirements in table 9.2 are valid under the following conditions:

P-CCPCH RSCP1,2 ≥ -102 dBm.

$$\left| \text{P - CCPCH RSCP1}|_{in\ dBm} - \text{P - CCPCH RSCP2}|_{in\ dBm} \right| \le 20dB$$

Relative Io difference [dB] ≤ relative RSCP difference [dB]

The received signal levels on SCH and P-CCPCH are according the requirements in paragraph 8.1.2.6

It is assumed that the measurements of P-CCPCH RSCP1 and P-CCPCH RSCP2 can be performed within 20ms due to slot allocations in the cells concerned.

Table 9.2: P-CCPCH_RSCP intra-frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions	
		Normal condition	Extreme condition	Io [dBm/3.84 MHz]	relative RSCP difference [dB]
P-CCPCH_RSCP	dBm	±1	±1	-94...-50	<2
		±2	±2		2...14
		±3	± 3		>14

The P-CCPCH_RSCP inter-frequency relative accuracy is defined as the P-CCPCH_RSCP measured from one cell compared to the P-CCPCH_RSCP measured from another cell on a different frequency.

The accuracy requirements in table 9.3 are valid under the following conditions:

P-CCPCH RSCP1,2 ≥ -102 dBm.

$$\left| \text{P - CCPCH RSCP1}\big|_{in\ dBm} - \text{P - CCPCH RSCP2}\big|_{in\ dBm} \right| \le 20dB$$

The received signal levels on SCH and P-CCPCH are according the requirements in paragraph 8.1.2.6

Table 9.3: P-CCPCH_RSCP inter-frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3.84 MHz]
P-CCPCH_RSCP	dBm	± 6	± 6	-94...-50

9.1.1.1.3 Range/mapping

The reporting range for *P-CCPCH RSCP* is from -115 ...-25 dBm.

In table 9.4 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.4

Reported value	Measured quantity value	Unit
P-CCPCH RSCP_LEV _00	P-CCPCH RSCP <–115	dBm
P-CCPCH RSCP_LEV _01	-115 ≤ P-CCPCH RSCP < –114	dBm
P-CCPCH RSCP_LEV _02	-114 ≤ P-CCPCH RSCP < –113	dBm
…	…	…
P-CCPCH RSCP_LEV _89	-27 ≤ P-CCPCH RSCP < -26	dBm
P-CCPCH RSCP_LEV _90	-26 ≤ P-CCPCH RSCP < -25	dBm
P-CCPCH RSCP_LEV _91	-25 ≤ P-CCPCH RSCP	dBm

9.1.1.2 CPICH measurements (FDD)

Note: This measurement is used for handover between UTRA TDD and UTRA FDD.

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

The measurement period for CELL_DCH state and CELL_FACH state can be found in section 8.

9.1.1.2.1 CPICH RSCP

9.1.1.2.1.1 Inter frequency measurement absolute accuracy requirement

The accuracy requirements in table 9.5 are valid under the following conditions:

CPICH_RSCP1$|_{\text{dBm}}$ ≥ -114 dBm.

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

Table 9.5: CPICH_RSCP Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3.84 MHz]
CPICH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-94...-50

9.1.1.2.1.2 Range/mapping

The reporting range for *CPICH RSCP* is from -115 ...-25 dBm.

In table 9.6 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.6

Reported value	Measured quantity value	Unit
CPICH_RSCP_LEV _00	CPICH RSCP <–115	dBm
CPICH_RSCP_LEV _01	-115 ≤ CPICH RSCP < –114	dBm
CPICH_RSCP_LEV _02	-114 ≤ CPICH RSCP < –113	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

9.1.1.2.2 CPICH Ec/Io

9.1.1.2.2.1 Inter frequency measurement relative accuracy requirement

The relative accuracy of CPICH Ec/Io is defined as the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on a different frequency.

The accuracy requirements in table 9.7 are valid under the following conditions:

CPICH_RSCP1,2 ≥ -114 dBm.

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

| 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 9.7 CPICH Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	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

9.1.1.2.2.2 Range/mapping

The reporting range for *CPICH Ec/Io* is from -24 ...0 dB.

In table 9.8 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.8

Reported value	Measured quantity value	Unit
CPICH_Ec/Io _00	CPICH Ec/Io < –24	dB
CPICH_Ec/Io _01	-24 ≤ CPICH Ec/Io < –23.5	dB
CPICH_Ec/Io _02	-23.5 ≤ CPICH Ec/Io < –23	dB
…	…	…
CPICH_Ec/Io _47	-1 ≤ CPICH Ec/Io < -0.5	dB
CPICH_Ec/Io _48	-0.5 ≤ CPICH Ec/Io < 0	dB
CPICH_Ec/Io _49	0 ≤ CPICH Ec/Io	dB

9.1.1.3 Timeslot ISCP

The measurement period for CELL_DCH state and CELL_FACH state can be found in section 8.

9.1.1.3.1 Absolute accuracy requirements

Table 9.9L: Timeslot_ISCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3.84 MHz]
Timeslot_ISCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-70...-50

9.1.1.3.2 Range/mapping

The reporting range for *Timeslot ISCP* is from -115...-25 dBm.

In table 9.10 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.10

Reported value	Measured quantity value	Unit
UE_TS_ISCP_LEV_00	Timeslot_ISCP < –115	dBm
UE_TS_ISCP_LEV_01	-115 ≤ Timeslot_ISCP < –114	dBm
UE_TS_ISCP_LEV_02	-114 ≤ Timeslot_ISCP < –113	dBm
…	…	…
UE_TS_ISCP_LEV_89	-27 ≤ Timeslot_ISCP < -26	dBm
UE_TS_ISCP_LEV_90	-26 ≤ Timeslot_ISCP < -25	dBm
UE_TS_ISCP_LEV_91	-25 ≤ Timeslot_ISCP	dBm

9.1.1.4 UTRA carrier RSSI

The measurement period shall be equal to the measurement period for P-CCPCH RSCP measurements. The measurement period for CELL_DCH state can be found in section 8.

9.1.1.4.1 Absolute accuracy requirement

Absolute accuracy case only one carrier is applied.

Table 9.11: UTRA carrier RSSI Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3.84 MHz]
UTRA Carrier RSSI	dBm	± 4	± 7	-94...-70
	dBm	± 6	± 9	-70...-50

9.1.1.4.2 Relative accuracy requirement

Relative accuracy requirement is defined as active cell frequency UTRA carrier RSSI compared to measured other frequency UTRA carrier RSSI level

The accuracy requirements in table 9.12 are valid under the following condition:

$| \text{Channel 1\_Io} |_{\text{dBm/3.84 MHz}}$ -Channel 2_Io $|_{\text{dBm/3.84 MHz}} | < 20$ dB.

Table 9.12: UTRA carrier RSSI Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm /3.84 MHz]
UTRA Carrier RSSI	dBm	± 7	± 11	-94...-50

9.1.1.4.3 Range/mapping

The reporting range for *UTRA carrier RSSI* is from -100 ...-25 dBm.

In table 9.13 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.13

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

9.1.1.5 GSM carrier RSSI

Note: This measurement is for handover between UTRAN and GSM.

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

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 idle intervals to perform GSM measurements, the measurement accuracy requirements for RXLEV in GSM 05.08 shall apply.

If the UE, in CELL_DCH state needs idle intervals to perform GSM measurements, the measurement accuracy requirement is stated in section 8.1.2.5.

If the UE, in CELL_FACH state, does not need measurement occasions and/or idle intervals to perform GSM measurements, the measurement accuracy requirements for RXLEV in GSM 05.08 shall apply.

If the UE, in CELL_FACH state needs measurement occasions and/or idle intervals to perform GSM measurements, the measurement accuracy requirement is stated in section 8.4.2.5.

The reporting range and mapping specified for RXLEV in GSM 05.08 shall apply.

9.1.1.6 SIR

The measurement period shall be equal to the measurement period for P-CCPCH RSCP measurements. The measurement period for CELL_DCH state and CELL_FACH state can be found in section 8.

9.1.1.6.1 Absolute accuracy requirements

Table 9.14: SIR Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal conditions	Extreme conditions	
SIR	dB	±3 dB	[ ]	For 0<SIR<20dB and Io range -94...-50 dBm/3.84 MHz
SIR	dB	±(3 - SIR)	[ ]	For -7 ≤ SIR ≤ 0 dB and Io range -94...-50 dBm/3.84 MHz

9.1.1.6.2 Range/mapping

The reporting range for *SIR* is from -11 ...20 dB.

In table 9.15 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.15

Reported value	Measured quantity value	Unit
UE_SIR_00	SIR< –11,0	dB
UE_SIR_01	-11,0 ≤ SIR< –10,5	dB
UE_SIR_02	-10,5 ≤ SIR< –10,0	dB
…	…	…
UE_SIR_61	-19 ≤ SIR< 19,5	dB
UE_SIR_62	19,5 ≤ SIR< 20	dB
UE_SIR_63	20 ≤ SIR	dB

9.1.1.7 Transport channel BLER

9.1.1.7.1 BLER measurement requirement

The Transport Channel BLER value shall be calculated from a window with the size equal to the reporting interval (see clause on periodical reporting criteria in TS 25.331).

9.1.1.7.2 Range/mapping

The *Transport channel BLER* reporting range is from 0 to 1.

In table 9.16 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.16

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	-

9.1.1.8 SFN-SFN observed time difference

The measurement period shall be equal to the measurement period for P-CCPCH RSCP measurements. The measurement period for CELL_DCH state and CELL_FACH state can be found in section 8.

9.1.1.8.1 Accuracy requirements

The accuracy requirement in table 9-17 is valid under the following conditions:

P-CCPCH_RSCP1,2 ≥ -102 dBm

$$\left| \text{P - CCPCH RSCP1}|_{in\ dBm} - \text{P - CCPCH RSCP2}|_{in\ dBm} \right| \le 20dB$$

The received signal levels on SCH and P-CCPCH are according the requirements in paragraph 8.1.2.6.

Table 9.17: SFN-SFN observed time difference accuracy

Parameter	Unit	Accuracy [chip]	Conditions
			Io [dBm/3.84 MHz]
SFN-SFN observed time difference	chip	+/-0,5 for both type 1 and 2	-94...-50

9.1.1.8.2 Range/mapping

The reporting range for *SFN-SFN observed time difference type 1* is from 0 ... 9830400 chip.

In table 9.18 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.18

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

The reporting range for *SFN-SFN observed time difference type 2* is from –1280 ... +1280 chip.

In table 9.19 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.19

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

9.1.1.9 Observed time difference to GSM cell

Note: This measurement is used to determine the system time difference between UTRAN and GSM cells.

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

The measurement period for CELL_DCH state can be found in section 8.

9.1.1.9.1 Accuracy requirements

Table 9.20: Observed time difference to GSM cell accuracy

Parameter	Unit	Accuracy [chip]	Conditions
Observed time difference to GSM cell	chip	± 20	

9.1.1.9.2 Range/mapping

The reporting range for *Observed time difference to GSM cell* is from 0 ... 3060/13 ms.

In table 9.21 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.21

Reported value	Measured quantity value	Unit
GSM_TIME _0000	0 ≤ Observed time difference to GSM cell < 1x3060/(4096x13)	ms
GSM_TIME _0001	1x3060/(4096x13) ≤ Observed time difference to GSM cell < 2x3060/(4096x13)	ms
GSM_TIME _0002	2x3060/(4096x13)≤ Observed time difference to GSM cell < 3x3060/(4096x13)	ms
GSM_TIME _0003	3x3060/(4096x13) ≤ Observed time difference to GSM cell < 4x3060/(4096x13)	ms
…	…	…
GSM_TIME _4093	4093x3060/(4096x13) ≤ Observed time difference to GSM cell < 4094x3060/(4096x13)	ms
GSM_TIME _4094	4094x3060/(4096x13) ≤ Observed time difference to GSM cell < 4095x3060/(4096x13)	ms
GSM_TIME _4095	4095x3060/(4096x13) ≤ Observed time difference to GSM cell < 3060/13	ms

9.1.1.10 UE GPS Timing of Cell Frames for UP

9.1.1.10.1 Accuracy requirement

The requirements in this section shall apply to UE supporting this capability.

The measurement period for CELL_DCH state and CELL_FACH state can be found in section 8.

Table 9.22

Parameter	Unit	Accuracy [chip]	Conditions
UE GPS Timing of Cell Frames for LCS	chip	[ ]	

9.1.1.10.2 UE GPS timing of Cell Frames for UP measurement report mapping

The reporting range for *UE GPS timing of Cell Frames for UP* is from 0 ... 2319360000000 chip.

In table 9.23 mapping of the measured quantity is defined.

Table 9.23

Reported value	Measured quantity value	Unit
GPS_TIME_00000000000000	UE GPS timing of Cell Frames for UP < 0,0625	chip
GPS_TIME_00000000000001	0,0625 ≤ UE GPS timing of Cell Frames for UP < 0,1250	chip
GPS_TIME_00000000000002	0,1250 ≤ UE GPS timing of Cell Frames for UP < 0,1875	chip
...	...	...
GPS_TIME_37109759999997	2319359999999,8125 ≤ UE GPS timing of Cell Frames for UP < 2319359999999,8750	chip
GPS_TIME_37109759999998	2319359999999,8750 ≤ UE GPS timing of Cell Frames for UP < 2319359999999,9375	chip
GPS_TIME_37109759999999	2319359999999,9375 ≤ UE GPS timing of Cell Frames for UP < 2319360000000,0000	chip

9.1.1.11 SFN-CFN observed time difference

Note: This measurement is for handover timing purposes to identify active cell and neighbour cell time difference.

