**TSG RAN Meeting #13** **RP-010636**
**Beijing, China, 18-21 September 2001**

**Title:** **CRs (Rel-5) for WI "Technical Enhancements and Improvements"**

**Source** **TSG RAN WG4**

**Agenda item:** **9.8**

| RAN4 Tdoc | Spec | CR | Title | Cat | Phase | Curr Ver | New Ver |
|---|---|---|---|---|---|---|---|
| R4-011323 | 25.101 | 132 | CPCH Performance | B | Rel-5 | 4.1.0 | 5.0.0 |
| R4-011324 | 25.104 | 87 | CPCH Performance | B | Rel-5 | 4.1.0 | 5.0.0 |
| R4-011326 | 25.133 | 184 | CPCH Performance | B | Rel-5 | 4.1.0 | 5.0.0 |
| R4-011325 | 25.141 | 116 | CPCH Performance | B | Rel-5 | 4.1.0 | 5.0.0 |

**3GPP TSG RAN WG4 Meeting #19** **R4-011323**

**Edinburgh, Great Britain, 3rd - 7th September 2001**

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# CHANGE REQUEST

⌘ **25.101** **CR** 132 ⌘ rev **-** ⌘ Current version: **4.1.0** ⌘

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***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Addition of UE performance requirement for CPCH |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI5 |
| ***Date:*** | ⌘ | 06 Sept 2001 |
| ***Category:*** | ⌘ | B |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
***F*** *(essential 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)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | CPCH was agreed by RAN to be added for Release 5. |
| ***Summary of change:*** | ⌘ | CPCH UE performance requirements are added for demodulation of the CSICH. Brief new sections are added to indicate that UE performance requirements for detection of AP-AICH and CD/CA-ICH are the same as for detection of AI |
| ***Consequences if not approved:*** | ⌘ | UE will not have certified performance to receive CSICH information. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 8, new clauses added as 8.x, 8.y and 8.z |
| ***Other specs affected:*** | ⌘ | ☐ Other core specifications ⌘<br>☐ Test specifications<br>☐ O&M Specifications |
| ***Other comments:*** | ⌘ | |

## 8.12 Demodulation of Paging Channel (PCH)

The receiver characteristics of paging channel are determined by the probability of missed paging message (Pm-p). PCH is mapped into the S-CCPCH and it is associated with the transmission of Paging Indicators (PI) to support efficient sleep-mode procedures.

### 8.12.1 Minimum requirement

For the parameters specified in Table 8.42 the average probability of missed paging (Pm-p) shall be below the specified value in Table 8.43. Power of downlink channels other than S-CCPCH and PICH are as defined in Table C.3 of Annex C. S-CCPCH structure is as defined in Annex A.6.

**Table 8.42: Parameters for PCH detection**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Number of paging indicators per frame (Np) | - | 72 | |
| Phase reference | - | P-CPICH | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | -3 |
| Propagation condition | | Static | Case 3 |

**Table 8.43: Test requirements for PCH detection**

| Test Number | S-CCPCH_Ec/Ior | PICH_Ec/Ior | Pm-p |
|---|---|---|---|
| 1 | -14.8 | -19.2 | 0.01 |
| 2 | -9.8 | -12.2 | 0.01 |

## 8.13 Detection of Acquisition Indicator (AI)

The receiver characteristics of Acquisition Indicator (AI) are determined by the probability of false alarm Pfa and probability of correct detection Pd. Pfa is defined as a conditional probability of detection of AI signature given that a AI signature was not transmitted. Pd is defined as a conditional probability of correct detection of AI signature given that the AI signature is transmitted.

### 8.13.1 Minimum requirement

For the parameters specified in Table8.44 the Pfa and 1-Pd shall not the exceed the specified values in Table 8.45. Power of downlink channels other than AICH is as defined in Table C.3 of Annex C.

**Table 8.44: Parameters for AI detection**

| Parameter | Unit | Test 1 |
|---|---|---|
| Phase reference | - | P-CPICH |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| Number of other transmitted AI signatures on AICH | - | 0 |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 |
| AICH_Ec/Ior | dB | -22.0 |
| AICH Power Offset | dB | -12.0 |
| Propagation condition | - | Static |

Note that AICH_Ec/Ior can not be set. Its value is calculated from other parameters and it is given for information only. (AICH_Ec/Ior = AICH Power Offset + CPICH_Ec/Ior)

**Table 8.45: Test requirements for AI detection**

| Test Number | Pfa | 1-Pd |
|---|---|---|
| 1 | 0.01 | 0.01 |

## 8.x Detection of Access Preamble Acquisition Indicator Channel (AP-AICH)

The requirement for detection of the AP-AICH for CPCH is the same as the requirement for detection of the AI which is described in section 8.13 of this specification.

## 8.y Detection of Collision Detection/Channel Assignment Indicator Channel (CD/CA-ICH)

The requirement for detection of the CD/CA-ICH for CPCH is the same as the requirement for detection of the AI which is described in section 8.13 of this specification.

## 8.z Demodulation of CPCH Status Indicator Channel (CSICH)

The receive characteristics of the CPCH Status Indicator Channel (CSICH) are determined by the average message error Ratio (MER). Under the test conditions described below, a CSICH message demodulation error will cause the UE to transmit a CPCH message when there is pending UL data to transmit. MER is measured at the message rate listed for the conditions in Table 8.z1.

### 8.z.1 Minimum requirement

For the parameters and conditions specified in Tables 8.z1, 8.z2 and 8.z3 the MER shall not exceed the values listed in table 8.z4.
Other downlink channels which are present in this test are P-CPICH, P-CCPCH, and PICH, and their powers are as specified in Annex C.3.2.

**Table 8.z1. CPCH test parameters and conditions for CSICH performance**

| Parameter | Test 1 | Test 2 |
|---|---|---|
| CPCH mode | UE Channel Selection (PCPCH availability is broadcast in CSICH) | |
| Number of PCPCHs in CPCH set | 15 | |
| Number of SIs per CSICH frame | 15 (one SI message per PCPCH) | |
| Number of CSICH bits per SI message | 8 (CSICH bit repeated 8 times in each SI message) | |
| CSICH Message Rate | 750 per second (15 messages in 20 msec frame) | |
| AP preamble signatures | 15 PCPCHs are given 1 signature each; 1 signature is unused. | |
| AP preamble slot subchannels | All slot subchannels are available for access without delay. | |
| CD preamble signatures | 16 (all signatures used) | |
| CD preamble slot subchannels | All slot subchannels are available for access without delay. | |
| Persistency value for all PCPCHs | 1 (full access, no delay) | |
| CSICH broadcast | N=15 SIs. For each PCPCH SI, SI=0 (PCPCH not available) | |
| AP-AICH broadcast | In each access slot, Node B transmits 15 AP-AICH-ACKs, one for each PCPCH. | |
| Channel Assignment (CA) | Not active | |
| CD/CA-ICH broadcast | In each access slot, Node B transmits 16 CD/CA-ICH ACKs, one for each possible signature. | |
| Power control preamble length for all PCPCHs | 0 slots | |
| Message length for all PCPCHs | 10 ms (1 TTI) (Nfmax = 1) | |
| Spreading factor for all PCPCHs | 64 | |
| Propagation condition | Static | Case 3 |

