**TSG RAN Meeting #14**                                                                         **RP-010778**

**Kyoto, Japan, 11 - 14 December 2001**

**Title:**        **CRs (R'99 and Rel-4 Category A) to TS 25.102**

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

**Agenda Item:**  **8.4.3**

| RAN4 Tdoc | Spec | CR | Title | Cat | Phase | Curr Ver | New Ver |
|---|---|---|---|---|---|---|---|
| R4-011443 | 25.102 | 81 | Tx On/Off Test Requirements for Discontinuous Transmission | F | Rel99 | 3.8.0 | 3.9.0 |
| R4-011487 | 25.102 | 82 | Tx On/Off Test Requirements for Discontinuous Transmission | A | Rel-4 | 4.2.0 | 4.3.0 |
| R4-011496 | 25.102 | 83 | Downlink power control - performance requirement for constant BLER target, 3.84 Mcps TDD option | F | Rel99 | 3.8.0 | 3.9.0 |
| R4-011584 | 25.102 | 84 | Downlink power control - performance requirement for constant BLER target, 3.84 Mcps TDD option | A | Rel-4 | 4.2.0 | 4.3.0 |

*CR-Form-v4*

# CHANGE REQUEST

| ⌘ | **25.102** CR **81** | ⌘ | ev | **-** | ⌘ | Current version: | **3.8.0** | ⌘ |

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

| | | |
|---|---|---|
| *Title:* ⌘ | Tx On/Off Test Requirements for Discontinuous Transmission | |
| *Source:* ⌘ | RAN WG4 | |
| *Work item code:* ⌘ | | *Date:* ⌘  12 Nov. 2001 |

| | |
|---|---|
| *Category:* ⌘ **F** | *Release:* ⌘  Rel99 |

Use <u>one</u> of the following categories:
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**B** (addition of feature),
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Use <u>one</u> 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:* ⌘ | Existing requirement for discontinuous transmission out-of-synchronisation handling of output power is not achievable with under ideal conditions. |
| *Summary of change:* ⌘ | Requirement is modified to provide a functional test that can be met.  Also the $\hat{I}_{or}/I_{oc}$ value is adjusted to be consistent with the recently revised requirement for DCH testing of 12.2 kbps operation in Table 8.3. |
| *Consequences if not approved:* ⌘ | It is not possible to meet the current requirement; therefore it will be impossible to build a UE that will meet the requirement.<br><br>Isolated Impact Analysis:<br>Correction to a function where the specification was:<br>• Containing some contradictions.<br>Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

| | |
|---|---|
| *Clauses affected:* ⌘ | 6.4.3.2 |

| | | |
|---|---|---|
| *Other specs affected:* ⌘ | ☐ Other core specifications ⌘ | |
| | ☐ Test specifications | |
| | ☐ O&M Specifications | |

| | |
|---|---|
| *Other comments:* ⌘ | |

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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.

## 6.4.3.2          Requirement for discontinuous transmission

### 6.4.3.2.1          Minimum requirement

During DTX, there are periods when the UE will receive no data from the UTRAN. As specified in TS 25.224, in order to keep synchronization, Special Bursts shall be transmitted by the UTRAN during these periods of no data.

During  these periods, the conditions for when the UE shall shut its transmitter on or off are defined by the power level of the received Special Bursts.

When the UE does not detect at least one special burst with a quality above a threshold $Q_{sbout}$ over the last 160 ms period, the UE shall shut its transmitter off within 40 ms. The UE shall not turn its transmitter on again until the special burst quality exceeds an acceptable level $Q_{sbin}$. When the UE estimates the special burst quality to be better than a threshold $Q_{sbin}$ over the last 160 ms, the UE shall again turn its transmitter on within 40 ms.

The UE transmitter shall be considered "off" if the transmitted power is below the level defined in subclause 6.5.1 (Transmit off power). Otherwise the transmitter shall be considered as "on".

### 6.4.3.2.2          Test case

This subclause specifies a test case, which provides additional information for how the minimum requirement should be interpreted for the purpose of conformance testing in case of discontinuous transmission.

