**TSG RAN Meeting #19** **RP-030026**
**Birmingham, United Kingdom, 11 - 14 March, 2003**

**Title** **CRs (R'99 and Rel-4/Rel-5 Category A) to TS 25.123**
**Source** **TSG RAN WG4**
**Agenda Item** **8.4.3**

| RAN4 Tdoc | Spec | CR | R | Cat | Rel | Curr Ver | Title | Work Item |
|---|---|---|---|---|---|---|---|---|
| R4-020018 | 25.123 | 288 | | F | R99 | 3.11.0 | Correction of interruption time in TDD Hard Handover | TEI |
| R4-020019 | 25.123 | 289 | | A | Rel-4 | 4.7.0 | Correction of interruption time in TDD Hard Handover | TEI |
| R4-020020 | 25.123 | 290 | | A | Rel-5 | 5.3.0 | Correction of interruption time in TDD Hard Handover | TEI |
| R4-020049 | 25.123 | 293 | | F | R99 | 3.11.0 | Transmitted code power accuracy | TEI |
| R4-020050 | 25.123 | 294 | | A | Rel-4 | 4.7.0 | Transmitted code power accuracy | TEI |
| R4-020051 | 25.123 | 295 | | A | Rel-5 | 5.3.0 | Transmitted code power accuracy | TEI |
| R4-020052 | 25.123 | 296 | | F | R99 | 3.11.0 | UE Timer accuracy for TDD | TEI |
| R4-020053 | 25.123 | 297 | | A | Rel-4 | 4.7.0 | UE Timer accuracy for TDD | TEI |
| R4-020054 | 25.123 | 298 | | A | Rel-5 | 5.3.0 | UE Timer accuracy for TDD | TEI |
| R4-020261 | 25.123 | 286 | 1 | F | Rel-4 | 4.7.0 | Correction of interruption time in TDD Hard Handover | LCRTDD-RF |
| R4-020262 | 25.123 | 287 | 1 | A | Rel-5 | 5.3.0 | Correction of interruption time in TDD Hard Handover | LCRTDD-RF |

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030261**

**Madrid, Spain 17 - 22 February, 2003**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.123** **CR** **286** ⌘ **rev** **1** ⌘ Current version: **4.7.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of interruption time in TDD Hard Handover |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | LCRTDD-RF |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-4 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
*2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*

***Reason for change:*** ⌘ In this test case, the delay uncertainty of the TTI of the uplink DCH is not taken into consideration. The timing of CFN between cell1 and cell2 is not always aligned in this test case described in TS25.123 A5.1. If the timing of CFN between cell1 and cell2 isn't aligned, uplink DCCH may not be able to be transmitted within the given test requirement. The transmission delay of a maximum TTI of the uplink DCH occurs to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell. This delay isn't taken into consideration with the interruption time.

The transmission delay to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell is added to the interruption time. Requirements for Hard Handover of TDD 1.28Mcps Option are not in line with other requirements and test cases in TS 25.123 and TS 25.133.

***Summary of change:*** ⌘ To add the maximum TTI of the uplink DCH to the interruption time
To define DCH parameter as UL Reference Measurement Channel 12.2 kbps.
This changes are made for TDD/TDD requirements and corresponding test cases for the TDD 1.28Mcps Option. The according changes to 3.84Mcps TDD Option are treated in separate CRs 288, 289 and 290.

The requirements are now given by a formula, and the contributors to this requirements are defined in more detail by this requirement, where the values for unknown cells have been revised.

***Consequences if*** ⌘ Even “Good UE” may not pass the test. The UE may not transmit uplink DCH at

| | |
|---|---|
| ***not approved:*** | the uplink TTI boundary. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5, A.5 | | | |
| ***Other specs affected:*** | ⌘ | **Y** / **N** | | ⌘ | |
| | | **X** / | Other core specifications | | 05.10/45.010 |
| | | **X** / | Test specifications | | 34.122 |
| | | / **X** | O&M Specifications | | |
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR287r1 cat. A to 25.123 v5.3.0 | | | |

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 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

#### 5.1.1.1 3.84 Mcps TDD option

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.

#### 5.1.1.2 1.28 Mcps TDD option

The purpose of TDD/TDD handover is to change the cell of the connection between UE and UTRAN. The handover procedure is initiated from UTRAN with a RRC message that implies a handover, refer to [16].The handover procedure may cause the UE to change its frequency.

### 5.1.2 Requirements

#### 5.1.2.1 TDD/TDD handover delay

##### 5.1.2.1.1 3.84 Mcps TDD option

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 5.1.2.2.1.

##### 5.1.2.1.2 1.28 Mcps TDD option

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 that implies a 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 start transmission 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 or the SYNC-UL in case that a handover to 1.28 Mcps TDD option with SYNCH uplink exchange is recommended at the designated activation time.

where $D_{handover}$ equals the RRC procedure performance value defined [16] plus the interruption time stated in section 5.1.2.2.2.

## 5.1.2.2 Interruption time

### 5.1.2.2.1 3.84 Mcps TDD option

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.

### 5.1.2.2.2 1.28 Mcps TDD option

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 or the SYNC-UL in case that a handover with SYNCH uplink exchange is recommended, shall be less than the value ~~in table 5.1A~~defined in the equation below. There is different requirement on the interruption time depending on if the cell is known or not and if the SFN of the target cell has to be decoded by the UE or not.

If TDD/TDD intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than,

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

where,

| | |
|---|---|
| $T_{offset}$ | Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel |

$T_{UL}$ Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell

$F_{SFN}$ Equal to 1 if SFN decoding is required and equal to 0 otherwise

KC Equal to 1 if a known target cell is indicated in the RRC message implying 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

$F_{max}$ denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

A cell shall be regarded as known by the UE if either or both of the following conditions are true:

- it has been measured during the last 5 seconds or
- a dedicated connection existed between the UE and the cell during the last 5 seconds.

The SFN of the target cell needs not to be decoded by the UE if either or both of the following conditions are true:

- a handover with timing maintain is commanded by the UTRAN or
- the SFN of the target cell is known by the UE.

~~**Table 5.1A: TDD/ TDD handover – interruption time**~~

| ~~cell in the handover command message~~ | ~~Maximum delay [ms]~~ | | | |
|---|---|---|---|---|
| | ~~Known Cell~~ | | ~~Unknown Cell~~ | |
| | ~~SFN not to be decoded~~ | ~~SFN needs to be decoded~~ | ~~SFN not to be decoded~~ | ~~SFN needs to be decoded~~ |
| ~~Intra frequency~~ | ~~40~~ | ~~70~~ | ~~350~~ | ~~400~~ |
| ~~Inter frequency~~ | ~~40~~ | ~~70~~ | ~~350~~ | ~~400~~ |

~~The interruption time includes the time that can elapse till the appearance of the channel required for the synchronisation. And the time that can elapse till the appearance of the new uplink DPCH or the UpPTS in which the SYNC-UL shall be transmitted , which can be up to one frame (10ms).~~

The interruption time requirement ~~in Table 5.1A~~ for the cell shall apply if the signal quality of the unknown cell is good enough for successful synchronisation with one attempt.

~~NOTE: One synchronisation attempt can consist of coherent averaging using several frames.~~

# 5.2 TDD/FDD Handover

## 5.2.1 Introduction

### 5.2.1.1 3.84 Mcps TDD option

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].

### 5.2.1.2 1.28 Mcps TDD option

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 UE supporting TDD and FDD.

### 5.2.2.1 TDD/FDD handover delay

#### 5.2.2.1.1 3.84 Mcps TDD option

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.

#### 5.2.2.1.2 1.28 Mcps TDD option

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 that implies a 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 defined in [16] plus the interruption time stated in section 5.2.2.2.2.

### 5.2.2.2 Interruption time

#### 5.2.2.2.1 3.84 Mcps TDD option

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.

#### 5.2.2.2.2 1.28 Mcps TDD option

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,

$$T_{interrupt} = T_{IU} + 40 + 50*KC + 150*UC + 10*F_{max} \text{ ms}$$

where,

| | |
|---|---|
| $T_{IU}$ | The interruption uncertainty when changing the timing from the old to the new cell. $T_{IU}$ can be up to one frame (10 ms). |
| KC | Equal to 1 if a known target cell is indicated in the RRC message implying 1.28Mcps TDD/FDD handover and equal to 0 otherwise. |
| UC | Equal to 1 if an unknown target cell is indicated in the RRC message implying 1.28Mcps TDD/FDD handover and equal to 0 otherwise. |
| $F_{max}$ | denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH. |

An inter-frequency 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.