**Table 8.z2: AP-AICH test parameters for CSICH performance**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | - | P-CPICH | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Number of transmitted AI signatures on AP-AICH | - | 15 (all ACK) | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | -3 |
| AP-AICH_Ec/Ior | dB | -10.0 | |
| AP-AICH Power Offset | dB | 0 | |
| Propagation condition | | Static | Case 3 |

Note that AP-AICH_Ec/Ior can not be set. Its value is calculated from other parameters and it is given for information only. (AP-AICH_Ec/Ior = AP-AICH Power Offset + CPICH_Ec/Ior)

**Table 8.z3: CD/CA-ICH test parameters for CSICH performance**

| Parameter | Unit | Test 1 | Test 2 |
|---|---|---|---|
| Phase reference | - | P-CPICH | |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Number of transmitted CD signatures on CD/CA-ICH | - | 16 (all ACK) | |
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | -3 |
| CD/CA-ICH_Ec/Ior | dB | -10.0 | |
| CD/CA-ICH Power Offset | dB | 0 | |
| Propagation condition | | Static | Case 3 |

Note that CD/CA-ICH_Ec/Ior can not be set. Its value is calculated from other parameters and it is given for information only. (CD/CA-ICH_Ec/Ior = CD/CA-ICH Power Offset + CPICH_Ec/Ior)

**Table 8.z4: CSICH demodulation requirements**

| Test Number | CSICH power offset | CSICH MER |
|---|---|---|
| 1 | -10.5 db | 0.001 |
| 2 | -3.0 db | 0.001 |

**3GPP TSG RAN WG4 Meeting #19** **R4-011324**

**Edinburgh, Great Britain, 3rd - 7th September 2001**

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# CHANGE REQUEST

⌘ **25.104** **CR** 87 ⌘ rev **-** ⌘ Current version: **4.1.0** ⌘

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***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Addition of BS performance requirement for CPCH |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI5 |
| ***Date:*** | ⌘ | 06 Sept 2001 |
| ***Category:*** | ⌘ | B |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
***F*** *(essential 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)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | CPCH was agreed by RAN to be added for Release 5. |
| ***Summary of change:*** | ⌘ | Brief new sections are added to indicate that BS requirements for preamble detection for CPCH are the same as the requirements for RACH preamble detection. New requirements section is added for demodulation of CPCH message part. |
| ***Consequences if not approved:*** | ⌘ | BS CPCH performance requirements remain undefined. |

| | | | | |
|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 8, new clause 8.x added | | |
| ***Other specs affected:*** | ⌘ | ☒ Other core specifications<br>☐ Test specifications<br>☐ O&M Specifications | ⌘ | TS 25.141v4.1.0 |
| ***Other comments:*** | ⌘ | | | |

## 8.7 Performance requirement for RACH

Performance requirements for RACH consists of two parts: preamble detection and message demodulation. Requirements for these are in sections 8.7.1 and 8.7.2, respectively. Requirements are defined for two propagation conditions: static and fading case 3. The propagation conditions are defined in annexes B.1 and B.2.

### 8.7.1 Performance requirement for RACH preamble detection

Probability of false alarm, Pfa (=false detection of the preamble) when the preamble was not sent, shall be $10^{-3}$ or less. The performance measure Required Ec/N0 at probability of detection, Pd of 0.99 and 0.999. Only 1 signature is used and it is known by the receiver. The requirement for preamble detection, when the preamble was sent is in table 8.9 and 8.10 for static and case 3 fading.

**Table 8.9: Requirements for Ec/N0 of Pd in static propagation condition**

| | **Pd = 0.99** | **Pd = 0.999** |
|---|---|---|
| Required Ec/N0 | -20.5 dB | -20.1 dB |

**Table 8.10: Requirements of Ec/N0 of Pd in case 3 fading**

| | **Pd = 0.99** | **Pd = 0.999** |
|---|---|---|
| Required Ec/N0 | -15.5 dB | -13.4 dB |

### 8.7.2 Demodulation of RACH message

The performance measure is required Eb/N0 for block error rate (BLER) of $10^{-1}$ and $10^{-2}$. Both measurement channels have TTI=20 ms. Payloads are 168 and 360 bits. Channel coding is rate ½ convolutional coding.

#### 8.7.2.1 Minimum requirements for Static Propagation Condition

**Table 8.11: Required Eb/N0 for static propagation**

| | **TB size = 168 bits** | | **TB size = 360 bits** | |
|---|---|---|---|---|
| | **BLER=$10^{-1}$** | **BLER=$10^{-2}$** | **BLER=$10^{-1}$** | **BLER=$10^{-2}$** |
| Required Eb/N0 | 4.1 dB | 5.0 dB | 3.9 dB | 4.8 dB |

#### 8.7.2.2 Minimum requirements for Multipath Fading Case 3

**Table 8.12: Required Eb/N0 for case 3 fading**

| | **TB size = 168 bits** | | **TB size = 360 bits** | |
|---|---|---|---|---|
| | **BLER=$10^{-1}$** | **BLER=$10^{-2}$** | **BLER=$10^{-1}$** | **BLER=$10^{-2}$** |
| Required Eb/N0 | 7.4 dB | 8.5 dB | 7.3 dB | 8.3 dB |

## 8.x Performance requirement for CPCH

Performance requirements for CPCH consists of two parts: preamble detection and message demodulation. Requirements for these are in sections 8.x.1 and 8.x.2, respectively. Requirements are defined for two propagation conditions: static and fading case 3. The propagation conditions are defined in annexes B.1 and B.2.

## 8.x.1 Performance requirement for CPCH preamble detection

### 8.x.1.1 Detection of CPCH Access Preamble (AP)

The requirement for detection of the AP for CPCH is the same as the requirement for detection of the RACH preamble which is described in section 8.7.1 of this specification.

### 8.x.1.2 Detection of CPCH Collision Detection Preamble (CD)

The requirement for detection of the CD for CPCH is the same as the requirement for detection of the RACH preamble which is described in section 8.7.1 of this specification.

## 8.x.2 Demodulation of CPCH message part

The performance measure is required Eb/N0 for block error rate (BLER) of $10^{-1}$ and $10^{-2}$. Both measurement channels have TTI=20 ms. Payloads are 168 and 360 bits. Channel coding is rate ½ convolutional coding.

