Source: **T1**

Title: **CR's to TS 34.121 v3.1.0 for approval**

Agenda item: **6.1**

Document for: **Approval**

This document contains 19 CRs to TS 34.121 v3.1.0. These CRs have been agreed by T1 and are put forward to TSG T for approval.

CRs due to changes in the core specifications:

T1 Doc	Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version -New
T1-000131	34.121	019		R99	Editorial corrections for References and Frequency Stability (2, 5.2, 5.3)	F	3.1.0	3.2.0
T1-000132	34.121	020		R99	Corrections for Output Power Dynamics in the Uplink (5.4)	F	3.1.0	3.2.0
T1-000133	34.121	021		R99	Transients for uplink inner loop power control (5.4.2.4.2)	F	3.1.0	3.2.0
T1-000134	34.121	022		R99	Transmit On/Off power (5.5.2.4.2)	F	3.1.0	3.2.0
T1-000135	34.121	023		R99	Change of TFC (5.6.4.2)	F	3.1.0	3.2.0
T1-000139	34.121	024		R99	Clarification of the definition on Peak Code Domain Error (5.13.2.1)	F	3.1.0	3.2.0
T1-000140	34.121	025		R99	UE interfering signal definition (6.3, 6.4, 6.5, 6.7)	F	3.1.0	3.2.0
T1-000143	34.121	026		R99	Performance requirements (7.1, 7.2, 7.3, 7.4, 7.5)	F	3.1.0	3.2.0
T1-000144	34.121	027		R99	CR on clause 7.6 and 7.7 in TS34.121 (7.6, 7.7)	F	3.1.0	3.2.0
T1-000146	34.121	028		R99	Performance requirements (7.9, 7.10, 7.11)	F	3.1.0	3.2.0
T1-000147	34.121	029		R99	Corrections for Annex D (Annex-D)	F	3.1.0	3.2.0
T1-000148	34.121	030		R99	Corrections for Annex E (Annex-E)	F	3.1.0	3.2.0
T1-000149	34.121	031		R99	Corrections for Transmit ON/OFF Power, Change of TFC and Power setting in uplink compressed mode (5.5, 5.6, 5.7)	F	3.1.0	3.2.0
T1-000136	34.121	032		R99	Corrections for power setting in uplink compressed mode (5.7)	F	3.1.0	3.2.0
T1-000145	34.121	033		R99	CR for subclause 7.8: Power control in downlink (7.8)	B	3.1.0	3.2.0

CRs due to adding/updating/correction of tests:

T1 Doc	Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version -New
T1-000137	34.121	034		R99	Corrections to clause 5.8, 5.9, 5.10, 5.11 and 5.12	F	3.1.0	3.2.0
T1-000138	34.121	035		R99	Corrections to EVM and PCDE formulae (B.2.7.1, B2.7.2)	F	3.1.0	3.2.0
T1-000141	34.121	036		R99	New initial conditions for Spurious emission test case (6.8.4.1)	F	3.1.0	3.2.0
T1-000142	34.121	037		R99	C.4.1 UL reference measurement channel for BTFD performance requirement (C.4.1)	F	3.1.0	3.2.0

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

***Document* T1-000131**

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121	**CR**	**019**	Current Version:	3.1.0
3G specification number ↑		*↑ CR number as allocated by 3G support team*		

For submission to TSG: T#9 (*list TSG meeting no. here ↑*)

for approval	X	*(only one box should*
for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 — *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)*

USIM	ME	UTRAN	Core Network
	X		

Source: T1/RF

Date: 2000-08-31

Subject: Editorial corrections for References and Frequency Stability

3G Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change:

- The corresponding clauses 6.3 "Frequency stability" in the core specification TS 25.101 were modified according to the CR 25.101-052.
- The version numbers of core specification TS 25.101 was updated.
- Removal of unnecessary test parameter.

Clauses affected: 2, 5.2, 5.3

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other 2G core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

1 Scope

The present document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain transmitting characteristics, receiving characteristics and performance requirements in FDD mode.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] 3GPP TS 25.101 "UE Radio transmission and reception (FDD)" V3.~~2~~3.1*.

[2] 3GPP TS 25.133 "Requirements for Support of Radio Resource Management (FDD)" V3.1.0*.

[3] 3GPP TS 34.108 "Common Test Environments for User Equipment (UE) Conformance Testing".

[4] 3GPP TS 34.109 "Logical Test Interface; Special conformance testing functions".

[5] 3GPP TS 25.214 "Physical layer procedures (FDD)".

[6] 3GPP TR 21.905 "Vocabulary for 3GPP Specifications".

[7] 3GPP TR 25.990 "Vocabulary".

*<*Editor's Note: The version numbers of the referred core documents are attached in order to avoid the confusion of readers. They will be removed in future because they are not permanent.>*

3 Definitions, symbols, abbreviations and equations

Definitions, symbols, abbreviations and equations used in the present document are listed in TR 21.905 [5] and TR 25.990 [6].

Terms are listed in alphabetical order in this clause.

3.1 Definitions

For the purpose of the present document, the following additional terms and definitions apply:

Average power: *[TBD]*

Maximum average power: average transmitter output power obtained over any specified time interval, including periods with no transmission, when the transmit time slots are at the maximum power setting

Peak Power: The instantaneous power of the RF envelope which is not expected to be exceeded for 99.9% of the time

Table 4.1: UTRA Absolute Radio Frequency Channel Number

Uplink	$N_u = 5 * (F_{uplink}$ MHz)	0.0 MHz ≤ F_{uplink} ≤ 3276.6 MHz where F_{uplink} is the uplink frequency in MHz
Downlink	$N_d = 5 * (F_{downlink}$ MHz)	0.0 MHz ≤ $F_{downlink}$ ≤ 3276.6 MHz where $F_{downlink}$ is the downlink frequency in MHz

5 Transmitter Characteristics

5.1 General

Transmitting performance test of the UE is implemented during communicating with the SS via air interface. The procedure is using normal call protocol until the UE is communicating on traffic channel basically. On the traffic channel, the UE provides special function for testing that is called Logical Test Interface and the UE is tested using this function. (Refer to [4] TS 34.109).

Transmitting or receiving bit/symbol rate for test channel is shown in Table 5.1.

Table 5.1: Bit / Symbol rate for Test Channel

Type of User Information	User bit rate	DL DPCH symbol rate	UL DPCH bit rate	Remarks
12.2 kbps reference measurement channel	12.2 kbps	30 ksps	60 kbps	Standard Test

Unless detailed the transmitter characteristic are specified at the antenna connector of the UE. For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed. Transmitter characteristics for UE(s) with multiple antennas/antenna connectors are FFS.

The UE antenna performance has a significant impact on system performance, and minimum requirements on the antenna efficiency are therefore intended to be included in future versions of this specification. It is recognised that different requirements and test methods are likely to be required for the different types of UE.

All the parameters in clause 5 are defined using the UL reference measurement channel (12.2 kbps) specified in subclause C.2.1 and unless stated otherwise, with the UL power control ON.

The common RF test conditions are defined in Annex E, and each test conditions in this subclause should refer Annex E. An individual test conditions are defined in the paragraph of each test.

5.2 Maximum Output Power

5.2.1 Definition and applicability

The maximum output power and its tolerance are defined according to the Power Class of the UE.

The maximum output power refers to the measure power when averaged over the transmit slot at the maximum power control setting.

For UE using directive antennas for transmission, a class dependent limit will be placed on the maximum Effective Isotropic Radiated Power (EIRP).

The requirements and this test apply to all types of UTRA for the FDD UE.

5.2.2 Conformance requirements

The UE maximum output power shall be within the shown value in Table 5.2.1 even for the multi-code transmission mode.

Table 5.2.1: Maximum Output Power

Power Class	Maximum output power	Tolerance
1	+33 dBm	+1/–3 dB
2	+27 dBm	+1/–3 dB
3	+24 dBm	+1/–3 dB
4	+21 dBm	± 2 dB

The reference for this requirement is [1] TS 25.101 subclause 6.2.1.

5.2.3 Test purpose

To verify that the error of the UE maximum output power does not exceed the prescribed tolerance in Table 5.2.1.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

5.2.4 Method of test

5.2.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.
2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.2.2~~.
3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~**Table 5.2.2: Test parameters for Maximum Output Power**~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	

5.2.4.2 Procedure

1) Set and send continuously Up power control commands to the UE.
2) Measure the output power of the UE by Tester. The output power shall be averaged over the transmit one timeslot.

5.2.5 Test requirements

The error of measured output power, derived in step 2), shall not exceed the prescribed tolerance in Table 5.2.1.

5.3 Frequency Error~~Stability~~

5.3.1 Definition and applicability

The frequency error~~stability~~ is the difference between the RF modulated carrier frequency transmitted from the UE with AFC ON and assigned frequency. The UE transmitter tracks to the RF carrier frequency received from the BS. These signals will have an apparent error due to BS frequency error and Doppler shift. In the later case, signals from the BS must be averaged over sufficient time that errors due to noise or interference are allowed for within the above ±0.1PPM figure.

The UE shall use the same frequency source for both RF frequency generation and the chip clock.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.3.2 Conformance requirements

The UE modulated carrier frequency shall be accurate to within ±0~~,~~.1 ppm compared to the carrier frequency received from the BS.

The reference for this requirement is [1] TS 25.101 subclause 6.3.

5.3.3 Test purpose

To verify that the UE carrier frequency error does not exceed ±0~~,~~.1 ppm.

An excess error of the carrier frequency increases the transmission errors in the up link own channel.

This test verifies the ability of receiver to derive correct frequency information for transmitter.

5.3.4 Method of test

5.3.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.3.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 5.3: Test parameters for Frequency Error~~Stability~~

Parameter	Level / Status	Unit
DPCH_Ec	–117	dBm / 3~~,~~.84 MHz
$\hat{I}_{or}$	–106~~,~~.7	dBm / 3~~,~~.84 MHz
~~Inner Loop Power Control~~	~~Enabled~~	
~~AFC~~	~~ON~~	
~~Modulation~~	~~ON~~	

5.3.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Measure the frequency error delta f, at the UE antenna connector by Tester using Global In-Channel-Tx-test (Annex B). Since counter method leads an incorrect result, EVM method shall be used.

5.3.5 Test requirements

For all measured bursts, the frequency error, derived in step 1), shall not exceed ±0,.1 ppm.

TSG-T WG1 meeting #8

Naantali, Finland, 31st Aug- 1st Sep, 2000

Document ***T1-000132***

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 020 Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG	T#9	for approval	X	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]
(at least one should be marked with an X)

Source: T1/RF **Date:** 2000-08-31

Subject: Corrections for Output Power Dynamics in the Uplink

3G Work item:

Category:				**Release:**		
	F	Correction	X		Phase 2	
	A	Corresponds to a correction in a 2G specification			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:

- The corresponding clause 6.4 "Output power dynamics" in the core specification TS 25.101 were modified according to the CRs 25.101-051 and 054.
- Removal of unnecessary test parameters.

Clauses affected: 5.4

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other 2G core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.4 Output Power Dynamics in the Uplink

Power control is used to limit the interference level.

5.4.1 Open Loop Power Control in the Uplink

5.4.1.1 Definition and applicability

Open loop power control in the uplink is the ability of the UE transmitter to set its output power to a specific value. This function is used for PRACH transmission and based on the information from BS using BCCH and the downlink received signal power level of the PCCPCH. The information from BS includes transmission power of PCCPCH and uplink interference power level.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.4.1.2 Conformance requirements

The UE open loop power is defined as the average power in a timeslot or ON power duration, whichever is available, and they are measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

The UE open loop power control tolerance is given in Table 5.4.1.1.

Table 5.4.1.1: Open loop power control tolerance

Normal conditions	± 9 dB
Extreme conditions	± 12 dB

The reference for this requirement is [1] TS 25.101 subclause 6.4.1.

5.4.1.3 Test purpose

The power of the received signal and the BCCH information control the power of the transmitted signal with the target to transmit at lowest power acceptable for proper communication.

The test stresses the ability of the receiver to measure the received power correctly over the receiver dynamic range.

The test purpose is to verify that the UE open loop power control tolerance does not exceed the described value shown in Table 5.4.1.1.

An excess error of the open loop power control decreases the system capacity.

5.4.1.4 Method of test

This test is also covered by subclause 5.5.2 Transmit ON/OFF Time mask.

5.4.1.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.4.1.2.
The RACH procedure within the call setup is used for the test.

See [3] TS 34.108 for details regarding generic call setup procedure.

Table 5.4.1.2: Test parameters for Open Loop Power Control (UE)

Parameter	Level / Status	Unit
$\hat{I}_{or}$	See Table 5.4.1.3	dBm / 3.84 MHz
~~Inner Loop Power Control~~	~~Disabled~~	

Table 5.4.1.3: Test parameters for Open Loop Power Control (SS)

Parameter	Upper dynamic range	middle	Sensitivity level
$\hat{I}_{or}$ 3)	[–25.0 dBm / 3.84 MHz]	[–65.7 dBm / 3.84 MHz]	[–106.7 dBm / 3.84 MHz]
CPICH_RSCP 3),4)	[–28.3 dBm]	[–69 dBm]	[–110 dBm]
Primary CPICH DL TX power	[+25 dBm]	[+31 dBm]	[+19 dBm]
Simulated path loss = Primary CPICH DL TX power – CPICH_RSCP	[+53.3 dB]	[+100 dB]	[+129 dB]
UL interference	[–75 dB]	[–101 dB]	[–110 dB]
Constant Value	[–10 dB]	[–10 dB]	[–10 dB]
Expected nominal UE TX power	[–31.7 dBm]	[–11 dBm]	[+9 dBm] 2)

NOTE 1: While the SS transmit power shall cover the receiver input dynamic range, the logical parameters: broadcasted transmit power, I_{BTS}, constant factor are chosen to achieve a UE TX power, located within the TX output power dynamic range of a class 4 UE.

NOTE 2: Nominal TX output power 9 dBm allows to check the open loop power algorithm within the entire tolerance range (9 dBm ± 12 dB; 9 dBm + 12 dB = 21 dBm = max power class 4).

NOTE 3: The power level of SCCPCH should be defined because SCCPCH is transmitted instead of DPCH during Preamble RACH transmission period. Currently, it is assumed that Table E.3.1 is utilised for DL physical channel condition. The power level of SCCPCH is temporarily set to the same as DL DPCH. However, it is necessary to check whether the above SCCPCH level is enough to establish a connection with the reference measurement channels.

NOTE 4: The purpose of this parameter is to calculate the Expected nominal UE TX power.

5.4.1.4.2 Procedure

1) Set the TX output level of the SS to obtain $\hat{I}_{or}$ at the UE antenna connector. $\hat{I}_{or}$ shall be according to Table 5.4.1.3 ([–25 dBm / 3.84 MHz]).

2) Measure the RACH output power of the UE according to Annex B.

3) Repeat the above measurement for all SS levels in Table 5.4.1.3.

5.4.1.5 Test requirements

The deviation with respect to the Expected nominal UE TX power (Table 5.4.1.3), derived in step 2), shall not exceed the prescribed tolerance in Table 5.4.1.1.

5.4.2 Inner Loop Power Control in the Uplink

5.4.2.1 Definition and applicability

Inner loop power control in the uplink is the ability of the UE transmitter to adjust its output power in accordance with one or more TPC commands received in the downlink.

The power control step is the change in the UE transmitter output power in response to a single TPC command, TPC_cmd, derived at the UE.

This clause does not cover all the requirements of compressed mode or soft handover.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.4.2.2 Conformance requirements

The UE transmitter shall have the capability of changing the output power with a step size of 1, 2 and 3 dB according to the value of Δ_{TPC} or Δ_{RP-TPC}, in the slot immediately after the TPC_cmd can be derived.

a) The transmitter output power step due to inner loop power control shall be within the range shown in Table 5.4.2.1. The Maximum power threshold is defined as the lowest permissible maximum output power for the UE power class, as defined in Table 5.2.1. The Minimum power threshold is defined as –50 dBm.

b) When the transmitter output power is between the Minimum and Maximum power thresholds, the transmitter average output power step due to inner loop power control shall be within the range shown in Table 5.4.2.2. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of ~~TCP~~ TPC commands of the same duration.

NOTE: 3dB inner loop power control steps are only used in compressed mode.

The inner loop power step is defined as the relative power difference~~s~~ between the average~~d~~ power of the original (reference) timeslot and the average~~d~~ power of the target timeslot ~~without~~, not including the transient duration. ~~(Figure. 5.5, 5.6.1 and 5.6.2) They are~~The transient duration is from 25μs before the slot boundary to 25μs after the slot boundary. The power is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

Table 5.4.2.1: Transmitter power control tolerance

TPC_cmd	Transmitter power control range (all units are in dB)					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+ 1	+0.5	+1.5	+1	+3	+1.5	+4.5
0	–0.5	+0.5	–0.5	+0.5	–0.5	+0.5
– 1	–0.5	–1.5	–1	–3	–1.5	–4.5
+ 1 at or above max power threshold	–0.5	+1.5	–0.5	+3	–0.5	+4.5
– 1 at or below min power threshold	+0.5	–1.5	+0.5	–3	+0.5	–4.5

Table 5.4.2.2: Transmitter average power control tolerance

TPC_cmd group	Transmitter power control range after 10 equal TPC_cmd group (all units are in dB)				Transmitter power control range after 7 equal TPC_cmd groups (all units are in dB)	
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+ 1	+8	+12	+16	+24	+16	+26
0	–1	+1	–1	+1	–1	+1
– 1	–8	–12	–16	–24	–16	–26
0,0,0,0,+1	+6	+14	N/A	N/A	N/A	N/A
0,0,0,0,–1	–6	–14	N/A	N/A	N/A	N/A

The reference for this requirement is [1] TS 25.101 subclause 6.4.2.1.1.

The requirements for the derivation of TPC_cmd are detailed in TS 25.214 subclauses 5.1.2.2.2 and 5.1.2.2.3.

5.4.2.3 Test purpose

- To verify that the UE inner loop power control size and response is meet to the described value shown in subclause 5.4.2.2.

- To verify that TPC_cmd is correctly derived from received TPC commands.

An excess error of the inner loop power control decreases the system capacity.

5.4.2.4 Method of test

5.4.2.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.4.2.3~~. The Uplink DPCH Power Control Info shall specify the Power Control Algorithm as algorithm 2 for interpreting TPC commands.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~Table 5.4.2.3: Test parameters for Inner Loop Power Control~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	

5.4.2.4.2 Procedure

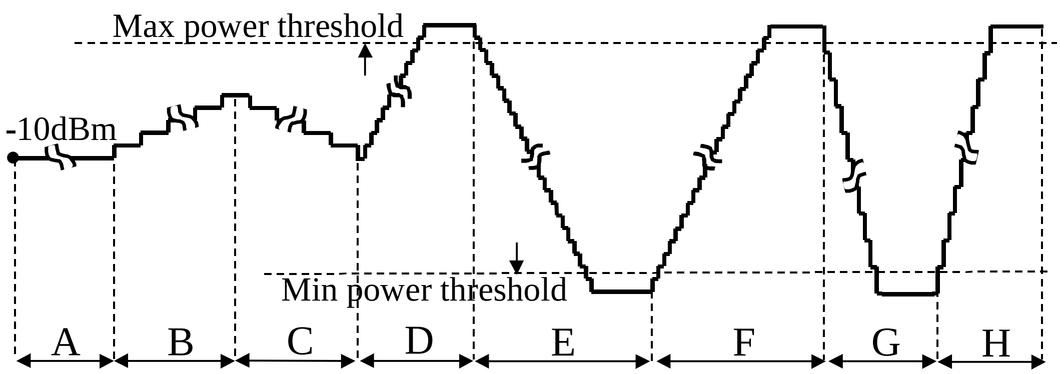


Figure 5.4.2.4 Inner Loop Power Control Test Steps

1) Set the downlink signal ($\hat{I}_{or}$) to yield an open loop output power, measured at the UE antenna connector, of -10±9 dBm.