The measurement period shall be equal to the measurement period for P-CCPCH RSCP measurements. The measurement period for CELL_DCH state can be found in section 8.

9.1.1.11.1 Accuracy requirements

The accuracy requirements in tables 9.24 are valid under the following conditions:

P-CCPCH_RSCP1,2 ≥ -102dBm.

$$\left| \text{P-CCPCH RSCP1}|_{in\ dBm} - \text{P-CCPCH RSCP2}|_{in\ dBm} \right| \leq 20dB$$

The received signal levels on SCH and P-CCPCH are according the requirements in paragraph 8.1.2.6

Table 9.24: SFN-CFN observed time difference accuracy for a TDD neighbour cell

Parameter	Unit	Accuracy [chip]	Conditions
			Io [dBm/3.84 MHz]
SFN-CFN observed time difference	chip	+/-0,5	-94...-50

The accuracy requirements in tables 9.25 are valid under the following conditions:

CPICH_RSCP1,2 ≥ -114 dBm.

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

The received signal levels on SCH and CPICH are according the requirements in paragraph 8.1.2.6

Table 9.25: SFN-CFN observed time difference accuracy for a FDD neighbour cell

Parameter	Unit	Accuracy [chip]	Conditions
			Io [dBm/3.84 MHz]
SFN-CFN observed time difference	chip	+/-1	-94...-50

9.1.1.11.2 Range/mapping

The reporting range for SFN-CFN observed time difference for a TDD neighbour cell is from 0...256 frames.

In table 9.26 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.26: SFN-CFN observed time difference range/mapping for a TDD neighbour cell

Reported value	Measured quantity value	Unit
SFN-CFN_TIME_000	0 ≤ SFN-CFN observed time difference < 1	frame
SFN-CFN_TIME_001	1 ≤ SFN-CFN observed time difference < 2	frame
SFN-CFN_TIME_002	2 ≤ SFN-CFN observed time difference < 3	frame
…	…	…
SFN-CFN_TIME_253	253 ≤ SFN-CFN observed time difference < 254	frame
SFN-CFN_TIME_254	254 ≤ SFN-CFN observed time difference < 255	frame
SFN-CFN_TIME_255	255 ≤ SFN-CFN observed time difference < 256	frame

The reporting range for *SFN-CFN observed time difference* for a FDD neighbour cell is from 0 ... 9830400 chip.

In table 9.27 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.27: SFN-CFN observed time difference range/mapping for a FDD neighbour cell

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

9.1.2 Performance for UE Measurements in Uplink (TX)

The output power is defined as the average power of the transmit timeslot, and is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off α=0,22 and a bandwidth equal to the chip rate.

9.1.2.1 UE transmitted power

The measurement period for CELL_DCH state and CELL_FACH state is 1 timeslot.

9.1.2.1.1 Absolute accuracy requirements

Table 9.28: UE transmitted power absolute accuracy

Parameter	Unit	PUEMAX	
		24dBm	21dBm
UE transmitted power=PUEMAX	dB	+1/-3	±2
UE transmitted power=PUEMAX-1	dB	+1,5/-3,5	±2,5
UE transmitted power=PUEMAX-2	dB	+2/-4	±3
UE transmitted power=PUEMAX-3	dB	+2,5/-4,5	±3,5
PUEMAX-10≤UE transmitted power<PUEMAX-3	dB	+3/-5	±4

Note 1: User equipment maximum output power, PUEMAX, is the maximum output power level without tolerance defined for the power class of the UE in 3GPP TS 25.102 "UTRA (UE) TDD; Radio Transmission and Reception".

Note 2: UE transmitted power is the reported value.

9.1.2.1.2 Range/mapping

The reporting range for *UE transmitted power* is from -50 ...+34 dBm.

In table 9.29 mapping of the measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.29

Reported value	Measured quantity value	Unit
UE_TX_POWER _021	-50 ≤ UE transmitted power < -49	dBm
UE_TX_POWER _022	-49 ≤ UE transmitted power < -48	dBm
UE_TX_POWER _023	-48 ≤ UE transmitted power < -47	dBm
…	…	…
UE_TX_POWER _102	31 ≤ UE transmitted power < 32	dBm
UE_TX_POWER _103	32 ≤ UE transmitted power < 33	dBm
UE_TX_POWER _104	33 ≤ UE transmitted power < 34	dBm

9.2 Measurements Performance for UTRAN

9.2.1 Performance for UTRAN Measurements in Uplink (RX)

9.2.1.1 RSCP

The measurement period shall be 100 ms.

9.2.1.1.1 Absolute accuracy requirements

Table 9.30: RSCP absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal conditions	Extreme conditions	Io [dBm/3.84 MHz]
RSCP	dB	± 6	± 9	-105..-74

9.2.1.1.2 Relative accuracy requirements

The relative accuracy of RSCP in inter frequency case is defined as the RSCP measured from one UE compared to the RSCP measured from another UE.

Table 9.31: RSCP relative accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Io [dBm/3.84 MHz]
RSCP	dB	± 3 for intra-frequency	-105..-74

9.2.1.1.3 Range/mapping

The reporting range for *RSCP* is from -120 ...-57 dBm.

In table 9.32 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.32

Reported value	Measured quantity value	Unit
RSCP_LEV _00	RSCP <–120,0	dBm
RSCP_LEV _01	-120,0 ≤ RSCP < –119,5	dBm
RSCP_LEV _02	-119,5 ≤ RSCP < –119,0	dBm
…	…	…
RSCP_LEV _125	-58,0 ≤ RSCP < -57,5	dBm
RSCP_LEV _126	-57,5 ≤ RSCP < -57,0	dBm
RSCP_LEV _127	-57,0 ≤ RSCP	dBm

9.2.1.2 Timeslot ISCP

The measurement period shall be 100 ms.

9.2.1.2.1 Absolute accuracy requirements

Table 9.33: Timeslot ISCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal conditions	Extreme conditions	Io [dBm/3.84 MHz]
Timeslot ISCP	dB	± 6	± 9	-105..-74

9.2.1.2.2 Range/mapping

The reporting range for *Timeslot ISCP* is from -120...-57 dBm.

In table 9.34 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.34

Reported value	Measured quantity value	Unit
UTRAN_TS_ISCP_LEV_00	Timeslot_ISCP < –120,0	dBm
UTRAN_TS_ISCP_LEV_01	-120,0 ≤ Timeslot_ISCP < –119,5	dBm
UTRAN_TS_ISCP_LEV_02	-119,5 ≤ Timeslot_ISCP < –119,0	dBm
…	…	…
UTRAN_TS_ISCP_LEV_125	-58,0 ≤ Timeslot_ISCP < -57,5	dBm
UTRAN_TS_ISCP_LEV_126	-57,5 ≤ Timeslot_ISCP < -57,0	dBm
UTRAN_TS_ISCP_LEV_127	-57,0 ≤ Timeslot_ISCP	dBm

9.2.1.3 Received Total Wideband Power

The measurement period shall be 100 ms.

9.2.1.3.1 Absolute accuracy requirements

Table 9.35: RECEIVED TOTAL WIDE BAND POWER Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Io [dBm/3.84 MHz]
RECEIVED TOTAL WIDE BAND POWER	dBm/3.84 MHz	± 4	-105..-74

9.2.1.3.2 Range/mapping

The reporting range for *RECEIVED TOTAL WIDE BAND POWER* is from -112 ... -50 dBm.

In table 9.36 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.36

Reported value	Measured quantity value	Unit
RECEIVED TOTAL WIDE BAND POWER_LEV _000	RECEIVED TOTAL WIDE BAND POWER < –112,0	dBm
RECEIVED TOTAL WIDE BAND POWER_LEV _001	-112,0 ≤ RECEIVED TOTAL WIDE BAND POWER < –111,9	dBm
RECEIVED TOTAL WIDE BAND POWER_LEV _002	-111,9 ≤ RECEIVED TOTAL WIDE BAND POWER < –111,8	dBm
…	…	…
RECEIVED TOTAL WIDE BAND POWER_LEV _619	-50,2 ≤ RECEIVED TOTAL WIDE BAND POWER < -50,1	dBm
RECEIVED TOTAL WIDE BAND POWER_LEV _620	-50,1 ≤ RECEIVED TOTAL WIDE BAND POWER < -50,0	dBm
RECEIVED TOTAL WIDE BAND POWER_LEV _621	-50,0 ≤ RECEIVED TOTAL WIDE BAND POWER	dBm

9.2.1.4 SIR

The measurement period shall be 80 ms.

9.2.1.4.1 Absolute accuracy requirements

Table 9.37: SIR Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Range
SIR	dB	± 3	For 0<SIR<20 dB when Io > -105 dBm/3.84 MHz
SIR	dB	+/-(3 - SIR)	For -7<SIR<0 dB when Io > -105 dBm/3.84 MHz

9.2.1.4.2 Range/mapping

The reporting range for *SIR* is from -11 ... 20 dB.

In table 9.38 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.38

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

9.2.1.5 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.

9.2.1.5.1 Accuracy requirement

The average of consecutive Transport channel BER measurements is required to fulfil the accuracy stated in table 9.39 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 table9.39.

Table 9.39: Transport channel BER accuracy

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%.

9.2.1.5.2 Range/mapping

The *Transport channel BER* reporting range is from 0 to 1.

In table 9.40 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.40

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	-

9.2.1.6 RX Timing Deviation

The measurement period shall be 100 ms.

9.2.1.6.1 Accuracy requirements

Table 9.41: RX Timing Deviation accuracy

Parameter	Unit	Accuracy [chip]	Conditions
			Range [chips]
RX Timing Deviation	chip	+/- 0,5	-256, …, 256

9.2.1.6.2 Range/mapping

The reporting range for *RX Timing Deviation* is from -255,9375 ... 255,9375 chips.

In table 9.42 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.42

Reported value	Measured quantity value	Unit
RX_TIME_DEV_0000	RX Timing Deviation < –255,9375	chip
RX_TIME_DEV_0001	-255,9375≤ RX Timing Deviation < 255,875	chip
RX_TIME_DEV_0002	-255,875≤ RX Timing Deviation < –255,8125	chip
…	…	…
RX_TIME_DEV_4096	000,00≤ RX Timing Deviation <0,0625	chip
…	…	…
RX_TIME_DEV_8189	255,8125 ≤ RX Timing Deviation < 255,875	chip
RX_TIME_DEV_8190	255,875≤ RX Timing Deviation < 255,9375	chip
RX_TIME_DEV_8191	255,9375 ≤ RX Timing Deviation	chip

NOTE: This measurement may be used for timing advance calculation or location services.

9.2.1.7 (void)

9.2.1.8 (void)

9.2.1.9 UTRAN GPS Timing of Cell Frames for UP

The requirements in this section shall apply to UTRAN supporting this capability.

9.2.1.9.1 Accuracy requirement

Table 9.43

Parameter	Unit	Accuracy [chip]	Conditions
UTRAN GPS timing of Cell Frames for UP	chip	[ ]	

9.2.1.9.2 Range/mapping

The reporting range for *UTRAN GPS timing of Cell Frames for UP* is from 0 ... 2319360000000 chip.

In table 9.44 the mapping of measured quantity is defined.

Table 9.44

Reported value	Measured quantity value	Unit
GPS_TIME_00000000000000	UTRAN GPS timing of Cell Frames for UP < 0,0625	chip
GPS_TIME_00000000000001	0,0625 ≤ UTRAN GPS timing of Cell Frames for UP < 0,1250	chip
GPS_TIME_00000000000002	0,1250 ≤ UTRAN GPS timing of Cell Frames for UP < 0,1875	chip
…	…	…
GPS_TIME_37109759999997	2319359999999,8125 ≤ UTRAN GPS timing of Cell Frames for UP < 2319359999999,8750	chip
GPS_TIME_37109759999998	2319359999999,8750 ≤ UTRAN GPS timing of Cell Frames for UP < 2319359999999,9375	chip
GPS_TIME_37109759999999	2319359999999,9375 ≤ UTRAN GPS timing of Cell Frames for UP < 2319360000000,0000	chip

9.2.2 Performance for UTRAN measurements in downlink (TX)

The output power is defined as the average power of the transmit timeslot, and is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate.

9.2.2.1 Transmitted carrier power

The measurement period shall be 100 ms.

9.2.2.1.1 Accuracy requirements

Table 9.45: Transmitted carrier power accuracy

Parameter	Unit	Accuracy [% units]	Conditions
			Range
Transmitted carrier power	%	± 10	For 10% ≤ Transmitted carrier power ≤90%

9.2.2.1.2 Range/mapping

The reporting range for *Transmitted carrier power* is from 0 ... 100 %.

In table 9.46 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 9.46

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	%

9.2.2.2 Transmitted code power

The measurement period shall be 100 ms.