### 8.x.2.1 Minimum requirements for Static Propagation Condition

**Table 8.11: Required Eb/N0 for static propagation**

| | TB size = 168 bits | | TB size = 360 bits | |
|---|---|---|---|---|
| | BLER=$10^{-1}$ | BLER=$10^{-2}$ | BLER=$10^{-1}$ | BLER=$10^{-2}$ |
| Required Eb/N0 | 4.1 dB | 5.0 dB | 3.9 dB | 4,8 dB |

### 8.x.2.2 Minimum requirements for Multipath Fading Case 3

**Table 8.12: Required Eb/N0 for case 3 fading**

| | TB size = 168 bits | | TB size = 360 bits | |
|---|---|---|---|---|
| | BLER=$10^{-1}$ | BLER=$10^{-2}$ | BLER=$10^{-1}$ | BLER=$10^{-2}$ |
| Required Eb/N0 | 7.5 dB | 8.5 dB | 7.3 dB | 8.1 dB |

**3GPP TSG RAN WG4 Meeting #19** **R4-011326**

**Edinburgh, Great Britain, 3rd - 7th September 2001**

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# CHANGE REQUEST

⌘ **25.133** **CR** 184 ⌘ rev **-** ⌘ Current version: **4.1.0** ⌘

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***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Addition of Requirements and Test Case for CPCH |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI5 |
| ***Date:*** | ⌘ | 06 Sept 2001 |
| ***Category:*** | ⌘ | B |
| ***Release:*** | ⌘ | Rel-5 |

*Use one of the following categories:*
- ***F*** *(essential 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)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | CPCH was agreed by RAN to be added for Release 5. |
| ***Summary of change:*** | ⌘ | CPCH access requirements and test case are added and modeled on RACH requirements and test case. |
| ***Consequences if not approved:*** | ⌘ | Operators and equipment suppliers will not have means to test CPCH access protocol performance. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 6, A.6: new 6.x and A.6.y clauses are added |
| ***Other specs affected:*** | ⌘ | ☐ Other core specifications ⌘<br>☐ Test specifications<br>☐ O&M Specifications |
| ***Other comments:*** | ⌘ | |

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

# 6 RRC Connection Control

## 6.1 RRC Re-establishment

### 6.1.1 Introduction

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

### 6.1.2 Requirements

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

When the UE is in CELL_DCH state, the UE shall be capable of sending a CELL UPDATE message using the cause "radio link failure" within $T_{RE\text{-}ESTABLISH}$ seconds from when the CPHY-Out-Of-Synch primitive indicates lost synchronisation.

The RRC Re-establishment delay requirement ($T_{RE\text{-}ESTABLISH\text{-}REQ}$) is defined as the time between the moment when the CPHY-Out-Of-Synch primitive indicates lost synchronisation, to when the UE starts to send preambles on the PRACH.

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

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

And the phase reference is the primary CPICH.

The RRC re-establishment delay shall be less than

$$50+T_{search}*NF + T_{SI} \text{ ms}$$

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

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

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

where $T_{SI}$ is the maximum repetition period of all relevant system information blocks that needs to be received by the UE to camp on a cell (ms).

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

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

## 6.2 (void)

## 6.3 Random Access

### 6.3.1 Introduction

The random access procedure is used when establishing the layer 1 communication between the UE and UTRAN. The random access shall provide a fast access but without disturbing ongoing connections. The random access is specified in

section 6 of TS 25.214 and the control of the RACH transmission is specified in section 11.2 of TS 25.321. A random access transmit sequence is described in section 6.7.2 of TS 25.303.

### 6.3.2 Requirements

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

#### 6.3.2.1 Correct behaviour when receiving an ACK

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

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

#### 6.3.2.2 Correct behaviour when receiving an NACK

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

#### 6.3.2.3 Correct behaviour at Time-out

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

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

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

The absolute power of any preamble shall not exceed the maximum allowed UL TX power +/-[] dB (or +/- [] dB in extreme conditions).

## 6.4 Transport format combination selection in UE

### 6.4.1 Introduction

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

### 6.4.2 Requirements

The UE shall continuously evaluate based on the *Limited TFC Set* and *Recovered TFC Set* criteria defined below, which TFCs of the given TFC set it can support. The evaluation shall be performed using the estimated UE transmit power of a corresponding TFC. The UE transmit power estimation shall be made using the UE transmitted power measured over the measurement period and the gain factors of the corresponding TFC.

The UE shall consider the *Limited TFC Set* criterion for a TFC to be fulfilled if the estimated UE transmit power of a certain TFC has been evaluated as greater than the Maximum UE transmitter power for at least X measurement periods out of Y successive measurement periods. If the *Limited TFC Set* criterion for a TFC is fulfilled, the UE shall consider that the TFC cannot be supported in TFC selection.

MAC in the UE shall indicate the available bitrate for each logical channel to upper layers within [15 ms] from the moment the *Limited TFC Set* criterion has been fulfilled.

The Maximum UE transmitter power is defined as follows

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

where

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

UE maximum transmit power is defined by the UE power class, and specified in [3].

The UE shall consider the *Recovered TFC Set* criterion for a TFC to be fulfilled if the UE has evaluated for at least Y successive measurement periods that the estimated UE transmit power for that TFC has not been greater than the Maximum UE transmitter power.

A TFC, which fulfilled the *Limited TFC Set* criterion, shall not be considered in the TFC selection until the *Recovered TFC Set* criterion has been fulfilled.

# 6.x CPCH Access

## 6.x.1 Introduction

The CPCH access procedure is used when establishing the layer 1 communication between the UE and UTRAN. The CPCH access shall provide a fast access but without disturbing ongoing connections. The CPCH access is specified in section 6.2 of TS 25.214 and the control of the CPCH transmission is specified in section 11.3 of TS 25.321. A CPCH access transmit sequence is described in section 6.3.3 of TS 25.303. A CPCH emergency stop sequence is described in section 6.7.4 of TS 25.303.

## 6.x.2 Requirements

The UE shall have capability to calculate initial power according to the open loop algorithm and apply this power level at the first AP preamble and increase the power on additional AP preambles. The UE shall stop transmitting AP preambles upon receipt of an ACK/NACK on the AP-AICH or if the maximum number of preambles within one cycle has been reached. Upon receipt of an AP-AICH ACK, the UE shall transmit a CD preamble with a randomly chosen signature/slot subchannel. Upon receipt of a CD/CA-ICH with matching signature, the UE shall transmit a CPCH message. If the UE receives a AP-AICH NACK or if the UE does not receive a CD/CA-ICH with matching signature and with CA message when CA is active, the AP preamble ramping procedure shall be repeated.

### 6.X.2.1 Correct behaviour when receiving Status Indicator(SI) on CPCH Status Indicator Channel(CSICH)

The CSICH channel broadcasts the availability of PCPCH channels, and when CA is active the CSICH channel also broadcasts the minimum available spreading factor. Before beginning CPCH access, the UE shall test the value(s) of

the most recent transmission of CSICH Status Indicator(s). If the result indicates that at least one PCPCH channel is available, the UE shall transmit an AP preamble. When Channel Assignment (CA) is not active, the UE shall transmit AP preambles with a signature and slot subchannel corresponding to an available PCPCH. When CA is active the UE shall transmit AP preambles with a signature and slot subchannel corresponding to a spreading factor equal to or greater that the minimum available spreading factor.