<NEXT CHANGED SECTION>

# A.5 UTRAN Connected Mode Mobility

## A.5.1 TDD/TDD Handover

### A.5.1.1 3.84Mcps TDD option

#### A.5.1.1.1 Handover to intra-frequency cell

##### A.5.1.1.1.1 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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

#### A.5.1.1.1.2 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.5.1.1.2 Handover to inter-frequency cell

#### A.5.1.1.2.1 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 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

### A.5.1.1.2.2 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.5.1.2 1.28Mcps TDD option

### A.5.1.2.1 Handover to intra-frequency cell

#### A.5.1.2.1.1 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 as reported in section 5.1.2.1.2.

The test parameters are given in Table A.5.1.5 and A.5.1.6 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used, and that PCCPCH 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 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 so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16].

**Table A.5.1.5: General test parameters for intra-frequency handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DPCH parameters | | | DL and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2.2 and A.2.1.2 |
| Power Control | | | On | |
| Target quality value on DPCH | | BLER | 0.01 | |
| Initial conditions | Active cell | | Cell 1 | |
| | Neighbouring cell | | Cell 2 | |
| Final condition | Active cell | | Cell 2 | |
| O | | dB | 0 | cell-individual-offset<br>The 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 | 5 | |
| T2 | | s | 5 | |
| T3 | | s | 5 | |

**Table A.5.1.6: Cell specific test parameters for intra-frequency handover**

| Parameter | Unit | Cell 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | Note1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 3 | | | 3 | | | 3 | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -70 | | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| **Parameter** | **Unit** | **Cell 2** | | | | | | | | |
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | n.a. | | Note1 |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf. | 5 | | -Inf. | 5 | | -Inf. | 5 | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -Inf. | -68 | | n.a. | | | n.a. | | |
| 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.5.1.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCH to cell 2 less than ~~40~~ 80 ms from the beginning of time period T3.

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

### A.5.1.2.2 Handover to inter-frequency cell

#### A.5.1.2.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the inter-frequency handover delay in CELL_DCH in the dual carrier case as reported in section 5.1.2.1.2.

The test consists of three successive time periods, with a time duration T1, T2 and T3. The test parameters are given in tables A.5.1.7 and A.5.1.8 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 timed 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 with activation time at beginning of T3 with a new active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16]

**Table A.5.1.7: General test parameters for inter-frequency handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DPCH parameters | | | DL and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2.2 and A.2.1.2 |
| Power Control | | | On | |
| Target quality value on DPCH | | BLER | 0.01 | |
| Initial conditions | Active cell | | Cell 1 | |
| | Neighbour cell | | Cell 2 | |
| Final conditions | Active cell | | Cell 2 | |
| Threshold non used frequency | | dBm | -75 | Absolute RSCP threshold for event 2C |
| O | | dB | 0 | cell-individual-offset<br>The 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<br>6 TDD neighbours on Channel 2 | |
| T1 | | s | 5 | |
| T2 | | s | 10 | |
| T3 | | s | 5 | |

**TableA.5.1.8: Cell Specific parameters for inter-frequency handover**

| **Parameter** | **Unit** | **Cell 1** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | Note1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 3 | | | 3 | | | 3 | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -70 | | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| **Parameter** | **Unit** | **Cell 2** | | | | | | | | |
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 2 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | n.a. | | Note1 |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf. | 9 | | -Inf. | 9 | | -Inf. | 9 | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -Inf. | -64 | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| Note 1: The DPCH level is controlled by the power control loop<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | | | | | | | | |

#### A.5.1.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCH to cell 2 less than ~~40~~ 80 ms from the beginning of time period T3.

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

## A.5.2 TDD/FDD Handover

### A.5.2.1 3.84 Mcps TDD option

#### A.5.2.1.1 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | |

**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<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | |

### A.5.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than100 ms from the beginning of time period T3.

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

## A.5.2.2 1.28 Mcps TDD option

### A.5.2.2.1 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 5.2.2.2.

The test parameters are given in Table A.5.2.4, A.5.2.5 and A.5.2.6 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 so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16].

**Table A.5.2.4: General test parameters for TDD/FDD handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DCH parameters | | | DL and UL Reference Measurement Channels 12.2 kbps | As specified in TS 25.102 ~~section~~ annex A and TS 25.101 annex A |
| Power Control | | | On | |
| Initial conditions | Active cell | | Cell 1 | TDD cell |
| | Neighbour cell | | Cell 2 | FDD cell |
| Final condition | Active cell | | Cell 2 | FDD cell |
| 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<br>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.5.2.5: Cell 1 specific test parameters for TDD/FDD handover**

| Parameter | Unit | Cell 1 | | | | | |
|---|---|---|---|---|---|---|---|
| **Timeslot number** | | **0** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | n.a. | | |
| DPCH_Ec/Ior | dB | n.a. | | | Note 1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | Note 2 | | n.a. |
| $\hat{I}_{or}/I_{oc}$ | dB | 5 | -1 | | 5 | -1 | |
| PCCPCH RSCP | dBm | -68 | -74 | | n.a. | | |
| $I_{oc}$ | dBm/ 1.28 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.5.2.6: 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 | -Inf | -75 | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf | 5 | |
| $I_{oc}$ | dBm/ 3.84 MHz | -70 | | |
| Propagation Condition | | AWGN | | |
| Note 1: The DPCH level is controlled by the power control loop<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | | |

### A.5.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than ~~130~~ 140 ms from the beginning of time period T3.

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

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030262**

**Madrid, Spain 17 - 22 February, 2003**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.123** **CR** **287** ⌘ **rev** **1** ⌘ Current version: **5.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of interruption time in TDD Hard Handover |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | LCRTDD-RF |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | In this test case, the delay uncertainty of the TTI of the uplink DCH is not taken into consideration. The timing of CFN between cell1 and cell2 is not always aligned in this test case described in TS25.123 A5.1. If the timing of CFN between cell1 and cell2 isn't aligned, uplink DCCH may not be able to be transmitted within the given test requirement. The transmission delay of a maximum TTI of the uplink DCH occurs to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell. This delay isn't taken into consideration with the interruption time.<br><br>The transmission delay to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell is added to the interruption time. Requirements for Hard Handover of TDD 1.28Mcps Option are not in line with other requirements and test cases in TS 25.123 and TS 25.133. |
| ***Summary of change:*** | ⌘ | To add the maximum TTI of the uplink DCH to the interruption time<br>To define DCH parameter as UL Reference Measurement Channel 12.2 kbps.<br>This changes are made for TDD/TDD requirements and corresponding test cases for the TDD 1.28Mcps Option. The according changes to 3.84Mcps TDD Option are treated in separate CRs 288, 289 and 290.<br><br>The requirements are now given by a formula, and the contributors to this requirements are defined in more detail by this requirement, where the values for unknown cells have been revised. |
| ***Consequences if not approved:*** | ⌘ | Even “Good UE” may not pass the test. The UE may not transmit uplink DCH at the uplink TTI boundary. |

| | | | | | | |
|---|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5, A.5 | | | | |
| | | **Y** | **N** | | | |
| ***Other specs affected:*** | ⌘ | **X** | | Other core specifications | ⌘ | 05.10/45.010 |
| | | **X** | | Test specifications | | 34.122 |
| | | | **X** | O&M Specifications | | |
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR286r1 cat. F to 25.123 v4.7.0 | | | | |

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 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

#### 5.1.1.1 3.84 Mcps TDD option

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.

#### 5.1.1.2 1.28 Mcps TDD option

The purpose of TDD/TDD handover is to change the cell of the connection between UE and UTRAN. The handover procedure is initiated from UTRAN with a RRC message that implies a handover, refer to [16].The handover procedure may cause the UE to change its frequency.

### 5.1.2 Requirements

#### 5.1.2.1 TDD/TDD handover delay

##### 5.1.2.1.1 3.84 Mcps TDD option

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 5.1.2.2.1.

##### 5.1.2.1.2 1.28 Mcps TDD option

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 that implies a 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 start transmission 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 or the SYNC-UL in case that a handover to 1.28 Mcps TDD option with SYNCH uplink exchange is recommended at the designated activation time.

where $D_{handover}$ equals the RRC procedure performance value defined [16] plus the interruption time stated in section 5.1.2.2.2.

## 5.1.2.2 Interruption time

### 5.1.2.2.1 3.84 Mcps TDD option

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.

### 5.1.2.2.2 1.28 Mcps TDD option

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 or the SYNC-UL in case that a handover with SYNCH uplink exchange is recommended, shall be less than the value ~~in table 5.1A~~defined in the equation below. There is different requirement on the interruption time depending on if the cell is known or not and if the SFN of the target cell has to be decoded by the UE or not.

If TDD/TDD intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than,

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

where,

| | |
|---|---|
| $T_{offset}$ | Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel |

$T_{UL}$ Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell

$F_{SFN}$ Equal to 1 if SFN decoding is required and equal to 0 otherwise

KC Equal to 1 if a known target cell is indicated in the RRC message implying 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

$F_{max}$ denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

A cell shall be regarded as known by the UE if either or both of the following conditions are true:

- it has been measured during the last 5 seconds or
- a dedicated connection existed between the UE and the cell during the last 5 seconds.