2) Step A: Transmit a sequence of at least 30 and no more than 60 TPC commands, which shall commence at a frame boundary and last for a whole number of frames, and which shall contain:

   - no sets of 5 consecutive "0" or "1" commands which commence in the 1st, 6th or 11th slots of a frame;

   - at least one set of 5 consecutive "0" commands which does not commence in the 1st, 6th or 11th slots of a frame;

   - at least one set of 5 consecutive "1" commands which does not commence in the 1st, 6th or 11th slots of a frame.

   The following is an example of a suitable sequence of TPC commands:

100000101010101111101000001010101011111010000010101010111110

3) Step B: Transmit a sequence of 50 TPC commands with the value 1.

4) Step C: Transmit a sequence of 50 TPC commands with the value 0.

5) Step D: Reconfigure the uplink channel to set the Power Control Algorithm to algorithm 1, and the TPC step size to 1 dB. Transmit a sequence of 90[1] TPC commands with the value 1.

6) Step E: Transmit a sequence of 150[1] TPC commands with the value 0.

7) Step F: Transmit a sequence of 150[1] TPC commands with the value 1.

8) Step G: Reconfigure the uplink channel to set the TPC step size to 2 dB (with the Power Control Algorithm remaining as algorithm 1). Transmit a sequence of 75[1] TPC commands with the value 0.

9) Step H: Transmit a sequence of 75[1] TPC commands with the value 1.

10) During steps A to H the mean output power of every slot shall be measured, with the following exceptions:

    - In steps D and F, measurement of the output power is not required in slots after the 10th slot after the mean output power has exceeded the maximum power threshold;

    - In steps E and G, measurement of the output power is not required in slots after the 10th slot after the mean output power has fallen below the minimum power threshold.

[1] NOTE: These numbers of TPC commands are given as examples. The actual number of TPC commands transmitted in these steps shall be at least 10 more than the number required to ensure that the UE reaches the relevant maximum or minimum power threshold in each step, as shown in Figure 5.4.2.4.

5.4.2.5 Test requirements

a) During Step A, the difference in mean output power between adjacent slots shall be within the prescribed range for a TPC_cmd of 0, as given in Table 5.4.2.1.

b) During Step A, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of 0, as given in Table 5.4.2.2.

c) During Step B, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1, given that every 5th TPC_cmd should have the value + 1, with a step size of 1 dB, and all other TPC_cmd should have the value 0.

d) During Step B, the change in mean output power over 50 consecutive slots shall be within the prescribed range for a TPC_cmd group of {0,0,0,0,+1}, as given in Table 5.4.2.2.

e) During Step C, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1, given that every 5th TPC_cmd should have the value – 1, with a step size of 1 dB, and all other TPC_cmd should have the value 0.

f) During Step C, the change in mean output power over 50 consecutive slots shall be within the prescribed range for a TPC_cmd group of {0,0,0,0,-1}, as given in Table 5.4.2.2.

g) During Step D, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of + 1 and step size of 1 dB, until the output power reaches (Maximum power threshold – 0.5 dB). When the output power is between the values of (Maximum power threshold – 0.5 dB) and (Maximum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to increase the output power to the Maximum power threshold, but shall not exceed + 1.5 dB. Once the output power is at or above the Maximum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

h) During Step D, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of + 1 and step size of 1 dB as given in Table 5.4.2.2, until the output power reaches (Maximum power threshold – 0.5 dB).

i) During Step E, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of – 1 and step size of 1 dB, until the output power reaches (Minimum power threshold + 0.5 dB). When the output power is between the values of (Minimum power threshold + 0.5 dB) and (Minimum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to decrease the output power to the Minimum power threshold, but shall not exceed – 1.5 dB. Once the output power is at or below the Minimum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

j) During Step E, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of – 1, and step size of 1 dB as given in Table 5.4.2.2, until the output power reaches (Minimum power threshold + 0,5 dB).

k) During Step F, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of + 1 and step size of 1 dB, until the output power reaches (Maximum power threshold – 0,5 dB). When the output power is between the values of (Maximum power threshold – 0,5 dB) and (Maximum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to increase the output power to the Maximum power threshold, but shall not exceed + 1,5 dB. Once the output power is at or above the Maximum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

l) During Step F, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of + 1, and step size of 1 dB as given in Table 5.4.2.2, until the output power reaches (Maximum power threshold – 0,5 dB).

m) During Step G, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of – 1 and step size of 2 dB, until the output power reaches (Minimum power threshold + 1 dB). When the output power is between the values of (Minimum power threshold + 1 dB) and (Minimum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to decrease the output power to the Minimum power threshold, but shall not exceed – 3 dB. Once the output power is at or below the Minimum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

n) During Step G, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of – 1, and step size of 2 dB as given in Table 5.4.2.2, until the output power reaches (Minimum power threshold +1 dB).

o) During Step H, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of + 1 and step size of 2 dB, until the output power reaches (Maximum power threshold –1 dB). When the output power is between the values of (Maximum power threshold –1 dB) and (Maximum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to increase the output power to the Maximum power threshold, but shall not exceed + 3 dB. Once the output power is at or above the Maximum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

p) During Step H, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of + 1, and step size of 2 dB as given in Table 5.4.2.2, until the output power reaches (Maximum power threshold – 1 dB).

5.4.3 Minimum Output Power

5.4.3.1 Definition and applicability

The minimum controlled output power of the UE is when the power control setting is set to a minimum value. This is when both the inner loop and open loop power control indicate a minimum transmit output power is required.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.4.3.2 Conformance requirements

The minimum transmit power is defined as an averaged power in a time slot measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The minimum transmit power shall be better than –50 dBm.

The reference for this requirement is [1] TS 25.101 subclause 6.4.3.1.

5.4.3.3 Test purpose

To verify that the UE minimum transmit power is below –50 dBm.

An excess minimum output power increases the interference to other channels, and decreases the system capacity.

5.4.3.4 Method of test

5.4.3.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.4.3~~.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~Table 5.4.3: Test parameters for Minimum Output Power~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	

5.4.3.4.2 Procedure

1) Set and send continuously Down power control commands to the UE.

2) Measure the output power of the UE by Tester.

5.4.3.5 Test requirements

The measured output power, derived in step 2), shall be below –50 dBm.

5.4.4 Out-of-synchronisation handling of output power

5.4.4.1 Definition and applicability

The UE shall monitor the DPCCH quality in order to detect a loss of the signal on Layer 1, as specified in [5] TS 25.214. The thresholds Q_{out} and Q_{in} specify at what DPCCH quality levels the UE shall shut its power off and when it ~~may turn its transmitter~~shall turn its power on respectively. The thresholds are not defined explicitly, but are defined by the conditions under which the UE shall shut its transmitter off and turn it on, as stated in this clause.

5.4.4.2 Conformance requirements

The parameters in Table 5.4.4.1 are defined using the DL reference measurement channel (12.2 kbps) specified in Annex C.3.1 and with static propagation conditions.

Table 5.4.4.1: DCH parameters for test of Out-of-synch handling

Parameter	Value	Unit
$\hat{I}_{or}/I_{oc}$	–1	dB
I_{oc}	–60	dBm / 3.84 MHz
$\frac{DPDCH\_E_c}{I_{or}}$	See Figure 5.4.4.1: Before point A –16.6 After point A Not defined	dB
$\frac{DPCCH\_E_c}{I_{or}}$	See Figure 5.4.4.1	dB
Information Data Rate	12.2	kbps
TFCI	on	-

The conditions for when the UE shall shut its transmitter off and when it ~~may~~shall turn it on are defined by the parameters in Table 5.4.4.1 together with the DPCH power level as defined in Figure 5.4.4.1.

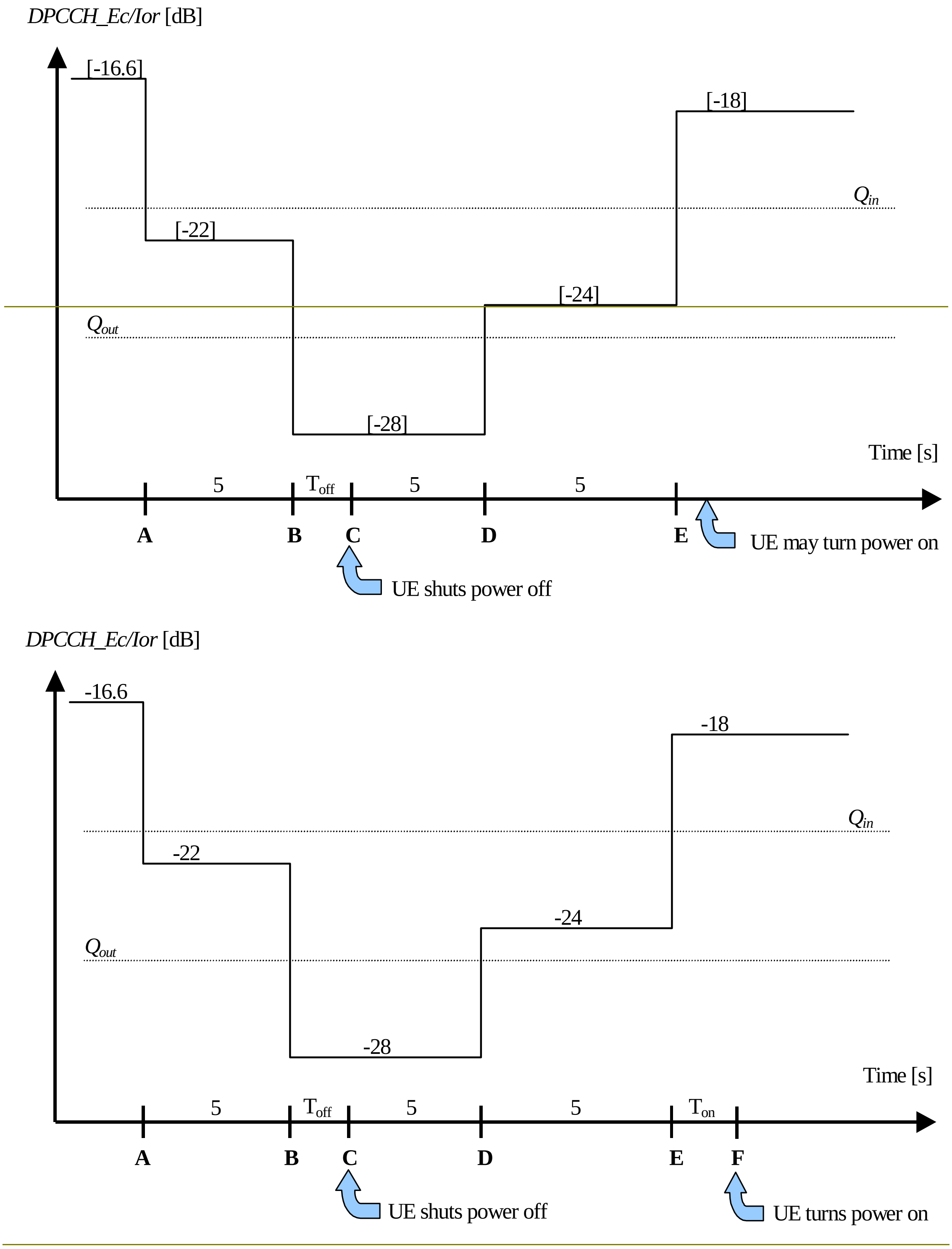


Figure 5.4.4.1: Conditions for out-of-synch handling in the UE. The indicated thresholds Q_{out} and Q_{in} are only informative.

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 ~~Toff~~T_{off} = ~~[~~200~~]~~ ms after point B.
3. The UE shall not turn its transmitter on between points C and E.
4. The UE ~~may~~shall turn its transmitter on before point F, which is T_{on} = 200 ms after point E.

The reference for this requirement is [1] TS 25.101 subclause 6.4.4.1.

5.4.4.3 Test purpose

[TBD]

5.4.4.4 Method of test

5.4.4.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.
2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.4.4.2~~.
3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~Table 5.4.4.2: Test parameters for test of Out-of-synch handling~~

~~Parameter~~	~~Level / Status~~	~~Unit~~

5.4.4.4.2 Procedure

[TBD]

5.4.4.5 Test requirements

[TBD]

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

***Document* T1-000133**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121	**CR**	**021**	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	T#9	for approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [ ]
(at least one should be marked with an X)

Source: T1/RF **Date:** 2000-08-31

Subject: Transients for uplink inner loop power control

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:** Phase 2	
A	Corresponds to a correction in an earlier release		Release 96	
B	Addition of feature		Release 97	
C	Functional modification of feature		Release 98	
D	Editorial modification		Release 99	X
			Release 00	

Reason for change:
- The duration of transient periods has been set in the core specifications.

Clauses affected: 5.4.2.4.2

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.4.2 Inner Loop Power Control in the Uplink

5.4.2.1 Definition and applicability

Inner loop power control in the uplink is the ability of the UE transmitter to adjust its output power in accordance with one or more TPC commands received in the downlink.

The power control step is the change in the UE transmitter output power in response to a single TPC command, TPC_cmd, derived at the UE.

This clause does not cover all the requirements of compressed mode or soft handover.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.4.2.2 Conformance requirements

The UE transmitter shall have the capability of changing the output power with a step size of 1, 2 and 3 dB according to the value of Δ_{TPC} or $\Delta_{RP\text{-}TPC}$, in the slot immediately after the TPC_cmd can be derived.

a) The transmitter output power step due to inner loop power control shall be within the range shown in Table 5.4.2.1. The Maximum power threshold is defined as the lowest permissible maximum output power for the UE power class, as defined in Table 5.2.1. The Minimum power threshold is defined as –50 dBm.

b) When the transmitter output power is between the Minimum and Maximum power thresholds, the transmitter average output power step due to inner loop power control shall be within the range shown in Table 5.4.2.2. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of TCP commands of the same duration.

NOTE: 3dB inner loop power control steps are only used in compressed mode.

The inner loop power is defined as the relative power differences between averaged power of original (reference) timeslot and averaged power of the target timeslot without transient duration. (Figure. 5.5, 5.6.1 and 5.6.2) They are measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

Table 5.4.2.1: Transmitter power control tolerance

TPC_cmd	Transmitter power control range (all units are in dB)					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+ 1	+0.5	+1.5	+1	+3	+1.5	+4.5
0	–0.5	+0.5	–0.5	+0.5	–0.5	+0.5
– 1	–0.5	–1.5	–1	–3	–1.5	–4.5
+ 1 at or above max power threshold	–0.5	+1.5	–0.5	+3	–0.5	+4.5
– 1 at or below min power threshold	+0.5	–1.5	+0.5	–3	+0.5	–4.5

Table 5.4.2.2: Transmitter average power control tolerance

TPC_cmd group	Transmitter power control range after 10 equal TPC_cmd group (all units are in dB)				Transmitter power control range after 7 equal TPC_cmd groups (all units are in dB)	
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+ 1	+8	+12	+16	+24	+16	+26
0	–1	+1	–1	+1	–1	+1
– 1	–8	–12	–16	–24	–16	–26
0,0,0,0,+1	+6	+14	N/A	N/A	N/A	N/A
0,0,0,0,–1	–6	–14	N/A	N/A	N/A	N/A

The reference for this requirement is [1] TS 25.101 subclause 6.4.2.1.1.

The requirements for the derivation of TPC_cmd are detailed in TS 25.214 subclauses 5.1.2.2.2 and 5.1.2.2.3.

5.4.2.3 Test purpose

- To verify that the UE inner loop power control size and response is meet to the described value shown in subclause 5.4.2.2.
- To verify that TPC_cmd is correctly derived from received TPC commands.

An excess error of the inner loop power control decreases the system capacity.

5.4.2.4 Method of test

5.4.2.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.
2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.4.2.3. The Uplink DPCH Power Control Info shall specify the Power Control Algorithm as algorithm 2 for interpreting TPC commands.
3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 5.4.2.3: Test parameters for Inner Loop Power Control

Parameter	Level / Status	Unit
Inner Loop Power Control	Enabled	

5.4.2.4.2 Procedure

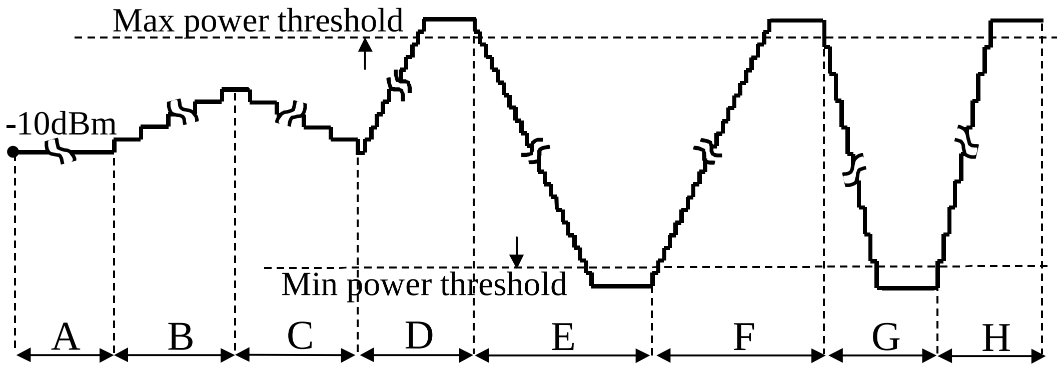


Figure 5.4.2.4 Inner Loop Power Control Test Steps

1) Set the downlink signal ($\hat{I}_{or}$) to yield an open loop output power, measured at the UE antenna connector, of -10±9 dBm.

2) Step A: Transmit a sequence of at least 30 and no more than 60 TPC commands, which shall commence at a frame boundary and last for a whole number of frames, and which shall contain:

   - no sets of 5 consecutive "0" or "1" commands which commence in the 1st, 6th or 11th slots of a frame;

   - at least one set of 5 consecutive "0" commands which does not commence in the 1st, 6th or 11th slots of a frame;

   - at least one set of 5 consecutive "1" commands which does not commence in the 1st, 6th or 11th slots of a frame.

   The following is an example of a suitable sequence of TPC commands:

   1000001010101010111110100000101010101011111010000010101010111110

3) Step B: Transmit a sequence of 50 TPC commands with the value 1.

4) Step C: Transmit a sequence of 50 TPC commands with the value 0.

5) Step D: Reconfigure the uplink channel to set the Power Control Algorithm to algorithm 1, and the TPC step size to 1 dB. Transmit a sequence of 90[1] TPC commands with the value 1.

6) Step E: Transmit a sequence of 150[1] TPC commands with the value 0.

7) Step F: Transmit a sequence of 150[1] TPC commands with the value 1.

8) Step G: Reconfigure the uplink channel to set the TPC step size to 2 dB (with the Power Control Algorithm remaining as algorithm 1). Transmit a sequence of 75[1] TPC commands with the value 0.

9) Step H: Transmit a sequence of 75[1] TPC commands with the value 1.

10) During steps A to H the mean output power of every slot shall be measured, with the following exceptions:

   - In steps D and F, measurement of the output power is not required in slots after the 10th slot after the mean output power has exceeded the maximum power threshold;

- In steps E and G, measurement of the output power is not required in slots after the 10^{th} slot after the mean output power has fallen below the minimum power threshold.

The transient periods of 25µs before each slot boundary and 25µs after each slot boundary shall not be included in the power measurements.

[1] NOTE: These numbers of TPC commands are given as examples. The actual number of TPC commands transmitted in these steps shall be at least 10 more than the number required to ensure that the UE reaches the relevant maximum or minimum power threshold in each step, as shown in Figure 5.4.2.4.