The conditions for the discontinuous test case  are as follows:

The handover triggering level shall be set very high to ensure that the beacon channel power never exceeds the value of 10dB above it.  Therefore the averaging time for signal quality will always be 160 milliseconds.

The UTRAN transmits Special Bursts as specified in TS 25.224.  The Special Burst Scheduling Parameter, SBSP = 4, which means that UTRAN sends a Special Burst at every fourth frame with no data. Therefore, the UTRAN sends a Special Burst in the first frame without data transmission, followed by 3 frames with no transmission; followed by a Special Burst, etc.

The DCH parameters are shown in Table 6.4A.

The quality levels at the thresholds $Q_{sbout}$ and $Q_{sbin}$ correspond to different signal levels depending on the downlink conditions DCH parameters. For the conditions in Table 6.4A, a signal with the quality at the level $Q_{sbout}$ can be generated by a DPCH_Ec/Ior ratio during received special bursts of -16 dB, and a signal with $Q_{sbin}$ by a DPCH_Ec/Ior ratio during received special bursts of -12 dB.

**Table 6.4A: DCH parameters for the Out-of-synch handling test case– discontinuous transmission**

| Parameter | Unit | Value |
|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | -11.1 |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| $\dfrac{DPCH\_E_c}{I_{or}}$ | dB | See figure 6.1A |
| Bits/burst (including TFCI bits) | bits | 244 |
| TFCI | - | On |

Figure 6.1A shows an example scenario where the special burst quality varies from a level above $Q_{sbin}$ , down to a level below $Q_{sbout}$ where the UE shall shut its power off and then back up to a level above $Q_{sbin}$ where the UE shall turn the power back on.

While the normal data is transmitted using two channelization codes, the Special Burst is transmitted with only one channelization code. Therefore the total energy per chip during Special Bursts is 3 dB lower than for continuous data transmission. The Special Bursts are represented by "SBs" in Figure 6.1A.

During the period of 3 frames with no data, the UE will receive a very low power, which is not shown in the figure. The power shown in the figure is the power of the Special Burst.
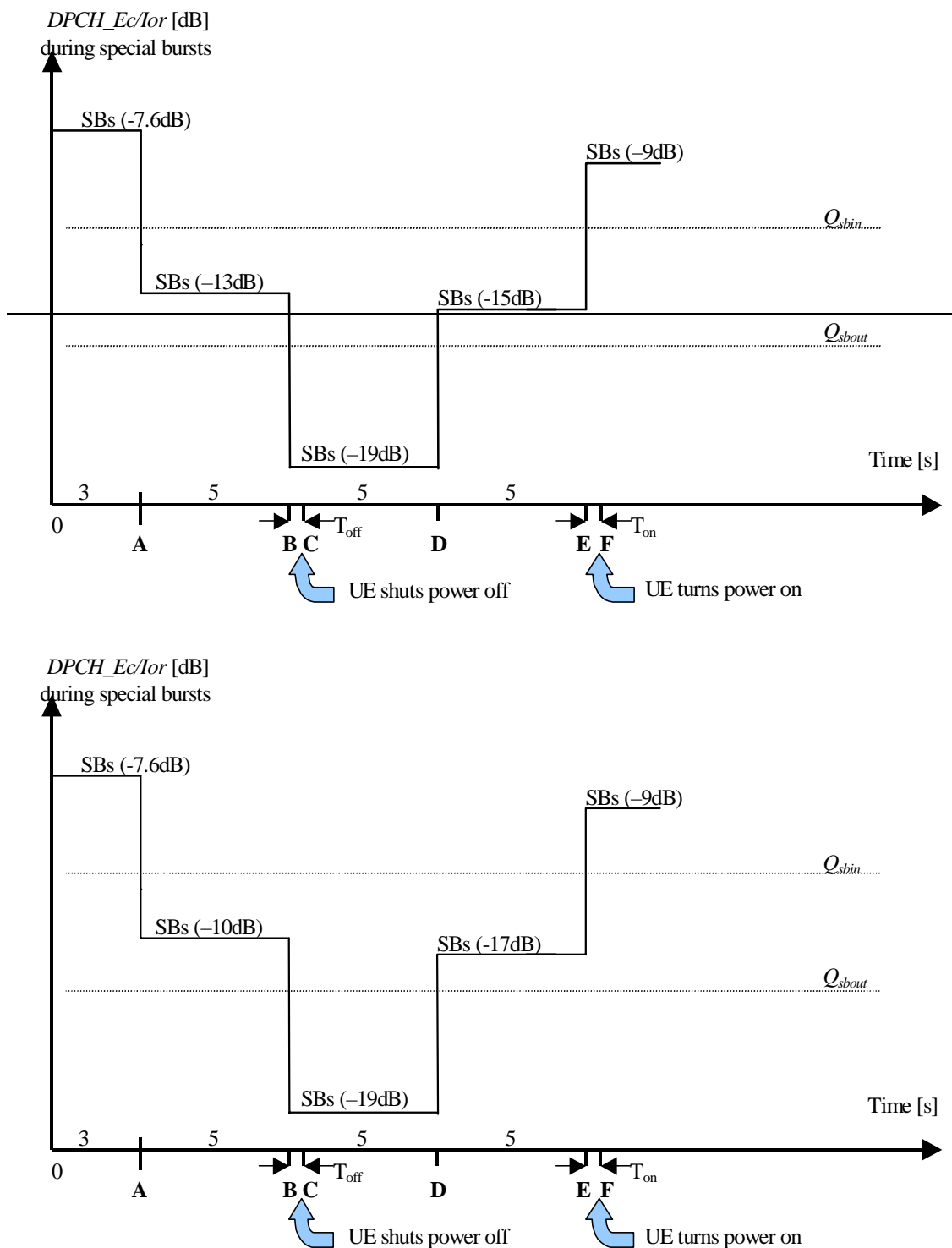