The SFN of the target cell needs not to be decoded by the UE if either or both of the following conditions are true:

- a handover with timing maintain is commanded by the UTRAN or
- the SFN of the target cell is known by the UE.

~~**Table 5.1A: TDD/ TDD handover – interruption time**~~

| ~~cell in the handover command message~~ | ~~Maximum delay [ms]~~ | | | |
|---|---|---|---|---|
| | ~~Known Cell~~ | | ~~Unknown Cell~~ | |
| | ~~SFN not to be decoded~~ | ~~SFN needs to be decoded~~ | ~~SFN not to be decoded~~ | ~~SFN needs to be decoded~~ |
| ~~Intra-frequency~~ | ~~40~~ | ~~70~~ | ~~350~~ | ~~400~~ |
| ~~Inter-frequency~~ | ~~40~~ | ~~70~~ | ~~350~~ | ~~400~~ |

~~The interruption time includes the time that can elapse till the appearance of the channel required for the synchronisation. And the time that can elapse till the appearance of the new uplink DPCH or the UpPTS in which the SYNC-UL shall be transmitted , which can be up to one frame (10ms).~~

The interruption time requirement ~~in Table 5.1A~~ for the cell shall apply if the signal quality of the unknown cell is good enough for successful synchronisation with one attempt.

~~NOTE: One synchronisation attempt can consist of coherent averaging using several frames.~~

# 5.2 TDD/FDD Handover

## 5.2.1 Introduction

### 5.2.1.1 3.84 Mcps TDD option

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].

### 5.2.1.2 1.28 Mcps TDD option

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 UE supporting TDD and FDD.

### 5.2.2.1 TDD/FDD handover delay

#### 5.2.2.1.1 3.84 Mcps TDD option

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.

#### 5.2.2.1.2 1.28 Mcps TDD option

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 that implies a 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.

$D_{handover}$ equals the RRC procedure performance value defined in [16] plus the interruption time stated in section 5.2.2.2.2.

### 5.2.2.2 Interruption time

#### 5.2.2.2.1 3.84 Mcps TDD option

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.

#### 5.2.2.2.2 1.28 Mcps TDD option

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,

$$T_{interrupt} = T_{IU} + 40 + 50*KC + 150*UC + 10*F_{max} \text{ ms}$$

where,

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

KC Equal to 1 if a known target cell is indicated in the RRC message implying 1.28Mcps TDD/FDD handover and equal to 0 otherwise.

UC Equal to 1 if an unknown target cell is indicated in the RRC message implying 1.28Mcps TDD/FDD handover and equal to 0 otherwise.

$F_{max}$ denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

An inter-frequency 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.

# A.5 UTRAN Connected Mode Mobility

## A.5.1 TDD/TDD Handover

### A.5.1.1 3.84Mcps TDD option

#### A.5.1.1.1 Handover to intra-frequency cell

##### A.5.1.1.1.1 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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

#### A.5.1.1.1.2 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.5.1.1.2 Handover to inter-frequency cell

#### A.5.1.1.2.1 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 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

### A.5.1.1.2.2 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.5.1.2 1.28Mcps TDD option

### A.5.1.2.1 Handover to intra-frequency cell

#### A.5.1.2.1.1 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 as reported in section 5.1.2.1.2.

The test parameters are given in Table A.5.1.5 and A.5.1.6 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used, and that PCCPCH 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 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 so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16].

**Table A.5.1.5: General test parameters for intra-frequency handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DPCH parameters | | | DL and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2.2 and A.2.1.2 |
| Power Control | | | On | |
| Target quality value on DPCH | | BLER | 0.01 | |
| Initial conditions | Active cell | | Cell 1 | |
| | Neighbouring cell | | Cell 2 | |
| Final condition | Active cell | | Cell 2 | |
| O | | dB | 0 | cell-individual-offset<br>The 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 | 5 | |
| T2 | | s | 5 | |
| T3 | | s | 5 | |

**Table A.5.1.6: Cell specific test parameters for intra-frequency handover**

| Parameter | Unit | Cell 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | Note1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 3 | | | 3 | | | 3 | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -70 | | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| **Parameter** | **Unit** | **Cell 2** | | | | | | | | |
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | n.a. | | Note1 |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf. | 5 | | -Inf. | 5 | | -Inf. | 5 | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -Inf. | -68 | | n.a. | | | n.a. | | |
| 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.5.1.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCH to cell 2 less than 80 ~~40~~ ms from the beginning of time period T3.

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

### A.5.1.2.2 Handover to inter-frequency cell

#### A.5.1.2.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the inter-frequency handover delay in CELL_DCH in the dual carrier case as reported in section 5.1.2.1.2.

The test consists of three successive time periods, with a time duration T1, T2 and T3. The test parameters are given in tables A.5.1.7 and A.5.1.8 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 timed 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 with activation time at beginning of T3 with a new active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16]

**Table A.5.1.7: General test parameters for inter-frequency handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DPCH parameters | | | DL and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2.2 and A.2.1.2 |
| Power Control | | | On | |
| Target quality value on DPCH | | BLER | 0.01 | |
| Initial conditions | Active cell | | Cell 1 | |
| | Neighbour cell | | Cell 2 | |
| Final conditions | Active cell | | Cell 2 | |
| Threshold non used frequency | | dBm | -75 | Absolute RSCP threshold for event 2C |
| O | | dB | 0 | cell-individual-offset<br>The 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<br>6 TDD neighbours on Channel 2 | |
| T1 | | s | 5 | |
| T2 | | s | 10 | |
| T3 | | s | 5 | |

**TableA.5.1.8: Cell Specific parameters for inter-frequency handover**

| **Parameter** | **Unit** | **Cell 1** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | Note1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 3 | | | 3 | | | 3 | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -70 | | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| **Parameter** | **Unit** | **Cell 2** | | | | | | | | |
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 2 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | n.a. | | Note1 |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf. | 9 | | -Inf. | 9 | | -Inf. | 9 | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -Inf. | -64 | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| Note 1: The DPCH level is controlled by the power control loop<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | | | | | | | | |

#### A.5.1.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCH to cell 2 less than 80 ~~40~~ ms from the beginning of time period T3.

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

## A.5.2 TDD/FDD Handover

### A.5.2.1 3.84 Mcps TDD option

#### A.5.2.1.1 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | |

**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<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | |

### A.5.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than100 ms from the beginning of time period T3.

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

## A.5.2.2 1.28 Mcps TDD option

### A.5.2.2.1 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 5.2.2.2.

The test parameters are given in Table A.5.2.4, A.5.2.5 and A.5.2.6 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 so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16].

**Table A.5.2.4: General test parameters for TDD/FDD handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DCH parameters | | | DL and UL Reference Measurement Channels 12.2 kbps | As specified in TS 25.102 ~~section~~ annex A and TS 25.101 annex A |
| Power Control | | | On | |
| Initial conditions | Active cell | | Cell 1 | TDD cell |
| | Neighbour cell | | Cell 2 | FDD cell |
| Final condition | Active cell | | Cell 2 | FDD cell |
| 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<br>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.5.2.5: Cell 1 specific test parameters for TDD/FDD handover**

| **Parameter** | **Unit** | **Cell 1** | | | | | |
|---|---|---|---|---|---|---|---|
| **Timeslot number** | | **0** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | n.a. | | |
| DPCH_Ec/Ior | dB | n.a. | | | Note 1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | Note 2 | | n.a. |
| $\hat{I}_{or}/I_{oc}$ | dB | 5 | -1 | | 5 | -1 | |
| PCCPCH RSCP | dBm | -68 | -74 | | n.a. | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | |
| Propagation Condition | | AWGN | | | | | |
| Note 1: The DPCH level is controlled by the power control loop<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | |

**Table A.5.2.6: 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 | -Inf | -75 | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf | 5 | |
| $I_{oc}$ | dBm/ 3.84 MHz | -70 | | |
| Propagation Condition | | AWGN | | |
| Note 1: The DPCH level is controlled by the power control loop<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | | |

### A.5.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 140 ~~130~~ ms from the beginning of time period T3.

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

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030018**

**Madrid, Spain 17 - 22 February, 2003**

*CR-Form-v7*

# CHANGE REQUEST

⌘ **25.123** **CR** **288** ⌘ **rev** ⌘ Current version: **3.11.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of interruption time in TDD Hard Handover |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | R99 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | In this test case, the delay uncertainty of the TTI of the uplink DCH is not taken into consideration. The timing of CFN between cell1 and cell2 is not always aligned in this test case described in TS25.123 A5.1. If the timing of CFN between cell1 and cell2 isn't aligned, uplink DCCH may not be able to be transmitted within the given test requirement. The transmission delay of a maximum TTI of the uplink DCH occurs to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell. This delay isn't taken into consideration with the interruption time.<br><br>The transmission delay to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell is added to the interruption time. |
| ***Summary of change:*** | ⌘ | To add the maximum TTI of the uplink DCH to the interruption time<br>To define DCH parameter as UL Reference Measurement Channel 12.2 kbps.<br>This changes are made for TDD/TDD as well as TDD/FDD requirements and corresponding test cases. |
| ***Consequences if not approved:*** | ⌘ | Even “Good UE” may not pass the test. The UE may not transmit uplink DCH at the uplink TTI boundary. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5, A.5 | | | |
| ***Other specs affected:*** | ⌘ | **Y** / **N** | | | |
| | | X / | Other core specifications | ⌘ | 05.10/45.010 |
| | | X / | Test specifications | | 34.122 |
| | | / X | O&M Specifications | | |
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR289 cat. A to 25.123 v4.7.0, CR290 cat. A | | | |

| | |
|---|---|
| | to 25.123 v5.3.0 |

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 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,