9.2.2.2.1 Absolute accuracy requirements

Table 9.47: Transmitted code power absolute accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Range
Transmitted code power	dB	[± 3]	Over the full range

9.2.2.2.2 Relative accuracy requirements

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 9.48: Transmitted code power relative accuracy

Parameter	Unit	Accuracy [dB]	Conditions
			Range
Transmitted code power	dB	± 2	Over the full range

9.2.2.2.3 Range/mapping

The reporting range for *Transmitted code power* is from -10 ... 46 dBm.

In table 9.49 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.49

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

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 TS34.122. Statistical interpretation of the requirements is described in Annex A.2.

A.2 Requirement classification for statistical testing

Requirements in this specification are either expressed as absolute requirements with a single value stating the requirement, or expressed as a success rate. There are no provisions for the statistical variations that will occur when the parameter is tested.

Annex A outlines the 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 25.123. The details of the tests, how many times to run it and how to establish confidence in the tests are described in TS 34.122. 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 25.123

A.2.1.1 Time and delay requirements on UE higher layer actions

One 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.

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 as observed during repeated tests shall be at least 90% in case of AWGN propagation condition.. How the limit is applied in the test depends on the confidence required, further detailed are in TS 34.122.

A.2.1.2 Measurements of power levels, relative powers and time

A very large number of requirements are on measurements that the UE performs:

In 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.

A.2.1.3 Implementation requirements

A few requirements are strict actions the UE should take or capabilities the UE should have, without any allowance for deviations. These requirements are absolute and should be tested as such. Examples are

"Event triggered report rate" in UTRAN Connected Mode Mobility (A.5)

A.2.1.4 Physical layer timing requirements

All requirements on "Timing Characteristics" (A.7) are absolute limits on timing accuracy.

A.2.1.5 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 25.102.

A.3 Reserved for Future Use

(void)

A.4 Idle Mode

A.4.1 Cell selection

NOTE: This section is included for consistency with numbering with section 4; no test covering requirements exist.

A.4.2 Cell Re-Selection

For each of the re-selection scenarios in section 4.2 a test is proposed.

For TDD/TDD cell reselection two scenarios are considered:

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

A.4.2.1 Scenario 1: TDD/TDD cell re-selection 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 Table A.4.1and A.4.2. 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		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
HCS			Not used	
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Qrxlevmin		dBm	-102	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.
T_{SI}		s	1.28	The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.4.2: Cell re-selection single carrier multi-cell case

Parameter	**Unit**	**Cell 1**				**Cell 2**				**Cell 3**			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	9	7	9	7	7	9	7	9	-1	-1	-1	-1
PCCPCH RSCP	dBm	-64	-66			-66	-64			-74	-74		
Qoffset1$_{s,n}$	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			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
PCCPCH RSCP	dBm	-74	-74			-74	-74			-74	-74		
Qoffset1$_{s,n}$	dB	C4, C1: 0; C4, C2:0; C4,C3:0C4, 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			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

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 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:

$T_{evaluateTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ TDD}$ of 6.4s according to Table 4.1 in section 4.2.2.7.

T_{SI} Maximum repetition rate 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: TDD/TDD cell re-selection 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 Table A.4.3 and A.4.4. 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		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
HCS			Not used	
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Qrxlevmin		dBm	-102	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.
T_{SI}		s	1.28	The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	30	
T2		s	15	

Table A.4.4: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	6	0	6	0	0	6	0	6	-3	-3	-3	-3
PCCPCH RSCP	dBm	-67	-73			-73	-67			-76	-76		
Qoffset$1_{s,n}$	dB	C1, C2: 0; C1, C3:0; C1,C4:0C1, C5:0; C1, C6:0				C2, C1: 0; C2, C3:0; C2,C4:0C2, C5:0; C2, C6:0				C3, C1: 0; C3, C2:0; C3,C4:0 C3, C5:0; C3, C6:0			
Qhyst1_s	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
Sintersearch	dB	not sent				not sent				not sent			
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
PCCPCH RSCP	dBm	-76	-76			-76	-76			-76	-76		
Qoffset$1_{s,n}$	dB	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			
Qhyst1_s	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
Sintersearch	dB	not sent				not sent				not sent			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

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 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:

$T_{evaluateTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ TDD}$ of 6.4s according to Table 4.1 in section 4.2.2.7.

T_{SI} Maximum repetition rate of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

A.4.2.3 Scenario 3: TDD/FDD cell re-selection

A.4.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the TDD/FDD cell re-selection delay reported in section 4.2.2.

This scenario implies the presence of 1 TDD and 1 FDD cell as given in Table A.4.5 and A.4.6.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.

Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4.5: General test parameters for the TDD/FDD cell re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	TDD cell
	Neighbour cells		Cell2	FDD cell
Final condition	Active cell		Cell2	
HCS			Not used	
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.
T_{SI}		s	1.28	The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	30	
T2		s	15	

Table A.4.6: TDD/FDD cell re-selection

Parameter	Unit	Cell 1				Cell 2	
Timeslot Number		**0**		**8**		**n.a**	**n.a.**
		T1	**T2**	**T 1**	**T 2**	**T 1**	**T 2**
UTRA RF Channel Number		Channel 1				Channel 2	
CPICH_Ec/Ior	dB	n.a.		n.a.		-10	-10
PCCPCH_Ec/Ior	dB	-3	-3			-12	-12
SCH_Ec/Ior	dB	-9	-9	-9	-9	-12	-12
SCH_t_{offset}		0	0	0	0	n.a.	n.a.
PICH_Ec/Ior	dB			-3	-3	-15	-15
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-0,941	-0,941
$\hat{I}_{or}/I_{oc}$	dB	3	-2	3	-2	-2	3
I_{oc}	dBm/3.84 MHz	-70					
CPICH_RSCP	dBm	n.a.		n.a.		-82	-77
PCCPCH_RSCP	dBm	-70	-75			n.a.	n.a.
Cell_selection and reselectionquality _measure		CPICH_RSCP				CPICH_RSCP	
Qrxlevmin	dBm	-102				-115	
Qoffset1$_{s,n}$	dB	C1, C2: -12				C2, C1: +12	
Qhyst1$_s$	dB	0				0	
Treselection	s	0				0	
Sintersearch	dB	not sent				not sent	
Propagation Condition		AWGN				AWGN	

NOTE: The purpose of this test case is to evaluate the delay of the TDD/FDD re-selection process, it is not intended to give reasonable values for a TDD/FDD cell re-selection.

A.4.2.3.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a 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: $T_{evaluateFDD} + T_{SI}$, where:

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

T_{SI} Maximum repetition rate 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.4.2.4 Scenario 4: inter RAT cell re-selection

A.4.2.4.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to GSM cell re-selection delay reported in section 4.3.2.1.

This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. Test parameters are given in Table, A.4.7, A.4.8, A.4.9.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.

For this test environment the ranking/mapping function indicated in the broadcast of cell 1 shall be in such a way as to enable the UE to evaluate that the TDD cell 1 is better ranked as the GSM cell 2 during T1 and the GSM cell 2 is better ranked than the TDD cell 1 during T2.

Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4.7: General test parameters for UTRAN to GSM Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	TDD Cell
	Neighbour cell		Cell2	GSM Cell
Final condition	Active cell		Cell2	
DRX cycle length		s	1,28	UTRAN cell
BCCH repetition period (GSM cell)		s	1,87	In GSM the system information is scheduled according to an 8 x (51 x 8) cycle (i.e. a system information message is transmitted every 235 ms). The cell selection parameters in system info 3 and 4 are transmitted at least every second. (GSM 05.02)
T1		s	15	
T2		s	15	

Table A.4.8: Cell re-selection UTRAN to GSM cell case (cell 1)

Parameter	Unit	Cell 1 (UTRA)			
Timeslot Number		**0**		**8**	
		T1	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0
PICH_Ec/Ior	dB			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	3	-2	3	-2
I_{oc}	dBm/3, 84 MHz	–70		–70	
PCCPCH RSCP	dBm	-70	-75		
Propagation Condition		AWGN		AWGN	
Treselection	s	0			
$Ssearch_{RAT}$	dB	not sent			

Table A.4.9: 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	-70
RXLEV_ACCESS_MIN	dBm	-100	
MS_TXPWR_MAX_CCH	dBm	30	

NOTE: The purpose of this test case is to evaluate the delay of the TDD/GSM re-selection process, it is not intended to give reasonable values for a TDD/GSM cell re-selection.

A.4.2.4.2 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 LOCATION UPDATING REQUEST message to perform a Location update.

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 UE shall keep a running average of 4 measurements, thus gives 4*1280ms ($T_{measureGSM}$ Table 4.1), means 5.12 seconds can elapse from the beginning of time period T2 before the UE has finished the measurements to evaluate that the GSM cell fulfils the re-selection criteria.

The cell selection parameters in the BCCH of the GSM cell in system info 3 and 4 are transmitted at least every second.

A.5 UTRAN Connected Mode Mobility

A.5.1 TDD/TDD Handover

A.5.1.1 Handover to intra-frequency cell

A.5.1.1.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the intra-frequency handover delay in CELL_DCH state in the single carrier case reported in section 5.1.2.1.

The test parameters are given in Table A.5.1.1 and A.5.1.2 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used, and that P-CCPCH RSCP and SFN-CFN observed timed difference shall be reported together with Event 1G. 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 message with activation time at the beginning of T3 with a new active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE such that the delay between the end of the last received TTI containing the message and the beginning of T3 is at least equal to the RRC procedure delay as defined in [16].

The second Beacon timeslot shall be provided in timeslot 8 for both cell 1 and cell 2. The UL DPCH shall be transmitted in timeslot 12.

Table A.5.1.1: General test parameters for Handover to intra-frequency cell

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final condition	Active cell		Cell 2	
HCS			Not used	
O		dB	0	Cell individual offset. This value shall be used for all cells in the test.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
Monitored cell list size			6 TDD neighbours on Channel 1	
T1		s	10	
T2		s	10	
T3		s	10	

Table A.5.1.2: Cell specific test parameters for Handover to intra-frequency cell

Parameter	Unit	Cell 1						Cell 2					
DL timeslot number		0			4			0			5		
		T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1						Channel 1					
PCCPCH_Ec/Ior	dB	-3			n.a.			-3			n.a.		
SCH_Ec/Ior	dB	-9			n.a.			-9			n.a.		
SCH_t_{offset}	dB	0			n.a.			5			n.a.		
DPCH_Ec/Ior	dB	n.a.			Note 1		n.a.	n.a.			n.a.		Note 1
OCNS_Ec/Ior	dB	-3,12			Note 2		n.a.	n.a.	-3,12		n.a.		Note 2
$\hat{I}_{or}/I_{oc}$	dB	1						-Inf.	3		-Inf.		3
PCCPCH RSCP	dBm	-72			n.a.			-Inf.	-70		n.a.		
I_{oc}	dBm/ 3,84 MHz	-70											
Propagation Condition		AWGN											
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior .													

A.5.1.1.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than 40 ms from the beginning of time period T3.

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

A.5.1.2 Handover to inter-frequency cell

A.5.1.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the inter-frequency handover delay in CELL_DCH state in the dual carrier case reported in section 5.1.2.1.

The test consists of two successive time periods, with a time duration T1 and T2. The test parameters are given in tables A.5.1.3 and A.5.1.4 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used. The PCCPCH RSCP and SFN-CFN observed time difference 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 message with activation time at beginning of T3 with one active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE such that the delay between the last the end of the last received TTI containing the message and the beginning of T3 is at least equal to the RRC procedure delay as defined in [16].

The second Beacon timeslot shall be provided in timeslot 8 for cell 1 and in timeslot 10 for cell 2. The UL DPCH shall be transmitted in timeslot 12.

Table A.5.1.3: General test parameters for Handover to inter-frequency cell

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final condition	Active cell		Cell 2	
HCS			Not used	
O		dB	0	Cell individual offset. This value shall be used for all cells in the test.
Hysteresis		dB	0	Hysteresis parameter for event 2C
Time to Trigger		ms	0	
Threshold non-used frequency		dBm	-80	Applicable for Event 2C
Filter coefficient			0	
Monitored cell list size			6 TDD neighbours on Channel 1 6 TDD neighbours on Channel 2	
T_{SI}		s	1,28	The value shall be used for all cells in the test.
T1		s	10	
T2		s	10	
T3		s	10	

TableA.5.1.4: Cell Specific parameters for Handover to inter-frequency cell

Parameter	Unit	Cell 1						Cell 2					
DL timeslot number		**0**			**4**			**2**			**5**		
		T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1						Channel 2					
PCCPCH_Ec/Ior	dB	-3			n.a.			-3			n.a.		
SCH_Ec/Ior	dB	-9			n.a.			-9			n.a.		
SCH_t_{offset}	dB	0			n.a.			5			n.a.		
DPCH_Ec/Ior	dB	n.a.			Note 1		n.a.	n.a.			n.a.		Note 1
OCNS_Ec/Ior	dB	-3,12			Note 2		n.a.	n.a.	-3,12		n.a.		Note 2
$\hat{I}_{or}/I_{oc}$	dB	1						-Inf.	7		-Inf		7
PCCPCH RSCP	dBm	-72			n.a.			-Inf.	-66		n.a.		
I_{oc}	dBm/ 3,84 MHz	-70											
Propagation Condition		AWGN											
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior .													

A.5.1.2.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than 40 ms from the beginning of time period T2.