**Figure 6.1A. Test case for out-of-synch handling in the UE - discontinuous transmission.**

In this test case, the requirements for the UE are that:

1) The UE shall not shut its transmitter off before point B.

2) The UE shall shut its transmitter off before point C, which is $T_{off}$ = 200 ms after point B.

3) The UE shall not turn its transmitter on between points C and E.

4) The UE shall turn its transmitter on before point F, which is $T_{on}$ = 200 ms after Point E.

*CR-Form-v4*

# CHANGE REQUEST

| ⌘ | **25.102** CR **82** | ⌘ | ev | **-** | ⌘ | Current version: | **4.2.0** | ⌘ |

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

| | |
|---|---|
| ***Title:*** ⌘ | Tx On/Off Test Requirements for Discontinuous Transmission |
| ***Source:*** ⌘ | RAN WG4 |

| | | | |
|---|---|---|---|
| ***Work item code:*** ⌘ | | ***Date:*** ⌘ | 12 Nov. 2001 |

| | |
|---|---|
| ***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
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*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:*** ⌘ | Existing requirement for discontinuous transmission out-of-synchronisation handling of output power is not achievable with under ideal conditions. |
| ***Summary of change:*** ⌘ | Requirement is modified to provide a functional test that can be met. Also the $\hat{I}_{or}/I_{oc}$ value is adjusted to be consistent with the recently revised requirement for DCH testing of 12.2 kbps operation in Table 8.3. |
| ***Consequences if not approved:*** ⌘ | It is not possible to meet the current requirement; therefore it will be impossible to build a UE that will meet the requirement.<br><br>Isolated Impact Analysis:<br>Correction to a function where the specification was:<br> • Containing some contradictions.<br>Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

| | |
|---|---|
| ***Clauses affected:*** ⌘ | 6.4.3.2 |

| | | | |
|---|---|---|---|
| ***Other specs affected:*** ⌘ | ☐ Other core specifications | ⌘ | |
| | ☐ Test specifications | | |
| | ☐ O&M Specifications | | |

| | |
|---|---|
| ***Other comments:*** ⌘ | |

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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.