### 6.x.2.2 Correct behaviour when receiving an AP-AICH ACK

The UE shall stop transmitting preambles upon receipt of an ACK on the AP-AICH and then shall transmit a CD preamble with a randomly chosen signature/slot subchannel.

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

### 6.x.2.3 Correct behaviour when receiving an AP-AICH NACK

The UE shall stop transmitting AP preambles upon receipt of a NACK on the AP-AICH and then shall repeat the ramping procedure when the backoff timer $T_{B0C2}$ expires.

### 6.x.2.4 Correct behaviour when receiving a CD/CA-ICH ACK with matching signature when Channel Assignment (CA) is not active

A CD/CA-ICH ACK with matching signature may be transmitted by the UTRAN in the access slot after the CD preamble. Upon receipt of an ACK on the CD/CA-ICH in the access slot corresponding to the transmitted CD preamble and with the same signature used in the transmitted CD preamble, the UE shall transmit the CPCH message on the PCPCH indicated by the AP signature and slot subchannel used in the last AP transmission. During CPCH message transmission, the UE shall detect the Start of Message (SOM) Indicator on the DL DPCCH. If the SOM is not detected within N_start_message frames, the UE shall stop transmission. If the CPCH message transmission length is less than NF_max frames, the UE shall transmit the End of Transmission (EOT) indicator for N_EOT frames immediately after the end of the CPCH message.

### 6.x.2.5 Correct behaviour when receiving a CD/CA-ICH ACK with matching signature when Channel Assignment (CA) is active

When CA is active, the CD/CA-ICH will contain both an ACK signal and a CA mesage which may be transmitted by the UTRAN in the access slot after the CD preamble. Upon receipt of an ACK on the CD/CA-ICH in the access slot corresponding to the transmitted CD preamble and with the same signature used in the transmitted CD preamble, the UE shall transmit the CPCH message on the PCPCH indicated by the CA signal in the CD/CA-ICH. During CPCH message transmission, the UE shall detect the Start of Message (SOM) Indicator on the DL DPCCH. If the SOM is not detected within N_start_message frames, the UE shall stop transmission. If the CPCH message transmission length is less than NF_max frames, the UE shall transmit the End of Transmission (EOT) indicator for N_EOT frames immediately after the end of the CPCH message.

### 6.x.2.6 Correct behaviour when not receiving a CD/CA-ICH ACK with matching signature

When an ACK on the CD/CA-ICH is not received in the access slot corresponding to the transmitted CD preamble and with the same signature used in the transmitted CD preamble, the UE shall repeat the AP ramping procedure.

### 6.x.2.7 Correct behaviour when not receiving a CD/CA-ICH CA message when Channel Assignment (CA) is active

When a CA message in the CD/CA-ICH is not received in the access slot corresponding to the transmitted CD preamble, the UE shall repeat the AP ramping procedure.

### 6.x.2.8 Correct behaviour at Time-out

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

### 6.x.2.9 Correct behaviour when reaching maximum transmit power

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

The absolute power of any preamble shall not exceed the maximum allowed UL TX power +/-[] dB (or +/- [] dB in extreme conditions).

### 6.x.2.10 Correct behaviour for Emergency Stop

During Transmission of the CPCH message part and upon receipt of an Emergency Stop indication from the BS, the UE shall stop transmitting within 20 msec of receipt of the last Emergency Stop Indication. An Emergency Stop indication may be transmitted by the UTRAN any time after the UTRAN has received the first TTI of the CPCH message.

# A.6 RRC Connection Control

## A.6.1 RRC Re-establishment delay

### A.6.1.1 Test Purpose and Environment

The purpose is to verify that the RRC re-establishment delay is within the specified limits. These tests will verify the requirements in section 6.1.2.

The test parameters are given in table A.6.1 and table A.6.2 below. In the measurement control information it is indicated to the UE that periodic reporting shall be used. The test consist of 2 successive time periods, with a time duration of T1 and T2 respectively. At the start of time period T2, the dedicated channel is removed.

**Table A.6.1 General test parameters for RRC re-establishment delay, Test 1**

| Parameter | Unit | Value | Comment |
|---|---|---|---|
| DCH Parameters | | DL Reference measurement channel 12.2 kbps | As specified in TS 25.101, section A.3.1 |
| Power Control | | On | |
| Active cell | | Cell 1 | |
| N313 | Frames | 20 | |
| N315 | Frames | 20 | |
| T313 | Seconds | 0 | |
| $T_{SI}$ | ms | 1280 | Maximum repetition period of all relevant system information blocks that needs to be received by the UE to camp on a cell. For information on the system information blocks that needs to be received by the UE, see TS 25.331. |
| | | | |
| | | | |
| | | | |
| Monitored cell list size | | 24 | Monitored set shall only include intra frequency neighbours. |
| Cell 2 included in monitored set | | Included | |
| Reporting frequency | Seconds | 4 | |
| T1 | | 10 | |
| T2 | | 6 | |

**Table A.6.2 Cell specific parameters for RRC re-establishment delay test, Test 1**

| Parameter | Unit | Cell 1 | | Cell 2 | |
|---|---|---|---|---|---|
| | | T1 | T2 | T1 | T2 |
| Cell Frequency | ChNr | 1 | | 1 | |
| CPICH_Ec/Ior | dB | -10 | | -10 | |
| PCCPCH_Ec/Ior | dB | -12 | | -12 | |
| SCH_Ec/Ior | dB | -12 | | -12 | |
| PICH_Ec/Ior | dB | -15 | | -15 | |
| DCH_Ec/Ior | dB | -17 | -Inf | Not applicable | |
| OCNS_Ec/Ior | dB | -1.049 | -0.941 | -0.941 | |
| $\hat{I}_{or}/I_{oc}$ | dB | 2,39 | | 4,39 | |
| $I_{oc}$ | dBm/ 3.84 MHz | -70 | | | |
| CPICH_Ec/Io | dB | -15 | | -13 | |
| Propagation Condition | | AWGN | | | |

**Table A.6.3 General test parameters for RRC re-establishment delay, Test 2**

| Parameter | Unit | Value | Comment |
|---|---|---|---|
| DCH Parameters | | DL Reference measurement channel 12.2 kbps | As specified in TS 25.101, section A.3.1 |
| Power Control | | On | |
| Active cell | | Cell 1 | |
| N313 | Frames | 20 | |
| N315 | Frames | 20 | |
| T313 | Seconds | 0 | |
| $T_{SI}$ | ms | 1280 | Maximum repetition period of all relevant system information blocks that needs to be received by the UE to camp on a cell. For information on the system information blocks that needs to be received by the UE, see TS 25.331. |
| | | | |
| | | | |
| | | | |
| Monitored cell list size | | 24 | Monitored set shall include 2 additional frequencies. |
| Cell 2 included in monitored set | | Not Included | |
| Reporting frequency | Seconds | 4 | |
| T1 | | 10 | |
| T2 | | 6 | |