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

where,

$T_{offset}$ Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel

$T_{UL}$ Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell

| | |
|---|---|
| $F_{SFN}$ | Equal to 1 if SFN decoding is required and equal to 0 otherwise |
| KC | Equal to 1 if a known target cell is indicated in the RRC message implying 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 |

$F_{max}$ denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

An 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,

$$T_{interrupt} = T_{offset} + 40 + 50*KC + 150*UC + 10*F_{max} \text{ ms}$$

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 |
| $F_{max}$ | denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH. |

An inter-frequency 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.

<NEXT CHANGED SECTION>

# 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2 and A.2.1 |
| 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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

### A.5.1.1.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than ~~40~~ 80 ms from the beginning of time period T3.

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

## A.5.1.2 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2 and A.2.1 |
| 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

## A.5.1.2.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than ~~40~~ 80 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 ~~section~~ annex A.2.2 and TS 25.101 annex A |
| 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | |

**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<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$ | | | |

## A.5.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than ~~100~~ 140 ms from the beginning of time period T3.

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

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030019**

**Madrid, Spain 17 - 22 February, 2003**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.123** **CR** **289** ⌘ **rev** ⌘ Current version: **4.7.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of interruption time in TDD Hard Handover |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-4 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | In this test case, the delay uncertainty of the TTI of the uplink DCH is not taken into consideration. The timing of CFN between cell1 and cell2 is not always aligned in this test case described in TS25.123 A5.1. If the timing of CFN between cell1 and cell2 isn't aligned, uplink DCCH may not be able to be transmitted within the given test requirement. The transmission delay of a maximum TTI of the uplink DCH occurs to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell. This delay isn't taken into consideration with the interruption time.<br><br>The transmission delay to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell is added to the interruption time. |
| ***Summary of change:*** | ⌘ | To add the maximum TTI of the uplink DCH to the interruption time<br>To define DCH parameter as UL Reference Measurement Channel 12.2 kbps.<br>This changes are made for TDD/TDD as well as TDD/FDD requirements and corresponding test cases. |
| ***Consequences if not approved:*** | ⌘ | Even “Good UE” may not pass the test. The UE may not transmit uplink DCH at the uplink TTI boundary. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5, A.5 | | | |
| ***Other specs affected:*** | ⌘ | **Y** / **N** | | | |
| | | X / | Other core specifications | ⌘ | 05.10/45.010 |
| | | X / | Test specifications | | 34.122 |
| | | / X | O&M Specifications | | |
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR288 cat. F to 25.123 v3.11.0, CR290 cat. A | | | |

| | |
|---|---|
| | to 25.123 v5.3.0 |

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 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

#### 5.1.1.1 3.84 Mcps TDD option

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.

#### 5.1.1.2 1.28 Mcps TDD option

The purpose of TDD/TDD handover is to change the cell of the connection between UE and UTRAN. The handover procedure is initiated from UTRAN with a RRC message that implies a handover, refer to [16].The handover procedure may cause the UE to change its frequency.

### 5.1.2 Requirements

#### 5.1.2.1 TDD/TDD handover delay

##### 5.1.2.1.1 3.84 Mcps TDD option

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 5.1.2.2.1.

##### 5.1.2.1.2 1.28 Mcps TDD option

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 that implies a 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 start transmission 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 or the SYNC-UL in case that a handover to 1.28 Mcps TDD option with SYNCH uplink exchange is recommended at the designated activation time.

where $D_{handover}$ equals the RRC procedure performance value defined [16] plus the interruption time stated in section 5.1.2.2.2.

## 5.1.2.2 Interruption time

### 5.1.2.2.1 3.84 Mcps TDD option

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,

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

where,

| | |
|---|---|
| $T_{offset}$ | Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel |
| $T_{UL}$ | Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell |
| $F_{SFN}$ | Equal to 1 if SFN decoding is required and equal to 0 otherwise |
| KC | Equal to 1 if a known target cell is indicated in the RRC message implying 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 |
| $\underline{F_{max}}$ | $\underline{F_{max}}$ denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH. |

An 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.

### 5.1.2.2.2 1.28 Mcps TDD option

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 or the SYNC-UL in case that a handover with SYNCH uplink exchange is recommended, shall be less than the value in table 5.1A. There is different requirement on the interruption time depending on if the cell is known or not and if the SFN of the target cell has to be decoded by the UE or not.

A cell shall be regarded as known by the UE if either or both of the following conditions are true:

- it has been measured during the last 5 seconds or
- a dedicated connection existed between the UE and the cell during the last 5 seconds.

The SFN of the target cell needs not to be decoded by the UE if either or both of the following conditions are true:

- a handover with timing maintain is commanded by the UTRAN or
- the SFN of the target cell is known by the UE.

**Table 5.1A: TDD/ TDD handover – interruption time**

| cell in the handover command message | Maximum delay [ms] | | | |
|---|---|---|---|---|
| | Known Cell | | Unknown Cell | |
| | SFN not to be decoded | SFN needs to be decoded | SFN not to be decoded | SFN needs to be decoded |
| Intra-frequency | 40 | 70 | 350 | 400 |
| Inter-frequency | 40 | 70 | 350 | 400 |

The interruption time includes the time that can elapse till the appearance of the channel required for the synchronisation. And the time that can elapse till the appearance of the new uplink DPCH or the UpPTS in which the SYNC-UL shall be transmitted , which can be up to one frame (10ms).

The requirement in Table 5.1A for the cell shall apply if the signal quality of the unknown cell is good enough for successful synchronisation with one attempt.

NOTE: One synchronisation attempt can consist of coherent averaging using several frames.

# 5.2 TDD/FDD Handover

## 5.2.1 Introduction

### 5.2.1.1 3.84 Mcps TDD option

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].

### 5.2.1.2 1.28 Mcps TDD option

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 UE supporting TDD and FDD.

### 5.2.2.1 TDD/FDD handover delay

#### 5.2.2.1.1 3.84 Mcps TDD option

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.

#### 5.2.2.1.2 1.28 Mcps TDD option

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 that implies a 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 defined in [16] plus the interruption time stated in section 5.2.2.2.2.

### 5.2.2.2 Interruption time

#### 5.2.2.2.1 3.84 Mcps TDD option

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,

$$T_{interrupt} = T_{offset} + 40 + 50*KC + 150*UC + 10*F_{max} \text{ ms}$$

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 |
| $F_{max}$ | denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH. |

An inter-frequency 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.

#### 5.2.2.2.2 1.28 Mcps TDD option

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,

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

where,

| | |
|---|---|
| $T_{IU}$ | The interruption uncertainty when changing the timing from the old to the new cell. $T_{IU}$ can be up to one frame (10 ms). |
| KC | Equal to 1 if a known target cell is indicated in the RRC message implying 1.28Mcps TDD/FDD handover and equal to 0 otherwise. |
| UC | Equal to 1 if an unknown target cell is indicated in the RRC message implying 1.28Mcps 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.

# A.5 UTRAN Connected Mode Mobility

## A.5.1 TDD/TDD Handover

### A.5.1.1 3.84Mcps TDD option

#### A.5.1.1.1 Handover to intra-frequency cell

##### A.5.1.1.1.1 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2 and A.2.1 |
| 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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

#### A.5.1.1.1.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than 80 ~~40~~ ms from the beginning of time period T3.

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

### A.5.1.1.2 Handover to inter-frequency cell

#### A.5.1.1.2.1 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 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2 and A.2.1 |
| 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

### A.5.1.1.2.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than 80 ~~40~~ ms from the beginning of time period T2.

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

# A.5.1.2 1.28Mcps TDD option

## A.5.1.2.1 Handover to intra-frequency cell

### A.5.1.2.1.1 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 as reported in section 5.1.2.1.2.

The test parameters are given in Table A.5.1.5 and A.5.1.6 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used, and that PCCPCH 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 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 so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16].