## 6.4.3.2      Requirement for discontinuous transmission

### 6.4.3.2.1       3.84 Mcps TDD Option

#### 6.4.3.2.1.1            Minimum Requirement

During DTX, there are periods when the UE will receive no data from the UTRAN. As specified in TS 25.224, in order to keep synchronization, Special Bursts shall be transmitted by the UTRAN during these periods of no data.

During these periods, the conditions for when the UE shall shut its transmitter on or off are defined by the power level of the received Special Bursts.

When the UE does not detect at least one special burst with a quality above a threshold $Q_{sbout}$ over the last 160 ms period, the UE shall shut its transmitter off within 40 ms. The UE shall not turn its transmitter on again until the special burst quality exceeds an acceptable level $Q_{sbin}$. When the UE estimates the special burst quality to be better than a threshold $Q_{sbin}$ over the last 160 ms, the UE shall again turn its transmitter on within 40 ms.

The UE transmitter shall be considered "off" if the transmitted power is below the level defined in subclause 6.5.1 (Transmit off power). Otherwise the transmitte shall be considered as "on".

#### 6.4.3.2.1.2            Test case

This subclause specifies a test case, which provides additional information for how the minimum requirement should be interpreted for the purpose of conformance testing in case of discontinuous transmission.

The conditions for the discontinuous test case are as follows:

The handover triggering level shall be set very high to ensure that the beacon channel power never exceeds the value of 10dB above it. Therefore the averaging time for signal quality will always be 160 milliseconds.

The UTRAN transmits Special Bursts as specified in TS 25.224. The Special Burst Scheduling Parameter, SBSP = 4, which means that UTRAN sends a Special Burst at every fourth frame with no data. Therefore, the UTRAN sends a Special Burst in the first frame without data transmission, followed by 3 frames with no transmission; followed by a Special Burst, etc.

The DCH parameters are shown in Table 6.4A.