5.4.2.5 Test requirements

a) During Step A, the difference in mean output power between adjacent slots shall be within the prescribed range for a TPC_cmd of 0, as given in Table 5.4.2.1.

b) During Step A, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of 0, as given in Table 5.4.2.2.

c) During Step B, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1, given that every 5^{th} TPC_cmd should have the value + 1, with a step size of 1 dB, and all other TPC_cmd should have the value 0.

d) During Step B, the change in mean output power over 50 consecutive slots shall be within the prescribed range for a TPC_cmd group of {0,0,0,0,+1}, as given in Table 5.4.2.2.

e) During Step C, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1, given that every 5^{th} TPC_cmd should have the value – 1, with a step size of 1 dB, and all other TPC_cmd should have the value 0.

f) During Step C, the change in mean output power over 50 consecutive slots shall be within the prescribed range for a TPC_cmd group of {0,0,0,0,-1}, as given in Table 5.4.2.2.

g) During Step D, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of + 1 and step size of 1 dB, until the output power reaches (Maximum power threshold – 0.5 dB). When the output power is between the values of (Maximum power threshold – 0.5 dB) and (Maximum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to increase the output power to the Maximum power threshold, but shall not exceed + 1.5 dB. Once the output power is at or above the Maximum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

h) During Step D, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of + 1 and step size of 1 dB as given in Table 5.4.2.2, until the output power reaches (Maximum power threshold – 0.5 dB).

i) During Step E, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of – 1 and step size of 1 dB, until the output power reaches (Minimum power threshold + 0.5 dB). When the output power is between the values of (Minimum power threshold + 0.5 dB) and (Minimum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to decrease the output power to the Minimum power threshold, but shall not exceed – 1.5 dB. Once the output power is at or below the Minimum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

j) During Step E, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of – 1, and step size of 1 dB as given in Table 5.4.2.2, until the output power reaches (Minimum power threshold + 0,5 dB).

k) During Step F, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of + 1 and step size of 1 dB, until the output power reaches (Maximum power threshold – 0,5 dB). When the output power is between the values of (Maximum power threshold – 0,5 dB) and (Maximum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to increase the output power to the Maximum power threshold, but shall not exceed + 1,5 dB. Once the output power is at or above the Maximum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

l) During Step F, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of + 1, and step size of 1 dB as given in Table 5.4.2.2, until the output power reaches (Maximum power threshold – 0,5 dB).

m) During Step G, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of – 1 and step size of 2 dB, until the output power reaches (Minimum power threshold + 1 dB). When the output power is between the values of (Minimum power threshold + 1 dB) and (Minimum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to decrease the output power to the Minimum power threshold, but shall not exceed – 3 dB. Once the output power is at or below the Minimum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

n) During Step G, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of – 1, and step size of 2 dB as given in Table 5.4.2.2, until the output power reaches (Minimum power threshold +1 dB).

o) During Step H, the difference in mean output power between adjacent slots shall be within the prescribed range given in Table 5.4.2.1 for a TPC_cmd of + 1 and step size of 2 dB, until the output power reaches (Maximum power threshold –1 dB). When the output power is between the values of (Maximum power threshold –1 dB) and (Maximum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to increase the output power to the Maximum power threshold, but shall not exceed + 3 dB. Once the output power is at or above the Maximum power threshold, the relevant condition in Table 5.4.2.1 shall be met.

p) During Step H, the change in mean output power over 10 consecutive slots shall be within the prescribed range for a TPC_cmd group of + 1, and step size of 2 dB as given in Table 5.4.2.2, until the output power reaches (Maximum power threshold – 1 dB).

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

Document T1-000134
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121	**CR**	**022**	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	T#9	for approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio		Core Network

Source:	T1/RF	**Date:**	2000-08-31
Subject:	Transmit On/Off power		
Work item:			

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:	Changes to core specifications, requiring minor corrections and clarifications to the test.
Clauses affected:	5.5.2.4.2

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

help.doc

<---------- double-click here for help and instructions on how to create a CR.

5.5.2 Transmit ON/OFF Time mask

5.5.2.1 Definition and applicability

The time mask for transmit ON/OFF defines the ramping time allowed for the UE between transmit OFF power and transmit ON power. Possible ON/OFF scenarios are PRACH, CPCH or uplink slotted mode

The requirements and this test apply to all types of UTRA for the FDD UE.

5.5.2.2 Conformance requirements

The transmit power levels versus time should meet the mask specified in Figure 5.5, and the signal is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

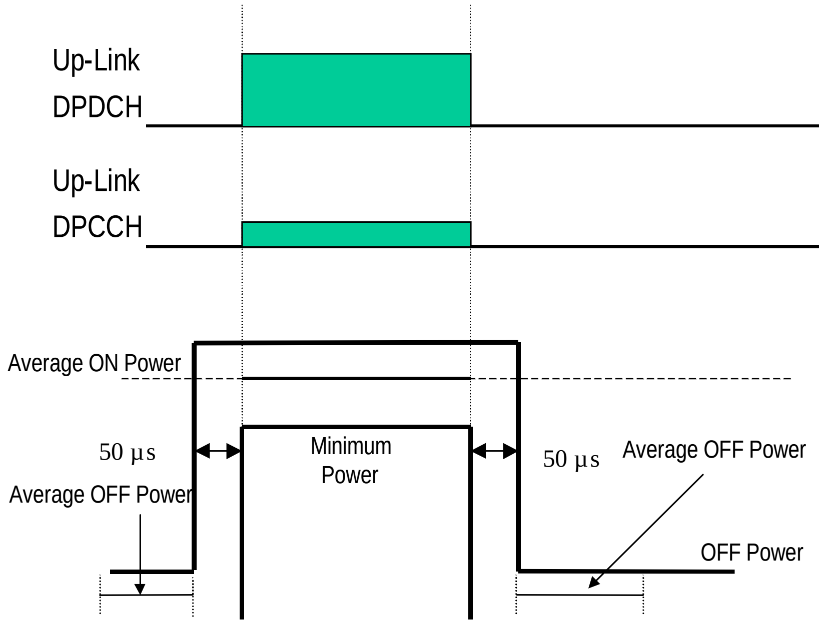


Figure 5.5: Transmit ON/OFF template

OFF Power is defined in 5.5.1.

ON power is defined as either case as follows. The specification depends on each possible case.

- First preamble of PRACH: Open loop accuracy (subclause 5.4.1).
- During preamble ramping of the RACH and compressed mode: Accuracy depending on size of the power step (subclause 5.6).
- Power step to Maximum Power: Maximum power accuracy (subclause 5.2).

The reference for this requirement is [1] TS 25.101 subclause 6.5.2.1.

This is tested using PRACH operation.

The minimum requirement for ON power is defined in subclause 5.4.1.2.

The minimum requirement for OFF power is defined in subclause 5.5.1.2.

5.5.2.3 Test purpose

To verify that the UE transmit ON/OFF power levels versus time meets the described mask shown in Figure 5.5.

An excess error of transmit ON/OFF response increases the interference to other channels, or increases transmission errors in the up link own channel.

5.5.2.4 Method of test

5.5.2.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.5.2.1.

   The RACH procedure within the call setup is used for the test.

See [3] TS 34.108 for details regarding generic call setup procedure.

Table 5.5.2.1: Test parameters for Transmit ON/OFF Time mask (UE)

Parameter	Level / Status	Unit
$\hat{I}_{or}$	See Table 5.5.2.2	dBm / 3.84 MHz
Inner Loop Power Control	Disabled	

Table 5.5.2.2: Test parameters for Transmit ON/OFF Time mask (SS)

Parameter	Upper dynamic range	middle	Sensitivity level
$\hat{I}_{or}$ 3)	[–25.0 dBm / 3.84 MHz]	[–65.7 dBm / 3.84 MHz]	[–106.7 dBm / 3.84 MHz]
CPICH_RSCP 3),4)	[–28.3 dBm]	[–69 dBm]	[–110 dBm]
Primary CPICH DL TX power	[+25 dBm]	[+31 dBm]	[+19 dBm]
Simulated path loss = Primary CPICH DL TX power – CPICH_RSCP	[+53.3 dB]	[+100 dB]	[+129 dB]
UL interference	[–75 dBm]	[–101 dBm]	[–110 dBm]
Constant Value	[–10 dB]	[–10 dB]	[–10 dB]
Expected nominal UE TX power	[–31.7 dBm]	[–11 dBm]	[+9 dBm] 2)

NOTE 1: While the SS transmit power shall cover the receiver input dynamic range, the logical parameters: broadcasted transmit power, I_{BTS}, constant factor are chosen to achieve a UE TX power, located within the TX output power dynamic range of a class 4 UE.

NOTE 2: Nominal TX output power 9 dBm allows to check the open loop power algorithm within the entire tolerance range (9 dBm ± 12 dB; 9dBm + 12dB = 21dBm = max power class 4).

NOTE 3: The power level of SCCPCH should be defined because SCCPCH is transmitted instead of DPCH during Preamble RACH transmission period. Currently, it is assumed that Table E.3.1 is utilised for DL physical channel condition. The power level of SCCPCH is temporarily set to the same as DL DPCH. However, it is necessary to check whether the above SCCPCH level is enough to establish a connection with the reference measurement channels.

NOTE 4: The purpose of this parameter is to calculate the Expected nominal UE TX power.

5.5.2.4.2 Procedure

1) Set the TX output level of the SS to obtain $\hat{I}_{or}$ at the UE antenna connector. $\hat{I}_{or}$ shall be according to Table 5.5.2.2 ([–25 dBm / 3.84 MHz]).

2) Measure the first RACH preamble output power (ON power) of the UE ~~according to Annex B~~. The measurements shall not include the transient periods.

3) Measure the OFF power immediately before and after the first RACH preamble (ON power). The measurements shall not include the ~~except~~ transient periods.

4) Repeat the above measurement for all SS levels in Table 5.5.2.2.

5.5.2.5 Test requirements

The deviation with respect to the Expected nominal UE TX power (Table 5.5.2.2), derived in step 2), shall not exceed the prescribed tolerance in Table 5.4.1.1. (Subclause 5.4.1.2).

The measured leakage power, derived in step 3), shall be below –56 dBm. (Subclause 5.5.1.2).

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

***Document* T1-000135**

e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121	**CR**	**023**	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ — *↑ CR number as allocated by MCC support team*

For submission to:	T#9	for approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio		Core Network	

Source:	T1/RF	**Date:**	2000-08-31
Subject:	Change of TFC		
Work item:			

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:	Changes to core specifications, requiring minor corrections and clarifications to the test.
Clauses affected:	5.6.4.2

Other specs affected:	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:	

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.6 Change of TFC

5.6.1 Definition and applicability

A change of TFC (Transport Format Combination) in uplink means that the power in the uplink varies according to the change in data rate. DTX, where the DPCH is turned off, is a special case of variable data, which is used to minimise the interference between UE(s) by reducing the UE transmit power when voice, user or control information is not present.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.6.2 Conformance requirements

A change of output power is required when the TFC, and thereby the data rate, is changed. The ratio of the amplitude between the DPDCH codes and the DPCCH code will vary. The power step due to a change in TFC shall be calculated in the UE so that the power transmitted on the DPCCH shall follow the inner loop power control. The power step shall then be rounded to the closest integer dB value. The accuracy of the power step, given the step size is specified in Table 5.6.1. The power change by TFC is defined as the relative power differences between the averaged power of original (reference) timeslot and the averaged power of target timeslot without transient duration. And they are measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

Table 5.6.1: Transmitter power step tolerance

Power control step size (Up or down) ΔP [dB]	Transmitter power step tolerance
1	+/– 0.5 dB
2	+/– 1.0 dB
3	+/– 1.5 dB
$4 \le \Delta P \le 10$	+/– 2 dB
$11 \le \Delta P \le 15$	+/– 3 dB
$16 \le \Delta P \le 20$	+/– 4 dB
$21 \le \Delta P$	+/– 6 dB

Clause C.2.1 defines the UL reference measurement channels (12,2 kbps) for TX test and the power ratio between DPCCH and DPDCH as –6 dB. Therefore, only one power control step size is selected as minimum requirement from Table 5.6.1. The accuracy of the power step, given the step size is specified in Table 5.6.2.

Table 5.6.2: Transmitter power step tolerance for test

Quantized amplitude ratios β_c and β_d	Power control step size (Up or down) ΔP [dB]	Transmitter power step tolerance
$\beta_c = 0.5333$, $\beta_d = 1.0$	7	+/– 2 dB

The transmit power levels versus time should meet the mask specified in Figure 5.6.1. When power increases the power step shall be performed before the frame boundary, when power decreases the power step shall be performed after the frame boundary.

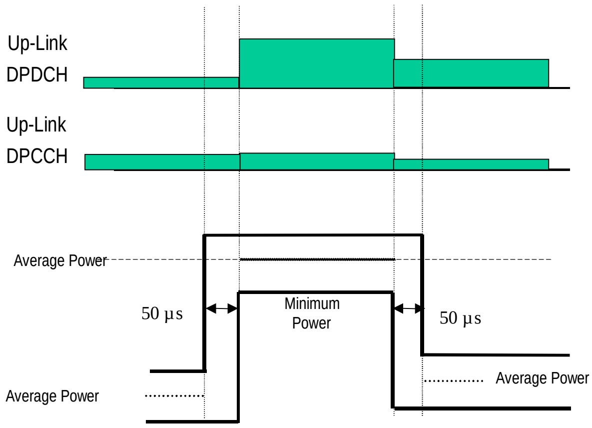


Figure 5.6.1: Transmit template during TFC change

The UL reference measurement channel (12.2 kbps) is fixed rate channel. Therefore, DTX, where the DPDCH is turned off, is tested, as shown in Figure 5.6.2.

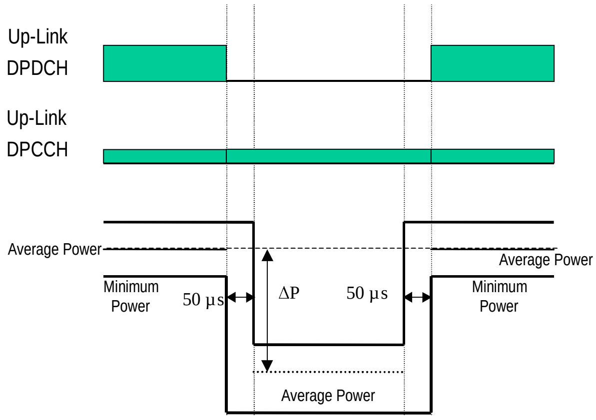


Figure 5.6.2: Transmit template during DTX

The reference for this requirement is [1] TS 25.101 subclause 6.5.3.1.

5.6.3 Test purpose

To verify that the tolerance of power control step size does not exceed the described value shown in Table 5.6.2.

To verify that the DTX ON/OFF power levels versus time meets the described mask shown in Figure 5.6.2.

5.6.4 Method of test

5.6.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Annex E. The Uplink DPCH Power Control Info shall specify the Power Control Algorithm as algorithm 2 for interpreting TPC commands.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

5.6.4.2 Procedure

1) Set the attenuation in the downlink signal ($\hat{I}_{or}$) to yield an open loop output power, measured at the UE antenna connector, of 0 dBm.

2) Send alternating “0” and “1” TPC commands in the downlink so as to satisfy the condition of obtaining TPC_cmd = 0.

3) Using the Tester, Mmeasure the average output power at the antenna connector of the UE by Tester in two cases, both DPDCH and DPCCH are ON and only DPCCH is ON. The measurements shall not include the transient periods.

5.6.5 Test requirements

The difference in mean output power between DPDCH ON and OFF, derived in step 3), shall not exceed the prescribed range in Table 5.6.2.

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

Document ***T1-000136***
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121	**CR**	**032**	Current Version: 3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to:	T#9	for approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG   *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [ ]
(at least one should be marked with an X)

Source: T1/RF   **Date:** 2000-08-31

Subject: Corrections for power setting in uplink compressed mode

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: Changes to core specifications, and simplification of the test.

Clauses affected: 5.7

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.7 Power setting in uplink compressed mode

5.7.1 Definition and applicability

Compressed mode in uplink means that the power in uplink is changed.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.7.2 Conformance requirements

A change of output power is required during uplink compressed frames since the transmission of data is performed in a shorter interval. The ratio of the amplitude between the DPDCH codes and the DPCCH code will also vary. The power step due to compressed mode shall be calculated in the UE so that the energy transmitted on the pilot bits during each transmitted slot shall follow the inner loop power control. Thereby the power step during the transmitted part of a compressed frame shall be such that the power on the DPCCH follows the inner loop power control with an additional power offset during a compressed frame of Npilot,N / Npilot,C where Npilot,C is the number of pilot bits per slot when in compressed mode, and Npilot,N is the number of pilot bits per slot in normal mode.

In addition to any power change due to the ratio $N_{pilot,N}$ / $N_{pilot,C}$, the average power in the first slot after a compressed mode transmission gap shall differ from the average power in the last slot before the transmission gap by an amount Δ_{RESUME}, where Δ_{RESUME} is calculated as described in subclause 5.1.2.3 of [5] TS 25.214.

The combined power step shall then be rounded to the closest integer dB value. The accuracy of the power step, given the step size is specified in Table 5.6.1 in paragraph 5.6.2. The power step is defined as the relative power differences between the average power of original (reference) timeslot and the averaged power of target timeslot. During the compress mode, the average should be done in only either power ON duration. The relative power is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

The transmit power levels versus time shall meet the mask specified in Figure 5.7.1. When power increases the power step shall be performed before the actual slot boundary, when power decreases the power step shall be performed after the actual slot boundary.

The reference for this requirement is [1] TS 25.101 subclause 6.5.4.1.

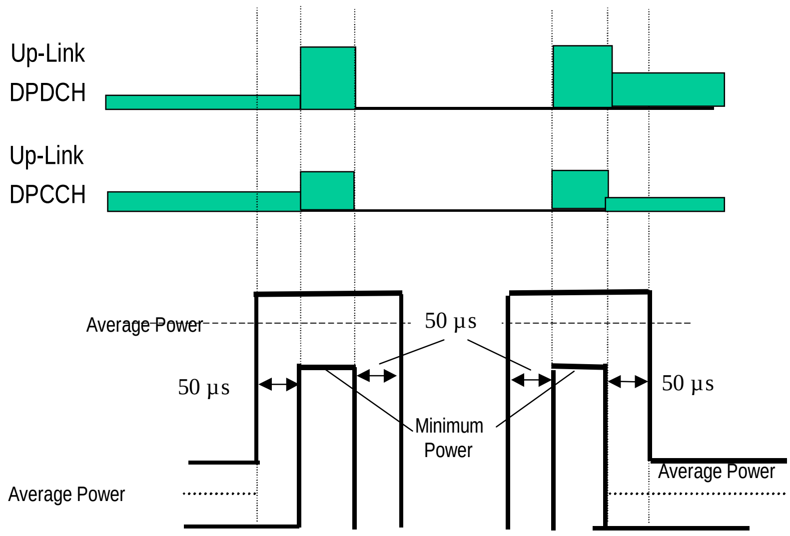


Figure 5.7.1: Transmit template during Compressed mode

The mean power in the transmission gaps, not including the ~~50 µs~~ transition periods, shall be less than –56 dBm. The reference for this requirement is [1] TS 25.101 subclause 6.5.1.1.

For RPL (Recovery Period Length) slots after the transmission gap, where RPL is the minimum out of the transmission gap length and 7 slots, the UE shall use the power control algorithm and step size specified by the signalled Recovery Period Power Control Mode (RPP), as detailed in TS 25.214 subclause 5.1.2.3.

When nominal 3 dB power control steps are used in the recovery period, the transmitter output power steps due to inner loop power control shall be within the range shown in Table 5.7.2, and the transmitter average output power step due to inner loop power control shall be within the range shown in Table 5.7.3, excluding any other power changes due, for example, to changes in spreading factor or number of pilot bits.