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

A.5.2 TDD/FDD Handover

A.5.2.1 Test purpose and Environment

The purpose of this test is to verify the requirement for the TDD/FDD handover delay in CELL_DCH state reported in section 5.2.2.1.

The test parameters are given in Table A.5.2.1, A.5.2.2 and A.5.2.3 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G and 2B shall be used. The CPICH_RSCP of the best cell on the unused frequency shall be reported together with Event 2B reporting. 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 message with activation time at the beginning of T3 with a new active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE such that the delay between the end of the last received TTI containing the message and the beginning of T3 is at least equal to the RRC procedure delay as defined in [16].

Table A.5.2.1: General test parameters for TDD/FDD handover

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Active cell		Cell 1	TDD cell
	Neighbour cell		Cell 2	FDD cell
Final condition	Active cell		Cell 2	FDD cell
HCS			Not used	
O		dB	0	Cell individual offset. This value shall be used for all cells in the test.
Hysteresis		dB	3	Hysteresis parameter for event 2B
Time to Trigger		ms	0	
Absolute threshold used frequency		dBm	-71	Applicable for Event 2B
Threshold non-used frequency		dBm	-80	Applicable for Event 2B
W non-used frequency			1	Applicable for Event 2B
Filter coefficient			0	
Monitored cell list size			6 TDD neighbours on Channel 1 6 FDD neighbours on Channel 2	
T_{SI}		s	1.28	The value shall be used for all cells in the test.
T1		s	5	
T2		s	15	
T3		s	5	

Table A.5.2.2: Cell 1 specific test parameters for TDD/FDD handover

Parameter	Unit	Cell 1					
DL timeslot number		**0**			**2**		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number		Channel 1					
PCCPCH_Ec/Ior	dB	-3			n.a.		
SCH_Ec/Ior	dB	-9			n.a.		
SCH_t_{offset}	dB	0			n.a.		
DPCH_Ec/Ior	dB	n.a.			Note 1		n.a.
OCNS_Ec/Ior	dB	-3,12			Note 2		n.a.
$\hat{I}_{or}/I_{oc}$	dB	5	-1		5	-1	
PCCPCH RSCP	dBm	-68	-74		n.a.		
I_{oc}	dBm/ 3,84 MHz	-70					
Propagation Condition		AWGN					
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior .							

Table A.5.2.3: Cell 2 specific test parameters for TDD/FDD handover

Parameter	Unit	Cell 2	
		T1, T2	**T3**
CPICH_Ec/Ior	dB	-10	
PCCPCH_Ec/Ior	dB	-12	
SCH_Ec/Ior	dB	-12	
PICH_Ec/Ior	dB	-15	
DPCH_Ec/Ior	dB	n.a.	Note 1
OCNS_Ec/Ior	dB	-0,941	Note 2
CPICH_RSCP	dBm	-83	-77
$\hat{I}_{or}/I_{oc}$	dB	-3	3
I_{oc}	dBm/3. 84 MHz	-70	
Propagation Condition		AWGN	
Note 1: The DPCH level is controlled by the power control loop Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}			

A.5.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 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%.

A.5.3 TDD/GSM Handover

NOTE: This section is included for consistency with numbering with section 5 currently no test covering requirements in sections 5.3.2.1 and 5.3.2.2 exists.

A.5.4 Cell Re-selection in CELL_FACH

A.5.4.1 Scenario 1: TDD/TDD cell re-selection single carrier case

A.5.4.1.1 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 5.4.2.1.1. The test parameters are given in Tables A.5.4.1 to A.5.4.4.

Table A.5.4.1: General test parameters for Cell Re-selection in CELL_FACH

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
HCS			Not used	
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Qrxlevmin		dBm	-102	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.
T_{SI}		s	1,28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.5.4.2: Physical channel parameters for S-CCPCH.

Parameter	Unit	Level
Channel bit rate	Kbps	24,4
Channel symbol rate	Ksps	12,2
Slot Format #	-	0
Frame allocation	-	Continuous frame allocation
Midamble allocation	-	Default Midamble

Table A.5.4.3: Transport channel parameters for S-CCPCH

Parameter	FACH
Transport Channel Number	1
Transport Block Size	240
Transport Block Set Size	240
Transmission Time Interval	20 ms
Type of Error Protection	Convolutional Coding
Coding Rate	½
Rate Matching attribute	256
Size of CRC	16

Table A.5.4.4: Cell specific test parameters for Cell Re-selection in CELL_FACH

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		0		8		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3

OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	9	7	9	7	7	9	7	9	-1	-1	-1	-1
PCCPCH RSCP	dBm	-64	-66			-66	-64			-74	-74		
$Qoffset1_{s,n}$	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			
$Qhyst1_s$	dB	0				0				0			
Treselection		0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
FACH measurement occasion info		not sent				not sent				not sent			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
PCCPCH RSCP	dBm	-74	-74			-74	-74			-74	-74		
$Qoffset\mathbf{1}_{s,n}$	dB	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			
$Qhyst1_s$	dB	0				0				0			
Treselection		0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
FACH measurement occasion info		not sent				not sent				not sent			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

NOTE: S-CCPCH shall not be located in TS0.

A.5.4.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the CELL UPDATE message with cause value “cell reselection“ in cell 2.

The cell re-selection delay shall be less than 2,5 s.

The rate of correct cell re-selections observed during repeated tests shall be at least 90%.

A.5.4.2 Scenario 2: TDD/TDD cell re-selection multi carrier case

A.5.4.2.1 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 the multi carrier case reported in section 5.4.2.1.2. The test parameters are given in Tables A.5.4.5 to A.5.4.8.

Table A.5.4.5: General test parameters for Cell Re-selection in CELL_FACH

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
HCS			Not used	
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Qrxlevmin		dBm	-102	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.
T_{SI}		s	1,28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.5.4.6: Physical channel parameters for S-CCPCH.

Parameter	Unit	Level
Channel bit rate	Kbps	24,4
Channel symbol rate	Ksps	12,2
Slot Format #	-	0
Frame allocation	-	Continuous frame allocation
Midamble allocation	-	Default Midamble

Table A.5.4.7: Transport channel parameters for S-CCPCH

Parameter	FACH
Transport Channel Number	1
Transport Block Size	240
Transport Block Set Size	240
Transmission Time Interval	20 ms
Type of Error Protection	Convolutional Coding
Coding Rate	½
Rate Matching attribute	256
Size of CRC	16

Table A.5.4.8: Cell specific test parameters for Cell Re-selection in CELL_FACH

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		0		8		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3

OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	9	3	9	3	3	9	3	9	-1	-1	-1	-1
PCCPCH RSCP	dBm	-64	-70			-70	-64			-74	-74		
Qoffset1$_{s,n}$	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			
Qhyst1$_s$	dB	0				0				0			
Treselection		0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
Sintersearch	dB	not sent				not sent				not sent			
FACH measurement occasion info		not sent				not sent				not sent			
Inter-frequency TDD measurement indicator		TRUE				TRUE				TRUE			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t$_{offset}$		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
PCCPCH RSCP	dBm	-74	-74			-74	-74			-74	-74		
Qoffset**1**$_{s,n}$	dB	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			
Qhyst1$_s$	dB	0				0				0			
Treselection		0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
Sintersearch	dB	not sent				not sent				not sent			
FACH measurement occasion info		not sent				not sent				not sent			
Inter-frequency TDD measurement indicator		TRUE				TRUE				TRUE			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

NOTE: S-CCPCH shall not be located in TS0.

A.5.4.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the CELL UPDATE message with cause value “cell reselection“ in cell 2.

The cell re-selection delay shall be less than 3 s.

The rate of correct cell re-selections observed during repeated tests shall be at least 90%.

A.5.5 Cell Re-selection in CELL_PCH

A.5.5.1 Scenario 1: TDD/TDD cell re-selection single carrier case

A.5.5.1.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in CELL_PCH state in section 5.5.2.

This scenario implies the presence of 1 carrier and 6 cells as given in Table A.5.5.1and A.5.5.2.

Table A.5.5.1: General test parameters for Cell Re-selection single carrier multi-cell case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
HCS			Not used	
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Qrxlevmin		dBm	-102	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.
T_{SI}		s	1.28	The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.5.5.2: Cell re-selection single carrier multi-cell case

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	9	7	9	7	7	9	7	9	-1	-1	-1	-1
PCCPCH RSCP	dBm	-64	-66			-66	-64			-74	-74		
Qoffset1$_{s,n}$	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			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
PCCPCH RSCP	dBm	-74	-74			-74	-74			-74	-74		
Qoffset1$_{s,n}$	dB	C4, C1: 0; C4, C2:0; C4,C3:0C4, 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			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

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 2, and starts to send the CELL UPDATE message with cause "cell reselection" in cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateTDD} + T_{SI}$, where:

$T_{evaluateTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ TDD}$ of 6.4s according to Table 4.1 in section 4.2.2.7.

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.5.5.2 Scenario 2: TDD/TDD cell re-selection multi carrier case

A.5.5.2.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in CELL_PCH state in section 5.5.2.

This scenario implies the presence of 1 carrier and 6 cells as given in Table A.5.5.3 and A.5.5.4.

Table A.5.5.3: General test parameters for Cell Re-selection in Multi carrier case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
HCS			Not used	
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Qrxlevmin		dBm	-102	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.
T_{SI}		s	1.28	The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	30	
T2		s	15	

Table A.5.5.4: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	6	0	6	0	0	6	0	6	-3	-3	-3	-3
PCCPCH RSCP	dBm	-67	-73			-73	-67			-76	-76		
Qoffset1$_{s,n}$	dB	C1, C2: 0; C1, C3:0; C1,C4:0C1, C5:0; C1, C6:0				C2, C1: 0; C2, C3:0; C2,C4:0C2, C5:0; C2, C6:0				C3, C1: 0; C3, C2:0; C3,C4:0 C3, C5:0; C3, C6:0			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
Sintersearch	dB	not sent				not sent				not sent			
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
PCCPCH RSCP	dBm	-76	-76			-76	-76			-76	-76		
Qoffset1$_{s,n}$	dB	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			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
Sintersearch	dB	not sent				not sent				not sent			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

A.5.5.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the CELL UPDATE message with cause "cell reselection" in cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateTDD} + T_{SI}$, where:

$T_{evaluateTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ TDD}$ of 6.4s according to Table 4.1 in section 4.2.2.7.

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 Cell Re-selection in URA_PCH

A.5.6.1 Scenario 1: TDD/TDD cell re-selection single carrier case

A.5.6.1.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in URA_PCH state in section 5.6.2.

This scenario implies the presence of 1 carrier and 6 cells as given in Table A.5.6.1 and A.5.6.2.

Cell1 and Cell2 shall belong to different UTRAN Registration Areas (URA).

Table A.5.6.1: General test parameters for Cell Re-selection single carrier multi-cell case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
HCS			Not used	
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Qrxlevmin		dBm	-102	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.
T_{SI}		s	1.28	The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.5.6.2: Cell re-selection single carrier multi-cell case

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	9	7	9	7	7	9	7	9	-1	-1	-1	-1
PCCPCH RSCP	dBm	-64	-66			-66	-64			-74	-74		
Qoffset1$_{s,n}$	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			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
PCCPCH RSCP	dBm	-74	-74			-74	-74			-74	-74		
Qoffset1$_{s,n}$	dB	C4, C1: 0; C4, C2:0; C4,C3:0C4, 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			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

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 2, and starts to send the URA UPDATE message with URA update cause value "change of URA" in cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateTDD} + T_{SI}$, where:

$T_{evaluateTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ TDD}$ of 6.4s according to Table 4.1 in section 4.2.2.7.

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 Scenario 2: TDD/TDD cell re-selection multi carrier case

A.5.6.2.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in URA_PCH state in section 5.6.2.

This scenario implies the presence of 1 carrier and 6 cells as given in Table A.5.6.3 and A.5.6.4.

Table A.5.6.3: General test parameters for Cell Re-selection in Multi carrier case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
HCS			Not used	
UE_TXPWR_MAX_RACH		dBm	21	The value shall be used for all cells in the test.
Qrxlevmin		dBm	-102	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.
T_{SI}		s	1.28	The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	30	
T2		s	15	

Table A.5.6.4: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	5	5	5	5	10	10	10	10
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	6	0	6	0	0	6	0	6	-3	-3	-3	-3
PCCPCH RSCP	dBm	-67	-73			-67	-70			-76	-76		
Qoffset1$_{s,n}$	dB	C1, C2: 0; C1, C3:0; C1,C4:0C1, C5:0; C1, C6:0				C2, C1: 0; C2, C3:0; C2,C4:0C2, C5:0; C2, C6:0				C3, C1: 0; C3, C2:0; C3,C4:0 C3, C5:0; C3, C6:0			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
Sintersearch	dB	not sent				not sent				not sent			
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**8**		**0**		**8**		**0**		**8**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		15	15	15	15	20	20	20	20	25	25	25	25
PICH_Ec/Ior	dB			-3	-3			-3	-3			-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
PCCPCH RSCP	dBm	-76	-76			-76	-76			-76	-76		
Qoffset1$_{s,n}$	dB	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			
Qhyst1$_s$	dB	0				0				0			
Treselection	s	0				0				0			
Sintrasearch	dB	not sent				not sent				not sent			
Sintersearch	dB	not sent				not sent				not sent			
I_{oc}	dBm/3, 84 MHz	-70											
Propagation Condition		AWGN											

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 2, and starts to send the URA UPDATE message with URA update cause value "change of URA" in cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateTDD} + T_{SI}$, where:

$T_{evaluateTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ TDD}$ of 6.4s according to Table 4.1 in section 4.2.2.7.