**Table A.5.1.5: General test parameters for intra-frequency handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DPCH parameters | | | DL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2.2 |
| Power Control | | | On | |
| Target quality value on DPCH | | BLER | 0.01 | |
| Initial conditions | Active cell | | Cell 1 | |
| | Neighbouring cell | | Cell 2 | |
| Final condition | Active cell | | Cell 2 | |
| O | | dB | 0 | cell-individual-offset<br>The 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 | 5 | |
| T2 | | s | 5 | |
| T3 | | s | 5 | |

**Table A.5.1.6: Cell specific test parameters for intra-frequency handover**

| Parameter | Unit | Cell 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | Note1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 3 | | | 3 | | | 3 | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -70 | | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| **Parameter** | **Unit** | **Cell 2** | | | | | | | | |
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | n.a. | | Note1 |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf. | 5 | | -Inf. | 5 | | -Inf. | | 5 |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -Inf. | -68 | | n.a. | | | n.a. | | |
| 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.5.1.2.1.2 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.5.1.2.2 Handover to inter-frequency cell

### A.5.1.2.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the inter-frequency handover delay in CELL_DCH in the dual carrier case as reported in section 5.1.2.1.2.

The test consists of three successive time periods, with a time duration T1, T2 and T3. The test parameters are given in tables A.5.1.7 and A.5.1.8 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 timed 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 with activation time at beginning of T3 with a new active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16]

**Table A.5.1.7: General test parameters for inter-frequency handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DPCH parameters | | | DL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2.2 |
| Power Control | | | On | |
| Target quality value on DPCH | | BLER | 0.01 | |
| Initial conditions | Active cell | | Cell 1 | |
| | Neighbour cell | | Cell 2 | |
| Final conditions | Active cell | | Cell 2 | |
| Threshold non used frequency | | dBm | -75 | Absolute RSCP threshold for event 2C |
| O | | dB | 0 | cell-individual-offset<br>The 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<br>6 TDD neighbours on Channel 2 | |
| T1 | | s | 5 | |
| T2 | | s | 10 | |
| T3 | | s | 5 | |

**TableA.5.1.8: Cell Specific parameters for inter-frequency handover**

| **Parameter** | **Unit** | **Cell 1** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | Note1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 3 | | | 3 | | | 3 | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -70 | | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| **Parameter** | **Unit** | **Cell 2** | | | | | | | | |
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 2 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | n.a. | | Note1 |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf. | 9 | | -Inf. | 9 | | -Inf. | 9 | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -Inf. | -64 | | n.a. | | | n.a. | | |
| 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.5.1.2.2.2 Test Requirements

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

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

## A.5.2 TDD/FDD Handover

### A.5.2.1 3.84 Mcps TDD option

#### A.5.2.1.1 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 ~~section~~ annex A.2.2 and TS 25.101 annex A |
| 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | |

**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<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | |

### A.5.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 140~~100~~ ms from the beginning of time period T3.

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

## A.5.2.2 1.28 Mcps TDD option

### A.5.2.2.1 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 5.2.2.2.

The test parameters are given in Table A.5.2.4, A.5.2.5 and A.5.2.6 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 so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16].

**Table A.5.2.4: 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 |
| Power Control | | | On | |
| Initial conditions | Active cell | | Cell 1 | TDD cell |
| | Neighbour cell | | Cell 2 | FDD cell |
| Final condition | Active cell | | Cell 2 | FDD cell |
| 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<br>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.5.2.5: Cell 1 specific test parameters for TDD/FDD handover**

| Parameter | Unit | Cell 1 | | | | | |
|---|---|---|---|---|---|---|---|
| **Timeslot number** | | **0** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | n.a. | | |
| DPCH_Ec/Ior | dB | n.a. | | | Note 1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | Note 2 | | n.a. |
| $\hat{I}_{or}/I_{oc}$ | dB | 5 | -1 | | 5 | -1 | |
| PCCPCH RSCP | dBm | -68 | -74 | | n.a. | | |
| $I_{oc}$ | dBm/ 1.28 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.5.2.6: 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 | -Inf | -75 | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf | 5 | |
| $I_{oc}$ | dBm/ 3.84 MHz | -70 | | |
| Propagation Condition | | AWGN | | |
| Note 1: The DPCH level is controlled by the power control loop<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | | |

### A.5.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 130 ms from the beginning of time period T3.

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

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030020**

**Madrid, Spain 17 - 22 February, 2003**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.123** **CR** **290** ⌘ **rev** ⌘ Current version: **5.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of interruption time in TDD Hard Handover |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | In this test case, the delay uncertainty of the TTI of the uplink DCH is not taken into consideration. The timing of CFN between cell1 and cell2 is not always aligned in this test case described in TS25.123 A5.1. If the timing of CFN between cell1 and cell2 isn't aligned, uplink DCCH may not be able to be transmitted within the given test requirement. The transmission delay of a maximum TTI of the uplink DCH occurs to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell. This delay isn't taken into consideration with the interruption time.<br><br>The transmission delay to align the timing of uplink DCH transmission with the maximum uplink TTI boundary of the target cell is added to the interruption time. |
| ***Summary of change:*** | ⌘ | To add the maximum TTI of the uplink DCH to the interruption time<br>To define DCH parameter as UL Reference Measurement Channel 12.2 kbps.<br>This changes are made for TDD/TDD as well as TDD/FDD requirements and corresponding test cases. |
| ***Consequences if not approved:*** | ⌘ | Even “Good UE” may not pass the test. The UE may not transmit uplink DCH at the uplink TTI boundary. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5, A.5 | | | |
| ***Other specs affected:*** | ⌘ | **Y** / **N** | | | |
| | | X / | Other core specifications | ⌘ | 05.10/45.010 |
| | | X / | Test specifications | | 34.122 |
| | | / X | O&M Specifications | | |
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR288 cat. F to 25.123 v3.11.0, CR289 cat. A | | | |

| | |
|---|---|
| | to 25.123 v4.7.0 |

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 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

#### 5.1.1.1 3.84 Mcps TDD option

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.

#### 5.1.1.2 1.28 Mcps TDD option

The purpose of TDD/TDD handover is to change the cell of the connection between UE and UTRAN. The handover procedure is initiated from UTRAN with a RRC message that implies a handover, refer to [16].The handover procedure may cause the UE to change its frequency.

### 5.1.2 Requirements

#### 5.1.2.1 TDD/TDD handover delay

##### 5.1.2.1.1 3.84 Mcps TDD option

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 5.1.2.2.1.

##### 5.1.2.1.2 1.28 Mcps TDD option

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 that implies a 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 start transmission 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 or the SYNC-UL in case that a handover to 1.28 Mcps TDD option with SYNCH uplink exchange is recommended at the designated activation time.

where $D_{handover}$ equals the RRC procedure performance value defined [16] plus the interruption time stated in section 5.1.2.2.2.

## 5.1.2.2 Interruption time

### 5.1.2.2.1 3.84 Mcps TDD option

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,

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

where,

| | |
|---|---|
| $T_{offset}$ | Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel |
| $T_{UL}$ | Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell |
| $F_{SFN}$ | Equal to 1 if SFN decoding is required and equal to 0 otherwise |
| KC | Equal to 1 if a known target cell is indicated in the RRC message implying 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 |
| $\underline{F_{max}}$ | $\underline{F_{max}}$ denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH. |

An 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.

### 5.1.2.2.2 1.28 Mcps TDD option

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 or the SYNC-UL in case that a handover with SYNCH uplink exchange is recommended, shall be less than the value in table 5.1A. There is different requirement on the interruption time depending on if the cell is known or not and if the SFN of the target cell has to be decoded by the UE or not.

A cell shall be regarded as known by the UE if either or both of the following conditions are true:

- it has been measured during the last 5 seconds or
- a dedicated connection existed between the UE and the cell during the last 5 seconds.

The SFN of the target cell needs not to be decoded by the UE if either or both of the following conditions are true:

- a handover with timing maintain is commanded by the UTRAN or
- the SFN of the target cell is known by the UE.

**Table 5.1A: TDD/ TDD handover – interruption time**

| cell in the handover command message | Maximum delay [ms] | | | |
|---|---|---|---|---|
| | Known Cell | | Unknown Cell | |
| | SFN not to be decoded | SFN needs to be decoded | SFN not to be decoded | SFN needs to be decoded |
| Intra-frequency | 40 | 70 | 350 | 400 |
| Inter-frequency | 40 | 70 | 350 | 400 |

The interruption time includes the time that can elapse till the appearance of the channel required for the synchronisation. And the time that can elapse till the appearance of the new uplink DPCH or the UpPTS in which the SYNC-UL shall be transmitted , which can be up to one frame (10ms).

The requirement in Table 5.1A for the cell shall apply if the signal quality of the unknown cell is good enough for successful synchronisation with one attempt.

NOTE: One synchronisation attempt can consist of coherent averaging using several frames.

# 5.2 TDD/FDD Handover

## 5.2.1 Introduction

### 5.2.1.1 3.84 Mcps TDD option

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].

### 5.2.1.2 1.28 Mcps TDD option

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 UE supporting TDD and FDD.