The quality levels at the thresholds $Q_{sbout}$ and $Q_{sbin}$ correspond to different signal levels depending on the downlink conditions DCH parameters. For the conditions in Table 6.4A, a signal with the quality at the level $Q_{sbout}$ can be generated by a DPCH_Ec/Ior ratio during received special bursts of -16 dB, and a signal with $Q_{sbin}$ by a DPCH_Ec/Ior ratio during received special bursts of -12 dB.
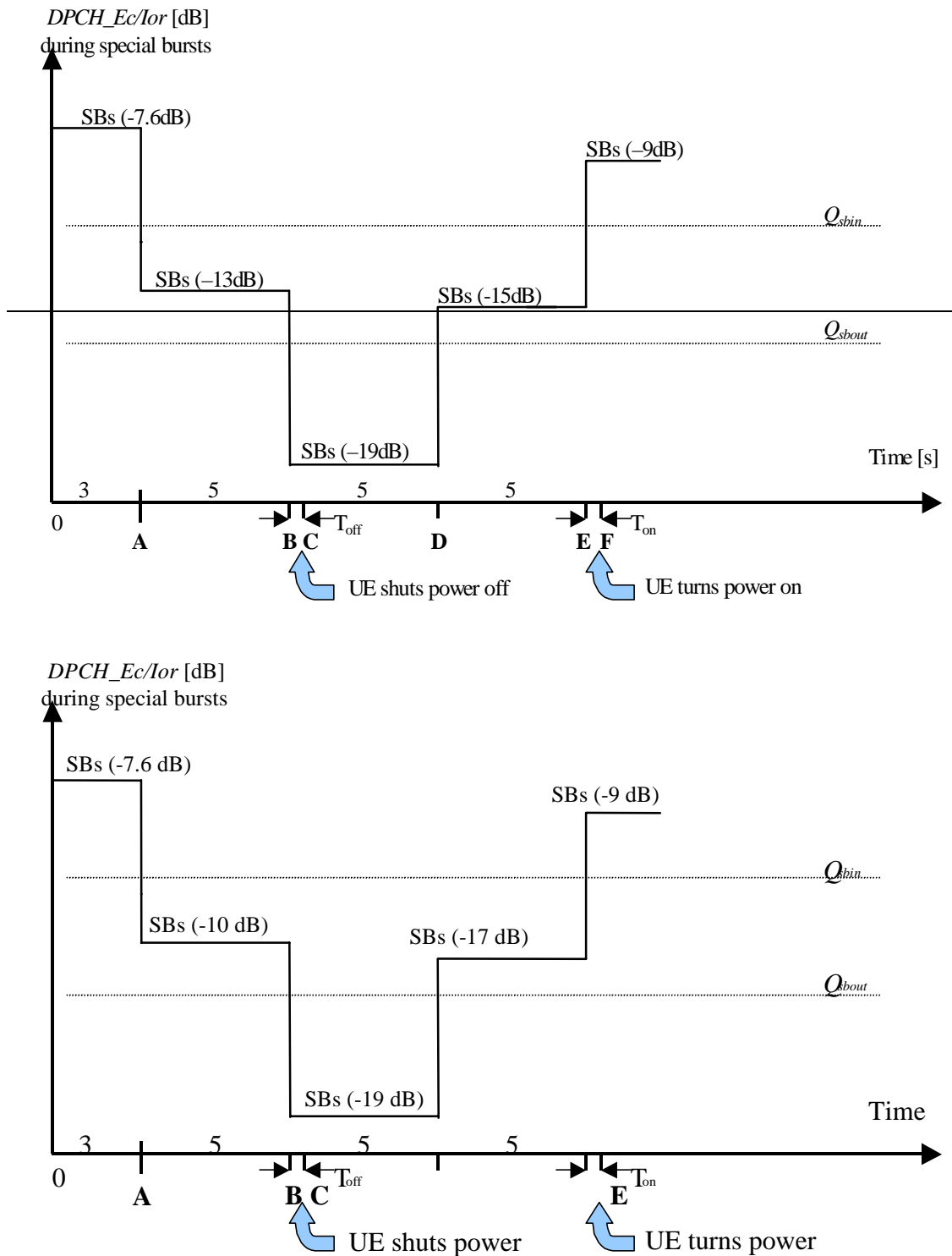
**Table 6.4A: DCH parameters for the of Out-of-synch handling test case – 3.84 Mcps TDD option – discontinuous transmission**

| Parameter | Unit | Value |
|-----------|------|-------|
| $\hat{I}_{or}/I_{oc}$ | dB | -1.1 |
| $I_{oc}$ | dBm/3.84 MHz | -60 |
| $\dfrac{DPCH\_E_c}{I_{or}}$ | dB | See figure 6.1A |
| Bits/burst (including TFCI bits) | bits | 244 |
| TFCI | - | On |

Figure 6.1A shows an example scenario where the special burst quality varies from a level above $Q_{sbin}$ , down to a level below $Q_{sbout}$ where the UE shall shut its power off and then back up to a level above $Q_{sbin}$ where the UE shall turn the power back on.

While the normal data is transmitted using two channelization codes, the Special Burst is transmitted with only one channelization code. Therefore the total energy per chip during Special Bursts is 3 dB lower than for continuous data transmission. The Special Bursts are represented by "SBs" in Figure 6.1A.

During the period of 3 frames with no data, the UE will receive a very low power, which is not shown in the figure. The power shown in the figure is the power of the Special Burst



**Figure 6.1A. Test case for out-of-synch handling in the UE – 3.84 Mcps TDD option - discontinuous transmission.**

In this test case, he requirements for the UE are that:

1) The UE shall not shut its transmitter off before point B.

2) The UE shall shut its transmitter off before point C, which is $T_{off} = 200$ ms after point B.

3) The UE shall not turn its transmitter on between points C and E.

4) The UE shall turn its transmitter on before point F, which is $T_{on} = 200$ ms after Point E.