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.6 void

A.6A RRC Connection Control

A.6A.1 RRC re-establishment delay

A.6A.1.1 RRC re-establishment delay to a known target cell

A.6A.1.1.1 Test Purpose and Environment

The purpose is to verify that the RRC re-establishment delay to a known target cell is within the specified limits. This test will partly verify the requirements in section 6A.1.2.

The test parameters are given in table A.6A.1 and table A.6A.2 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 time durations of T1 and T2 respectively.

During T1, the DL DPCH in cell 1 shall be transmitted in timeslot 2 and the UL DPCH in cell 1 shall be transmitted in timeslot 10. At the beginning of time period T2, the DPCH shall be removed.

Cell 1 and cell shall be synchronised, i.e. share the same frame and timeslot timing.

Table A.6A.1: General test parameters for RRC re-establishment delay, known target cell case

Parameter		Unit	Value	Comment
DCH parameters			DL reference measurement channel 12.2 kbps	As specified in TS 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Active cell		Cell 1	Cell 2 shall be included in the monitored set in Cell 1.
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
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.
N313			20	
N315			1	
T313		Seconds	0	
T_{SI}		ms	1280	
Monitored cell list size			24 TDD neighbours on Channel 1	
Reporting frequency		Seconds	4	
T1			10	
T2			6	

Table A.6A.2: Cell specific parameters for RRC re-establishment delay test, known target cell case

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3	n.a.	n.a.	-3	-3	n.a.	n.a.
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	15	15	15	15
PICH_Ec/Ior	dB	n.a.	n.a.	-3	-3	n.a.	n.a.	-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	3	-13	3	-13	5	5	5	5
I_{oc}	dBm/3.84 MHz	-70							
PCCPCH_RSCP	dB	-70	-86	n.a.	n.a.	-68	-68	n.a.	n.a.
Propagation Condition		AWGN							

A.6A.1.1.2 Test Requirements

The RRC re-establishment delay $T_{RE\text{-}ESTABLISH}$ to a known target cell shall be less than 2 s.

The rate of successful RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in this test 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+$T_{313}$

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

and,

N_{313} Equal to 20 and therefore resulting in 200 ms delay.

T_{313} Equal to 0 s.

$T_{SEARCH\text{-}KNOWN}$ Equal to 100 ms

T_{SI} Equal to 1280 ms, the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure performance value of system information blocks defined in [16] for a UTRAN cell.

T_{RA} Equal to 40 ms, the additional delay caused by the random access procedure.

A.6A.1.2 RRC re-establishment delay to an unknown target cell

A.6A.1.2.1 Test Purpose and Environment

The purpose is to verify that the RRC re-establishment delay to an unknown target cell is within the specified limits. This test will partly verify the requirements in section 6A.1.2.

The test parameters are given in table A.6A.3 and table A.6A.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 time durations of T1 and T2 respectively.

During T1, the DL DPCH in cell 1 shall be transmitted in timeslot 2 and the UL DPCH in cell 1 shall be transmitted in timeslot 10. At the beginning of time period T2, the DPCH shall be removed.

Cell 1 and cell shall be synchronised, i.e. share the same frame and timeslot timing.

Table A.6A.3: General test parameters for RRC re-establishment delay, unknown target cell case

Parameter		Unit	Value	Comment
DCH parameters			DL reference measurement channel 12.2 kbps	As specified in TS 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Active cell		Cell 1	Cell 2 shall not be included in the monitored set in Cell 1.
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
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.
N313			20	
N315			1	
T313		Seconds	0	
T_{SI}		ms	1280	
Monitored cell list size			16 TDD neighbours on Channel 1 16 TDD neighbours on Channel 2	
Reporting frequency		Seconds	4	
T1			10	
T2			6	

Table A.6A.4: Cell specific parameters for RRC re-establishment delay test, unknown target cell case

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3	n.a.	n.a.	-3	-3	n.a.	n.a.
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	15	15	15	15
PICH_Ec/Ior	dB	n.a.	n.a.	-3	-3	n.a.	n.a.	-3	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	3	-13	3	-13	5	5	5	5
I_{oc}	dBm/3.84 MHz	-70							
PCCPCH_RSCP	dB	-70	-86	n.a.	n.a.	-68	-68	n.a.	n.a.
Propagation Condition		AWGN							

A.6A.1.2.2 Test Requirements

The RRC re-establishment delay $T_{RE\text{-}ESTABLISH}$ to an unknown target cell shall be less than 3,7s.

The rate of successful RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in this test 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,

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

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

and,

N_{313} Equal to 20 and therefore resulting in 200 ms delay.

T_{313} Equal to 0 s.

$T_{SEARCH-UNKNOWN}$ Equal to 800 ms

NF Equal to 2, the number of different frequencies in the monitored set of cell 1.

T_{SI} Equal to 1280 ms, the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure performance value of system information blocks defined in [16] for a UTRAN cell.

T_{RA} Equal to 40 ms, the additional delay caused by the random access procedure.

A.6A.2 Transport format combination selection in UE

A.6A.2.1 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 6A.2.

A.6A.2.1.1 Interactive or Background, PS, UL: 64 kbps

The test will verify the general requirement on TFC selection in section 6A.2 for a 64 kbps UL reference RAB intended for packet data services, i.e. Interactive or Background, PS as defined in TS 34.108 and multiplexed to a 3.4 kbps DCCH.

The test parameters are given in Table A.6A.5, A.6A.6, A.6A.7 and Table A.6A.8 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.6A.6 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.6A.5: 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	Gain factors for TFC0 to TFC9 shall be set to 1.
Power Control		On	
Active cell		Cell 1	
Maximum allowed UL TX power	dBm	0	Value of IE “Maximum allowed UL Tx power
Primary CCPCH Tx power	dBm	18	Value of IE “Primary CCPCH Tx power”
UL timeslot interference	dBm	-80	Value of IE “UL timeslot interference” This value shall apply to all timeslots
α		1	IE “Alpha” either not sent or explicitly set to value
UL target SIR	dB	6	
DPCH constant offset	dB	adjustable	Value of IE “DPCH constant power
T1	s	10	
T2	s	10	

Table A.6A.6: Transport channel parameters for UL reference RAB, Interactive or Background and DCCH

Parameter	Unit	64 kbps RAB	DCCH 3.4kbps
Transport Channel Number		1	2
Transmission Time Interval	ms	20	40
Type of Error Protection		Turbo coding	Convolutional coding
Coding Rate		1/3	
Size of CRC	bits	16	
Transport Block Size	bits	336	148
Transport Block Set Size	bits	336*B (B=0,1,2,3,4)	148*B (B=0,1)
Transport Format Set TF0 TF1 TF2 TF3 TF4	bits	 0x336 1x336 2x336 3x336 4x336	 0x148 1x148 N/A N/A N/A

Table A.6A.7: 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.6A.8: Physical channel parameters

Parameter	Unit	Value
UL timeslot		7
Burst type		1
Resource units		{(spreading factor 16 x 1 code) + (spreading factor 4 x 1 code)} x 1 time slot
TFCI	bits	16
TPC	bits	2
Frame allocation		Continuous

The test shall be performed in AWGN channel propagation conditions. The P-CCPCH in the DL shall be transmitted in timeslot 0.

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.6A.5 shall be signalled to the UE.

During time period T1:

With the received P-CCPCH power level set to –60 dBm, the value of the DPCH constant value shall be adjusted such that the mean UE output power is -10 dBm. These conditions are held steady during period T1.

During time period T2:

At the beginning of time period T2, the received P-CCPCH power level shall be decreased by 20 dB.

A.6A.2.2 Test Requirements

A.6A.2.2.1 Interactive or Background, PS, UL: 64 kbps

The UE shall have stopped using UL_TFC8 and UL_TFC9 within 170 ms from beginning of time period T2.

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

NOTE: The delay from the beginning of T2 can be expressed as:

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

where:

T_{detect_block} Equal to 30 ms, the time needed to detect that UL_TFC8 and UL_TFC9 can no longer be supported. This defines the maximum time to detect that the *Elimination* criterion is fulfilled for UL_TFC8 and UL_TFC9.

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 $MAX(T_{adapt\_max}, T_{TTI}) = MAX(0, 40) = 40$ ms.

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

T_{TTI} See section 6A.2. Equals 40 ms in the test case.

T_{L1_proc} Equals 35 ms.

T_{align_TTI} Align with the longest uplink TTI where the new TFC can be selected. The worst case equals 40 ms in this test case.

T_{offset} Equal to 10 ms, the maximum time between reception of the DL beacon timeslot and the UL DPCH timeslot.

A.7 Timing characteristics

A.7.1 Timing Advance

A.7.1.1 Test Purpose and Environment

The purpose of this test is to verify the requirements on timing advance adjustment accuracy and timing advance adjustment delay in section 7.1.2.

The test parameters are given in table A.7.1.1 and table A.7.1.2. The test consists of two successive time periods, with a time duration of T1and T2 respectively. At the start of time duration T1, the UE shall transmit with the Uplink Timing Advance value set to zero, i.e. Timing Advance disabled.

During time period T1, UTRAN shall send an Uplink Physical Channel control message with activation time at the beginning of T2. The Uplink Physical Channel Control message shall be sent to the UE such that the delay between the end of the last received TTI containing the message and the beginning of T2 is greater than or equal to the RRC procedure delay as defined in [16].

Table A.7.1.1: General test parameters for Timing Advance test

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Timing Advance value		0	IE "Uplink timing advance" value zero or IE "Uplink timing advance control" value disabled.
Final condition	Timing Advance value		5	IE "Uplink timing advance" value set to 5.
Monitored cell list size			6 TDD neighbours on Channel 1	
T_{SI}		s	1.28	The value shall be used for all cells in the test.
T1		s	5	
T2		s	5	

Table A.7.1.2: Cell specific test parameters for Timing Advance test

Parameter	Unit	Cell 1			
DL timeslot number		**0**		**2**	
		T1	T2	T1	T2
UTRA RF Channel Number		Channel 1			
PCCPCH_Ec/Ior	dB	-3		n.a.	
SCH_Ec/Ior	dB	-9		n.a.	
SCH_t_{offset}	dB	0		n.a.	
DPCH_Ec/Ior	dB	n.a.		Note 1	
OCNS_Ec/Ior	dB	-3,12		Note 2	
$\hat{I}_{or}/I_{oc}$	dB	3			
I_{oc}	dBm/ 3,84 MHz	-70			
Propagation Condition		AWGN			
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior					

A.7.1.2 Test Requirements

The UE shall apply the signalled Timing Advance value to the UL DPCH transmission timing at the designated activation time, i.e the beginning of time period T2. The Timing Advance adjustement accuracy shall be within the limits specified in section 7.1.2.

The rate of correct Timing Advance adjustements observed during repeated tests shall be at least 90%.

A.7.2 Cell synchronization accuracy

NOTE: This section is included for consistency with numbering with section 7; currently no test covering requirements in section 7.2 exists.

A.7.3 UE Transmit Timing

NOTE: This section is included for consistency with numbering with section 7; currently no test covering requirements in section 7.3 exists.

A.8 UE Measurements Procedures

A.8.1 TDD intra frequency measurements

A.8.1.1 Event 1G triggered reporting in AWGN propagation condition

A.8.1.1.1 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 section 9.1.

The test parameters are given in Table A.8.1.1 and A.8.1.1A below. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. Three cells shall be present in the test, cell 1 being the serving cell and cell 2 and cell 3 being neighbour cells on the used frequency. All cells shall be synchronised, i.e. share the same frame and timeslot timing.

In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used, and that P-CCPCH RSCP shall be reported together with Event 1G. The Measurement control message shall be sent to the UE such that the delay between the end of the last received TTI containing the message and the beginning of T1 is at least equal to the RRC procedure delay as defined in [16].

The second Beacon timeslot shall be provided in timeslot 8 for both cell 1 and cell 2. The DL DPCH shall be transmitted in timeslot 2 and the UL DPCH shall be transmitted in timeslot 10. The TTI of the uplink DCCH shall be 20ms.

Table A.8.1.1: General test parameters for Event 1G triggered reporting in AWGN propagation condition

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2, Cell 3	
Final condition	Active cell		Cell 1	
O		dB	0	Cell individual offset. This value shall be used for all cells in the test.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Threshold used frequency		dBm	-70	Applicable for Event 1G
Filter coefficient			0	
Monitored cell list size			12 TDD neighbours on Channel 1	
T1		s	6	
T2		s	6	
T3		s	6	

Table A.8.1.1A: Cell specific parameters for Event 1G triggered reporting in AWGN propagation condition

Parameter	Unit	Cell 1			Cell 2			Cell 3		
		T1	T2	T3	T1	T2	T3	T1	T2	T3
DL timeslot number		**0**			**0**			**0**		
UTRA RF Channel Number		Channel 1			Channel 1			Channel 1		
PCCPCH_Ec/Ior	dB	-3			-3			-3		
SCH_Ec/Ior	dB	-9			-9			-9		
SCH_t_{offset}		0			5			10		
OCNS_Ec/Ior	dB	-3,12			-3,12			-3,12		
$\hat{I}_{or}/I_{oc}$	dB	7	5		5	7	-Inf	-Inf		7
PCCPCH RSCP	dBm	-66	-68		-68	-66	-Inf	-Inf		-66
I_{oc}	dBm / 3,84 MHz	-70								
Propagation Condition		AWGN								

A.8.1.1.2 Test Requirements

The UE shall send one Event 1G triggered measurement report for Cell 2 with a measurement reporting delay less than 200ms from the beginning of time period T2.