**Table A.6.4 Cell specific parameters for RRC re-establishment delay test, Test 2**

| Parameter | Unit | Cell 1 | | Cell 2 | |
|---|---|---|---|---|---|
| | | T1 | T2 | T1 | T2 |
| Cell Frequency | ChNr | 1 | | 2 | |
| CPICH_Ec/Ior | dB | -10 | | -10 | |
| PCCPCH_Ec/Ior | dB | -12 | | -12 | |
| SCH_Ec/Ior | dB | -12 | | -12 | |
| PICH_Ec/Ior | dB | -15 | | -15 | |
| DCH_Ec/Ior | dB | -17 | -Inf | Not applicable | |
| OCNS_Ec/Ior | dB | -1.049 | -0.941 | -0.941 | |
| $\hat{I}_{or}/I_{oc}$ | dB | -3,35 | | 0,02 | |
| $I_{oc}$ | dBm/ 3.84 MHz | -70 | | | |
| CPICH_Ec/Io | dB | -15 | | -13 | |
| Propagation Condition | | AWGN | | | |

## A.6.1.2 Test Requirements

**Test 1**

RRC re-establishment delay shall be less than 1630 ms.

**Test 2**

RRC re-establishment delay shall be less than 3930 ms.

# A.6.2 Random Access

## A.6.2.1 Test Purpose and Environment

The purpose of these tests are to verify that the behaviour of the random access procedure is according to the requirements and that the PRACH power settings are within specified limits. This tests will verify the requirements in section 6.3.2.

**Table A.6.5: RF Parameters for Random Access test**

| Parameter | Unit | Cell 1 |
|---|---|---|
| UTRA RF Channel Number | | Channel 1 |
| CPICH_Ec/Ior | dB | -10 |
| PCCPCH_Ec/Ior | dB | -12 |
| SCH_Ec/Ior | dB | -12 |
| Number of other transmitted Acquisition Indicators | - | 0 |
| AICH_Ec/Ior | dB | -10 |
| PICH_Ec/Ior | dB | -15 |
| OCNS_Ec/Ior when an AI is not transmitted | dB | -0.941 |
| OCNS_Ec/Ior when an AI is transmitted | dB | -1.516 |
| $\hat{I}_{or}/I_{oc}$ | dB | 0 |
| $I_{oc}$ | dBm/3.84 MHz | -70 |
| CPICH_Ec/Io | dB | -13 |
| Propagation Condition | | AWGN |

The test parameters "System Information Block (SIB) type 5 (ASC #0)" defined in section 6.1 of TS34.108, shall be used in all random access tests. Crucial parameters for the test requirements are repeated in Table A.6.6 and A.6.7 and these overrule the parameters defined in SIB type 5.

**Table A.6.6: UE parameters for Random Access test**

| Parameter | Unit | Value |
|---|---|---|
| Access Service Class (ASC#0)<br><br>- Persistence value | 0..1 | 1 |
| Maximum number of preamble ramping cycles ($M_{max}$). | | 2 |
| Maximum number of preambles in one preamble ramping cycle (Preamble Retrans Max) | | 12 |
| The backoff time $T_{B01}$<br>$N_{B01min}$=$N_{B01max}$ | ms<br>#TTI | N/A<br>10 |
| Power step when no acquisition indicator is received (Power offset P0) | dB | 3 |
| Power offset between the last transmitted preamble and the control part of the message (Power offset P p-m) | dB | 0 |
| Maximum allowed UL TX power | dBm | 0 |

**Table A.6.7: UTRAN parameters for Random Access test**

| Parameter | Unit | Value |
|---|---|---|
| Primary CPICH DL TX power | dBm | -8 |
| UL interference | dBm | -102 |
| SIR in open loop power control (Constant value) | dB | 0 |
| AICH Power Offset | dB | 0 |

## A.6.2.2 Test Requirements

### A.6.2.2.1 Correct behaviour when receiving an ACK

The UE shall stop transmitting preambles upon a ACK on the AICH has been received and then transmit a message. An ACK shall be transmitted after 10 preambles have been received by the UTRAN.

The absolute power applied to the first preamble shall be -30 dBm with an accuracy as specified in section 6.4.1.1 of TS 25.101 [3]. The relative power applied to additional preambles shall have an accuracy as specified in section 6.5.2.1 of TS 25.101 [3].

The UE shall transmit 10 preambles and 1 message.

### A.6.2.2.2 Correct behaviour when receiving an NACK

The UE shall stop transmitting preambles upon a NACK on the AICH has been received and then repeat the ramping procedure when the back off timer $T_{B01}$ expires. The NACK shall be transmitted after the 10 preambles have been received by the UTRAN.

The UE shall transmit 10 preambles in the first ramping cycle and no transmission shall be done by the UE within 100 ms after the NACK has been transmitted by the UTRAN. Then the UE shall start the second preamble ramping cycle.

### A.6.2.2.3 Correct behaviour at Time-out

The UE shall stop transmit preambles when reaching the maximum number of preambles allowed in a cycle. The UE shall then repeat the ramping procedure until the maximum number of preamble ramping cycles are reached. No ACK/NACK shall be sent by UTRAN during this test.

The UE shall transmit 2 preambles cycles, consisting of 12 preambles in each preamble cycle.

### A.6.2.2.4 Correct behaviour when reaching maximum transmit power

The UE shall not exceed the maximum allowed UL TX power configured by the UTRAN. No ACK/NACK shall be sent by UTRAN during this test.

The absolute power of any preambles belonging to the first or second preamble cycle shall not exceed 0 dBm +/-[] dB (or +/- [] dB in extreme conditions).

# A6.y CPCH Access

## A.6.y.1 Test Purpose and Environment

The purpose of these tests are to verify that the behaviour of the CPCH access procedure is according to the requirements and that the CPCH power settings are within specified limits. This test will verify the requirements in section 6.X.

**Table A.6.y1: RF Parameters for CPCH Access test**

| Parameter | Unit | Cell 1 |
|---|---|---|
| UTRA RF Channel Number | | Channel 1 |
| CPICH_Ec/Ior | dB | -10 |
| PCCPCH_Ec/Ior | dB | -12 |
| SCH_Ec/Ior | dB | -12 |
| Number of other transmitted AP-AICH Indicators | - | 0 |
| Number of other transmitted CD/CA-ICH Indicators | - | 0 |
| AP-AICH_Ec/Ior | dB | -10 |
| CD/CA-ICH_Ec/Ior | dB | -10 |
| CSICH_Ec/Ior | dB | -10 |
| PICH_Ec/Ior | dB | -15 |
| OCNS_Ec/Ior when an AI is not transmitted | dB | -0.941 |
| OCNS_Ec/Ior when an AI is transmitted | dB | -1.516 |
| $\hat{I}_{or}/I_{oc}$ | dB | 0 |
| $I_{oc}$ | dBm/3.84 MHz | -70 |
| CPICH_Ec/Io | dB | -13 |
| Propagation Condition | | AWGN |

The test parameters System Information Blocks (SIBs) type 8 and 9 defined in section 7.1.13 of TS34.123, shall be used in all CPCH access tests. Crucial parameters for the test requirements are repeated in Table A.6.y2 and A.6.y3 and these overrule the parameters defined in SIBs type 8 and 9.