### 5.2.2.1 TDD/FDD handover delay

#### 5.2.2.1.1 3.84 Mcps TDD option

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.

#### 5.2.2.1.2 1.28 Mcps TDD option

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 that implies a 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.

$D_{handover}$ equals the RRC procedure performance value defined in [16] plus the interruption time stated in section 5.2.2.2.2.

### 5.2.2.2 Interruption time

#### 5.2.2.2.1 3.84 Mcps TDD option

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,

$$T_{interrupt} = T_{offset} + 40 + 50*KC + 150*UC + 10*F_{max} \text{ ms}$$

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 |
| $F_{max}$ | denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH. |

An inter-frequency 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.

#### 5.2.2.2.2 1.28 Mcps TDD option

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,

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

where,

| | |
|---|---|
| $T_{IU}$ | The interruption uncertainty when changing the timing from the old to the new cell. $T_{IU}$ can be up to one frame (10 ms). |
| KC | Equal to 1 if a known target cell is indicated in the RRC message implying 1.28Mcps TDD/FDD handover and equal to 0 otherwise. |
| UC | Equal to 1 if an unknown target cell is indicated in the RRC message implying 1.28Mcps 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.

# A.5 UTRAN Connected Mode Mobility

## A.5.1 TDD/TDD Handover

### A.5.1.1 3.84Mcps TDD option

#### A.5.1.1.1 Handover to intra-frequency cell

##### A.5.1.1.1.1 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2 and A.2.1 |
| 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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

#### A.5.1.1.1.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than 80 ~~40~~ ms from the beginning of time period T3.

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

### A.5.1.1.2 Handover to inter-frequency cell

#### A.5.1.1.2.1 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 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2 and A.2.1 |
| 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | | | | | | | |

### A.5.1.1.2.2 Test Requirements

The UE shall start to transmit the UL DPCH to Cell 2 less than 80 ~~40~~ ms from the beginning of time period T2.

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

# A.5.1.2 1.28Mcps TDD option

## A.5.1.2.1 Handover to intra-frequency cell

### A.5.1.2.1.1 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 as reported in section 5.1.2.1.2.

The test parameters are given in Table A.5.1.5 and A.5.1.6 below. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used, and that PCCPCH 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 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 so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16].

**Table A.5.1.5: General test parameters for intra-frequency handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DPCH parameters | | | DL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2.2 |
| Power Control | | | On | |
| Target quality value on DPCH | | BLER | 0.01 | |
| Initial conditions | Active cell | | Cell 1 | |
| | Neighbouring cell | | Cell 2 | |
| Final condition | Active cell | | Cell 2 | |
| O | | dB | 0 | cell-individual-offset<br>The 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 | 5 | |
| T2 | | s | 5 | |
| T3 | | s | 5 | |

**Table A.5.1.6: Cell specific test parameters for intra-frequency handover**

| Parameter | Unit | Cell 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | Note1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 3 | | | 3 | | | 3 | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -70 | | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| **Parameter** | **Unit** | **Cell 2** | | | | | | | | |
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | n.a. | | Note1 |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf. | 5 | | -Inf. | 5 | | -Inf. | | 5 |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -Inf. | -68 | | n.a. | | | n.a. | | |
| 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.5.1.2.1.2 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.5.1.2.2 Handover to inter-frequency cell

### A.5.1.2.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the inter-frequency handover delay in CELL_DCH in the dual carrier case as reported in section 5.1.2.1.2.

The test consists of three successive time periods, with a time duration T1, T2 and T3. The test parameters are given in tables A.5.1.7 and A.5.1.8 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 timed 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 with activation time at beginning of T3 with a new active cell, cell 2. The Physical Channel reconfiguration message shall be sent to the UE so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16]

**Table A.5.1.7: General test parameters for inter-frequency handover**

| Parameter | | Unit | Value | Comment |
|---|---|---|---|---|
| DPCH parameters | | | DL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 section A.2.2.2 |
| Power Control | | | On | |
| Target quality value on DPCH | | BLER | 0.01 | |
| Initial conditions | Active cell | | Cell 1 | |
| | Neighbour cell | | Cell 2 | |
| Final conditions | Active cell | | Cell 2 | |
| Threshold non used frequency | | dBm | -75 | Absolute RSCP threshold for event 2C |
| O | | dB | 0 | cell-individual-offset<br>The 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<br>6 TDD neighbours on Channel 2 | |
| T1 | | s | 5 | |
| T2 | | s | 10 | |
| T3 | | s | 5 | |

**TableA.5.1.8: Cell Specific parameters for inter-frequency handover**

| **Parameter** | **Unit** | **Cell 1** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | Note1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | 3 | | | 3 | | | 3 | | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -70 | | | n.a. | | | n.a. | | |
| Propagation Condition | | AWGN | | | | | | | | |
| **Parameter** | **Unit** | **Cell 2** | | | | | | | | |
| **Timeslot Number** | | **0** | | | **DwPTS** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 2 | | | | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | | | | n.a. | | |
| DwPCH_Ec/Ior | | | | | 0 | | | | | |
| DPCH_Ec/Ior | dB | n.a. | | | n.a. | | | n.a. | | Note1 |
| OCNS_Ec/Ior | dB | -3 | | | | | | Note2 | | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf. | 9 | | -Inf. | 9 | | -Inf. | 9 | |
| $I_{oc}$ | dBm/ 1.28 MHz | -70 | | | | | | | | |
| PCCPCH_RSCP | dBm | -Inf. | -64 | | n.a. | | | n.a. | | |
| 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.5.1.2.2.2 Test Requirements

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

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

## A.5.2 TDD/FDD Handover

### A.5.2.1 3.84 Mcps TDD option

#### A.5.2.1.1 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 and UL Reference Measurement Channel 12.2 kbps | As specified in TS 25.102 ~~section~~ annex A.2.2 and TS 25.101 annex A |
| 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<br>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<br>Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior . | | | | | | | |

**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<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | |

### A.5.2.1.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 140~~100~~ ms from the beginning of time period T3.

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

## A.5.2.2 1.28 Mcps TDD option

### A.5.2.2.1 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 5.2.2.2.

The test parameters are given in Table A.5.2.4, A.5.2.5 and A.5.2.6 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 so that the whole message is available at the UE the RRC procedure delay prior to the beginning of T3. The RRC procedure delay is defined [16].

**Table A.5.2.4: 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 |
| Power Control | | | On | |
| Initial conditions | Active cell | | Cell 1 | TDD cell |
| | Neighbour cell | | Cell 2 | FDD cell |
| Final condition | Active cell | | Cell 2 | FDD cell |
| 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<br>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.5.2.5: Cell 1 specific test parameters for TDD/FDD handover**

| Parameter | Unit | Cell 1 | | | | | |
|---|---|---|---|---|---|---|---|
| **Timeslot number** | | **0** | | | **5** | | |
| | | T1 | T2 | T3 | T1 | T2 | T3 |
| UTRA RF Channel Number | | Channel 1 | | | | | |
| PCCPCH_Ec/Ior | dB | -3 | | | n.a. | | |
| DPCH_Ec/Ior | dB | n.a. | | | Note 1 | | n.a. |
| OCNS_Ec/Ior | dB | -3 | | | Note 2 | | n.a. |
| $\hat{I}_{or}/I_{oc}$ | dB | 5 | -1 | | 5 | -1 | |
| PCCPCH RSCP | dBm | -68 | -74 | | n.a. | | |
| $I_{oc}$ | dBm/ 1.28 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.5.2.6: 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 | -Inf | -75 | |
| $\hat{I}_{or}/I_{oc}$ | dB | -Inf | 5 | |
| $I_{oc}$ | dBm/ 3.84 MHz | -70 | | |
| Propagation Condition | | AWGN | | |
| Note 1: The DPCH level is controlled by the power control loop<br>Note 2 : The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{or}$. | | | | |

### A.5.2.2.2 Test Requirements

The UE shall start to transmit the UL DPCCH to Cell 2 less than 130 ms from the beginning of time period T3.