Table 5.7.2: Transmitter power control range for 3dB step size

TPC_cmd	Transmitter power control range for 3dB step size	
	Lower	Upper
+ 1	+1.5 dB	+4.5 dB
0	–0.5 dB	+0.5 dB
– 1	–1.5 dB	–4.5 dB

Table 5.7.3: Transmitter average power control range for 3dB step size

TPC_cmd group	Transmitter power control range after 7 equal TPC_cmd groups	
	Lower	Upper
+ 1	+16 dB	+26 dB
0	–~~2~~ 1 dB	+~~2~~ 1 dB
– 1	–16 dB	–26 dB

The reference for this requirement is [1] TS 25.101 subclause 6.4.2.1.1.

5.7.3 Test purpose

To verify that the changes in uplink transmit power in compressed mode are within the prescribed tolerances.

Excess error in transmit power setting in compressed mode increases the interference to other channels, or increases transmission errors in the uplink.

5.7.4 Method of test

5.7.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.7.4. The 12.2 kbps UL reference measurement channel is used, with gain factors β_c = 0.5333 and β_d = 1.0 in non-compressed frames. Slot formats 0, 0A and 0B are used on the uplink DPCCH.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 5.7.4: Test parameters for Power Setting in Uplink Compressed Mode

Parameter	Level / Status	Unit
Inner Loop Power Control	Enabled	

5.7.4.2 Procedure

~~*<Editor's Note: The following procedure and test requirements are still under discussion. This might not be consistent with the core specification TS25.101 until the next revision.>*~~

NOTE: CFNs are given in this procedure for reference as examples only. A fixed offset may be applied to the CFNs.

(1) ~~1)~~ Set the attenuation in the downlink signal (Îor) to yield an open loop output power, measured at the UE antenna connector, of –~~10~~ 34±9 dBm at the start of the test.

(2) ~~2)~~ Signal the uplink power control parameters to use Algorithm 1 and a step size of 2 dB.

~~3) Use Slot Format #0 on the uplink DPCCH.~~

(3) ~~4) During the time period between CFN #57 and CFN #253, s~~Signal the ~~following~~ sets of compressed mode parameters shown in Table 5.7.5. ~~These~~ This sets of compressed mode parameters defines ~~5~~ the compressed mode patterns which ~~are~~ is used ~~for the~~to test ~~between CFN #254 and CFN #56~~the implementation of 3dB output power steps and the implementation of a power change when resuming transmission after a compressed mode gap.

Table 5.7.5: Parameters for pattern A for compressed mode test

Parameter	Meaning	Value
TGPRC	Number of transmission gap patterns within the Transmission Gap Pattern Sequence	1
TGCFN	Connection Frame Number of the first frame of the first pattern within the Transmission Gap Pattern Sequence	0
TGSN	Slot number of the first transmission gap slot within the TGCFN	10
TGL1	Length of first transmission gap within the transmission gap pattern	10 slots
TGL2	Length of second transmission gap within the transmission gap pattern	5 slots
TGD	Duration between the starting slots of two consecutive transmission gaps within a transmission gap pattern	20 slots
TGPL1	Duration of transmission gap pattern 1	3 frames
TGPL2	Duration of transmission gap pattern 2	Omit
RPP	Recovery Period Power Control Mode	Mode 1
ITP	Initial Transmit Power Mode	Mode 1
UL/DL Mode	Defines whether only DL, only UL, or combined UL/DL compressed mode is used	UL/DL
Downlink Compressed Mode Method	Method for generating downlink compressed mode gap	SF/2
Uplink Compressed Mode Method	Method for generating uplink compressed mode gap	SF/2
Scrambling code change	Indicates whether the alternative scrambling code is used	No code change
Downlink frame type	Downlink compressed frame structure	A
DeltaSIR	Delta in DL SIR target value to be set in the UE during compressed frames	0
DeltaSIRafter	Delta in DL SIR target value to be set in the UE one frame after the compressed frames	0

The resulting compressed mode pattern is shown in Figure 5.7.2.

~~**Pattern A**~~

~~This set of compressed mode parameters results in a set of 5 uplink frames in which the first 2 frames are compressed, with a 10-slot transmission gap beginning at the 11th slot of the first compressed frame, as shown in Figure 5.7.2.~~

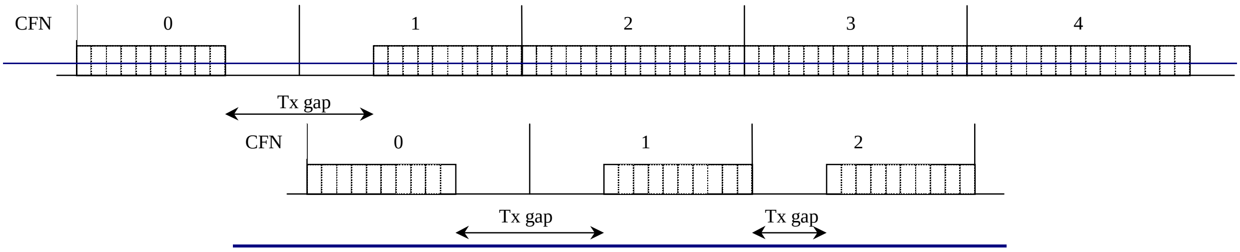


Figure 5.7.2: Pattern A for compressed mode test

(4) Transmit TPC commands on the downlink as shown in Table 5.7.6:

Table 5.7.6: TPC commands transmitted in downlink

CFN	TPC commands in downlink
0	1 1 1 1 1 1 1 1 1 1 - - - - -
1	- - - - - 1 1 1 1 1 1 1 1 0 0
2	- - - - - 0 1 0 1 0 1 0 1 0 1

(5) Measure the mean output power in the following slots, not including the 25µs transient periods at the start and end of each slot:

CFN 1: Slots # 5,6,7,8,9,10,11,12,14
CFN 2: Slot # 5

Also measure the mean output power in each transmission gap, not including the 25µs transient periods at the start and end of each transmission gap.

(6) Re-start the test, setting the attenuation in the downlink signal (Îor) to yield an open loop output power, measured at the UE antenna connector, of 3±9 dBm.

(7) Repeat steps (2), (3) and (4) above, with the exception that TGCFN = 3.

(8) Transmit TPC commands on the downlink as shown in Table 5.7.7:

Table 5.7.7: TPC commands transmitted in downlink

CFN	TPC commands in downlink
3	0 0 0 0 0 0 0 0 0 0 - - - - -
4	- - - - - 0 0 0 0 0 0 0 0 1 1
5	- - - - - 1 0 1 0 1 0 1 0 1 0

(9) Measure the mean output power in the following slots, not including the 25µs transient periods at the start and end of each slot:

CFN 4: Slots # 5,6,7,8,9,10,11,12,14
CFN 5: Slot # 5

Also measure the mean output power in each transmission gap, not including the 25µs transient periods at the start and end of each transmission gap.

(10) Re-start the test, setting the attenuation in the downlink signal (Îor) to yield an open loop output power, measured at the UE antenna connector, of –10±9 dBm.

(11) Signal the uplink power control parameters to use Algorithm 1 and a step size of 1 dB.

(12) Signal the set of compressed mode parameters shown in Table 5.7.8. This set of compressed mode parameters defines the compressed mode pattern which is used to test the implementation of power steps at the start and end of

compressed frames, and the implementation of a zero power change when resuming transmission after a compressed mode gap.

Table 5.7.8: Parameters for pattern B for compressed mode test

Parameter	Meaning	Value
TGPRC	Number of transmission gap patterns within the Transmission Gap Pattern Sequence	1
TGCFN	Connection Frame Number of the first frame of the first pattern within the Transmission Gap Pattern Sequence	7
TGSN	Slot number of the first transmission gap slot within the TGCFN	8
TGL1	Length of first transmission gap within the transmission gap pattern	14 slots
TGL2	Length of second transmission gap within the transmission gap pattern	omit
TGD	Duration between the starting slots of two consecutive transmission gaps within a transmission gap pattern	0
TGPL1	Duration of transmission gap pattern 1	4 frames
TGPL2	Duration of transmission gap pattern 2	Omit
RPP	Recovery Period Power Control Mode	Mode 0
ITP	Initial Transmit Power Mode	Mode 0
UL/DL Mode	Defines whether only DL, only UL, or combined UL/DL compressed mode is used	UL/DL
Downlink Compressed Mode Method	Method for generating downlink compressed mode gap	SF/2
Uplink Compressed Mode Method	Method for generating uplink compressed mode gap	SF/2
Scrambling code change	Indicates whether the alternative scrambling code is used	No code change
Downlink frame type	Downlink compressed frame structure	A
DeltaSIR	Delta in DL SIR target value to be set in the UE during compressed frames	0
DeltaSIRafter	Delta in DL SIR target value to be set in the UE one frame after the compressed frames	0

The resulting compressed mode pattern is shown in Figure 5.7.3.This is used to test the implementation of PRM = 0 and PCM = 0.

Parameter	Value
TGL	10 slots
CFN	0
SN	10
TGP1	5 frames
TGD	0
PD	5 frames
PCM	0
PRM	0
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

Pattern B

This set of compressed mode parameters results in a series of 10 sets of 3 frames in which the first 2 frames in each set are compressed, with a 10-slot transmission gap beginning at the 11th slot of the first compressed frame.

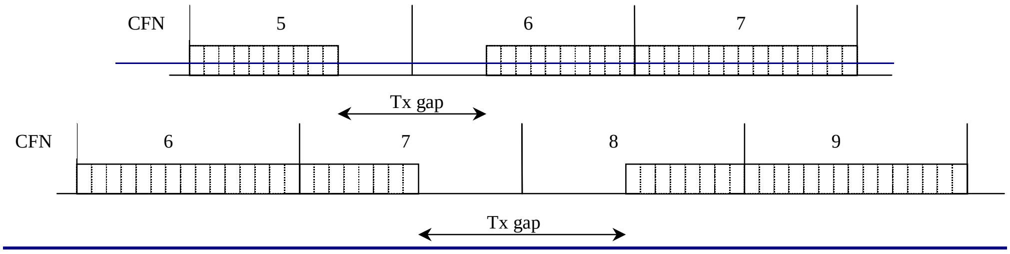


Figure 5.7.3: Pattern B for compressed mode test

(13) Transmit TPC commands on the downlink as shown in Table 5.7.8:

Table 5.7.8: TPC commands transmitted in downlink

CFN	TPC commands in downlink
6	0 0 0 0 0 0 0 0 0 0 0 0 1 1 1
7	1 1 1 1 1 1 1 1 - - - - - - -
8	- - - - - - - 0 0 0 0 0 0 0 0
9	0 0 0 1 1 1 1 1 1 1 1 1 1 1 1

(14) Measure the mean output power in the following slots, not including the 25µs transient periods at the start and end of each slot:

CFN 6: Slot # 14
CFN 7: Slots # 0 and 7
CFN 8: Slots # 7 and 14
CFN 9: Slot # 0

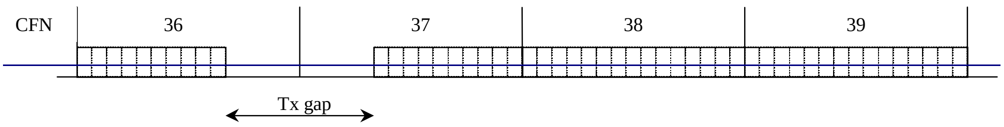
Also measure the mean output power in the transmission gap, not including the 25µs transient periods at the start and end of the transmission gap.

~~This is used to test the implementation of 3dB output power steps and PCM = 1.~~

~~Parameter~~	~~Value~~
~~TGL~~	~~10 slots~~
~~CFN~~	~~5~~
~~SN~~	~~10~~
~~TGP1~~	~~3~~
~~TGD~~	~~0~~
~~PD~~	~~30~~
~~PCM~~	~~1~~
~~PRM~~	~~0~~
~~UL/DL Mode~~	~~UL/DL~~
~~Compressed Mode Method~~	~~SF/2~~
~~Scrambling code change~~	~~No code change~~
~~Downlink frame type~~	~~A~~
~~DeltaSIR~~	~~0~~
~~DeltaSIRafter~~	~~0~~

~~Pattern C~~

~~This set of compressed mode parameters results in 4 sets of 4 frames in which the first 2 frames in each set are compressed, with a 10-slot transmission gap beginning at the 11th slot of the first compressed frame.~~



~~Figure 5.7.4: Pattern C for compressed mode test~~

This is used to test the implementation of PRM = 1.

Parameter	Value
TGL	10 slots
CFN	36
SN	10
TGP1	4
TGD	0
PD	16
PCM	0
PRM	1
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

Pattern D

This set of compressed mode parameters results in a set of 2 frames in which the first frame is compressed, with a 4 slot transmission gap beginning in the 1st slot of the compressed frame.

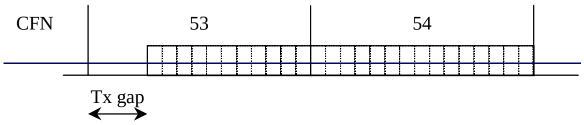


Figure 5.7.5: Pattern D for compressed mode test

This is used to test the implementation of a transmission gap at the start of a frame.

Parameter	Value
TGL	4 slots
CFN	53
SN	0
TGP1	2
TGD	0
PD	2
PCM	0
PRM	1
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

Pattern E

This set of compressed mode parameters results in a set of 2 frames in which the first frame is compressed, with a 4 slot transmission gap beginning at the 12th slot of the compressed frame.

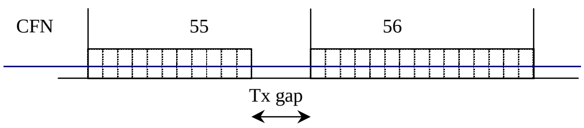


Figure 5.7.6: Pattern E for compressed mode test

This is used to test the implementation of a transmission gap at the end of a frame.

Parameter	Value
TGL	4 slots
CFN	55
SN	11
TGP1	2
TGD	0
PD	2
PCM	0
PRM	1
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

5) Transmit TPC commands on the downlink as follows:

CFN	TPC commands in downlink	Compressed Mode Pattern
254 (and all previous even-numbered CFNs)	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
255 (and all previous odd-numbered CFNs)	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
0	0 1 1 1 1 1 1 1 1 1 - - - - -	A
1	- - - - - 0 0 0 0 0 0 0 0 0 1	
2	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
3	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
4	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
5, 8, 11, 14, 17	1 1 1 1 1 1 1 1 1 1 - - - - -	B
6, 9, 12, 15, 18	- - - - - 0 0 0 0 0 0 0 1 0 1	
7, 10, 13, 16, 19	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
20	1 0 1 0 1 0 1 0 1 0 - - - - -	
23, 26, 29, 32	0 0 0 0 0 0 0 0 0 0 - - - - -	
21, 24, 27, 30, 33	- - - - - 1 1 1 1 1 1 1 0 1 0	
22, 25, 28, 31, 34	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
35	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
36	1 0 0 0 0 0 0 0 0 0 - - - - -	C
37	- - - - - 1 1 1 0 1 0 1 0 1 0	
38	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
39	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
40	1 0 0 0 0 0 0 0 0 0 - - - - -	
41	- - - - - 0 0 0 0 0 0 0 1 0 1	
42	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
43	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
44, 48	0 1 1 1 1 1 1 1 1 1 - - - - -	
45, 49	- - - - - 0 0 0 1 0 1 0 1 0 1	
46, 50	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
47, 51	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
52	1 1 1 1 1 1 0 1 0 1 0 1 0 1 0	
53	- - - - 0 1 0 1 0 1 0 1 0 1 0	D
54	1 0 1 0 1 0 1 0 1 0 1 1 1 1 1	
55	1 1 0 1 0 1 0 1 0 1 0 - - - -	E
56	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	

6) Measure the mean output power in every slot (not including 50 µs transition periods) which is:

- the last slot before a compressed frame; *or*
- the first slot in a compressed frame; *or*
- the last slot before a transmission gap; *or*
- the first slot after a transmission gap; *or*
- the last slot of a compressed frame; *or*
- the first slot after a compressed frame.

~~Measure the mean output power in every uplink transmission gap (not including 50 µs transition periods).~~

5.7.5 Test requirements

For ease of reference, the following uplink output power measurements are defined in Figure 5.7.~~7~~4. In this figure:

- ~~P_i~~ P_g is the mean power in ~~the~~ an uplink transmission gap, excluding the ~~50~~ 25 µs transient periods.

~~When the transmission gap is not at the beginning of a compressed frame:~~

- P_a is the mean power in the last slot before ~~the~~ a compressed frame (or pair of compressed frames), excluding the ~~50~~ 25 µs transient periods.

- P_b is the mean power in the first slot of ~~the~~ a compressed frame, excluding the 25 µs transient periods.

- P_c is the mean power in the last slot before ~~the~~ a transmission gap, excluding the 25 µs transient periods.

~~When the transmission gap is not at the end of a compressed frame:~~

- P_d is the mean power in the first slot after ~~the~~ a transmission gap, excluding the 25 µs transient periods.

- P_e is the mean power in the last slot of ~~the~~ a compressed frame, excluding the 25 µs transient periods.

- P_f is the mean power in the first slot after ~~the~~ a compressed frame (or pair of compressed frames), excluding the ~~50~~ 25 µs transient periods.

~~When the transmission gap is at the beginning of the compressed frame:~~

~~- P_g is the mean power in the last slot before the compressed frame.~~

~~When the transmission gap is at the end of the compressed frame:~~

~~- P_h is the mean power in the first slot after the compressed frame.~~

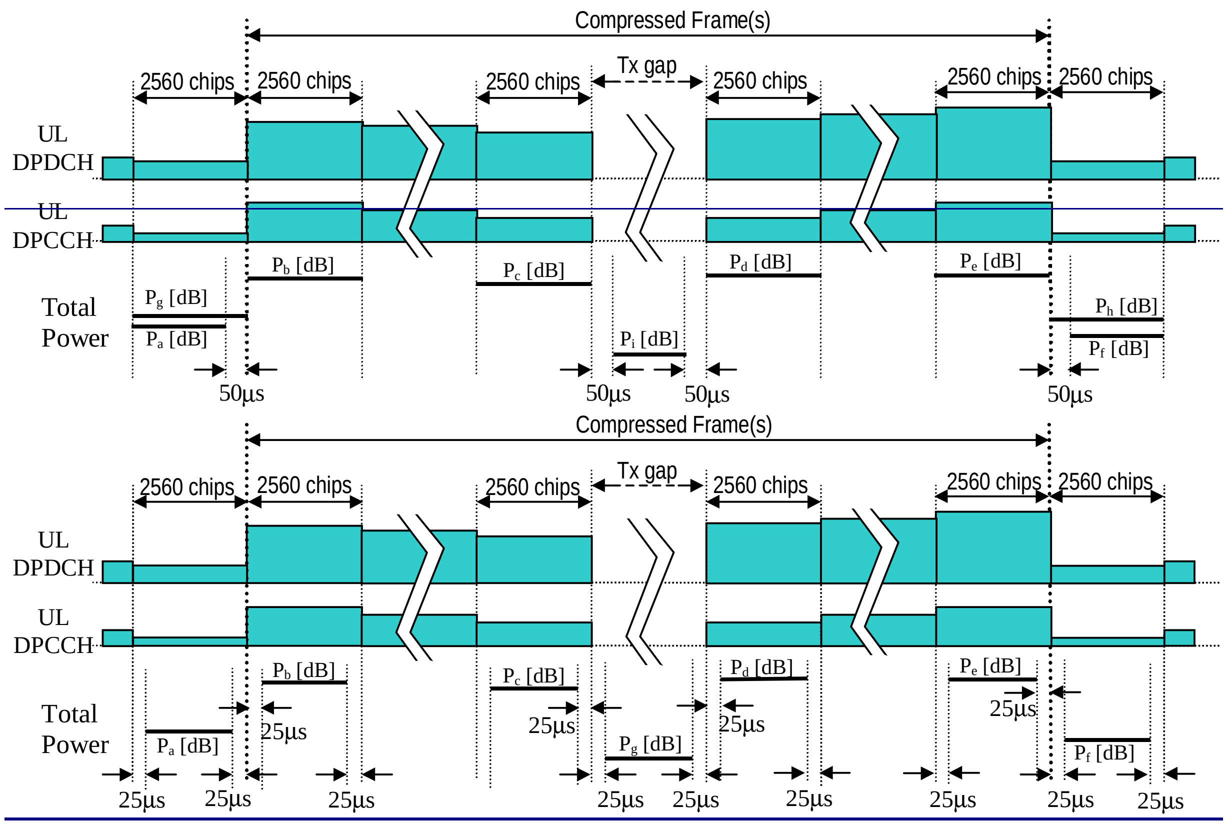


Figure 5.7.~~7~~4: Uplink transmit power in uplink compressed mode

1. At the boundary between CFN 6 and CFN 7, $P_b – P_a$ shall be within the range +4 ± 2 dB.
2. In slot #5 of CFN 2, the power difference $P_d – P_c$ from the power in slot #14 of CFN 1 shall be within the range -6 ± 3 dB.
3. In slot #5 of CFN 5, the power difference $P_d – P_c$ from the power in slot #14 of CFN 4 shall be within the range +6 ± 3 dB.
4. In slot #7 of CFN 8, the power difference $P_d – P_c$ from the power in slot #7 of CFN 7 shall be within the range 0 ± 3 dB.
5. In CFNs 0, 1, 2, 3, 4, 5, 7 and 8, P_g shall be less than –56 dBm.
6. At the boundary between CFN 8 and CFN 9, $P_f – P_e$ shall be within the range -4 ± 2 dB.
7. In the slots between slot #6 of CFN 1 and slot #12 of CFN 1 inclusive, the change in mean output power from the previous slot shall be within the range given in Table 5.7.2 for TPC_cmd = +1.
8. The aggregate change in mean output power from slot #5 of CFN 1 to slot #12 of CFN 1 shall be within the range given in Table 5.7.3 for TPC_cmd = +1.
9. In the slots between slot #6 of CFN 4 and slot #12 of CFN 4 inclusive, the change in mean output power from the previous slot shall be within the range given in Table 5.7.2 for TPC_cmd = -1.
10. The aggregate change in mean output power from slot #5 of CFN 4 to slot #12 of CFN 4 shall be within the range given in Table 5.7.3 for TPC_cmd = -1.