**Table A.6.y2: UE parameters for CPCH Access test**

| Parameter | Unit | Value |
|---|---|---|
| Access Service Class (ASC#0)<br><br>- CPCH Persistence value | <br><br>0..1 | <br><br>1 |
| Number of PCPCHs | | 2, for CA not active case, minimum spreading factor = 128 |
| Channel Assignment (CA) | | Not active or active |
| Maximum number of preamble ramping cycles ($N_{access\_fails}$). | | 2 |
| Maximum number of preambles in one preamble ramping cycle ($N_{ap\_retrans\_max}$) | | 12 |
| Number of frames for UE backoff after N ap_retrans_max unsuccessful AP access attempts or no matching CD/CA-ICH received (NF_bo_no aich) | radio frames | 2 |
| Number of slots for UE fixed backoff after access attempt to busy CPCH (NS_bo_busy) | Access slots | 15 |
| NF_max | 64 | frames |
| N_EOT | 7 | frames |
| Power step when no acquisition indicator is received (Power offset $P_0$) | dB | 3 |
| Power offset between the last transmitted CD preamble and the control part of the message (DeltaPp-m) | dB | 0 |
| Maximum allowed UL TX power | dBm | 0 |

**Table A.6.y3: UTRAN parameters for CPCH Access test**

| Parameter | Unit | Value |
|---|---|---|
| Primary CPICH DL TX power | dBm | -8 |
| UL interference | dBm | -102 |
| Target SIR for outer loop power control (Constant value) | dB | 0 |
| AP-AICH Power Offset | dB | 0 |
| CD/CA-ICH Power Offset | dB | 0 |
| CSICH Power Offset | dB | 0 |
| CSICH information | [cf. TS25.211] | For all cases: 1 PCPCH available, 1PCPCH unavailable. For CA active case: MASF = 04 (NOTE 1). |
| Channel Assignment (CA) | | Not active or active |

NOTE 1: MASF = 0 signals that the minimum available CPCH spreading factor is 04; this is signalled by setting MASF(0) = MASF(1) = MASF(2) = 1.

## A.6.y.2 Test Requirements

### A.6.y.2.1 Correct behaviour when receiving an AP-AICH ACK

The UE shall stop transmitting AP preambles when an ACK on the AP-AICH is received and then shall transmit a CD preamble with a randomly chosen signature/slot subchannel.

The UE shall transmit 10 AP preambles and 1 CD preamble. An AP-AICH ACK shall be transmitted by the UTRAN after the 10 AP preambles have been received by the UTRAN. When Channel Assignment (CA) is not active, the UE shall transmit AP preambles with a signature and slot subchannel corresponding to the available PCPCH. When CA is active the UE shall transmit AP preambles with a signature and slot subchannel corresponding to a spreading factor of 128.

The absolute power applied to the first AP preamble shall be [-30 dBm] with an accuracy as specified in table 6.4.1.1 of 25.101 [3]. The relative power applied to additional AP preambles or CD preambles shall have an accuracy as specified in section 6.5.2.1 of 25.101 [3].

### A.6.y.2.2 Correct behaviour when receiving an AP-AICH NACK

The UE shall stop transmitting AP preambles when a NACK on the AP-AICH is received and then shall repeat the ramping procedure.

The UE shall transmit 10 AP preambles in the first ramping cycle, shall cease transmission for 20 ms, and then shall start the second preamble ramping cycle. The AP-AICH NACK shall be transmitted by the UTRAN after the 10 preambles have been received by the UTRAN. When Channel Assignment (CA) is not active, the UE shall transmit AP preambles with a signature and slot subchannel corresponding to the available PCPCH. When CA is active the UE shall transmit AP preambles with a signature and slot subchannel corresponding to a spreading factor of 128.

### A.6.y.2.3 Correct behaviour when receiving a CD/CA-ICH ACK with matching signature when CA is not active

When an ACK on the CD/CA-ICH is received in the access slot corresponding to the transmitted CD preamble and with the same signature used in the transmitted CD preamble, the UE shall transmit the CPCH message on the available PCPCH.

The UE shall transmit 10 AP preambles, 1 CD preamble and 1 CPCH message with EOT indication. An AP-AICH ACK shall be transmitted by the UTRAN after the 10 AP preambles have been received by the UTRAN, and then a CD/CA-ICH ACK with matching signature shall be transmitted by the UTRAN in the corresponding slot after the CD preamble. When Channel Assignment (CA) is not active, the UE shall transmit AP preambles with a signature and slot subchannel corresponding to the available PCPCH.

### A.6.y.2.4 Correct behaviour when receiving a CD/CA-ICH ACK with matching signature when CA is active

When an ACK on the CD/CA-ICH is received in the access slot corresponding to the transmitted CD preamble and with the same signature used in the transmitted CD preamble, the UE shall transmit the CPCH message on the available PCPCH with a spreading factor of 128.

The UE shall transmit 10 AP preambles, 1 CD preamble and 1 CPCH message with EOT indication. An AP-AICH ACK shall be transmitted by the UTRAN after the 10 AP preambles have been received by the UTRAN, and then a

CD/CA-ICH ACK (ACK with matching signature and CA signal indicating the available PCPCH) shall be transmitted by the UTRAN in the corresponding slot after the CD preamble. When Channel Assignment (CA) is active, the UE shall transmit AP preambles with a signature and slot subchannel corresponding to a spreading factor of 128.

### A.6.y.2.5 Correct behaviour when not receiving a CD/CA-ICH ACK with matching signature

When an ACK on the CD/CA-ICH is not received in the access slot corresponding to the transmitted CD preamble and with the same signature used in the transmitted CD preamble, the UE shall repeat the ramping procedure.

The UE shall transmit 10 AP preambles and 1 CD preamble in the first ramping cycle, shall cease transmission for 20 ms, and then shall start the second preamble ramping cycle. An AP-AICH ACK shall be transmitted by the UTRAN after the 10 AP preambles have been received by the UTRAN. When Channel Assignment (CA) is not active, the UE shall transmit AP preambles with a signature and slot subchannel corresponding to the available PCPCH. When CA is active the UE shall transmit AP preambles with a signature and slot subchannel corresponding to a spreading factor of 128.

### A.6.y.2.6 Correct behaviour when not receiving a CD/CA-ICH CA message when Channel Assignment (CA) is active

When a CA message in the CD/CA-ICH is not received in the access slot corresponding to the transmitted CD preamble, the UE shall repeat the ramping procedure.