The UE shall send one Event 1G triggered measurement report for Cell 3 with a measurement reporting delay less than 800ms 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 events correctly reported during repeated tests shall be at least 90%.

A.8.1.2 Event 1H and 1I triggered reporting in AWGN propagation conditions

A.8.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of event 1H and event 1I. This test will partly verify the requirements in section 8.1.2 and section 9.1.

The test parameters are given in Table A.8.1.2, Table A.8.1.2A and Table A.8.1.2B below. The test consists of five successive time periods, with a time duration of T1, T2, T3, T4 and T5 respectively. Two cells shall be present in the test, cell 1 being the current serving cell and cell 2 being a neighbour cell on the used frequency.

In the measurement control information it shall be indicated to the UE that event-triggered reporting with event 1H and event 1I shall be used and that Timeslot ISCP and P-CCPCH RSCP shall be reported together with event 1H and 1I. Measurement control information shall be sent to the UE before the beginning of time period T1.

The second Beacon timeslot shall be provided in timeslot 8 for both cell 1 and cell 2. The UL DPCH shall be transmitted in timeslot 10. In addition, timeslots 3 and 4 shall be allocated as DL timeslots. Cell 1 and cell 2 shall be synchronised, i.e. share the same frame and timeslot timing.

Table A.8.1.2: General test parameters for correct event 1H and 1I reporting in AWGN propagation condition

Parameter		Unit	Value	Comment
DCH parameters			DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final condition	Active cell		Cell 1	
HCS			Not used	
O		dB	0	Cell individual offset. This value shall be used for all cells in the test.
Timeslot list cell 1			2, 3, 4	Timeslot numbers in IE “Cell info” for Cell 1
Timeslot list cell 2			4	Timeslot numbers in IE “Cell info” for Cell 2
Threshold used frequency		dBm	-68	Threshold 1 applicable for event 1H, cell 1 timeslots 2, 4 and cell 2 timeslot 4
Threshold used frequency		dBm	-73	Threshold 2 applicable for event 1H, cell 1 timeslots 2, 3, 4 and cell 2 timeslot 4
Threshold used frequency		dBm	-67	Applicable for event 1I, cell 1 timeslots 2, 4 and cell 2 timeslot 4
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
Monitored cell list size			6 TDD neighbours on Channel 1	Cell 2 shall belong to the monitored set
T1		s	5	
T2		s	5	
T3		s	5	
T4		s	5	
T5		s	5	

Table A.8.1.2A: Cell 1 specific test parameters for correct event 1H and 1I reporting in AWGN propagation condition

Parameter	Unit	Cell 1									
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
UTRA RF Channel Number		Channel 1									
DL timeslot number		**0**					**2**				
PCCPCH_Ec/Ior	dB	-3					n.a.				
SCH_Ec/Ior	dB	-9					n.a.				
SCH_t_{offset}	dB	5					n.a.				
DPCH_Ec/Ior	dB	n.a.					Note 1				
OCNS_Ec/Ior	dB	-3.12					Note 2				
$\hat{I}_{or}/I_{oc}$	dB	4					4				
PCCPCH RSCP	dBm	-69					n.a.				
I_{oc}	dBm / 3,84 MHz	-70									
Propagation Condition		AWGN									
DL timeslot number		**3**					**4**				
PCCPCH_Ec/Ior	dB	n.a.					n.a.				
SCH_Ec/Ior	dB	n.a.					n.a.				
SCH_t_{offset}	dB	n.a.					n.a.				
DPCH_Ec/Ior	dB	n.a.					n.a.				
OCNS_Ec/Ior	dB	0					0				
$\hat{I}_{or}/I_{oc}$	dB	3					0				6
PCCPCH RSCP	dBm	n.a.					n.a.				
I_{oc}	dBm / 3,84 MHz	-70									
Propagation Condition		AWGN									
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior											

Table A.8.1.2B: Cell 2 specific test parameters for correct event 1H and 1I reporting in AWGN propagation condition

Parameter	Unit	Cell 2									
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
UTRA RF Channel Number		Channel 1									
DL timeslot number		**0**					**2**				
PCCPCH_Ec/Ior	dB	-3					n.a.				
SCH_Ec/Ior	dB	-9					n.a.				
SCH_t_{offset}	dB	10					n.a.				
DPCH_Ec/Ior	dB	n.a.					n.a.				
OCNS_Ec/Ior	dB	-3,12					0				
$\hat{I}_{or}/I_{oc}$	dB	1					0	6	0		
PCCPCH RSCP	dBm	-72					n.a.				
I_{oc}	dBm / 3,84 MHz	-70									
Propagation Condition		AWGN									
DL timeslot number		**3**					**4**				
PCCPCH_Ec/Ior	dB	n.a.					n.a.				
SCH_Ec/Ior	dB	n.a.					n.a.				
SCH_t_{offset}	dB	n.a.					n.a.				
DPCH_Ec/Ior	dB	n.a.					n.a.				
OCNS_Ec/Ior	dB	0					0				
$\hat{I}_{or}/I_{oc}$	dB	3					6				0
PCCPCH RSCP	dBm	n.a.					n.a.				
I_{oc}	dBm / 3,84 MHz	-70									
Propagation Condition		AWGN									

A.8.1.2.2 Test Requirements

The UE shall send one event 1I triggered measurement report, with a measurement reporting delay less than 400 ms from the beginning of time period T2.

The UE shall send one event 1H triggered measurement report, with a measurement reporting delay less than 400 ms from the beginning of time period T3.

The UE shall send one event 1H triggered measurement report, with a measurement reporting delay less than 400 ms from the beginning of time period T4.

The UE shall send one event 1I triggered measurement report, with a measurement reporting delay less than 400 ms from the beginning of time period T5.

The UE shall not send event 1H or 1I 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.8.1.3 Correct reporting of neighbours in fading propagation condition

A.8.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs sufficient layer 1 filtering of the P-CCPCH RSCP measurement which is the base for Event 1G evaluation. This test is performed in fading propagation conditions and will partly verify the requirements in section 8.1.2.

The test parameters are given in Table A.8.1.3 and A.8.1.3A below. The test consists of one time period with time duration of T1. Two cells shall be present in the test, cell 1 being the current serving cell and cell 2 being a neighbour cell on the used frequency. Cell 1 and cell 2 shall be synchronised, i.e. share the same frame and timeslot timing.

In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used, and that P-CCPCH RSCP shall be reported together with Event 1G. The Measurement control message shall be sent to the UE such that the delay between the end of the last received TTI containing the message and the beginning of T1 is at least equal to the RRC procedure delay as defined in [16].

The DL DPCH shall be transmitted in timeslot 4 and the UL DPCH shall be transmitted in timeslot 12. The TTI of the UL DCCH shall be 20ms.

Table A.8.1.3: 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 25.102 section A.2.2
Power Control			On	
Target quality value on DTCH		BLER	0.01	
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final condition	Active cell		Cell 1	
O		dB	0	Cell individual offset. This value shall be used for all cells in the test.
Hysteresis		dB	0	
Time to Trigger		ms	200	
Filter coefficient			0	
Monitored cell list size			6 TDD neighbours on Channel 1	Sent before the beginning of time period T1
T1		s	200	

Table A.8.1.3A: Cell specific test parameters for correct reporting of neighbours in fading propagation condition

Parameter	Unit	Cell 1		Cell 2	
		T1	T1	T1	T1
DL timeslot number		**0**	**8**	**0**	**8**
UTRA RF Channel Number		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3	n.a.	-3	n.a.
SCH_Ec/Ior	dB	-9	-9	-9	-9
SCH_t_{offset}		0	0	2	2
PICH_Ec/Ior	dB	n.a.	-3	n.a.	-3
OCNS_Ec/Ior	dB	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	7	7	2	2
PCCPCH RSCP	dBm	-66	n.a.	-71	n.a.
I_{oc}	dBm/ 3,84 MHz	-70			
Propagation Condition		Case 4 as specified in TS25.102 Annex B			

A.8.1.3.2 Test Requirements

The number of Event 1G triggered measurement reports during time period T2 shall be less than 60.

A.8.2 TDD 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 8.1.2.2.

This test will derive that the terminal makes correct reporting of an event Cell 1 is the active cell, Cell 2 is a neighbour cell on the used frequency. The power level on Cell 1 is kept constant and the power level of Cell 2 is changed using "change of best cell event" General test parameters are given in the table A.8.2A below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used. P-CCPCH RSCP of the best cell has to be reported together with Event 2C reporting. New measurement control information, which defines neighbour cells etc., is always sent before the event starts.

The cell specific test parameters are shown in Table A.8.2B.

Table A.8.2A: General test parameters for correct reporting of TDD inter frequency neighbours in AWGN propagation condition

Parameter	Unit	Value	Comment
DPCH parameters active cell		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.102 section A. The DPCH is located in an other timeslot than 0 or 8
Power Control		On	
Active cell		Cell 1	
Threshold non used frequency	dB	-71	Absolute P-CCPCH RSCP threshold for event 2C
Hysteresis	dB	0	
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 T1 starts.
T1	s	10	
T2	s	10	

Table A.8.2B: Cell Specific Parameters for Correct Reporting of inter frequency Neighbours in AWGN Propagation Condition

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		8		0		8	
		T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2			
P-CCPCH_Ec/Ior	dB	-3	-3			-3	-3		
SCH_Ec/Ior	dB	-9	-9	-9	-9	-9	-9	-9	-9
SCH_t_{offset}		0	0	0	0	15	15	15	15
PICH_Ec/Ior				-3	-3			-3	-3
OCNS		-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12	-3,12
$\hat{I}_{or}/I_{oc}$	dB	3	3	3	3	-Infinity	9	-Infinity	9
I_{oc}	dBm/ 3.84 MHz	-70							
PCCPCH_RSCP	dB	-70	-70			-Infinity	-64		
Propagation Condition		AWGN							

NOTE: The DPCH of all cells are located in an other timeslot than 0 or 8

A.8.2.1.2 Test Requirements

The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than 5 s from the beginning of time period T2.

The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

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

A.8.3 FDD measurements

A.8.3.1 Correct reporting of FDD neighbours in AWGN propagation condition

A.8.3.1.1 Test Purpose and Environment

This test will derive that the terminal makes correct reporting of an event. Cell 1 is current active cell, Cell 2 is a FDD cell. The power level of CPICH RSCP of cell 2 and the P-CCPCH RSCP of cell 1 is changed. General test parameters are given in the table A.8.3A below and they are signalled from test device. New measurement control information, which defines neighbour cells etc., is always sent before the handover starts. The test parameters are given in Table A.8.3B below.

Table A.8.3A: General test parameters for Correct reporting of FDD neighbours in AWGN propagation condition

Parameter	Unit	Value	Comment
DPCH parameters active cell		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.102 section A. The DPCH is located in an other timeslot than 0 or 8
Power Control		On	
Active cell		Cell 1	
Threshold non used frequency	dB	-86	Absolute CPICH RSCP threshold for event 2C
Hysteresis	dB	0	
W non-used frequency		1	Applicable for event 2C
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 T1 starts.
T1	s	10	
T2	s	10	

Table A.8.3B: Cell Specific parameters for Correct reporting of FDD neighbours in AWGN propagation condition

Parameter	Unit	Cell 1				Cell 2	
Timeslot Number		0		8		n.a	
		T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2	
CPICH_Ec/Ior	dB	n.a.		n.a.		-10	
PCCPCH_Ec/Ior	dB	-3	-3			-12	
SCH_Ec/Ior	dB	-9	-9	-9	-9	-12	
SCH_t_{offset}		0	0	0	0	n.a.	
PICH_Ec/Ior				-3	-3	-15	
OCNS	dB	-3,12	-3,12	-3,12	-3,12	-0,941	
$\hat{I}_{or}/I_{oc}$	dB	3	3	3	3	-infinity	-2
I_{oc}	dBm/3.84 MHz	-70				-70	
CPICH_RSCP		n.a.				-infinity	-82
PCCPCH_RSCP	dB	-70	-70	-70	-70	n.a.	
Propagation Condition		AWGN				AWGN	

NOTE: The DPCH of the TDD cell is located in an other timeslot than 0 or 8

A.8.3.1.2 Test Requirements

The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than [5] seconds from the start of time period T2.

The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

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

A.9 Measurement Performance Requirements

Unless explicitly stated:

- Measurement channel is 12.2 kbps as defined in TS 25.102 annex A. This measurement channel is used both in active cell and cells to be measured.
- Cell 1 is the active cell.
- Single task reporting.
- Power control is active.

A.9.1 Measurement Performance for UE

A.9.1.1 P-CCPCH RSCP

A.9.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the P-CCPCH RSCP measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.1.1.