*CR-Form-v4*

# CHANGE REQUEST

| | ⌘ | **25.102** CR **83** | ⌘ | rev | **-** | ⌘ | Current version: | **3.8.0** | ⌘ |

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

| | | |
|---|---|---|
| *Title:* | ⌘ | Downlink power control – constant BLER target for 3.84 Mcps TDD option |
| *Source:* | ⌘ | RAN WG4 |
| *Work item code:* | ⌘ | | *Date:* ⌘ | 13 Nov. 2001 |

| | | |
|---|---|---|
| *Category:* | ⌘ **F** | *Release:* ⌘ Rel99 |

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**B** (addition of feature),
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Detailed explanations of the above categories can be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> 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:* | ⌘ | No performance requirement for downlink power control exists.  The verification of UE downlink power control performance is critical to insuring the UE will function properly within UTRAN. |
| *Summary of change:* | ⌘ | Definition of performance requirement for power control downlink – constant BLER target.  Eliminate Test 2, to simplify testing.  Change propagation conditions to Case1 and eliminate Case 4 from specification.  Also alignment text with 1.28 Mcps TDD option REL-4 for clarity and consistency. |
| *Consequences if not approved:* | ⌘ | Incomplete specification with no method to verify UE downlink power control performance.  Different text/definitions in R99 and 1.28 Mcps TDD option REL-4, which may cause confusion.<br><br>Isolated Impact Analysis:<br>Correction to a function where the specification was:<br>• Procedural text or rules were missing.<br>Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

| | | |
|---|---|---|
| *Clauses affected:* | ⌘ | 8.5, B.2 |

| | | |
|---|---|---|
| *Other specs affected:* | ⌘ | ☐ Other core specifications   ⌘<br>☐ Test specifications<br>☐ O&M Specifications |
| *Other comments:* | ⌘ | |

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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.

# 8.5       Power control in downlink

Power control in the downlink is the ability of the UE receiver to converge to the required link quality set by the network while using minimum downlink power.

## 8.5.1       Minimum requirements

For the parameters specified in Table 8.12 the average downlink $\hat{I}_{or}/I_{oc}$ shall be below the specified value in Table 8.13 more than 90% of the time.  BLER shall be as shown in Table 8.13 more than 90% of the time.  ~~power shall not exceed the values specified in Table 8.13.~~ Downlink power control is ON during the test.

Table 8.12: Test parameters for downlink power control

| Parameter | Unit | Test 1 | ~~Test 2~~ |
|---|---|---|---|
| $\dfrac{DPCH\_E_c}{I_{or}}$ | dB | 0 | [] |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Information Data Rate | kbps | 12.2 | |
| Target quality value on DTCH | BLER | 0.01 | |
| Propagation condition | | Case 41 | |
| DL Power Control step size, $\Delta_{TPC}$ | dB | 1 | |
| Maximum_DL_power * | dB | 0 | |
| Minimum_DL_power * | dB | -27 | |

**Table 8.13: Requirements for downlink power control**

| Parameter | Unit | Test 1 | ~~Test 2~~ |
|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | []8.0 | [] |
| Measured quality on DTCH | BLER | 0.01±30% | ~~0.01±30%~~ |

**<Next Changed Section>**

# B.2       Multi-path fading propagation conditions

Table B.1 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

**Table B.1: Propagation Conditions for Multi path Fading Environments**

| Case 1, speed 3km/h | | Case 2, speed 3 km/h | | Case 3, 120 km/h | | ~~Case 4, 3 km/h~~ | |
|---|---|---|---|---|---|---|---|
| Relative Delay [ns] | Average Power [dB] | Relative Delay [ns] | Average Power [dB] | Relative Delay [ns] | Average Power [dB] | ~~Relative Delay [ns]~~ | ~~Average Power [dB]~~ |
| 0 | 0 | 0 | 0 | 0 | 0 | ~~0~~ | ~~0~~ |
| 976 | -10 | 976 | 0 | 260 | -3 | ~~976~~ | ~~0~~ |
| | | 12000 | 0 | 521 | -6 | | |
| | | | | 781 | -9 | | |

# 3GPP TSG RAN WG4 Meeting #20

**R4-011584**

# East Brunswick, NJ, USA 12th - 16th November 2001

# CHANGE REQUEST

⌘ **25.102** CR **84** ⌘ ev **-** ⌘ Current version: **4.2.0** ⌘

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

| | |
|---|---|
| ***Title:*** ⌘ | Downlink power control – constant BLER target for 3.84 Mcps TDD option |
| ***Source:*** ⌘ | RAN WG4 |
| ***Work item code:*** ⌘ | **Date:** ⌘ 14 Nov. 2001 |

***Category:*** ⌘ **A**

*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.