The UE shall transmit 10 AP preambles and 1 CD preamble in the first ramping cycle, shall cease transmission for 20 ms, and then shall start the second preamble ramping cycle. An AP-AICH ACK shall be transmitted by the UTRAN after the 10 AP preambles have been received by the UTRAN. A CD/CA-ICH ACK without a CA message shall be transmitted by the UTRAN after the CD preamble. The UE shall transmit AP preambles with a signature and slot subchannel corresponding to a spreading factor of 128.

### A.6.y.2.7 Correct behaviour at Time-out

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

The UE shall transmit 2 AP preambles cycles, consisting of 12 AP preambles in each AP preamble cycle. The UTRAN shall not transmit during this test. When Channel Assignment (CA) is not active, the UE shall transmit AP preambles with a signature and slot subchannel corresponding to the available PCPCH. When CA is active the UE shall transmit AP preambles with a signature and slot subchannel corresponding to a spreading factor of 128.

### A.6.y.2.8 Correct behaviour when reaching maximum transmit power

The UE shall not exceed the maximum allowed UL TX power configured by the UTRAN. The absolute power of the AP preambles belonging to the first or second preamble cycle shall not exceed 0 dBm +/-[] dB (or +/- [] dB in extreme conditions).

The UE shall transmit 2 AP preambles cycles, consisting of 12 AP preambles in each AP preamble cycle. The UTRAN shall not transmit during this test. When Channel Assignment (CA) is not active, the UE shall transmit AP preambles with a signature and slot subchannel corresponding to the available PCPCH. When CA is active the UE shall transmit AP preambles with a signature and slot subchannel corresponding to a spreading factor of 128.

### A.6.y.2.9 Correct behaviour for Emergency Stop

During Transmission of the CPCH message part and upon receipt of an Emergency Stop indication from the UTRAN, the UE shall stop transmitting within 20 msec of receipt of the Emergency Stop Indication. An Emergency Stop indication shall be transmitted by the UTRAN after the UTRAN has received the first TTI of the CPCH message.

**3GPP TSG RAN WG4 Meeting #19** **R4-011325**

**Edinburgh, Great Britain, 3rd - 7th September 2001**

*CR-Form-v4*

# CHANGE REQUEST

⌘ **25.141** **CR** 116 ⌘ ev **-** ⌘ Current version: **4.1.0** ⌘

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

***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Addition of BS performance requirement for CPCH |
| ***Source:*** | ⌘ | RAN WG4 |
| ***Work item code:*** | ⌘ | TEI5 |
| ***Date:*** | ⌘ | 06 Sept 2001 |
| ***Category:*** | ⌘ | **B** |
| ***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)*
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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)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | New BS CPCH performance requirements are added to 3GPP 25.104 v.4.1.0 (cf R4-011324). New corresponding testcases in 3GPP 25.141 v.4.1.0 also need to be added. |
| ***Summary of change:*** | ⌘ | Added testcases for CPCH message demodulation.in static and multipath fading case 3 conditions. |
| ***Consequences if not approved:*** | ⌘ | BS CPCH conformance testcases are not defined and tests can not be performed. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | New clause 8.x for CPCH performance. New clause A.x in Annex A. |
| ***Other specs affected:*** | ⌘ | ☐ Other core specifications ⌘<br>☐ Test specifications<br>☐ O&M Specifications |
| ***Other comments:*** | ⌘ | |

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# 8.x CPCH Performance

## 8.x.1 CPCH access preamble and collision detection preamble detection in static propagation conditions

### 8.x.1.1 Definition and applicability

The CPCH access preamble and collision detection preamble are identical to the RACH preamble. The performance requirement of CPCH for access preamble (AP) and collision detection preamble (CD) detection in static propagation conditions is the same as that defined for RACH preamble and is determined by the two parameters probability of false detection of the preamble (Pfa) and the probability of detection of preamble (Pd).

The requirement in this subclause shall apply to base stations intended for general-purpose applications.

### 8.x.1.2 Conformance and test requirement

The conformance and test requirement for CPCH for access preamble (AP) and collision detection preamble (CD) detection in static propagation conditions is the same as that defined for RACH preamble in section 8.8.1 of this specification. No additional conformance test is needed.

## 8.x.2 CPCH access preamble and collision detection preamble detection in multipath fading case 3

### 8.x.2.1 Definition and applicability

The CPCH access preamble and collision detection preamble are identical to the RACH preamble. The performance requirement of CPCH for access preamble (AP) and collision detection preamble (CD) detection in multipath fading case 3 conditions is the same as that defined for RACH preamble and is determined by the two parameters probability of false detection of the preamble (Pfa) and the probability of detection of preamble (Pd).

The requirement in this subclause shall apply to base stations intended for general-purpose applications.

### 8.x.2.2 Conformance and test requirement

The conformance and test requirement for CPCH for access preamble (AP) and collision detection preamble (CD) detection in multipath fading case 3 conditions is the same as that defined for RACH preamble in section 8.8.2 of this specification. No additional conformance test is needed.

## 8.x.3 Demodulation of CPCH message in static propagation conditions

### 8.x.3.1 Definition and applicability

The performance requirement of CPCH in static propagation conditions is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified $E_b/N_0$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

The power on the access preamble and collision detection preamble is set to meet or exceed the requirements on Pfa and Pd in subclauses 8.x.1 and 8.x.2. Only one signature is used and it is known by the receiver.

The requirement in this subclause shall apply to base stations intended for general-purpose applications.

### 8.x.3.2 Conformance requirement

The BLER shall not exceed the limit for the $E_b/N_0$ specified in table 8.cc.

**Table 8.cc: Performance requirements in AWGN channel**

| Transport Block size TB and TTI in frames | $E_b/N_0$ for required BLER < $10^{-1}$ | $E_b/N_0$ for required BLER < $10^{-2}$ |
|---|---|---|
| 168 bits, TTI = 20 ms | 4.1 dB | 5.0 dB |
| 360 bits, TTI = 20 ms | 3.9 dB | 4.8 dB |

The reference for this requirement is TS 25.104 subclause 8.x.2.

### 8.x.3.3 Test purpose

The test shall verify the receiver's ability to receive the test signal under static propagation conditions with a BLER not exceeding a specified limit.

### 8.x.3.4 Method of test

Annex B functional setups for DCH shall also be used for CPCH tests.

#### 8.x.3.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

RF channels to be tested: B, M and T; see subclause 4.8

Preamble threshold factor: chosen to fulfil the requirements on Pfa and Pd in subclauses 8.x.1 and 8.x.2

1) Connect the BS tester generating the wanted signal and AWGN generators to both BS antenna connectors for diversity reception via a combining network as shown in annex B for DCH.

#### 8.x.3.4.2 Procedure

1) Adjust the AWGN generator to -84 dBm/3.84 MHz at the BS input.

2) The characteristics of the wanted signal shall be configured according to the corresponding UL CPCH reference measurement channel defined in annex A.