Cell 1 and cell 2 shall be synchronised, i.e. share the same frame and timeslot timing. The DL DPCH shall be transmitted in timeslot 4 and the UL DPCH shall be transmitted in timeslot 12.

A.9.1.1.1.1 Intra frequency test parameters

In this case all cells are on the same frequency. The second Beacon timeslot shall be provided in timeslot 8 for both cell 1 and cell 2.

Both P-CCPCH RSCP intra frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.1.

Table A.9.1: P-CCPCH 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
DL timeslot number		0	0	0	0	0	0
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3		-3		-3	
SCH_Ec/Ior	dB	-9		-9		-9	
SCH_t_{offset}		0	5	0	5	0	5
OCNS_Ec/Ior	dB	-3,12		-3,12		-3,12	
Ioc	dBm / 3.84 MHz	-75.7		-59.8		-98.7	
Îor/Ioc	dB	5	2	9	2	3	0
PCCPCH RSCP, Note 1	dBm	-73.7	-76.7	-53.8	-60.8	-98.7	-101.7
Io, Note 1	dBm / 3.84 MHz	-69		-50		-94	
Propagation condition		AWGN		AWGN		AWGN	
NOTE 1: PCCPCH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							

A.9.1.1.1.2 Inter frequency test parameters

In this case both cells are on different frequencies. The second Beacon timeslot shall be provided in timeslot 8 for cell 1 and in timeslot 10 for cell 2.

P-CCPCH RSCP inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.2.

Table A.9.2: P-CCPCH RSCP Inter frequency tests parameters

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
DL timeslot number		0	2	0	2	0	2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
PCCPCH_Ec/Ior	dB	-3		-3		-3	
SCH_Ec/Ior	dB	-9		-9		-9	
SCH_t_{offset}		0	5	0	5	0	5
OCNS_Ec/Ior	dB	-3,12		-3,12		-3,12	
Ioc	dBm / 3.84 MHz	-75.2	-75.2	-57.8	-54.1	-98.7	-97
$\hat{I}$or/Ioc	dB	5	5	7	2	3	0
PCCPCH RSCP, Note 1	dBm	-73.2	-73.2	-54.8	-55.1	-98.7	-100
Io, Note 1	dBm / 3.84 MHz	-69		-50		-94	
Propagation condition		AWGN		AWGN		AWGN	
NOTE 1: PCCPCH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							

A.9.1.1.2 Test Requirements

The P-CCPCH RSCP measurement accuracy shall meet the requirements in section 9.1.1.1.

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

A.9.1.2 CPICH measurements

A.9.1.2.1 CPICH RSCP

A.9.1.2.1.1 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 9.1.1.2 and applies to UE's supporting this capability.

The DL DPCH shall be transmitted in timeslot 1 and the UL DPCH shall be transmitted in timeslot 3.

A.9.1.2.1.1.1 Inter frequency test parameters

In this case both cells are on different frequencies. Cell 1 is a UTRA TDD cell and cell 2 is a UTRA FDD cell. No second Beacon timeslot shall be provided for cell 1.

CPICH RSCP inter frequency absolute accuracy requirements are tested by using test parameters in Table A.9.3.

Table A.9.3: CPICH RSCP Inter frequency tests parameters

Parameter	Unit	Test 1		Test 2	
		Cell 1	Cell 2	Cell 1	Cell 2
DL timeslot number		0	n.a.	0	n.a.
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	n.a.	-10	n.a.	-10
PCCPCH_Ec/Ior	dB	-3	-12	-3	-12
SCH_Ec/Ior	dB	-9	-12	-9	-12
SCH_t_{offset}		5	n.a.	5	n.a.
PICH_Ec/Ior	dB	n.a.	-15	n.a.	-15
OCNS_Ec/Ior	dB	-3.12	-0.94	-3.12	-0.94
Ioc	dBm/ 3.84 MHz	-57.7	-60	-84.7	-84
Îor/Ioc	dB	7	9.54	3	0
PCCPCH RSCP, Note 1	dBm	-53.7	n.a.	-84.7	n.a.
CPICH RSCP, Note 1	dBm	n.a.	-60.46	n.a.	-94
Io, Note 1	dBm/3.84 MHz	-50	-50	-80	-81
Propagation condition	-	AWGN		AWGN	
NOTE 1: PCCPCH RSCP, CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.					

A.9.1.2.1.2 Test Requirements

The CPICH RSCP measurement accuracy shall meet the requirements in section 9.1.1.2.

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

A.9.1.2.2 CPICH Ec/Io

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.1.3 exists.

A.9.1.3 Timeslot ISCP

A.9.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the Timeslot ISCP measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.1.3.

Cell 1 and cell 2 shall be synchronised, i.e. share the same frame and timeslot timing. The DL DPCH shall be transmitted in timeslot 4 and the UL DPCH shall be transmitted in timeslot 12.

A.9.1.3.1.1 Intra frequency test parameters

In this case all cells are on the same frequency. The second Beacon timeslot shall be provided in timeslot 8 for both cell 1 and cell 2.

The Timeslot ISCP intra frequency absolute accuracy requirements are tested by using test parameters in Table A.9.4.

Table A.9.4: Timeslot ISCP Intra frequency test parameters

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
DL timeslot number		0	0	0	0	0	0
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3		-3		-3	
SCH_Ec/Ior	dB	-9		-9		-9	
SCH_t_{offset}		0	5	0	5	0	5
OCNS_Ec/Ior	dB	-3,12		-3,12		-3,12	
Ioc	dBm / 3.84 MHz	-75.7		-59.8		-98.7	
Îor/Ioc	dB	5	2	9	2	3	0
Timeslot ISCP, Note 1	dBm	-73.7	-70.7	-57.8	-50.8	-98.7	-95.7
Io, Note 1	dBm / 3.84 MHz	-69		-50		-94	
Propagation condition		AWGN		AWGN		AWGN	
NOTE 1: Timeslot ISCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							

A.9.1.3.2 Test Requirements

The Timeslot ISCP measurement accuracy shall meet the requirements in section 9.1.1.3.

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

A.9.1.4 UTRA Carrier RSSI

A.9.1.4.1 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 9.1.1.4.

Cell 1 and cell 2 shall be synchronised, i.e. share the same frame and timeslot timing. The DL DPCH shall be transmitted in timeslot 4 and the UL DPCH shall be transmitted in timeslot 12.

A.9.1.4.1.1 Inter frequency test parameters

In this case both cells are on different frequencies. The second Beacon timeslot shall be provided in timeslot 8 for cell 1 and in timeslot 10 for cell 2.

Both UTRA Carrier RSSI absolute and relative accuracy requirements are tested by using test parameters in Table A.9.5.

Table A.9.5: UTRA Carrier RSSI Inter frequency tests parameters

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
DL timeslot number		0	2	0	2	0	2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
PCCPCH_Ec/Ior	dB	-3		-3		-3	
SCH_Ec/Ior	dB	-9		-9		-9	
SCH_t_{offset}		0	5	0	5	0	5
OCNS_Ec/Ior	dB	-3,12		-3,12		-3,12	
Ioc	dBm / 3.84 MHz	-75.2	-75.2	-57.8	-54.1	-98.7	-97
$\hat{I}$or/Ioc	dB	5	5	7	2	3	0
Io, Note 1	dBm / 3.84 MHz	-69		-50		-94	
Propagation condition		AWGN		AWGN		AWGN	
NOTE 1: Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							

A.9.1.4.2 Test Requirements

The UTRA Carrier RSSI absolute measurement accuracy shall meet the requirements in section 9.1.1.4.

The UTRA Carrier RSSI relative measurement accuracy shall meet the requirements in Table A.9.6 by taking into account the effect of thermal noise and noise added by the receiver.

Table A.9.6: UTRA Carrier RSSI relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm/3.84 MHz]
UTRA Carrier RSSI	dBm	-4…5.2	-7…8.2	-94…-87
	dBm	± 4	± 7	-87...-70
	dBm	± 6	± 9	-70...-50

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

A.9.1.5 GSM carrier RSSI

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.1.5 exists.

A.9.1.6 SIR

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.1.6 exists.

A.9.1.7 Transport channel BLER

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.1.7 exists.

A.9.1.8 SFN-SFN observed time difference

A.9.1.8.1 SFN-SFN observed time difference type 1

A.9.1.8.1.1 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 9.1.1.8.

Cell 1 and cell 2 shall be synchronised, i.e. share the same frame and timeslot timing. During the test, the timing difference between cell 1 and cell 2 can be set to any value from 0…9830400 chip.

The DL DPCH shall be transmitted in timeslot 4 and the UL DPCH shall be transmitted in timeslot 12. The second Beacon timeslot shall be provided in timeslot 8 for cell 1 and in timeslot 10 for cell 2.

A.9.1.8.1.1.1 Intra frequency test parameters

In this case all cells are on the same frequency. The SFN-SFN observed time difference type 1 accuracy requirements in the intra-frequency case are tested by using test parameters in Table A.9.7.

Table A.9.7: SFN-SFN observed time difference type 1 Intra frequency test parameters

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
DL timeslot number		0	2	0	2	0	2
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3		-3		-3	
SCH_Ec/Ior	dB	-9		-9		-9	
SCH_t_{offset}		0	5	0	5	0	5
OCNS_Ec/Ior	dB	-3,12		-3,12		-3,12	
Ioc	dBm / 3.84 MHz	-75.2	-75.2	-57.8	-54.7	-98.7	-98.7
Îor/Ioc	dB	5	5	7	3	3	3
Io, Note 1	dBm / 3.84 MHz	-69		-50		-94	
Propagation condition		AWGN		AWGN		AWGN	
NOTE 1: Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							

A.9.1.8.1.1.2 Inter frequency test parameters

In this case both cells are on different frequencies. The SFN-SFN observed time difference type 2 accuracy requirements in the inter-frequency case are tested by using test parameters in Table A.9.8.

Table A.9.8: SFN-SFN observed time difference type 1 Inter frequency tests parameters

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
DL timeslot number		0	2	0	2	0	2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
PCCPCH_Ec/Ior	dB	-3		-3		-3	
SCH_Ec/Ior	dB	-9		-9		-9	
SCH_t_{offset}		0	5	0	5	0	5
OCNS_Ec/Ior	dB	-3,12		-3,12		-3,12	
Ioc	dBm / 3.84 MHz	-75.2	-75.2	-57.8	-54.7	-98.7	-98.7
$\hat{I}$or/Ioc	dB	5	5	7	3	3	3
Io, Note 1	dBm / 3.84 MHz	-69		-50		-94	
Propagation condition		AWGN		AWGN		AWGN	
NOTE 1: Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							

A.9.1.8.1.2 Test Requirements

The SFN-SFN observed time difference type 1 measurement accuracy shall meet the requirements in section 9.1.1.8.

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

A.9.1.8.2 SFN-SFN observed time difference type 2

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements on SFN-SFN observed time difference type 2 in sections 9.1.1.8 exists.

A.9.1.9 Observed time difference to GSM cell

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.1.9 exists.

A.9.1.10 SFN-CFN observed time difference

A.9.1.10.1 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 9.1.1.10.

Cell 1 and cell 2 shall be synchronised, i.e. share the same frame and timeslot timing. During the test, the timing difference between cell 1 and cell 2 can be set to any value from 0…256 frames.

The DL DPCH shall be transmitted in timeslot 4 and the UL DPCH shall be transmitted in timeslot 12. The second Beacon timeslot shall be provided in timeslot 8 for cell 1 and in timeslot 10 for cell 2.

A.9.1.10.1.1 Intra frequency test parameters

In this case all cells are on the same frequency. The SFN-CFN observed time difference accuracy requirements in the intra-frequency case are tested by using test parameters in Table A.9.9.

Table A.9.9: SFN-CFN observed time difference Intra frequency test parameters

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
DL timeslot number		0	2	0	2	0	2
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3		-3		-3	
SCH_Ec/Ior	dB	-9		-9		-9	
SCH_t_{offset}		0	5	0	5	0	5
OCNS_Ec/Ior	dB	-3,12		-3,12		-3,12	
Ioc	dBm / 3.84 MHz	-75.2	-75.2	-57.8	-54.7	-98.7	-98.7
Îor/Ioc	dB	5	5	7	3	3	3
Io, Note 1	dBm / 3.84 MHz	-69		-50		-94	
Propagation condition		AWGN		AWGN		AWGN	
NOTE 1: Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							

A.9.1.10.1.2 Inter frequency test parameters

In this case both cells are on different frequencies. The SFN-CFN observed time difference accuracy requirements in the inter-frequency case are tested by using test parameters in Table A.9.10.

Table A.9.10: SFN-CFN observed time difference Inter frequency tests parameters

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
DL timeslot number		0	2	0	2	0	2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
PCCPCH_Ec/Ior	dB	-3		-3		-3	
SCH_Ec/Ior	dB	-9		-9		-9	
SCH_t_{offset}		0	5	0	5	0	5
OCNS_Ec/Ior	dB	-3,12		-3,12		-3,12	
Ioc	dBm / 3.84 MHz	-75.2	-75.2	-57.8	-54.7	-98.7	-98.7
Îor/Ioc	dB	5	5	7	3	3	3
Io, Note 1	dBm / 3.84 MHz	-69		-50		-94	
Propagation condition		AWGN		AWGN		AWGN	
NOTE 1: Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							

A.9.1.10.2 Test Requirements

The SFN-CFN observed time difference measurement accuracy shall meet the requirements in section 9.1.1.10.