1. In CFNs 0, 23, 26, 29, 32, 44 and 48, $P_b – P_a$ should be within the range 4 ± 2 dB.
2. In CFNs 5, 8, 11, 14, 17, 20, 36 and 40 $P_b – P_a$ should be within the range 0 ± 0.5 dB.
3. In CFNs 1, 6, 9, 12, 15, 18, 21, 24, 27, 30 and 33, $P_d – P_c$ should be within the range 0 ± 0.5 dB.
4. In CFNs 0, 1, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18, 20, 21, 23, 24, 26, 27, 29, 30, 32, 33, 36, 37, 40, 41, 44, 45, 48, 49, 53 and 55, P_i should be less than –56 dBm.
5. In CFNs 2, 7, 10, 13, 16, 19, 42, 46 and 50, $P_f – P_e$ should be within the range 0 ± 0.5 dB.
6. In CFNs 22, 25, 28, 31, 34, 38 and 54, $P_f – P_e$ should be within the range – 4 ± 2 dB.
7. In slots 5-12 of CFN 1, the difference in mean output power between adjacent slots should be within the range given in Table 5.4.2.1 for TPC_cmd = –1 with a 2 dB step size.
8. In slots 5-12 of CFNs 6, 9, 12, 15 and 18, the difference in mean output power between adjacent slots should be within the range given in Table 5.7.2 for TPC_cmd = –1.
9. In slots 5-12 of CFNs 6, 9, 12, 15 and 18, the change in mean output power over the 7 slots should be within the range given in Table 5.7.3 for TPC_cmd = –1.
10. In slots 5-12 of CFNs 21, 24, 27, 30 and 33, the difference in mean output power between adjacent slots should be within the range given in Table 5.7.2 for TPC_cmd = 1.
11. In slots 5-12 of CFNs 21, 24, 27, 30 and 33, the change in mean output power over the 7 slots should be within the range given in Table 5.7.3 for TPC_cmd = –1.
12. In CFN 37, $P_d – P_c$ should be within the range +12 ± 3 dB.
13. In CFN 41, $P_d – P_c$ should be within the range +13 ± 3 dB.
14. In CFN 45, $P_d – P_c$ should be within the range –12 ± 3 dB.
15. In CFN 49, $P_d – P_c$ should be within the range –13 ± 3 dB.
16. In CFN 53, $P_d – P_g$ should be within the range –3 ± 1.5 dB.
17. In CFN 55, $P_b – P_a$ should be within the range +4 ± 2 dB.

18. In CFN 56, $P_h - P_c$ should be within the range -6 ± 2 dB.

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

Document T1-000137
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 034 Current Version: 3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: T #9
list expected approval meeting # here ↑

for approval	X	strategic		*(for SMG use only)*
for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [ ]
(at least one should be marked with an X)

Source: T1/RF **Date:** 2000-08-31

Subject: Corrections to clause 5.8, 5.9, 5.10, 5.11 and 5.12

Work item:

Category:
(only one category shall be marked with an X)

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: Unnecessary test parameters and their related descriptions should be removed.

Clauses affected: 5.8, 5.9, 5.10, 5.11, 5.12

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

help.doc

<---------- double-click here for help and instructions on how to create a CR.

5.8 Occupied Bandwidth (OBW)

5.8.1 Definition and applicability

Occupied bandwidth is a measure of the bandwidth containing 99 % of the total integrated power of the transmitted spectrum, centred on the assigned channel frequency.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.8.2 Conformance requirements

The occupied channel bandwidth shall be less than 5 MHz based on a chip rate of 3.84 Mcps.

The reference for this requirement is [1] TS 25.101 subclause 6.6.1.

5.8.3 Test purpose

To verify that the UE occupied channel bandwidth is less than 5 MHz based on a chip rate of 3.84 Mcps.

Excess occupied channel bandwidth increases the interference to other channels or to other systems.

5.8.4 Method of test

5.8.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.8.1~~.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~Table 5.8.1: Test parameters for Occupied Bandwidth~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	
~~DTX mode~~	~~Off~~	

5.8.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Measure the power spectrum distribution within two times or more range over the requirement for Occupied Bandwidth specification centring on the current carrier frequency with 30 kHz or less RBW. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter).

3) Calculate the total power within the range of all frequencies measured in '2)' and save this value as "Total Power".

4) Sum up the power upward from the lower boundary of the measured frequency range in '2)' and seek the limit frequency point by which this sum becomes 0.5 % of "Total Power" and save this point as "Lower Frequency".

5) Sum up the power downward from the upper boundary of the measured frequency range in '2)' and seek the limit frequency point by which this sum becomes 0.5 % of "Total Power" and save this point as "Upper Frequency".

Calculate the difference ("Upper Frequency" − "Lower Frequency" = "Occupied Bandwidth") between two limit frequencies obtained in '4)' and '5)'.

5.8.5 Test requirements

The measured Occupied Bandwidth, derived in step 6), shall not exceed 5 MHz.

5.9 Spectrum emission mask

5.9.1 Definition and applicability

The spectrum emission mask of the UE applies to frequencies, which are between 2.5 MHz and 12.5 MHz away from the UE centre carrier frequency. The out of channel emission is specified relative to the UE output power measured in a 3.84 MHz bandwidth.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.9.2 Conformance requirements

The power of any UE emission shall not exceed the levels specified in Table 5.9.1.

Table 5.9.1: Spectrum Emission Mask Requirement

Frequency offset from carrier Δf	Minimum requirement	Measurement bandwidth
2.5 - 3.5 MHz	–35 – 15*(Δf – 2.5) dBc	30 kHz *
3.5 - 7.5 MHz	–35 – 1*(Δf – 3.5) dBc	1 MHz *
7.5 - 8.5 MHz	–39 – 10*(Δf – 7.5) dBc	1 MHz *
8.5 - 12.5 MHz	–49 dBc	1 MHz *

NOTE*:

1. The first and last measurement position with a 30 kHz filter is 2.515 MHz and 3.485 MHz.
2. The first and last measurement position with a 1 MHz filter is 4 MHz and 12 MHz.
3. The lower limit shall be –50 dBm / 3.84 MHz or which ever is higher.

The reference for this requirement is [1] TS 25.101 subclause 6.6.2.1.1.

5.9.3 Test purpose

To verify that the power of UE emission does not exceed the prescribed limits shown in Table 5.9.1.

Excess emission increases the interference to other channels or to other systems.

5.9.4 Method of test

5.9.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.9.2~~.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~Table 5.9.2: Test parameters for UE spectrum emission mask~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	
~~DTX mode~~	~~Off~~	

5.9.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Measure the power of the transmitted signal with a measurement filter of bandwidths according to Table 5.9.1. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). The centre frequency of the filter shall be stepped in contiguous steps according to Table 5.9.1. The measured power shall be recorded for each step.

3) Measure the wanted output power according to Annex B.

4) Calculate the ratio of the power 2) with respect to 3) in dBc.

5.9.5 Test requirements

The result of 5.9.4.2 step 4) shall fulfil the requirements of Table 5.9.1.

5.10 Adjacent Channel Leakage Power Ratio (ACLR)

5.10.1 Definition and applicability

ACLR is the ratio of the transmitted power to the power measured in an adjacent channel. Both the transmitted power and the adjacent channel power are measured with a filter that has a Root-Raised Cosine (RRC) filter response with roll-off α=0.22 and a bandwidth equal to the chip rate.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.10.2 Conformance requirements

If the adjacent channel power is greater than –50dBm then the ACLR should be higher than the value specified in Table 5.10.1.

Table 5.10.1: UE ACLR due to modulation

Power Class	UE channel	ACLR limit
3	+ 5 MHz or – 5 MHz	33 dB
	+ 10 MHz or – 10 MHz	43 dB
4	+ 5 MHz or – 5 MHz	33 dB
	+ 10 MHz or – 10 MHz	43 dB

The reference for this requirement is [1] TS 25.101 subclause 6.6.2.2.1.

5.10.3 Test purpose

To verify that the UE ACLR due to modulation does not exceed prescribed limit shown in Table 5.10.1.

Excess ACLR increase the interference to other channels or to other systems.

5.10.4 Method of test

5.10.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.10.2~~.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~Table 5.10.2: Test parameters for Leakage Power due to Modulation~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	
~~DTX mode~~	~~Off~~	

5.10.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Measure the power within the bandwidth of current carrier through a matched filter (RRC 0.22).

3) Measure the power fallen in the bandwidth of the first adjacent channels and the second adjacent channels through a matched filter (RRC 0.22).

4) Calculate the ratio of the power between the values measured in '2)'and '3)'.

5.10.5 Test requirements

If the measured adjacent channel power, derived in step 3), is greater than –50dBm then the measured ACLR, derived in step 4), shall be higher than the limit in Table 5.10.1.

5.11 Spurious Emissions

5.11.1 Definition and applicability

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

The frequency boundary and the detailed transitions of the limits between the requirement for out band emissions and spectrum emissions are based on ITU-R Recommendations SM.329.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.11.2 Conformance requirements

These requirements are only applicable for frequencies, which are greater than 12.5 MHz away from the UE centre carrier frequency.

Table 5.11.1a: General spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
9 kHz ≤ f < 150 kHz	1 kHz	–36 dBm
150 kHz ≤ f < 30 MHz	10 kHz	–36 dBm
30 MHz ≤ f < 1000 MHz	100 kHz	–36 dBm
1 GHz ≤ f < 12.75 GHz	1 MHz	–30 dBm

Table 5.11.1b: Additional spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
1893.5 MHz < f < 1919.6 MHz	300 kHz	–41 dBm
925 MHz ≤ f ≤ 935 MHz	100 kHz	–67 dBm *
935 MHz < f ≤ 960 MHz	100 kHz	–79 dBm *
1805 MHz ≤ f ≤ 1880 MHz	100 kHz	–71 dBm *

*NOTE: The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 5.11.1a are permitted for each UARFCN used in the measurement.

The reference for this requirement is [1] TS 25.101 subclause 6.6.3.1.

5.11.3 Test purpose

To verify that the UE spurious emissions do not exceed described value shown in Table 5.11.1a and Table 5.11.1b.

Excess spurious emissions increase the interference to other systems.

5.11.4 Method of test

5.11.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.11.2~~.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~**Table 5.11.2: Test parameters for Spurious Emissions**~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	

5.11.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Sweep the spectrum analyzer (or equivalent equipment) over a frequency range and measure the average power of spurious emission.

5.11.5 Test requirements

The measured average power of spurious emission, derived in step 2), shall not exceed the described value in Table 5.11.1a and 5.11.1b.

5.12 Transmit Intermodulation

5.12.1 Definition and applicability

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.

UE(s) transmitting in close vicinity of each other can produce intermodulation products, which can fall into the UE, or BS receive band as an unwanted interfering signal. The UE transmit intermodulation attenuation is defined by the ratio of the output power of the wanted signal to the output power of the intermodulation product when an interfering CW signal is added at a level below the wanted signal. Both the wanted signal power and the IM product power are measured with a filter that has a Root-Raised Cosine (RRC) filter response with roll-off $\alpha = 0{,}22$ and a bandwidth equal to the chip rate.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.12.2 Conformance requirements

The UE transmit intermodulation shall not exceed the described value in Table 5.12.1.

Table 5.12.1: Transmit Intermodulation

CW Signal Frequency Offset from Transmitting Carrier	5MHz	10MHz
Interference CW Signal Level	–40 dBc	
Intermodulation Product	–31 dBc	–41 dBc

The reference for this requirement is [1] TS 25.101 subclause 6.7.1.

5.12.3 Test purpose

To verify that the UE transmit intermodulation does not exceed the described value in Table 5.12.1.

An excess transmit intermodulation increases transmission errors in the up link own channel when other transmitter exists nearby.

5.12.4 Method of test

5.12.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.2.

2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.12.2~~.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~Table 5.12.2: Test parameters for Transmit Intermodulation~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	

5.12.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Set the frequency of the CW generator to the offset 1 or offset 2 as shown in Table 5.12.1.

3) Measure the average output power of the UE by spectrum analyzer (or equivalent equipment) through RRC filter.

4) Search the intermodulation product signal, then measure the average power of transmitting intermodulation through RRC filter, and calculate the ratio to the average output power of UE.

5) Repeat the measurement with another tone offset.

5.12.5 Test requirements

The measured average power of transmit intermodulation, derived in step 4), shall not exceed the described value in Table 5.12.1.

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

Document T1-000138
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 035 Current Version: 3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	T#9	for approval	X	strategic	(for SMG
list expected approval meeting # here ↑		for information		non-strategic	use only)

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio		Core Network	

Source: T1/RF **Date:** 2000-08-31

Subject: Corrections to EVM and PCDE formulae

Work item:

Category:				**Release:**		
	F	Correction	X		Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change: The EVM and PCDE calculations are relative to R' not R, and should therefore be normalised relative to R' not R.

Clauses affected: B.2.7.1, B.2.7.2

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

B.2.7.1 Error Vector Magnitude (EVM)

The Error Vector Magnitude EVM is calculated according to the following steps:

1) Take the error vector **E** defined in subclause B.2.7 (Form EVM) and calculate the RMS value of **E**; the result will be called RMS(**E**).

2) Take the varied reference vector **R’** defined in subclause B.2.6~~3~~ and calculate the RMS value of **R’**; the result will be called RMS(**R’**).

3) Calculate EVM according to:

~~$EVM = \frac{RMS(\mathbf{E})}{RMS(\mathbf{R})} \times 100\%$~~ $$EVM = \frac{RMS(E)}{RMS(R')} \times 100\%$$ (here, EVM is relative and expressed in %)

(see note TDD)

B.2.7.2 Peak Code Domain Error (PCDE)

The Peak Code Domain Error is calculated according to the following steps:

1) Take the error vectors **e** defined in subclause B.2.7 (Form PCDE)

2) Take the orthogonal vectors of the channelisation code set **C** (all codes belonging to one spreading factor) as defined in TS 25.213 and TS 25.223 (range +1, -1). (see Note: Symbol length)

3) To achieve meaningful results it is necessary to descramble **e,** leading to **e’** (see Note1: Scrambling code)

4) Calculate the inner product of **e’** with **C**. Do this for all symbols of the measurement interval and for all codes in the code space.
This gives an array of format k x ns, each value representing an error-vector representing a specific symbol and a specific code, which can be exploited in a variety of ways.

   k: number of codes

   ns: number of symbols in the measurement interval

5) Calculate k RMS values, each RMS value unifying ns symbols within one code.
(These values can be called "*Absolute CodeEVMs*" [Volt].)

6) Find the peak value among the k "*Absolute CodeEVMs*".
(This value can be called "*Absolute PeakCodeEVM*" [Volt].)

7) Calculate PCDE according to:

$$10{*}\lg \frac{(\text{“}\textit{Absolute PeakCodeEVM}\text{”})^2}{(RMS(\mathbf{R'}))^2} \text{ dB}$$ (a relative value in dB).

(see Note: Denominator)

(see Note2: Scrambling code)

(see Note IQ)

(see Note TDD)

(see Note Synch channel)

TSG-T WG1 meeting #8 **Document** ***T1-000139***

Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 **CR** **024** Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG T#9 for approval X for information *(only one box should be marked with an X)*

list TSG meeting no. here ↑

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: *(at least one should be marked with an X)* USIM [ ] ME [X] UTRAN [ ] Core Network [ ]

Source: T1/RF **Date:** 2000-08-31

Subject: Clarification of the definition on Peak Code Domain Error (PCDE)

3G Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	
A	Corresponds to a correction in a 2G specification		
B	Addition of feature		
C	Functional modification of feature		
D	Editorial modification		

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change:

- The corresponding clauses 6.8.3 "Peak code domain error" in the core specification TS 25.101 were modified according to the CR 25.101-053.

Clauses affected: 5.13.2.1

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other 2G core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

5.12.4 Method of test

5.12.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.2.
2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.12.2.
3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 5.12.2: Test parameters for Transmit Intermodulation

Parameter	Level / Status	Unit
Inner Loop Power Control	Enabled	

5.12.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.
2) Set the frequency of the CW generator to the offset 1 or offset 2 as shown in Table 5.12.1.
3) Measure the average output power of the UE by spectrum analyzer (or equivalent equipment) through RRC filter.
4) Search the intermodulation product signal, then measure the average power of transmitting intermodulation through RRC filter, and calculate the ratio to the average output power of UE.
5) Repeat the measurement with another tone offset.

5.12.5 Test requirements

The measured average power of transmit intermodulation, derived in step 4), shall not exceed the described value in Table 5.12.1.

5.13 Transmit Modulation

5.13.1 Error Vector Magnitude (EVM)

5.13.1.1 Definition and applicability

The Error Vector Magnitude (EVM) is a measure of the difference between the measured waveform and the theoretical modulated waveform (the error vector). It is the square root of the ratio of the mean error vector power to the mean reference signal power expressed as a %. The measurement interval is one power control group (timeslot).

The requirements and this test apply to all types of UTRA for the FDD UE.

5.13.1.2 Conformance requirements

The EVM shall not exceed 17.,5 % for the parameters specified in Table 5.13.1.

Table 5.13.1: Parameters for EVM

Parameter	Level / Status	Unit
Output power	≥ –20	dBm
Operating conditions	Normal conditions	
Power control step size	1	dB

The reference for this requirement is [1] TS 25.101 clause 6.8.2.1.

5.13.1.3 Test purpose

To verify that the EVM does not exceed 17.5 % for the specified parameters in Table 5.13.1.

An excess EVM increases transmission errors in the up link own channel.

5.13.1.4 Method of test

5.13.1.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.13.2.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 5.13.1: Test parameters for EVM

Parameter	Level / Status	Unit
Operating conditions	Normal conditions	
Power control step size	1	dB

5.13.1.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Measure the EVM using Global In-Channel Tx-Test (Annex B).