3) Adjust the equipment so that required $E_b/N_0$ specified in table 8.cc is achieved. To achieve the specified $E_b/N_0$, the wanted signal level (of the message part) at the BS input should be adjusted to: $-84+10*\text{Log10}(TB/(TTI*3.84*10^6))+E_b/N_0$ [dBm]. The wanted signal levels during transmission (of the message part) at the BS input for the specified $E_b/N_0$ levels in table 8.cc is found in table 8.dd.

**Table 8.dd: Wanted signal levels (of the CPCH message part) during transmission in AWGN channel**

| Transport Block size TB and TTI in frames | Wanted signal level during transmission for required BLER<$10^{-1}$ | Wanted signal level during transmission for required BLER<$10^{-2}$ |
|---|---|---|
| 168 bits, TTI = 20 ms | -106.5 dBm | -105.6 dBm |
| 360 bits, TTI = 20 ms | -103.4 dBm | -102.5 dBm |

4) The test signal generator sends an access preamble followed by a collision detection preamble then followed by the actual CPCH message. This pattern is repeated (see figure 8.ee). The receiver tries to detect the AP and CD preambles and the CPCH message. The block error rate is calculated for the messages that have been decoded. Messages following undetected preambles shall not be taken into account in the BLER measurement.

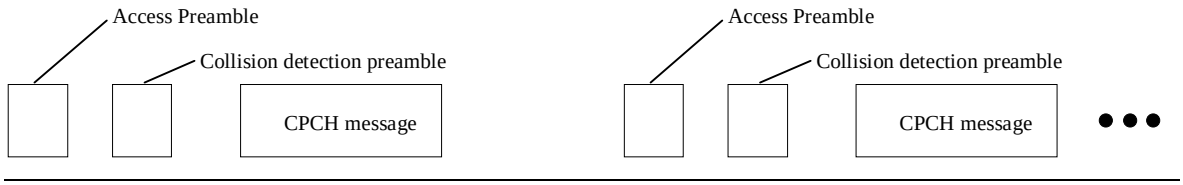


**Figure 8.ee: CPCH test signal pattern**

### 8.x.3.5 Test requirements

The BLER measured according the subclause 8.x.3.4.2 shall not exceed the limits specified in table 8.cc.

## 8.x.4 Demodulation of CPCH message in multipath fading case 3

### 8.x.4.1 Definition and applicability

The performance requirement of CPCH in multipath fading case 3 is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified $E_b/N_0$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

The power on the access preamble and collision detection preamble is set to meet or exceed the requirements on Pfa and Pd in subclauses 8.x.1 and 8.x.2. Only one signature is used and it is known by the receiver.

The requirement in this subclause shall apply to base stations intended for general-purpose applications.

### 8.x.4.2 Conformance requirement

The BLER shall not exceed the limit for the $E_b/N_0$ specified in table 8.ff.

**Table 8.ff: Performance requirements in fading case 3 channel**

| Transport Block size TB and TTI in frames | $E_b/N_0$ for required BLER < $10^{-1}$ | $E_b/N_0$ for required BLER < $10^{-2}$ |
|---|---|---|
| 168 bits, TTI = 20 ms | 7.5 dB | 8.5 dB |
| 360 bits, TTI = 20 ms | 7.3 dB | 8.1 dB |

The reference for this requirement is TS 25.104 subclause 8.x.2.

### 8.x.4.3 Test purpose

The test shall verify the receiver's ability to receive the test signal under multipath fading case 3 propagation conditions with a BLER not exceeding a specified limit.

### 8.x.4.4 Method of test

Annex B functional setups for DCH shall also be used for CPCH tests.

#### 8.x.4.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

RF channels to be tested: B, M and T; see subclause 4.8

Preamble threshold factor: chosen to fulfil the requirements on Pfa and Pd in subclauses 8.x.1 and 8.x.2

1) Connect the BS tester generating the wanted signal and AWGN generators to both BS antenna connectors for diversity reception via a combining network as shown in annex B for DCH.

### 8.x.4.4.2 Procedure

1) Adjust the AWGN generator to -84 dBm/3.84 MHz at the BS input.

2) The characteristics of the wanted signal shall be configured according to the corresponding UL CPCH reference measurement channel defined in annex A.

3) Adjust the equipment so that required $E_b/N_0$ specified in table 8.ff is achieved. To achieve the specified $E_b/N_O$, the wanted signal level (of the message part) at the BS input should be adjusted to: $-84+10*\text{Log10}(TB/(TTI*3.84*10^6))+E_b/N_0$ [dBm]. The wanted signal levels during transmission (of the message part) at the BS input for the specified $E_b/N_0$ levels in table 8.ff is found in table 8.gg.

**Table 8.gg: Wanted signal levels (of the CPCH message part) during transmission in fading case 3 channel**

| Transport Block size TB and TTI in frames | Wanted signal level during transmission for required BLER<$10^{-1}$ | Wanted signal level during transmission for required BLER<$10^{-2}$ |
|---|---|---|
| 168 bits, TTI = 20 ms | -103.1 dBm | -102.1 dBm |
| 360 bits, TTI = 20 ms | -100.0 dBm | -99.2 dBm |

4) The test signal generator sends an access preamble followed by a collision detection preamble then followed by the actual CPCH message. This pattern is repeated (see figure 8.hh). The receiver tries to detect the preamble and the message. The block error rate is calculated for the messages that have been decoded. Messages following undetected preambles shall not be taken into account in the BLER measurement.

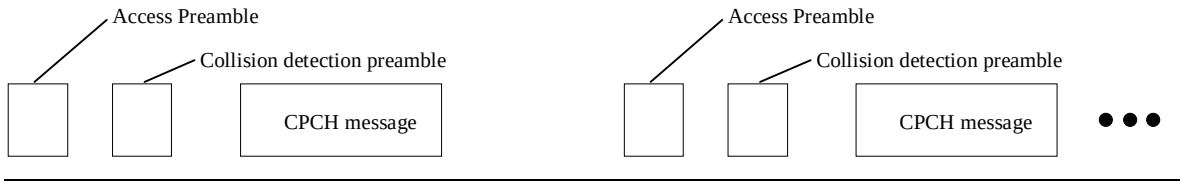


**Figure 8.hh: CPCH test signal pattern**

### 8.x.4.5 Test requirements

The BLER measured according to subclause 8.x.4.4.2 shall not exceed the limits specified in table 8.ff.

# A.x Reference measurement channels for UL CPCH

The parameters for the UL CPCH reference measurement channels are specified in Table A.ii.

**Table A.ii: Reference measurement channels for UL CPCH**

| Parameter | | | Unit |
|---|---|---|---|
| CPCH | CRC | 16 | bits |
| | Channel Coding | Rate ½ conv. coding | |
| | TTI | 20 | ms |
| | TB size | 168, 360 | bits |
| | Rate Matching | Repetition | |
| | Number of diversity antennas | 2 | |
| | Preamble detection window size | 256 | chips |
| | Power control preamble length | 0 | slots |
| Power ratio of CPCH Control/Data TB = 168 | | -2.69 | dB |
| Power ratio of CPCH Control/Data TB = 360 | | -3.52 | dB |