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

A.9.1.11 UE transmitted power

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.1.11 exists.

Annex B (informative): Change History

Table B.1: CRs approved by TSG-RAN#7

RAN Doc	Spec	CR	R	Ph	Subject	Cat	Curr	New
RP-000020	25.123	001		R99	Update of test requirements for TDD/TDD Handover	F	3.0.0	3.1.0
RP-000020	25.123	002		R99	Update of the requirements for TDD/FDD Handover	F	3.0.0	3.1.0
RP-000020	25.123	003		R99	Update of Cell Selection and Re-selection sections	C	3.0.0	3.1.0
RP-000020	25.123	004		R99	Update of Power management and Radio Link Surveillance sections	F	3.0.0	3.1.0
RP-000020	25.123	005		R99	Update of measurements performance requirements	F	3.0.0	3.1.0
RP-000020	25.123	006		R99	Inclusion of transport channel BER	F	3.0.0	3.1.0
RP-000020	25.123	007		R99	Receiver Timing Advance	F	3.0.0	3.1.0
April 2000	25.123	-	-	R99	MCC Editorial update and clause 10 renumbering	A	3.1.0	3.1.1

Table B.2: CRs approved by TSG-RAN#8

RAN Doc	Spec	CR	R	Ph	Subject	Cat	Curr	New
RP-000209	25.123	008		R99	Correction of UTRAN "Transmitted carrier power" accuracy requirements	F	3.1.1	3.2.0
RP-000209	25.123	009		R99	Measurement reporting delay	F	3.1.1	3.2.0
RP-000209	25.123	010		R99	Update of UE SIR Measurements performance requirements	F	3.1.1	3.2.0
RP-000209	25.123	011		R99	UE Transport Channel BLER measurement	F	3.1.1	3.2.0
RP-000209	25.123	012		R99	Editorial corrections of 25.123	F	3.1.1	3.2.0
RP-000209	25.123	013		R99	Range and mapping in TS 25.123 (TDD)	F	3.1.1	3.2.0
RP-000209	25.123	014		R99	Requirement for UE Tx Power Measurement	F	3.1.1	3.2.0
RP-000209	25.123	015		R99	Addition of test parameters to RRM Measurements performance requirements	F	3.1.1	3.2.0

Table B.3: CRs approved by TSG-RAN#9

RAN Doc	Spec	CR	R	Ph	Subject	Cat	Curr	New
RP-000399	25.123	16		R99	Handling of measurement uncertainties in conformance testing (TDD) for RRM measurements	F	3.2.0	3.3.0
RP-000399	25.123	17		R99	Basestation Physical Channel BER Measurement	F	3.2.0	3.3.0
RP-000399	25.123	18		R99	Repetition Period of System Information	F	3.2.0	3.3.0
RP-000399	25.123	19		R99	RRC connection mobility in cell_FACH, cell_PCH and URA_PCH	F	3.2.0	3.3.0
RP-000399	25.123	20		R99	Basestation SIR Measurement	F	3.2.0	3.3.0
RP-000399	25.123	21		R99	UE SIR Measurement Accuracy	F	3.2.0	3.3.0
RP-000399	25.123	22		R99	UE TS ISCP range/mapping correction	F	3.2.0	3.3.0
RP-000399	25.123	23		R99	Alignment of TDD measurements for UE: SFN-CFN observed time difference	F	3.2.0	3.3.0
RP-000399	25.123	24		R99	UTRAN Transport Channel BLER	F	3.2.0	3.3.0
RP-000399	25.123	25		R99	Accuracy requirements for Node-B synchronization	F	3.2.0	3.3.0
RP-000399	25.123	26		R99	Alignment of TDD measurements with FDD: GPS related measurements	F	3.2.0	3.3.0

Table B.4: CRs approved by TSG RAN #10

RAN Doc	Spec	CR	R	Ph	Subject	Cat	Curr	New
RP-000590	25.123	27		R99	Re-structuring TS 25.123 Section 3	F	3.3.0	3.4.0
RP-000590	25.123	28		R99	Re-structuring TS 25.123 Section 4+A4	F	3.3.0	3.4.0
RP-000590	25.123	29		R99	Re-structuring TS 25.123 Section 5	F	3.3.0	3.4.0
RP-000590	25.123	30		R99	Re-structuring TS 25.123 Section A5	F	3.3.0	3.4.0
RP-000590	25.123	31		R99	Re-structuring TS 25.123 Section 6+7	F	3.3.0	3.4.0
RP-000590	25.123	32		R99	Re-structuring TS 25.123 Section 8+A8	F	3.3.0	3.4.0
RP-000590	25.123	33		R99	Re-structuring TS 25.123 Section 9+A9	F	3.3.0	3.4.0
RP-000590	25.123	34		R99	Re-structuring TS 25.123 Annex A1-3	F	3.3.0	3.4.0

Table B.5: CRs approved by TSG RAN #11

RAN Doc	Spec	CR	R	Ph	Subject	Cat	Curr	New
RP-010090	25.123	35		R99	Deletion of cell-selection requirements	F	3.4.0	3.5.0
RP-010090	25.123	37		R99	Corrections in idle mode and corresponding test cases.	F	3.4.0	3.5.0
RP-010090	25.123	38		R99	Section 8 changes	F	3.4.0	3.5.0
RP-010090	25.123	39		R99	Section 9 Changes	F	3.4.0	3.5.0
RP-010090	25.123	40		R99	Correction of the cell-reselection and handover requirements in connected mode.	F	3.4.0	3.5.0
RP-010090	25.123	41		R99	Change and completion of the cell-reselection requirements in CELL-FACH state.	F	3.4.0	3.5.0
RP-010090	25.123	42		R99	Change of the cell-reselection requirements.	F	3.4.0	3.5.0
RP-010090	25.123	43		R99	Extension of reporting range for UTRAN UL measurements	F	3.4.0	3.5.0

Table B.6: CRs approved by TSG RAN #12

RAN Doc	Spec	CR	R	Title	Cat	Curr	New
RP-010351	25.123	46		UTRAN Measurements Test Cases	F	3.5.0	3.6.0
RP-010351	25.123	48		Cell synchronisation definition	F	3.5.0	3.6.0
RP-010351	25.123	50		UE measurement capability	F	3.5.0	3.6.0
RP-010351	25.123	52		Measurements performance requirements	F	3.5.0	3.6.0
RP-010351	25.123	54		FDD Measurements in Cell DCH State	F	3.5.0	3.6.0
RP-010351	25.123	56		Test tolerances	F	3.5.0	3.6.0
RP-010351	25.123	58		UE P-CCPCH RSCP relative accuracy	F	3.5.0	3.6.0
RP-010351	25.123	60		UE P-CCPCH RSCP inter-frequency accuracy	F	3.5.0	3.6.0
RP-010351	25.123	62		UE Tx Timing	F	3.5.0	3.6.0
RP-010351	25.123	64		Correction of re-selection requirements in Cell-FACH state.	F	3.5.0	3.6.0
RP-010352	25.123	66		General section 5 corrections	F	3.5.0	3.6.0
RP-010352	25.123	68		Correction to chapter 4.2 Cell re-selection	F	3.5.0	3.6.0
RP-010352	25.123	70		TDD Measurements in Cell DCH State	F	3.5.0	3.6.0
RP-010352	25.123	72		GSM Measurements in Cell DCH State	F	3.5.0	3.6.0
RP-010352	25.123	79		Measurements in Cell FACH State	F	3.5.0	3.6.0
RP-010352	25.123	81		TDD Measurement Test Cases	F	3.5.0	3.6.0
RP-010352	25.123	83		FDD Measurement Test Cases	F	3.5.0	3.6.0

Table B.7: CRs approved by TSG RAN #13

RAN Tdoc	Spec	CR	R	Ph	Title	Cat	Curr	New
RP-010618	25.123	88		Rel99	Section 4 corrections and clarifications in the test cases	F	3.6.0	3.7.0
RP-010618	25.123	90		Rel99	General section 5 corrections	F	3.6.0	3.7.0
RP-010618	25.123	92		Rel99	Introduction of intra- and inter-frequency test cases for Cell-PCH and URA-PCH	F	3.6.0	3.7.0
RP-010618	25.123	94		Rel99	Transport Channel BER accuracy requirement	F	3.6.0	3.7.0
RP-010618	25.123	96		Rel99	Success Rates in Test Cases	F	3.6.0	3.7.0
RP-010618	25.123	98		Rel99	Introduction of RRC Connection re-establishment requirements	F	3.6.0	3.7.0
RP-010618	25.123	100		Rel99	Introduction of RRC Connection re-establishment test cases	F	3.6.0	3.7.0
RP-010618	25.123	102		Rel99	Correction of UE CPICH RSCP reporting range	F	3.6.0	3.7.0
RP-010618	25.123	104		Rel99	Clarification to requirement classification for statistical testing	F	3.6.0	3.7.0
RP-010618	25.123	106		Rel99	Corrections to sections on inter-frequency measurements in Idle Mode and UE measurement capabilities in Cell-DCH and Cell-FACH for UTRA TDD	F	3.6.0	3.7.0
RP-010618	25.123	108		Rel99	Correction to event 1G triggered measurement reporting delay requirement for UTRA TDD intra-frequency measurement test in A.8.1.1	F	3.6.0	3.7.0

Table B.8: CRs approved by TSG RAN #14

RAN Tdoc	Spec	CR	R	Ph	Title	Cat	Curr	New
RP-010781	25.123	123		Rel99	Clarification of CPICH measurement accuracy	F	3.7.0	3.8.0
RP-010781	25.123	125		Rel99	CELL_FACH test cases for UTRA TDD	F	3.7.0	3.8.0
RP-010781	25.123	127		Rel99	Correction to test requirement for URA_PCH test cases	F	3.7.0	3.8.0
RP-010781	25.123	129		Rel99	Correction of RSSI relative accuracy requirements	F	3.7.0	3.8.0
RP-010781	25.123	131		Rel99	Corrections to TDD/TDD inter-frequency test cases in Annex A	F	3.7.0	3.8.0
RP-010781	25.123	133		Rel99	Correction to GSM carrier RSSI	F	3.7.0	3.8.0
RP-010781	25.123	135		Rel99	Requirements for TFC selection at UE maximum power	F	3.7.0	3.8.0

Table B.9: CRs approved by TSG RAN #15

RAN Tdoc	Spec	CR	R	Ph	Title	Cat	Curr	New
RP-020018	25.123	141	1	R99	Introduction TDD/TDD Handover Test Cases	F	3.8.0	3.9.0
RP-020018	25.123	142		R99	Corrections to Section 9	F	3.8.0	3.9.0
RP-020018	25.123	143		R99	Removal of section 6 on DCA	F	3.8.0	3.9.0
RP-020018	25.123	144		R99	Requirements on UE TS ISCP measurement	F	3.8.0	3.9.0
RP-020019	25.123	145	1	R99	Corrections measurement requirements in CELL_DCH and CELL_FACH states	F	3.8.0	3.9.0
RP-020018	25.123	146		R99	Corrections to reporting requirements in CELL_FACH state	F	3.8.0	3.9.0
RP-020019	25.123	147	1	R99	Introduction of Test Case for correct event 1H/I reporting	F	3.8.0	3.9.0
RP-020018	25.123	148	1	R99	Introduction TDD/FDD Handover Test Case	F	3.8.0	3.9.0
RP-020018	25.123	150		R99	Corrections to Timing Advance requirements	F	3.8.0	3.9.0
RP-020018	25.123	151	1	R99	Introduction of Timing Advance Test Case	F	3.8.0	3.9.0
RP-020018	25.123	152		R99	Correction of OCNS level settings in Annex A test cases	F	3.8.0	3.9.0
RP-020019	25.123	154	1	R99	Corrections to Idle Mode sections	F	3.8.0	3.9.0

Table B.10: CRs approved by TSG RAN #16

RAN Tdoc	Spec	CR	R	Ph	Title	Cat	Curr	New
RP-020282	25.123	182	1	R99	Correction to Test Case for Event-triggered reporting in AWGN	F	3.9.0	3.10.0
RP-020282	25.123	191	1	R99	Introduction of measurement-specific test cases	F	3.9.0	3.10.0
RP-020282	25.123	221		R99	TFC selection in UE requirements and test case	F	3.9.0	3.10.0
RP-020282	25.123	222		R99	Introduction of intra-frequency fading test case	F	3.9.0	3.10.0
RP-020282	25.123	223	1	R99	HO interruption times TDD to TDD/FDD/GSM	F	3.9.0	3.10.0
RP-020282	25.123	224	1	R99	Measurement reporting and capabilities for the support of event-triggered and periodic reporting criteria in CELL_DCH and CELL_FACH states	F	3.9.0	3.10.0
RP-020283	25.123	225		R99	Corrections to requirements on Connected Mode TDD to TDD/FDD/GSM cell re-selection delay, interruption time during FACH reception and CELL_FACH test cases	F	3.9.0	3.10.0
RP-020283	25.123	226		R99	Corrections to RRC re-establishment delay requirements and test cases	F	3.9.0	3.10.0
RP-020283	25.123	241		R99	Correction to power definitions and measurement applicability for TDD	F	3.9.0	3.10.0

History

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