3) Set the power level of UE to –20dBm or send Down power control commands (1dB step size should be used.) to the UE until UE output power shall be –20dBm with +/- 1dB tolerance.

4) Repeat step 2).

5.13.1.5 Test requirements

The measured EVM, derived in step 2) and 4), shall not exceed 17.5%.

5.13.2 Peak code domain error

5.13.2.1 Definition and applicability

The ~~code domain error~~Peak Code Domain Error is computed by projecting power of the error vector ~~power~~(as defined in 5.13.1.1) onto the code domain at ~~the maximum~~a specific spreading factor. The ~~error vector for each power code~~Code Domain Error for every code in the domain is defined as the ratio of the mean power of the projection onto that code, to the mean power of the composite reference waveform expressed in dB. The ~~peak code domain error~~Peak

Code Domain Error is defined as the maximum value for the ~~code domain error~~Code Domain Error for all codes. The measurement interval is one power control group (timeslot).

The requirements and this test apply only to the UE in which the multi-code transmission is provided.

5.13.2.2 Conformance requirements

The peak code domain error shall not exceed -15 dB at spreading factor 4 for the parameters specified in Table 5.13.3.The requirements are defined using the UL reference measurement channel (768 kbps) specified in subclause C.2.6.

Table 5.13.3: Parameters for Peak code domain error

Parameter	Level / Status	Unit
Output power	≥ –20	dBm
Operating conditions	Normal conditions	
Power control step size	1	dB

The reference for this requirement is [1] TS 25.101 subclause 6.8.3.1.

5.13.2.3 Test purpose

To verify that the UE peak code domain error does not exceed -15 dB for the specified parameters in Table 5.13.3.

An excess peak code domain error increases transmission errors in the up link own channel.

5.13.2.4 Method of test

5.13.2.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.13.4.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 5.13.4: Test parameters for Peak code domain error

Parameter	Level / Status	Unit
Operating conditions	Normal conditions	
Uplink signal	multi-code	
Information bit rate	2*384	kbps
Power control step size	1	dB

5.13.2.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Measure the Peak code Domain error using Global In-Channel Tx-Test (Annex B).

3) Set the power level of UE to –20dBm or send Down power control commands (1dB step size should be used.) to the UE until UE output power shall be–20dBm with +/- 1dB tolerance.

4) Repeat step 2).

5.13.2.5 Test requirements

The measured Peak code domain error, derived in step 2) and 4), shall not exceed -15 dB.

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

Document T1-000140

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 025 Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG T#9 for approval X for information *(only one box should be marked with an X)*

list TSG meeting no. here ↑

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]
(at least one should be marked with an X)

Source: T1/RF **Date:** 2000-08-31

Subject: UE interfering signal definition

3G Work item:

Category: *(only one category Shall be marked With an X)*

F	Correction	X
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: The definition of modulated interfering signal was added to TS25.101. The definition is copied to TS34.121.

Clauses affected: 6.3, 6.4, 6.5, 6.7

Other specs Affected:

Other 3G core specifications		→ List of CRs:
Other 2G core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

6.2.4 Method of test

6.2.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.3.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 6.2.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 6.2: Test parameters for Reference Sensitivity Level

Parameter	Level / Status	Unit
$\hat{I}_{or}$	–106. 7	dBm / 3.84 MHz
DPCH_Ec	–117	dBm / 3.84 MHz
Tx output power	UE maximum power	

6.2.4.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.

2) Measure the BER of DCH received from the UE at the SS.

6.2.5 Test requirements

The measured BER, derived in step 2), shall not exceed 0.001.

6.3 Maximum Input Level

6.3.1 Definition and applicability

This is defined as the maximum receiver input power at the UE antenna port which does not degrade the specified BER performance.

The requirements and this test apply to all types of UTRA for the FDD UE.

6.3.2 Conformance requirements

The BER shall not exceed 0.001 for the parameters specified in Table 6.3.

The reference for this requirement is [1] TS 25.101 subclause 7.4.1.

NOTE: Since the spreading factor is large (10log(SF)=21dB), the majority of the total input signal consists of the OCNS interference. The OCNS interference consists of 16 dedicated data channels. The channelisation codes for data channels are chosen optimally to reduce peak to average ratio (PAR). All dedicated channels user data is uncorrelated to each other.

6.3.3 Test purpose

To verify that the UE BER does not exceed 0.001 for the parameters specified in Table 6.3.

The lack of the maximum input level decreases the coverage area at the near side from BS.

6.3.4 Method of test

6.3.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.3.
2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 6.3.
3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 6.3: Test parameters for Maximum Input Level

Parameter	Level / Status	Unit
$\hat{I}_{or}$	–25	dBm / 3.84MHz
$\frac{DPCH\_E_c}{I_{or}}$	–19	dB

6.3.4.2 Procedure

1) Measure the BER of DCH received from the UE at the SS.

6.3.5 Test requirements

The measured BER, derived in step 1), shall not exceed 0.001.

6.4 Adjacent Channel Selectivity (ACS)

6.4.1 Definition and applicability

Adjacent Channel Selectivity (ACS) is a measure of a receiver's ability to receive a W-CDMA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

The requirements and this test apply to all types of UTRA for the FDD UE.

6.4.2 Conformance requirements

For the UE of power class 3 and 4, the BER shall not exceed 0.001 for the parameters specified in Table 6.4. This test condition is equivalent to the ACS value 33 dB.

The reference for this requirement is [1] TS 25.101 subclause 7.5.1.

Note The I_{oac} (modulated) signal consists of common channels needed for tests and 16 dedicated data channels. The channelisation codes for data channels are chosen optimally to reduce peak to average ratio (PAR). All dedicated channels user data is uncorrelated to each other.

6.4.3 Test purpose

To verify that the UE BER does not exceed 0.001 for the test parameters specified in Table 6.4.

The lack of the ACS decreases the coverage area when other transmitter exists in the adjacent channel.

6.4.4 Method of test

6.4.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.4.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 6.4.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 6.4: Test parameters for Adjacent Channel Selectivity

Parameter	Level / Status	Unit
DPCH_Ec	–103	dBm / 3.84 MHz
$\hat{I}_{or}$	–92.7	dBm / 3.84 MHz
I_{oac} (modulated)	–52	dBm / 3.84 MHz
F_{uw} (offset)	–5 or +5	MHz

6.4.4.2 Procedure

1) Set the parameters of the interference signal generator as shown in Table 6.4.

2) Measure the BER of DCH received from the UE at the SS.

6.4.5 Test requirements

The measured BER, derived in step 1), shall not exceed 0.001.

6.5 Blocking Characteristics

6.5.1 Definition and applicability

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

The requirements and this test apply to all types of UTRA for the FDD UE.

6.5.2 Conformance requirements

The BER shall not exceed 0.~~,~~001 for the parameters specified in Table 6.5.1 and Table 6.5.2. For Table 6.5.2 up to (24) exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size.

The reference for this requirement is [1] TS 25.101 subclause 7.6.1.

Note: $I_{blocking}$ (modulated) consists of common channels and 16 dedicated data channels. The channelisation codes for data channels are chosen optimally to reduce peak to average ratio (PAR). All dedicated channels user data is uncorrelated to each other.

6.7 Intermodulation Characteristics

6.7.1 Definition and applicability

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

The requirements and this test apply to all types of UTRA for the FDD UE.

6.7.2 Conformance requirements

The BER shall not exceed 0.001 for the parameters specified in Table 6.7.1.

The reference for this requirement is [1] TS 25.101 subclause 7.8.1.

Note: I_{ouw2} (modulated) consists of common channels and 16 dedicated data channels. The channelisation codes for data channels are chosen optimally to reduce peak to average ratio (PAR). All dedicated channels user data is uncorrelated to each other.

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

Document ***T1-000141***

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121	CR	**036**	Current Version:	3.1.0
3G specification number ↑		*↑ CR number as allocated by 3G support team*		

For submission to TSG	T#9	for approval	X	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Proposed change affects: *(at least one should be marked with an X)*

USIM		ME	X	UTRAN		Core Network	

Source:	T1/RF	**Date:**	2000-08-31
Subject:	New initial conditions for Spurious emission test case (subclause 6.8.4.1)		
3G Work item:			

Category: *(only one category Shall be marked With an X)*

			Release:	
F	Correction	X	Phase 2	
A	Corresponds to a correction in a 2G specification		Release 96	
B	Addition of feature		Release 97	
C	Functional modification of feature		Release 98	
D	Editorial modification		Release 99	X
			Release 00	

Reason for change: The method to set Cell Search Mode is unclear in current test method.

Clauses affected: 6.8

Other specs Affected:

Other 3G core specifications		→ List of CRs:	
Other 2G core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

6.8 Spurious Emissions

6.8.1 Definition and applicability

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the UE antenna connector.

The requirements and this test apply to all types of UTRA for the FDD UE.

6.8.2 Conformance requirements

The spurious emission shall be:

a) Less than –60 dBm / 3,84 MHz at the UE antenna connector, for frequencies within the UE receive band. In URA_PCH-, Cell_PCH- and IDLE- stage the requirement applies also for UE transmit band.

b) Less than –57 dBm / 100 kHz at the UE antenna connector, for frequencies band from 9 kHz to 1 GHz.

c) Less than –47 dBm / 100 kHz at the UE antenna connector, for frequencies band from 1 GHz to 12.75 GHz.

The reference for this requirement is [1] TS 25.101 subclause 7.9.1.

6.8.3 Test purpose

To verify that the UE spurious emission meets the specifications described in subclause 6.8.2.

Excess spurious emissions increase the interference to other systems.

6.8.4 Method of test

6.8.4.1 Initial conditions

1) ~~1)~~ Connect a spectrum analyzer (or other suitable test equipment) to the UE antenna connector as shown in Figure A.8.

2) UE shall be camped on a cell

3) UE shall perform Location Registration (LR) before the test procedure in subclause 6.8.4.2, but not during it.

4) ~~2)~~ Neighbour cell list shall be empty.~~Enable the UE receiver and set Cell Search Mode on a PCCPCH. Since there is no downlink signal, the UE should not pass the Cell Search mode.~~

5) Paging repetition period and DRX cycle shall be set to minimum (shortest possible time interval).

6.8.4.2 Procedure

1) Sweep the spectrum analyzer (or other suitable test equipment) over a frequency range from the lowest intermediate frequency or lowest oscillator frequency used in the receiver or 1 MHz, whichever is lowest to at least 3 times the carrier frequency.

6.8.5 Test requirements

The all measured spurious emissions, derived in step 1), shall be:

a) Less than –60 dBm / 3,84 MHz at the UE antenna connector, for frequencies within the UE receive band. In URA_PCH-, Cell_PCH- and IDLE- sta~~g~~te the requirement applies also for UE transmit band.

b) Less than –57 dBm / 100 kHz at the UE antenna connector, for frequencies band from 9 kHz to 1 GHz.

c) Less than –47 dBm / 100 kHz at the UE antenna connector, for frequencies band from 1 GHz to 12.75 GHz.

TSG-T WG1 meeting #8 **Document** ***T1-000142***

Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 **CR** **037** Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG T#9 for approval **X** *(only one box should*

list TSG meeting no. here ↑ for information *be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]

(at least one should be marked with an X)

Source:	T1/RF	**Date:**	2000-08-31
Subject:	UL reference measurement channel for BTFD performance requirements		
3G Work item:			

Category:				**Release:**		
	F	Correction	X		Phase 2	
	A	Corresponds to a correction in a 2G specification			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:	There are some mistakes and undecided values of DPCCH/ DPDCH power ratio in UL reference measurement channel for BTFD performance requirements.
Clauses affected:	C.4.1

Other specs affected:				
	Other 3G core specifications		→	List of CRs:
	Other 2G core specifications		→	List of CRs:
	MS test specifications		→	List of CRs:
	BSS test specifications		→	List of CRs:
	O&M specifications		→	List of CRs:

Other comments:	

help.doc

<--------- double-click here for help and instructions on how to create a CR.

C.4.1 UL reference measurement channel for BTFD performance requirements

The parameters for UL reference measurement channel for BTFD are specified in Table C.4.1,~~ and~~ Table C.4.2. and Table C.4.2.A

Table C.4.1: UL reference measurement channel physical parameters for BTFD

Parameter	Level									Unit
	Rate1	Rate2	Rate3	Rate4	Rate5	Rate6	Rate7	Rate8	Rate9	
Information bit rate	~~12.2k~~ 12.8k	~~10.2k~~ 10.8k	~~7.95k~~ 8.55	~~7.4k~~ 8.0k	~~6.7k~~ 7.3k	~~5.9k~~ 6.5k	~~5.15k~~ 5.75k	~~4.75k~~ 5.35k	~~1.95k~~ 2.55k	kbps
~~DPDCH~~	~~60~~									~~kbps~~
DPCCH	15									kbps
DPCCH Slot Format #i	0									-
DPCCH/DPDCH power ratio	-5.46	-5.46 ~~[T.B.D.]~~	-5.46 ~~[T.B.D.]~~	-5.46 ~~[T.B.D.]~~	-5.46 ~~[T.B.D.]~~	-2.69 ~~[T.B.D.]~~	-2.69 ~~[T.B.D.]~~	-2.69 ~~[T.B.D.]~~	-2.69 ~~[T.B.D.]~~	dB
TFCI	On									-
~~Repetition~~	~~23~~									~~%~~

Table C.4.2: UL reference measurement channel, transport channel parameters for BTFD

Parameters	DTCH									DCCH
	Rate1	Rate2	Rate3	Rate4	Rate5	Rate6	Rate7	Rate8	Rate9	
Transport Channel Number	1									2
Transport Block Size	~~244~~ 256	~~204~~ 216	~~159~~ 171	~~148~~ 160	~~134~~ 146	~~118~~ 130	~~103~~ 115	~~95~~ 107	~~39~~ 51	100
Transport Block Set Size	~~244~~ 256	~~204~~ 216	~~159~~ 171	~~148~~ 160	~~134~~ 146	~~118~~ 130	~~103~~ 115	~~95~~ 107	~~39~~ 51	100
Transmission Time Interval	20 ms									40 ms
Type of Error Protection	Convolution Coding									Convolution Coding
Coding Rate	1/3									1/3
~~Static Rate Matching parameter~~ Rate Matching Attribute	~~1.0~~256									~~1.0~~256
Size of CRC	~~16~~ 0									12

Table C.4.2.A: Physical channel parameters

Min spreading factor	64
Max number of DPDCH data bits/radio frame	600
Puncturing Limit	1

TSG-T WG1 meeting #8 **Document** ***T1-000143***

Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 026 Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG T#9 for approval [X] for information [ ] *(only one box should be marked with an X)*

list TSG meeting no. here ↑

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]

(at least one should be marked with an X)

Source:	T1/RF	**Date:**	2000-08-31
Subject:	Performance requirements		
3G Work item:			

Category: *(only one category shall be marked with an X)*

			Release:		
F	Correction	X		Phase 2	
A	Corresponds to a correction in a 2G specification			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

- The corresponding clauses in Chapter 8 of the core specification TS 25.101 were modified according to the CRs 25.101-042, 044, 045r1, 052 and 058.

Clauses affected: 7.1, 7.2, 7.3, 7.4, 7.5

Other specs affected:

Other 3G core specifications		→ List of CRs:	
Other 2G core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

7 Performance requirements

7.1 General

The performance requirements for the UE in this clause are specified for the measurement channels specified in Annex C and Table 7.1.1, the propagation conditions specified in 7.1.2 and the Down link Physical channels specified in Annex D. Unless stated otherwise, DL power control is OFF.

The method for Block Error Ratio (BLER) measurement is specified in [4] TS 34.109.

Table 7.1.1: Bit / Symbol rate for Test Channel

Type of User Information	User bit rate	DL DPCH symbol rate	UL DPCH bit rate
12.2 kbps reference measurement channel	12.2 kbps	30 ksps	60 kbps
64/144/384 kbps reference measurement channel	64 kbps	120 ksps	240 kbps
	144 kbps	240 ksps	480 kbps
	384 kbps	480 ksps	960 kbps

~~**Table 7.1.2: Summary of UE performance targets**~~

Meas. Channel	Information Data Rate	Static	Multi-path Case 1	Multi-path Case 2	Multi-path Case 3	Multi-path Case 4	Moving	Birth / Death
		Propagation conditions / Performance metric						
DCH	12.2 kbps	BLER<10-2	BLER<10-2	BLER<10-2	BLER<10-2		BLER<	BLER<
	64 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}		BLER<	BLER<
	144 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}		-	-
	384 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}		-	-

7.1.1 Measurement Configurations

In all measurements UE should transmit with maximum power while receiving signals from BS. Transmission Power Control is always disable during the measurements. Chip Rate is specified to be 3.84 MHz.

It as assumed that fields inside DPCH have the same energy per PN chip. Also, if the power of SCCPCH is not specified in the test parameter table, it should be set to zero. The power of OCNS should be adjusted that the power ratios (E_c/I_{or}) of all specified forward channels add up to one.

Measurement configurations for different scenarios are shown in Figure A.9, Figure A.10 and Figure A.11.

7.2 Demodulation in Static Propagation conditions

7.2.1 Demodulation of Dedicated Channel (DCH)

7.2.1.1 Definition and applicability

The receive characteristic of the Dedicated Channel (DCH) in the static environment is determined by the Block Error Ratio (BLER). BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.2.1.2 Conformance requirements

For the parameters specified in Table 7.2.1.1 the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown ~~the BLER shall not exceed the piece-wise linear BLER curve specified by the points~~ in Table 7.2.1.2. These requirements are applicable for TFCS size 16.

~~Note: The performance requirements for 384 kbps will be replaced with new value using 10ms TTI measurement channel defined in clause C.3.5.~~

Table 7.2.1.1: DCH parameters in static propagation conditions

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
$\hat{I}_{or}/I_{oc}$	–1				dB
I_{oc}	–60				dBm / 3.84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.2.1.2: DCH requirements in static propagation conditions

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
1	–16.6 dB	10^{-2}
2	–13.1 dB	10^{-1}
	–12.8 dB	10^{-2}
3	–9.9 dB	10^{-1}
	–9.8 dB	10^{-2}
4	–5.6 dB	10^{-1}
	–5.5 dB	10^{-2}

The reference for this requirement is [1] TS 25.101 subclause 8.2.3.1.

7.2.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a static propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a BLER not exceeding a specified value.

7.2.1.4 Method of test

7.2.1.4.1 Initial conditions

1. Connect the SS and an AWGN noise source to the UE antenna connector as shown in Figure A.9.

2. Set up a call according to the Generic call setup procedure.
3. Set the test parameters for test 1-5 as specified in Table 7.2.1.1.
4. Enter the UE into loopback test mode and start the loopback test.

7.2.1.4.2 Procedures

1. Measure BLER of DCH.

7.2.1.5 Test requirements

For the parameters specified in Table 7.2.1.1 the BLER shall not exceed the value at the DPCH_Ec/Ior specified associated piece-wise linear BLER curve specified by the points in Table 7.2.1.2.

7.3 Demodulation of DCH in Multi-path Fading Propagation conditions

7.3.1 Single Link Performance

7.3.1.1 Definition and applicability

The receive characteristics of the Dedicated Channel (DCH) in different multi-path fading environments are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into in Dedicated Physical Channel (DPCH).

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.3.1.2 Conformance requirements

For the parameters specified in Table 7.3.1.1, 7.3.1.3, 7.1.3.5 and 7.1.3.75 the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown the BLER shall not exceed the associated piece-wise linear BLER curves specified by the points in Table 7.3.1.2, 7.3.1.4, 7.3.1.6 and 7.3.1.86. These requirements are applicable for TFCS size 16.

Note: The performance requirements for 384 kbps will be replaced with new value using 10ms TTI measurement channel defined in clause C.3.5.