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

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030049**

**Madrid, Spain 17 - 22 February, 2003**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.123** **CR** **293** ⌘ **rev** ⌘ Current version: **3.11.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Transmitted code power accuracy |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | R99 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Requirement for UTRAN measurement transmitted code power absolute accuracy is still in square brackets but has not been changed for a while, so it can be assumed to be stable. By removing the square brackets, the absolute accuracy requirement for UTRAN transmitted code Power is set to ± 3. |
| ***Summary of change:*** | ⌘ | Square brackets are removed with the absolute accuracy requirement of [± 3] for UTRAN measurement transmitted code power |
| ***Consequences if not approved:*** | ⌘ | Missing accuracy requirement for UTRAN measurement transmitted code power absolute accuracy. UTRAN implementation may not behave as required when absolute accuracy is not defined to be stable. Different Implementations may not behave in the same way and UTRAN behaviour based on this measurements might be affected. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 9.2.2.2.1 |

| ***Other specs affected:*** ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|
| | | X | Other core specifications | |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR294 cat. A to 25.123 v4.7.0, CR295 cat. A to 25.123 v5.3.0 |

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

### 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 |

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030050**

**Madrid, Spain 17 - 22 February, 2003**

*CR-Form-v7*

# CHANGE REQUEST

⌘ **25.123** **CR** **294** ⌘ **rev** ⌘ Current version: **4.7.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Transmitted code power accuracy |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-4 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Requirement for UTRAN measurement transmitted code power absolute accuracy is still in square brackets but has not been changed for a while, so it can be assumed to be stable. By removing the square brackets, the absolute accuracy requirement for UTRAN transmitted code Power is set to ± 3. |
| ***Summary of change:*** | ⌘ | Square brackets are removed with the absolute accuracy requirement of [± 3] for UTRAN measurement transmitted code power |
| ***Consequences if not approved:*** | ⌘ | Missing accuracy requirement for UTRAN measurement transmitted code power absolute accuracy. UTRAN implementation may not behave as required when absolute accuracy is not defined to be stable. Different Implementations may not behave in the same way and UTRAN behaviour based on this measurements might be affected. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 9.2.2.2.1 |

| ***Other specs affected:*** ⌘ | Y | N | | ⌘ |
|---|---|---|---|---|
| | | X | Other core specifications | |
| | | X | Test specifications | |
| | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR293 cat. F to 25.123 v3.11.0, CR295 cat. A to 25.123 v5.3.0 |

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

### 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 |

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030051**

**Madrid, Spain 17 - 22 February, 2003**

*CR-Form-v7*

# CHANGE REQUEST

⌘ **25.123** **CR** **295** ⌘ **rev** ⌘ Current version: **5.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Transmitted code power accuracy |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Requirement for UTRAN measurement transmitted code power absolute accuracy is still in square brackets but has not been changed for a while, so it can be assumed to be stable. By removing the square brackets, the absolute accuracy requirement for UTRAN transmitted code Power is set to ± 3. |
| ***Summary of change:*** | ⌘ | Square brackets are removed with the absolute accuracy requirement of [± 3] for UTRAN measurement transmitted code power |
| ***Consequences if not approved:*** | ⌘ | Missing accuracy requirement for UTRAN measurement transmitted code power absolute accuracy. UTRAN implementation may not behave as required when absolute accuracy is not defined to be stable. Different Implementations may not behave in the same way and UTRAN behaviour based on this measurements might be affected. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 9.2.2.2.1 |

| | | Y | N | | |
|---|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ | | X | Other core specifications | ⌘ |
| | | | X | Test specifications | |
| | | | X | O&M Specifications | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR293 cat. F to 25.123 v3.11.0, CR294 cat. A to 25.123 v4.7.0 |

**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

### 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 |

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030052**

**Madrid, Spain 17 - 22 February, 2003**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.123** **CR** **296** ⌘**rev** ⌘ Current version: **3.11.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☐ Core Network ☐

| | | | | |
|---|---|---|---|---|
| ***Title:*** | ⌘ | UE timer accuracy for TDD | | |
| ***Source:*** | ⌘ | RAN WG4 | | |
| ***Work item code:*** | ⌘ | TEI | ***Date:*** ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **F** | ***Release:*** ⌘ | R99 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
*2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*

***Reason for change:*** ⌘ UE timers are used in different protocol entities to control the UE behaviour. Some examples are (TS 25.331):

- T305: Sets the time for UE periodic transmission of CELL UPDATE and URA UPDATE messages.
  Value range: 5, 10, 30, 60, 120, 360, 720, infinity [minutes]
- T314 and T315: Sets the time for how long UE shall attempt to re-establish the RRC Connection, in case of radio link failure.
  Value range T314: 0, 2, 4, 6, 8, 12, 16, 20 [seconds]
  Value range T315: 0,10, 30, 60, 180, 600, 1200, 1800 [seconds]
- T316 and T317: Sets the time for how long UE can be out-of-service in states Cell_PCH/URA_PCH and Cell_FACH.
  Value range T316: 0, 10, 20, 30, 40, 50, infinity [seconds]
  Value range T317: 0,10, 30, 60, 180, 600, 1200, 1800 [seconds]

It is assumed that in a typical UE implementation, the time measurement function is quite accurate, since most UE implementations are expected to provide e.g. a time of day clock feature. However, requirements on UE timer accuracy would facilitate the UTRAN setting of the corresponding timers on the network side. For this purpose, we expect that not so tight accuracy requirements are needed.

Furthermore, for UE conformance test cases in TS 34.123, reference to core specification requirements on UE timer accuracy would facilitate setting of test requirements. Otherwise, the requirements would be implicitly specified by the conformance test cases, which is not a desired situation.

Therefore if we do not add these requirements there will be:

| | | |
|---|---|---|
| | | ▪ Problems in setting of UTRAN timers for supervising UE procedures<br><br>Problems when setting test requirements in UE conformance tests |
| ***Summary of change:*** | ⌘ | Requirements on UE timer accuracy have been introduced. |
| ***Consequences if not approved:*** | ⌘ | Requirements on UE timer accuracy would be missing. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 7.4 (new) | | | |
| ***Other specs affected:*** | ⌘ | **Y** / **N**<br>☐ / **X**<br>☐ / **X**<br>☐ / **X** | Other core specifications<br>Test specifications<br>O&M Specifications | ⌘ | |
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR297 cat. A to 25.123 v4.7.0, CR298 cat. A to 25.123 v5.3.0 | | | |

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 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.

# 7.4 UE timer accuracy

## 7.4.1 Introduction

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

## 7.4.2 Requirements

For UE timers T3xx, $T_{barred}$, Treselection, Penalty_time, $T_{CRmax}$, $T_{CrmaxHyst}$ [16], UE shall comply with the timer accuracies according to Table 7.1.

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

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

| Timer value [s] | Accuracy |
|---|---|
| timer value <4 | ± 0.1 s |
| timer value ≥ 4 | ± 2.5 % |

**Table 7.1**

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030053**

**Madrid, Spain 17 - 22 February, 2003**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.123** **CR** **297** ⌘**rev** ⌘ Current version: **4.7.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☐ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | UE timer accuracy for TDD |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-4 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

***Reason for change:*** ⌘ UE timers are used in different protocol entities to control the UE behaviour. Some examples are (TS 25.331):

- T305: Sets the time for UE periodic transmission of CELL UPDATE and URA UPDATE messages.
  Value range: 5, 10, 30, 60, 120, 360, 720, infinity [minutes]
- T314 and T315: Sets the time for how long UE shall attempt to re-establish the RRC Connection, in case of radio link failure.
  Value range T314: 0, 2, 4, 6, 8, 12, 16, 20 [seconds]
  Value range T315: 0,10, 30, 60, 180, 600, 1200, 1800 [seconds]
- T316 and T317: Sets the time for how long UE can be out-of-service in states Cell_PCH/URA_PCH and Cell_FACH.
  Value range T316: 0, 10, 20, 30, 40, 50, infinity [seconds]
  Value range T317: 0,10, 30, 60, 180, 600, 1200, 1800 [seconds]

It is assumed that in a typical UE implementation, the time measurement function is quite accurate, since most UE implementations are expected to provide e.g. a time of day clock feature. However, requirements on UE timer accuracy would facilitate the UTRAN setting of the corresponding timers on the network side. For this purpose, we expect that not so tight accuracy requirements are needed.

Furthermore, for UE conformance test cases in TS 34.123, reference to core specification requirements on UE timer accuracy would facilitate setting of test requirements. Otherwise, the requirements would be implicitly specified by the conformance test cases, which is not a desired situation.

Therefore if we do not add these requirements there will be:

| | |
|---|---|
| | ▪ Problems in setting of UTRAN timers for supervising UE procedures<br><br>Problems when setting test requirements in UE conformance tests |
| ***Summary of change:*** ⌘ | Requirements on UE timer accuracy have been introduced. |
| ***Consequences if not approved:*** ⌘ | Requirements on UE timer accuracy would be missing. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 7.4 (new) | | | |
| ***Other specs affected:*** | ⌘ | **Y** | **N** | | ⌘ |
| | | | **X** | Other core specifications | |
| | | | **X** | Test specifications | |
| | | | **X** | O&M Specifications | |
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR296 cat. F to 25.123 v3.11.0, CR298 cat. A to 25.123 v5.3.0 | | | |

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 7 Timing characteristics

## 7.1 Timing Advance

### 7.1.1 3.84 Mcps TDD option

#### 7.1.1.1 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.

#### 7.1.1.2 Requirements

##### 7.1.1.2.1 Timing Advance adjustment 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.

##### 7.1.1.2.2 Timing Advance adjustment 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 adjustment of the timing advance.