***Release:*** ⌘ Rel-4

*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:*** ⌘ | No performance requirement for downlink power control exists. The verification of UE downlink power control performance is critical to insuring the UE will function properly within UTRAN. |
| ***Summary of change:*** ⌘ | Definition of performance requirement for power control downlink – constant BLER target. Eliminate Test 2, to simplify testing. Change propagation conditions to Case1 and eliminate Case 4 from specification. Also alignment text with 1.28 Mcps TDD option REL-4 for clarity and consistency. |
| ***Consequences if not approved:*** ⌘ | Incomplete specification with no method to verify UE downlink power control performance. Different text/definitions in R99 and 1.28 Mcps TDD option REL-4, which may cause confusion.<br><br>Isolated Impact Analysis:<br>Correction to a function where the specification was:<br>• Procedural text or rules were missing.<br>Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

| | |
|---|---|
| ***Clauses affected:*** ⌘ | 8.5, B.2 |
| ***Other specs affected:*** ⌘ | ☐ Other core specifications ⌘ <br> ☐ Test specifications <br> ☐ O&M Specifications |
| ***Other comments:*** ⌘ | |

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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.

## 8.5.1 Power control in downlink, constant BLER target

### 8.5.1.1 Minimum requirements 3.84 Mcps TDD option

For the parameters specified in Table 8.12 the average downlink $\hat{I}_{or}/I_{oc}$ shall be below the specified value in Table 8.13 more than 90% of the time. BLER shall be as shown in Table 8.13 more than 90% of the time. . Downlink power control is ON during the test.

**Table 8.12: Test parameters for downlink power control – constant BLER Target (3.84 Mcps TDD option)**

| Parameter | Unit | Test 1 | ~~Test 2~~ |
|---|---|---|---|
| $\dfrac{DPCH\_E_c}{I_{or}}$ | dB | 0 | [] |
| $I_{oc}$ | dBm/3.84 MHz | -60 | |
| Information Data Rate | kbps | 12.2 | |
| Target quality value on DTCH | BLER | 0.01 | |
| Propagation condition | | Case 4~~1~~ | |
| DL Power Control step size, $\Delta_{TPC}$ | dB | 1 | |
| Maximum_DL_power * | dB | 0 | |
| Minimum_DL_power * | dB | -27 | |

**Table 8.13: Requirements for downlink power control – constant BLER Target (3.84 Mcps TDD option)**

| Parameter | Unit | Test 1 | ~~Test 2~~ |
|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | [~~]~~8.0 | [] |
| Measured quality on DTCH | BLER | 0.01±30% | ~~0.01±30%~~ |

**&lt;Next Changed Section&gt;**

# B.2.1 3.84 Mcps TDD Option

Table B1 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

**Table B1: Propagation Conditions for Multi path Fading Environments**

| Case 1, speed 3km/h | | Case 2, speed 3 km/h | | Case 3, 120 km/h | | ~~Case 4, 3 km/h~~ | |
|---|---|---|---|---|---|---|---|
| Relative Delay [ns] | Average Power [dB] | Relative Delay [ns] | Average Power [dB] | Relative Delay [ns] | Average Power [dB] | ~~Relative Delay [ns]~~ | ~~Average Power [dB]~~ |
| 0 | 0 | 0 | 0 | 0 | 0 | ~~0~~ | ~~0~~ |
| 976 | -10 | 976 | 0 | 260 | -3 | ~~976~~ | ~~0~~ |
| | | 12000 | 0 | 521 | -6 | | |
| | | | | 781 | -9 | | |