Table 7.3.1.1: DCH parameters in multi-path fading propagation conditions (Case 1)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
$\hat{I}_{or}/I_{oc}$	9				dB
I_{oc}	–60				dBm / 3.84 MHz
Information Data Rate	12.2	64	144	384	kbps

Table 7.3.1.2: DCH requirements in multi-path fading propagation conditions (Case 1)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
1	–15.0 dB	10^{-2}
2	–13.9 dB	10^{-1}
	–10.0 dB	10^{-2}
3	–10.6 dB	10^{-1}
	–6.8 dB	10^{-2}
4	–6.3 dB	10^{-1}
	–2.2 dB	10^{-2}

Table 7.3.1.3: DCH parameters in multi-path fading propagation conditions (Case 2)

Parameter	Test 5	Test 6	Test 7	Test 8	Unit
Phase reference	P-CPICH				
$\hat{I}_{or}/I_{oc}$	–3	–3	3	6	dB
I_{oc}	–60				dBm / 3.84 MHz
Information Data Rate	12.2	64	144	384	kbps

Table 7.3.1.4: DCH requirements in multi-path fading propagation conditions (Case 2)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
5	–7.7 dB	10^{-2}
6	–6.4 dB	10^{-1}
	–2.7 dB	10^{-2}
7	–8.1 dB	10^{-1}
	–5.1 dB	10^{-2}
8	–5.5 dB	10^{-1}
	–3.2 dB	10^{-2}

Table 7.3.1.5: DCH parameters in multi-path fading propagation conditions (Case 3)

Parameter	Test 9	Test 10	Test 11	Test 12	Unit
Phase reference	P-CPICH				
$\hat{I}_{or}/I_{oc}$	–3	–3	3	6	dB
I_{oc}	–60				dBm / 3.84 MHz
Information Data Rate	12.2	64	144	384	kbps

Table 7.3.1.6: DCH requirements in multi-path fading propagation conditions (Case 3)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
9	–11.8 dB	10^{-2}
10	–8.1 dB	10^{-1}
	–7.4 dB	10^{-2}
	–6.8 dB	10^{-3}
11	–9.0 dB	10^{-1}
	–8.5 dB	10^{-2}
	–8.0 dB	10^{-3}
12	–5.9–6.0 dB	10^{-1}
	–5.1–5.5 dB	10^{-2}
	–4.4–5.0 dB	10^{-3}

Table 7.3.1.7: DCH parameters in multi-path fading propagation conditions (Case 1) with S-CPICH

Parameter	Test 13	Test 14	Test 15	Test 16	Unit
Phase reference	S-CPICH				
$\hat{I}_{or}/I_{oc}$	9				dB
I_{oc}	-60				dBm / 3.84 MHz
Information Data Rate	12.2	64	144	384	kbps

Table 7.3.1.8: DCH requirements in multi-path fading propagation conditions (Case 1) with S-CPICH

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
13	-15.0 dB	10^{-2}
14	-13.9 dB	10^{-1}
	-10.0 dB	10^{-2}
15	-10.6 dB	10^{-1}
	-6.8 dB	10^{-2}
16	-6.3 dB	10^{-1}
	-2.2 dB	10^{-2}

The reference for this requirement is [1] TS 25.101 subclause 8.3.1.1.

7.3.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a BLER not exceeding a specified value.

7.3.1.4 Method of test

7.3.1.4.1 Initial conditions

1. Connect the SS, multi-path fading simulator and an AWGN noise source to the UE antenna connector as shown in Figure A.10.
2. Set up a call according to the Generic call setup procedure.
3. Set the test parameters for test 1-15 as specified Table 7.3.1.1, Table 7.3.1.3,~~ and~~ Table 7.3.1.5 and Table 7.3.1.7.
4. Enter the UE into loopback test mode and start the loopback test.
5. Setup fading simulators as fading condition case 1 to 3 which are described in Table D.2.2.1

7.3.1.4.2 Procedures

1. Measure BLER of DCH.

7.3.1.5 Test requirements

For the parameters specified in Table 7.3.1.1, Table 7.3.1.3,~~ and~~ Table 7.3.1.5 and Table 7.3.1.7~~,~~ the BLER shall not exceed the value at the DPCH_Ec/Ior specified~~ associated piece-wise linear BLER curve specified by the points~~ in Table 7.3.1.2, Table 7.3.1.4,~~ and~~ Table 7.3.1.6 and Table 7.3.1.8.

7.4 Demodulation of DCH in Moving Propagation conditions

7.4.1 Single Link Performance

7.4.1.1 Definition and applicability

The receive single link performance of the Dedicated ~~Traffic~~ Channel (DCH) in dynamic moving propagation conditions are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into Dedicated Physical Channel (DPCH).

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.4.1.2 Conformance requirements

For the parameters specified in Table 7.4.1.1 the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown ~~the BLER shall not exceed the piece-wise linear BLER curve specified in points~~ in Table 7.4.1.2.

Table 7.4.1.1: DCH parameters in moving propagation conditions

Parameter	Test 1	Test 2	Unit
Phase reference	P-CPICH		
$\hat{I}_{or}/I_{oc}$	–1		dB
I_{oc}	–60		dBm / 3.84 MHz
Information Data Rate	12.2	64	kbps

Table 7.4.1.2: DCH requirements in moving propagation conditions

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
1	–14.5 dB	10^{-2}
2	–10.9 dB	10^{-2}

The reference for this requirement is [1] TS 25.101 subclause 8.4.1.1.

7.4.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a moving propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a BLER not exceeding a specified value.

7.4.1.4 Method of test

7.4.1.4.1 Initial conditions

1. Connect the SS and an AWGN noise source to the UE antenna connector as shown in Figure A.10.
2. Set up a call according to the Generic call setup procedure.
3. Set the test parameters as specified in Table 7.4.1.1.
4. Enter the UE into loopback test mode and start the loopback test.
5. Setup fading simulator as moving propagation condition, which is described in clause D.2.3.

7.4.1.4.2 Procedures

1. Measure BLER of DCH.

7.4.1.5 Test requirements

For the parameters specified in Table 7.4.1.1 the BLER shall not exceed the value at the DPCH_Ec/Ior specified ~~associated piece-wise linear BLER curve specified by the points~~ in Table 7.4.1.2.

7.5 Demodulation of DCH in Birth-Death Propagation conditions

7.5.1 Single Link Performance

7.5.1.1 Definition and applicability

The receive single link performance of the Dedicated ~~Traffic~~ Channel (DCH) in dynamic birth-death propagation conditions are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into Dedicated Physical Channel (DPCH).

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.5.1.2 Conformance requirements

For the parameters specified in Table 7.5.1.1~~,~~ the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown ~~the BLER shall not exceed the piece-wise linear BLER curve in the points~~ in Table 7.5.1.2.

Table 7.5.1.1: DCH parameters in birth-death propagation conditions

Parameter	Test 1	Test 2	Unit
Phase reference	P-CPICH		
$\hat{I}_{or}/I_{oc}$	–1		dB
I_{oc}	–60		dBm / 3.84 MHz
Information Data Rate	12.2	64	kbps

Table 7.5.1.2: DCH requirements in birth-death propagation conditions

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
1	–12.6 dB	10^{-2}
2	-8.7 dB	10^{-2}

The reference for this requirement is [1] TS 25.101 subclause 8.5.1.1.

7.5.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a birth-death propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a BLER not exceeding a specified value.

7.5.1.4 Method of test

7.5.1.4.1 Initial conditions

1. Connect the SS and an AWGN noise source to the UE antenna connector as shown in Figure A.10.
2. Set up a call according to the Generic call setup procedure.
3. Set the test parameters as specified in Table 7.5.1.1.
4. Enter the UE into loopback test mode and start the loopback test.
5. Setup fading simulator as birth-death propagation condition, which is described in clause D.2.4.

7.5.1.4.2 Procedures

1. Measure BLER of DCH.

7.5.1.5 Test requirements

For the parameters specified in Table 7.5.1.1 the BLER shall not exceed the value at the DPCH_Ec/Ior specified ~~associated piece-wise linear BLER curve specified by the points~~ in Table 7.5.1.2.

TSG-T WG1 meeting #8 ***Document*** ***T1-000144***

Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 027 Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG	T#9	for approval	X	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)*	USIM		ME	X	UTRAN		Core Network	

Source: T1/RF **Date:** 2000-08-31

Subject: CR on clause 7.6 and 7.7 in TS34.121

3G Work item:

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in a 2G specification			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:

- The relevant section in the core specification TS 25.101 was modified by TSG-RAN
- Correct test requirements to be more feasible.

Clauses affected: 7.6,7,7

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other 2G core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

help.doc

<---------- double-click here for help and instructions on how to create a CR.

7.6 Demodulation of DCH in Base Station Transmit diversity modes

7.6.1 Demodulation of DCH in open-loop transmit diversity mode

7.6.1.1 Definition and applicability

The receive characteristic of the Dedicated Channel (DCH) in open loop transmit diversity mode is determined by the Block Error Ratio (BLER). DCH is mapped into in Dedicated Physical Channel (DPCH).

The requirements and this test apply to all types of UTRA for the FDD UE.

7.6.1.2 Conformance requirements

For the parameters specified in Table 7.6.1.1 the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown ~~the BLER shall not exceed the associated piece-wise linear BLER curve specified by the points~~ in Table 7.6.1.2.

Table 7.6.1.1: Test parameters for DCH reception in a open-loop transmit diversity scheme (Propagation condition: Case 1)

Parameter	Test 1	Unit
Phase reference	P-CPICH	
$\hat{I}_{or}/I_{oc}$	9	dB
I_{oc}	–60	dBm / 3.84 MHz
Information data rate	12.2	kbps

Table 7.6.1.2: Test requirements for DCH reception in open-loop transmit diversity scheme

Test Number	$\frac{DPCH\_E_c}{I_{or}}$ (antenna 1/2)	BLER
1	[–16.8 dB]	10^{-2}

The reference for this requirement is [1] TS 25.101 subclause 8.6.1.1.

7.6.1.3 Test purpose

To verify that UE reliably demodulates the DPCH of the BS while open loop transmit diversity is enabled during the connection.

7.6.1.4 Method of test

7.6.1.4.1 Initial conditions

1) Connect SS, multi-path fading simulators and an AWGN source to the UE antenna connector as shown in Figure A.12.

2) Set up a call according to the Generic call setup procedure.

3) RF parameters are set up according to Table 7.6.1.1 and Table E 3.4.

4) Enter the UE into loopback test mode and start the loopback test.

5) Activate open loop Tx diversity function.

6) Set up fading simulators as fading condition case 1, which is described in Table D.2.2.1.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

7.6.1.4.2 Procedure

1) Measure BLER in points specified in Table 7.6.1.2.

7.6.1.5 Test Requirements

For the parameters specified in Table 7.6.1.1 the BLER shall not exceed the value at the DPCH_Ec/Ior specified ~~associated piece-wise linear BLER curve specified by the points~~ in Table 7.6.1.2.

7.6.2 Demodulation of DCH in closed loop transmit diversity mode

7.6.2.1 Definition and applicability

The receive characteristic of the dedicated channel (DCH) in closed loop transmit diversity mode is determined by the Block Error Ratio (BLER). DCH is mapped into in Dedicated Physical Channel (DPCH).

The requirements and this test apply to all types of UTRA for the FDD UE.

7.6.2.2 Conformance requirements

For the parameters specified in Table 7.6.2.1 the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown ~~the BLER shall not exceed the associated piece-wise linear BLER curves specified by the points~~ in Table 7.6.2.2.

Table 7.6.2.1: Test Parameters for DCH Reception in closed loop transmit diversity mode (Propagation condition: Case 1)

Parameter	Test 1 (Mode 1)	Test 2 (Mode 2)	Unit
$\hat{I}_{or}/I_{oc}$	9	9	dB
I_{oc}	–60	–60	dBm / 3.84 MHz
Information data rate	12.2	12.2	kbps
Feedback error ratio	4	4	%

Table 7.6.2.2: Test requirements for DCH reception in feedback transmit diversity mode

Test Number	$\frac{DPCH\_E_c}{I_{or}}$ (see note~~1~~)	BLER
1	–18.0 ~~–17.5~~ dB	10^{-2}
2	–18.3 ~~–17.8~~ dB	10^{-2}
Note: This is the total power from both antennas. Power sharing between antennas are closed loop mode dependent as specified in TS25.214.		

The reference for this requirement is [1] TS 25.101 subclause 8.6.2.1.

~~1 This is the total power from both antennas. Power sharing between antennas are closed loop mode dependent as specified in TS25.214~~

7.6.2.3 Test purpose

To verify that UE reliably demodulates the DPCH of the BS while closed loop transmit diversity is enabled during the connection.

7.6.2.4 Method of test

7.6.2.4.1 Initial conditions

1) Connect SS, multi-path fading simulators and an AWGN source to the UE antenna connector as shown in Figure A.12.

2) Set up a call according to the Generic call setup procedure.

3) RF parameters are set up according to Table 7.6.2.1 and Table E 3.5.

4) Enter the UE into loopback test mode and start the loopback test.

5) Activate closed loop Tx diversity function.

6) Set up fading simulators as fading condition case 1, which is described in Table D.2.2.1.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

7.6.2.4.2 Procedure

1) Measure BLER in points specified in Table 7.6.2.2.

7.6.2.5 Test Requirements

For the parameters specified in Table 7.6.2.1 the BLER shall not exceed the value at the DPCH_Ec/Ior specified associated piece-wise linear BLER curve specified by the points in Table 7.6.2.2.

7.6.3 Demodulation of DCH in Site Selection Diversity Transmission Power Control mode

7.6.3.1 Definition and applicability

The bit error characteristics of UE receiver is determined in Site Selection Diversity Transmission Power Control (SSDT) mode. Two BS emulators are required for this performance test. The delay profiles of signals received from different base stations are assumed to be the same but time shifted by 10 chip periods.

The requirements and this test apply to all types of UTRA for the FDD UE.

7.6.3.2 Conformance requirements

DCH parameters are specified in Table 7.6.3.1. The downlink physical channels and their relative power to Ior are the same as those specified in clause E.3.2 irrespective of BSs and the test cases. DPCH_Ec/Ior value applies whenever DPDCH in the cell is transmitted. In Test 1 and Test 3, the received powers at UE from two BSs are the same, while 3dB offset is given to one that comes from one of BSs for Test 2 and Test 4 as specified in Table 7.6.3.1.

For the parameters specified in Table 7.6.3.1, the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown the BLER shall not exceed the value at the DPCH_Ec/Ior specified in Table 7.6.3.2.

Table 7.6.3.1: DCH parameters in multi-path propagation conditions during SSDT mode (Propagation condition: Case 1)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
~~$\frac{CPICH\_E_c}{I_{or}}$ (for Cell 1)~~	~~–10~~	~~–13~~	~~–10~~	~~–10~~	~~dB~~
~~$\frac{CPICH\_E_c}{I_{or}}$ (for Cell 2)~~	~~–10~~	~~–10~~	~~–10~~	~~–10~~	~~dB~~
~~$\frac{DPCH\_E_{c1}}{I_{or}} / \frac{DPCH\_E_{c2}}{I_{or}}$~~ *	~~0~~	~~–3~~	~~0~~	~~+3~~	~~dB~~
Phase reference	P-CPICH				
$\hat{I}_{or1}/I_{oc}$	0	-3	0	0	dB
$\hat{I}_{or2}/I_{oc}$	0	0	0	-3	dB
I_{oc}	–60				dBm / 3.84 MHz
Information Data Rate	12.2	12.2	12.2	12.2	kbps
Feedback error rate*	4	4	4	4	%
Number of FBI bits assigned to "S" Field	1	1	2	2	
Code word Set	Long	Long	Short	Short	

*NOTE: ~~DPCH_E$_c$/I$_{or}$ value applies whenever DPDCH in the cell is transmitted.~~Feedback error rate is defined as FBI bit error rate.

Table 7.6.3.2: DCH requirements in multi-path propagation conditions during SSDT Mode

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
1	–7.5 dB	10^{-2}
2	–6.5 dB	10^{-2}
3	–10.5 dB	10^{-2}
4	–9.2 dB	10^{-2}

The reference for this requirement is [1] TS 25.101 subclause 8.6.3.1.

7.6.3.3 Test purpose

To verify that UE reliably demodulates the DPCH of the selected BS while site selection diversity is enabled during soft handover.

7.6.3.4 Method of test

7.6.3.4.1 Initial conditions

1) Connect two SS's, multi-path fading simulators and an AWGN source to the UE antenna connector as shown in Figure A.11.

2) Set up a call according to the Generic call setup procedure, and RF parameters are set up according to Table 7.6.3.1 and Table 7.6.3.2.

3) Enter the UE into loopback test mode and start the loopback test.

4) Activate SSDT function.

5) Set up fading simulators as fading condition case 1, which is described in Table D.2.2.1.

7.6.3.4.2 Procedure

Measure BLER in points specified in Table 7.6.3.2.

7.6.3.5 Test Requirements

BLER shall not exceed the value at the DPCH_Ec/Ior specified in Table 7.6.3.2.

7.7 Demodulation in Handover conditions

7.7.1 Demodulation of DCH in Inter-Cell Soft Handover ~~Performance~~

7.7.1.1 Definition and applicability

The bit error ratio characteristics of UE is determined during an inter-cell soft handover. During the soft handover a UE receives signals from different Base Stations. A UE has to be able to demodulate two PCCPCH channels and to combine the energy of DCH channels. Delay profiles of signals received from different Base Stations are assumed to be the same but time shifted by 10 chips.

The receive characteristics of the different channels during inter-cell handover are determined by the Block Error Ratio (BLER) values.

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.7.1.2 Conformance requirements

For the parameters specified in Table 7.7.1.1~~,~~ the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown ~~the BLER shall not exceed the piece-wise linear BLER curve specified by the points~~ in Table 7.7.1.2

Table 7.7.1.1: DCH parameters in multi-path propagation conditions during Soft Handoff (Case 3)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
$\hat{I}_{or1}/I_{oc}$ and $\hat{I}_{or2}/I_{oc}$	0	0	3	6	dB
I_{oc}	-60				dBm / 3.84 MHz
Information Data Rate	12.2	64	144	384	kbps

Table 7.7.1.2: DCH requirements in multi-path propagation conditions during Soft Handoff (Case 3)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
1	~~[~~–15.2 dB~~]~~	10^{-2}
2	~~[~~–11.8 dB~~]~~	10^{-1}
	~~[~~–11.3 dB~~]~~	10^{-2}
3	~~[~~–9.6 dB~~]~~	10^{-1}
	~~[~~–9.2 dB~~]~~	10^{-2}
4	~~[~~–6.0 dB~~]~~	10^{-1}
	~~[~~–5.5 dB~~]~~	10^{-2}

The reference for this requirement is [1] TS 25.101 subclause 8.7.1.1.

7.7.1.3 Test purpose

To verify that the BLER does not exceed the value at the DPCH_Ec/Ior specified piece-wise linear BLER curve specified by the points in Table 7.7.1.2.

7.7.1.4 Method of test

7.7.1.4.1 Initial conditions

[TBD]

7.7.1.4.2 Procedures

1) Connect the SS, multi-path fading simulator and an AWGN noise source to the UE antenna connector as shown in Figure A.11.

2) Set up the call.

3) Set the test parameters for test 1-5 as specified in Table 7.7.1.1.

4) Count, at the SS, the number of information blocks transmitted and the number of correctly received information blocks at the UE.

5) Measure BLER of DCH channel.

7.7.1.5 Test requirements

[TBD] For the parameters specified in Table 7.7.1.1 the BLER shall not exceed the value at the DPCH_Ec/Ior specified in Table 7.7.1.2.

7.7.2 Combining of TPC commands not known to be the same

7.7.2.1 Definition and applicability

[TBD]

7.7.2.2 Conformance requirements

Test parameters are specified in Table 7.7.2.1. Cell1 and Cell2 TPC patterns are repeated 15 times i.e., over 4 frames. Transmitted power of UE in relative uplink slots is recorded. If the transmitted power of a given slot is increased compared to a previous slot, then a variable "Transmitted power UP" is increased by one, otherwise a variable "Transmitted power DOWN" is increased by one. The requirements for "Transmitted power UP" and "Transmitted power DOWN" are shown in Table 7.7.2.2. Note that test is done without additional noise source Ioc.