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

### 7.1.2 1.28 Mcps TDD option

For 1.28 Mcps TDD the timing advance in the UE is adjusted by means of uplink synchronization. For the random access procedure the node B commands the UE to adjust its synchronisation shift by means of signalling the received position of the UpPTS in the FPACH. During the connection the node B measures the timing in the uplink and transmits a SS (Synchronization Shift) command to the UE at least once per sub-frame.

These SS commands determined whether the UE synchronization shift is either left unchanged, or adjusted 1 step up or 1 step down. The step size of the SS adjustment is (k/8)Tc where k (=1,2, …,8) is signalled by higher layer signalling.

#### 7.1.2.1 Uplink synchronization control requirements for UE for 1.28 Mcps TDD option

Uplink synchronization control is the ability of the UE transmitter to adjust its TX timing in accordance with one or more SS commands received in the downlink.

##### 7.1.2.1.1 Uplink synchronization control steps

The SS step is the change in UE transmission timing in response to a single SS command, SS_cmd, received by the UE.

###### 7.1.2.1.1.1 Minimum requirement

The UE transmitter shall have the capability of changing the transmission timing with a step size of 1/8, 2/8, 3/8, …, 1 chip according to the value of $\Delta_{SS}$, within n=(1,2,…,14) time slots excluding special timeslots (DwPTS, GP, UpPTS) after the SS_cmd arrived (closed loop). For the open loop any step being a multiple of 1/8 chip has to be allowed.

a) The minimum transmission timing step $\Delta_{SS,min}$ due to closed loop uplink synchronization control shall be within the range shown in Table 7.1.

b) In case uplink synchronization control implies larger adjustment than the minimum step the UE shall perform a multiple integer number of the minimum step. Within the implementation grid of the applicable timing steps of the UE the step being closest to the required step should be executed.

**Table 7.1: Uplink synchronisation control range**

| SS_cmd | Uplink synchronisation control range for minimum step | |
|---|---|---|
| | 1/8 chip step size | |
| | Lower | Upper |
| Up | 1/9 chip | 1/7 chip |
| Down | 1/9 chip | 1/7 chip |

## 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 for 3.84 Mcps TDD Option

### 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.

## 7.4 UE timer accuracy

### 7.4.1 Introduction

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

### 7.4.2 Requirements

For UE timers T3xx, $T_{barred}$, Treselection, Penalty time, $T_{CRmax}$, $T_{CrmaxHyst}$ [16], UE shall comply with the timer accuracies according to Table 7.1.

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

- Inaccuracy in the start and stop conditions of a timer (e.g. UE reaction time to detect that start and stop conditions of a timer is fulfilled), or

- Inaccuracies due to restrictions in observability of start and stop conditions of a UE timer (e.g. TTI alignment when UE sends messages at timer expiry).

| Timer value [s] | Accuracy |
|---|---|
| timer value <4 | ± 0.1 s |
| timer value ≥ 4 | ± 2.5 % |

**Table 7.1**

**3GPP TSG RAN WG4 (Radio) Meeting #26** **R4-030054**

**Madrid, Spain 17 - 22 February, 2003**

*CR-Form-v7*

# CHANGE REQUEST

⌘ **25.123** **CR** **298** ⌘ **rev** ⌘ Current version: **5.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☐ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | UE timer accuracy for TDD |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 04/03/2003 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(addition of feature),*
***C*** *(functional modification of feature)*
***D*** *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
*2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*

***Reason for change:*** ⌘ UE timers are used in different protocol entities to control the UE behaviour. Some examples are (TS 25.331):

- T305: Sets the time for UE periodic transmission of CELL UPDATE and URA UPDATE messages.
  Value range: 5, 10, 30, 60, 120, 360, 720, infinity [minutes]
- T314 and T315: Sets the time for how long UE shall attempt to re-establish the RRC Connection, in case of radio link failure.
  Value range T314: 0, 2, 4, 6, 8, 12, 16, 20 [seconds]
  Value range T315: 0,10, 30, 60, 180, 600, 1200, 1800 [seconds]
- T316 and T317: Sets the time for how long UE can be out-of-service in states Cell_PCH/URA_PCH and Cell_FACH.
  Value range T316: 0, 10, 20, 30, 40, 50, infinity [seconds]
  Value range T317: 0,10, 30, 60, 180, 600, 1200, 1800 [seconds]

It is assumed that in a typical UE implementation, the time measurement function is quite accurate, since most UE implementations are expected to provide e.g. a time of day clock feature. However, requirements on UE timer accuracy would facilitate the UTRAN setting of the corresponding timers on the network side. For this purpose, we expect that not so tight accuracy requirements are needed.

Furthermore, for UE conformance test cases in TS 34.123, reference to core specification requirements on UE timer accuracy would facilitate setting of test requirements. Otherwise, the requirements would be implicitly specified by the conformance test cases, which is not a desired situation.

Therefore if we do not add these requirements there will be:

| | | |
|---|---|---|
| | | ▪ Problems in setting of UTRAN timers for supervising UE procedures<br><br>Problems when setting test requirements in UE conformance tests |
| ***Summary of change:*** | ⌘ | Requirements on UE timer accuracy have been introduced. |
| ***Consequences if not approved:*** | ⌘ | Requirements on UE timer accuracy would be missing. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 7.4 (new) | | | |
| ***Other specs affected:*** | ⌘ | **Y** / **N**<br>☐ / ☐<br>☐ / ☐<br>☐ / ☐ | Other core specifications<br>Test specifications<br>O&M Specifications | ⌘ | |
| ***Other comments:*** | ⌘ | Equivalent CRs in other Releases: CR296 cat. F to 25.123 v3.11.0, CR297 cat. A to 25.123 v4.7.0 | | | |

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

# 7 Timing characteristics

## 7.1 Timing Advance

### 7.1.1 3.84 Mcps TDD option

#### 7.1.1.1 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.

#### 7.1.1.2 Requirements

##### 7.1.1.2.1 Timing Advance adjustment 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.

##### 7.1.1.2.2 Timing Advance adjustment 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 adjustment of the timing advance.

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

### 7.1.2 1.28 Mcps TDD option

For 1.28 Mcps TDD the timing advance in the UE is adjusted by means of uplink synchronization. For the random access procedure the node B commands the UE to adjust its synchronisation shift by means of signalling the received position of the UpPTS in the FPACH. During the connection the node B measures the timing in the uplink and transmits a SS (Synchronization Shift) command to the UE at least once per sub-frame.

These SS commands determined whether the UE synchronization shift is either left unchanged, or adjusted 1 step up or 1 step down. The step size of the SS adjustment is (k/8)Tc where k (=1,2, …,8) is signalled by higher layer signalling.

#### 7.1.2.1 Uplink synchronization control requirements for UE for 1.28 Mcps TDD option

Uplink synchronization control is the ability of the UE transmitter to adjust its TX timing in accordance with one or more SS commands received in the downlink.

##### 7.1.2.1.1 Uplink synchronization control steps

The SS step is the change in UE transmission timing in response to a single SS command, SS_cmd, received by the UE.

###### 7.1.2.1.1.1 Minimum requirement

The UE transmitter shall have the capability of changing the transmission timing with a step size of 1/8, 2/8, 3/8, …, 1 chip according to the value of $\Delta_{SS}$, within n=(1,2,…,14) time slots excluding special timeslots (DwPTS, GP, UpPTS) after the SS_cmd arrived (closed loop). For the open loop any step being a multiple of 1/8 chip has to be allowed.

a) The minimum transmission timing step $\Delta_{SS,min}$ due to closed loop uplink synchronization control shall be within the range shown in Table 7.1.

b) In case uplink synchronization control implies larger adjustment than the minimum step the UE shall perform a multiple integer number of the minimum step. Within the implementation grid of the applicable timing steps of the UE the step being closest to the required step should be executed.

**Table 7.1: Uplink synchronisation control range**

| SS_cmd | Uplink synchronisation control range for minimum step | |
|---|---|---|
| | 1/8 chip step size | |
| | Lower | Upper |
| Up | 1/9 chip | 1/7 chip |
| Down | 1/9 chip | 1/7 chip |

## 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 for 3.84 Mcps TDD Option

### 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.

## 7.4 UE timer accuracy

### 7.4.1 Introduction

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

### 7.4.2 Requirements

For UE timers T3xx, $T_{barred}$, Treselection, Penalty time, $T_{CRmax}$, $T_{CrmaxHyst}$ [16], UE shall comply with the timer accuracies according to Table 7.1.

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

- Inaccuracy in the start and stop conditions of a timer (e.g. UE reaction time to detect that start and stop conditions of a timer is fulfilled), or

- Inaccuracies due to restrictions in observability of start and stop conditions of a UE timer (e.g. TTI alignment when UE sends messages at timer expiry).

| Timer value [s] | Accuracy |
|---|---|
| timer value <4 | ± 0.1 s |
| timer value ≥ 4 | ± 2.5 % |

**Table 7.1**