Table 7.7.2.1: Parameters for TPC command combining (Static conditions)

Parameter	Test 1	Unit
Initial power in uplink	–5	dBm
DPCH_Ec/Ior	–12	dB
$\hat{I}_{or1}/I_{oc}$ and $\hat{I}_{or2}/I_{oc}$	–60	dBm / 3.84 MHz
Power-Control-Algorithm	Algorithm 1	-
Cell 1 TPC commands over 4 slots	{0,0.1.1}	-
Cell 2 TPC commands over 4 slots	{0,1,0,1}	-
Information Data Rate	12.2	kbps

Table 7.7.2.2: Test requirements for TPC command combining

Test Number	Transmitted power UP	Transmitted power DOWN
1	[≥15]	[≥30]

The reference for this requirement is [1] TS 25.101 subclause 8.7.2.1.

7.7.2.3 Test purpose

[TBD]

7.7.2.4 Method of test

7.7.2.4.1 Initial conditions

[TBD]

7.7.2.4.2 Procedures

[TBD]

7.7.2.5 Test requirements

[TBD]

TSG-T WG1 meeting #8 ***Document*** ***T1-000145***
Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 033 Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG: T #9	for approval	X	*(only one box should*
list TSG meeting no. here ↑	for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]
(at least one should be marked with an X)

Source: T1/RF **Date:** 2000-08-31

Subject: CR for subclause 7.8: Power control in downlink

3G Work item:

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in a 2G specification			Release 96	
B	Addition of feature	X		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: The requirements for downlink power control were changed in TS25.101. Subclause 8.8.1 was modified and subclauses 8.8.2 and 8.8.3 were added in TS25.101 v3.3.1.

Clauses affected: 7.8

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other 2G core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

7.7.1.5 Test requirements

[TBD]

7.8 7.8 Power control in downlink, constant BLER

Power control in the downlink is the ability of the UE receiver to converge to required link quality set by the network while using as low power as possible in downlink . If a BLER target has been assigned to a DCCH (See Annex C.3), then it has to be such that outer loop is based on DTCH and not on DCCH.

7.8.1 Power control in the downlink, constant BLER targetDefinition and applicability

7.8.1.1 Definition and applicability

Power control in the downlink is the ability of the UE receiver to converge to required link quality set by the network while using as low power as possible in downlink. If a BLER target has been assigned to a DCCH (See Annex C.3), then it has to be such that outer loop is based on DTCH and not on DCCH. The requirements and this test apply to all types of UTRA for the FDD UE.

7.8.1.2 Conformance requirements

For the parameters specified in Table 7.8.1 the downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value in Table 7.8.2 and the measured BLER value shall be as required in Table 7.8.2.

NOTE:

1. Power control in downlink is ON during the test.

For the parameters specified in Table 7.8.1.1 the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER shown in Table 7.8.1.2. Power control in downlink is ON during the test.

Table 7.8.1.1: Test parameter for downlink power control, constant BLER target

Parameter	Test 1	Test 2	Unit
$\hat{I}_{or}/I_{oc}$	9	-1	dB
I_{oc}	–60		dBm / 3.84 MHz
Information Data Rate	12.2		kbps
Target quality on DTCH	0.01		BLER
Propagation condition	Case 4		

Table 7.8.1.2: Requirements in downlink power control, constant BLER target

Parameter	Test 1	Test 2	Unit
$\frac{DPCH\_E_c}{I_{or}}$	[-16.0]	[-9.0]	dB
Measured quality on DTCH	0.01±30%FFS	0.01±30%FFS	BLER
Confidence level for measured quality and $\frac{DPCH\_E_c}{I_{or}}$	90		%

The reference for this requirement is [1] TS 25.101 subclause 8.8.1.1.

7.8.1.3 Test purpose

To verify that the UE receiver is capable of converging to required link quality set by network while using as low power as possible.

7.8.1.4 Method of test

7.8.1.4.1 Initial conditions

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in Figure A.10.

2) Set up a call according to the Generic call setup procedure.

3) RF parameters are set up according to Table 7.8.1.1 and Table E.3.3.

4) Enter the UE into loopback test mode and start the loopback test.

5) SS signals to UE target quality value on DTCH as specified in Table 7.8.1.1. SS will vary the physical channel power in downlink according to the TPC commands from UE. At the same time BLER is measured. This is continued until the target quality value on DTCH is met, within the minimum accuracy requirement.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

7.8.1.4.2 Procedure

1) After the target quality on DTCH is met, BLER is measured. Simultaneously the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power is measured. This is repeated until adequate amount of measurements is done to reach the required confidence level.

2) The measured quality on DTCH (BLER) and the measured average downlink $\frac{DPCH\_E_c}{I_{or}}$ power are compared to limits in Table 7.8.1.2.

7.8.1.5 Test Requirements

a) The measured quality on DTCH does not exceed the values in Table 7.8.1.2.

b) The average measured downlink $\frac{DPCH\_E_c}{I_{or}}$ power does not exceed the values in Table 7.8.1.2.

7.8.2 Power control in the downlink, initial convergence

7.8.2.1 Definition and applicability

This requirement verifies that DL power control works properly during the first seconds after DPCH connection is established. The requirements and this test apply to all types of UTRA for the FDD UE.

7.8.2.2 Conformance requirements

For the parameters specified in Table 7.8.2.1 the downlink DPCH_Ec/Ior power, which is averaged over [50 ms], shall be within the range specified in Table 7.8.2.2. T1 equals to [500 ms] and it starts [10 ms] after the DPDCH connection is initiated. T2 equals to [500 ms] and it starts when T1 has expired. Power control is ON during the test.

Table 7.8.2.1: Test parameters for downlink power control, initial convergence

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Target quality value on DTCH	0.01	0.01	0.1	0.1	BLER
Initial DPCH_Ec/Ior	-5.9	-25.9	-2.1	-22.1	dB
Information Data Rate	12.2	12.2	64	64	kbps
$\hat{I}_{or}/I_{oc}$	-1				dB
I_{oc}	-60				dBm/3.84 MHz
Propagation condition	[Static]				

Table 7.8.2.2: Requirements in downlink power control, initial convergence

Parameter	Test 1 and Test 2	Test 3 and Test 4	Unit
$\frac{DPCH\_E_c}{I_{or}}$ during T1	[-18.9 ≤ DPCH_Ec/Ior ≤ -11.9]	[-15.1 ≤ DPCH_Ec/Ior ≤ -8.1]	dB
$\frac{DPCH\_E_c}{I_{or}}$ during T2	[-18.9 ≤ DPCH_Ec/Ior ≤ -14.9]	[-15.1 ≤ DPCH_Ec/Ior ≤ -11.1]	dB
Confidence level for measured $\frac{DPCH\_E_c}{I_{or}}$	[90]		%

The reference for this requirement is [1] TS 25.101 subclause 8.8.2.1.

7.8.2.3 Test purpose

To verify that DL power control works properly during the first seconds after DPCH connection is established.

7.8.2.4 Method of test

7.8.2.4.1 Initial conditions

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in Figure A.10.

7.8.2.4.2 Procedure

1) Set up call using test parameters according to Table 7.8.2.1.

2) Measure $\frac{DPCH\_E_c}{I_{or}}$ power averaged over [50 ms] during T1. T1 starts [10 ms] after DPDCH connection is initiated and T1 equals to [500 ms]

3) Measure $\frac{DPCH\_E_c}{I_{or}}$ power averaged over [50 ms] during T2. T2 starts, when T1 has expired and T2 equals to [500 ms]

7.8.2.5 Test Requirements

a) The measured downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be within the range specified in Table 7.8.2.2 during T1 with 90% confidence level.

b) The measured downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be within the range specified in Table 7.8.2.2 during T2 with 90% confidence level.

7.8.3 Power control in the downlink, wind up effects

7.8.3.1 Definition and applicability

This requirement verifies that, after the downlink maximum power is limited in the UTRAN and it has been released again, the downlink power control in the UE does not have a wind up effect, i.e. the required DL power has increased during time period the DL power was limited. Stage 1 is used for the power control to converge, during Stage 2 the maximum downlink power is limited by UTRAN and during Stage 3 the downlink power is released free and the downlink power is measured to detect that the power is lower than specified. The requirements and this test apply to all types of UTRA for the FDD UE.

7.8.3.2 Conformance requirements

This test is run in three stages where stage 1 is for convergence of the power control loop, in stage two the maximum downlink power for the dedicated channel is limited not to be higher than the parameter specified in Table 7.8.3.1. All parameters used in the three stages are specified in Table 7.8.3.1. The $\frac{DPCH\_E_c}{I_{or}}$ during stage 3 shall during 90 % of the time be lower than the value specified in Table 7.8.3.2. Power control of the UE is ON during the test.

Table 7.8.3.1: Test parameter for downlink power control, wind-up effects

Parameter	Test 1			Unit
	Stage 1	Stage 2	Stage 3	
Time in each stage	>15	5	0.5	s
$\hat{I}_{or}/I_{oc}$	5			dB
I_{oc}	-60			dBm/3.84 MHz
Information Data Rate	12.2			kbps
Max downlink $\frac{DPCH\_E_c}{}$	No limitation	[-15.7]	No limitation	dB

Quality target on DTCH	0.01	BLER
Propagation condition	Case 4	

Table 7.8.3.2: Requirements in downlink power control, wind-up effects

Parameter	Test 1, stage 3	Unit
$\frac{DPCH\_E_c}{I_{or}}$	[-12.9]	dB
Confidence level for $\frac{DPCH\_E_c}{I_{or}}$	[90]	%

The reference for this requirement is [1] TS 25.101 subclause 8.8.3.1.

7.8.3.3 Test purpose

To verify that the UE downlink power control does not require too high downlink power during a period after the downlink power is limited by the UTRAN.

7.8.3.4 Method of test

7.8.3.4.1 Initial conditions

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in Figure A.10.

2) Set up a call according to the Generic call setup procedure.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

7.8.3.4.2 Procedure

1) Measure $\frac{DPCH\_E_c}{I_{or}}$ power during stage 3 according to Table 7.8.3.1.

7.8.3.5 Test Requirements

The measured downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be lower than the level specified in table 7.8.3.2 during stage 3 with 90% confidence level.

TSG-T WG1 meeting #8 *Document* ***T1-000146***

Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 028 Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG	T#9	for approval	X	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: *(at least one should be marked with an X)*	USIM		ME	X	UTRAN		Core Network	

Source: T1/RF **Date:** 2000-08-31

Subject: Performance requirements

3G Work item:

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in a 2G specification			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:

- The corresponding clauses in Chapter 8 of the core specification TS 25.101 were modified according to the CRs 25.101-034, 050 and 052.

Clauses affected: 7.9, 7.10, 7.11

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other 2G core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

7.8.4 Method of test

7.8.4.1 Initial conditions

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in Figure A.10.

2) Set up a call according to the Generic call setup procedure.

3) RF parameters are set up according to Table 7.8.1 and Table E.3.3.

4) Enter the UE into loopback test mode and start the loopback test.

5) SS signals to UE target quality value on DTCH as specified in Table 7.8.1. SS will vary the physical channel power in downlink according to the TPC commands from UE. At the same time BLER is measured. This is continued until the target quality value on DTCH is met, within the minimum accuracy requirement.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

7.8.4.2 Procedure

1) After the target quality on DTCH is met, BLER is measured. Simultaneously the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power is measured. This is repeated until adequate amount of measurements is done to reach the required confidence level.

2) The measured quality on DTCH (BLER) and the measured average downlink $\frac{DPCH\_E_c}{I_{or}}$ power are compared to limits in Table 7.8.2.

7.8.5 Test Requirements

a) The measured quality on DTCH does not exceed the values in Table 7.8.2.

b) The average measured downlink $\frac{DPCH\_E_c}{I_{or}}$ power does not exceed the values in Table 7.8.2.

7.9 Void

Note: This subclause is kept for stable subclause numbering.

7.910 Downlink compressed mode

Downlink compressed mode is used to create gaps in the downlink transmission, to allow the UE to make measurements on other frequencies.

7.910.1 Single link performance

7.910.1.1 Definition and applicability

The receiver single link performance of the Dedicated Traffic Channel (DCH) in compressed mode is determined by the Block Error Ratio (BLER) and transmitted DPCH_Ec/Ior power in the downlink, average power in the downlink and the maximum power in the uplink.

The compressed mode parameters are given in clause C.54. Tests 1 and 2 are using Set 1 compressed mode pattern parameters from Table C.21 in clause C.5 while tests 3 and 4 are using Set 2 compressed mode patterns from the same table.

The requirements and this test apply to all types of UTRA for the FDD UE.

7.910.1.2 Conformance requirements

For the parameters specified in Table 7.910.1 the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the reported BLER shown in Table 7.910.2 and the measured quality on DTCH shall be as required in Table 7.9.2. The uplink DPDCH power shall be below the specified value.

Downlink power control is ON during the test. Uplink TPC commands shall be error free. System simulator shall increase the transmitted power during compressed frames by the same amount that UE is expected to increase its SIR target during those frames.

NOTE:

1. Inner loop power control is ON during the test.

Table 7.910.1: Test parameter for downlink compressed mode

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Delta SIR1	0		0		dB
Delta SIR after1	0		0		dB
Delta SIR2	0	0	0	0	dB
Delta SIR after2	0	0	0	0	dB
$\hat{I}_{or}/I_{oc}$	9				dB
I_{oc}	–60				dBm / 3.84 MHz
Information Data Rate	12.2				kbps
TFCI	On				-
Propagation condition	Case 2				
Target quality value on DTCH	0.01				BLER

Table 7.910.2: Requirements in downlink compressed mode

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
$\frac{DPCH\_E_c}{I_{or}}$					dB
Target quality					
Downlink BLER					
Uplink DPDCH	[Maximum power / slot]				dBm
Measured quality on DTCH	0.01 ± 30 %				BLER
Confidence level for measured quality and DPCH_Ec/Ior	[90]				%

The reference for this requirement is [1] TS 25.101 subclause 8.9.1.1.

7.910.1.3 Test purpose

It is the purpose of the test, to verify, that, due to temporary dynamic re-organisation of certain parameters in the DL compressed mode the BLER at the UE is preserved.

As the inner loop power control is running, controlling the DL power, it is furtheron verified, whether the preserved BLER is achieved by a sufficient low average DL power.

7.9~~10~~.1.4 Method of test

7.9~~10~~.1.4.1 Initial conditions

[TBD]

7.9~~10~~.1.4.2 Procedure

[TBD]

7.9~~10~~.1.5 Test requirements

[TBD]

7.10~~11~~ Blind transport format detection

7.10~~11~~.1 Definition and applicability

Performance of Blind transport format detection is determined by the Block Error Ratio (BLER) values and by the measured average transmitted DPCH_Ec/Ior value.

7.10~~11~~.2 Conformance requirements

For the parameters specified in Table 7.10~~11~~.1 the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power shall be below the specified value for the BLER and FDR shown ~~the BLER and FDR shall not exceed the piece-wise linear BLER curve specified by the points~~ in T~~t~~able 7.10~~11~~.2.

Table 7.11.1: Test parameters for Blind transport format detection

Parameter	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Unit
$\hat{I}_{or}/I_{oc}$	–1			–3			dB
I_{oc}	–60						dBm / 3.84 MHz
Information Data Rate	12.2 (rate 1)	7.95 (rate 2)	1.95 (rate 3)	12.2 (rate 1)	7.95 (rate 2)	1.95 (rate 3)	kbps
propagation condition	static			multi-path fading case 3			-
TFCI	off						-

Table 7.10~~11~~.2: The Requirements for DCH reception in Blind transport format detection

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER	FDR
1	[–17.7dB]	10^{-2}	10^{-4}
2	[–17.8dB]	10^{-2}	10^{-4}
3	[–18.4dB]	10^{-2}	10^{-4}
4	[–13.0dB]	10^{-2}	10^{-4}
5	[–13.2dB]	10^{-2}	10^{-4}
6	[–13.8dB]	10^{-2}	10^{-4}

* The value of DPCH_Ec/Ior, Ioc, and Ior/Ioc are defined in case of DPCH is transmitted

Note: In the test, 9 deferent Transport Format Combinations (Table.7.10~~11~~.3) are sent ~~informed~~ during the call set up procedure, so that UE has ~~have~~ to detect correct transport format in this 9 candidates.

Table.7.10~~11~~.3: Transport format combinations informed during the call set up procedure in the test

	1	2	3	4	5	6	7	8	9
DTCH	12.2k	10.2k	7.95k	7.4k	6.7k	5.9k	5.15k	4.75k	1.95k
DCCH					2.4k				

7.10~~11~~.3 Test purpose

To verify the ability of the blind transport format detection to receive a predefined test signal, representing a static propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a block error ratio (BLER) and false transport format detection ratio (FDR) not exceeding a specified value.

To verify the ability of the blind transport format detection to receive a predefined test signal, representing a malti-path propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a block error ratio (BLER) and false transport format detection ratio (FDR) not exceeding a specified value.

7.10~~11~~.4 Method of test

7.10~~11~~.4.1 Initial conditions

1. Connect the SS and AWGN noise source to the UE antenna connector as shown in Figure A.9 in the case for test 1-3. Connect the SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in Figure A.10 in the case of test 4-6.
2. Set up a call according to the Generic call setup procedure.
3. Set the test parameters for test 1-6 as specified Table 7.10~~11~~.1 and Table 7.10~~11~~.2.
4. Enter the UE into loopback test mode and start the loopback test.
5. In the case of test 4-6, Setup fading simulator as fading condition case 3 which are described in Table D.2.2.1.

7.10~~11~~.4.2 Procedure

Measure BLER and FDR of DCH.

7.10~~11~~.5 Test requirements

BLER and FDR shall not exceed the values at the DPCH_Ec/Ior specified ~~value at the DPCH_Ec/Ior specified~~ in Table 7.10~~11~~.2.

TSG-T WG1 meeting #8 ***Document*** ***T1-000147***
Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121	**CR**	**029**	Current Version:	3.1.0
3G specification number ↑		*↑ CR number as allocated by 3G support team*		

For submission to TSG	T#9	for approval	X	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: *(at least one should be marked with an X)*	USIM		ME	X	UTRAN		Core Network	

Source:	T1/RF	**Date:**	2000-08-31
Subject:	Corrections for Annex D		
3G Work item:			

Category:				**Release:**		
	F	Correction	X		Phase 2	
	A	Corresponds to a correction in a 2G specification			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:

- The corresponding Annex B "Propagation Conditions" in the core specification TS 25.101 was modified according to the CRs 25.101-049 and 061.

Clauses affected: Annex D

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other 2G core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

Annex D (normative): Propagation Conditions

D.1 General

D.2 Propagation Conditions

D.2.1 Static propagation condition

The propagation for the static performance measurement is an Additive White Gaussian Noise (AWGN) environment. No fading and multi-paths exist for this propagation model.

D.2.2 Multi-path fading propagation conditions

Table D.2.2.1 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

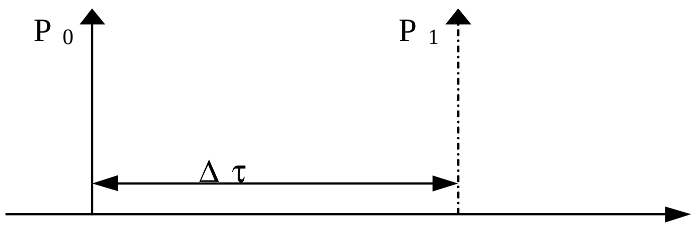
Table D.2.2.1: Propagation condition for multi-path fading environments

Case 1, speed 3km/h		Case 2, speed 3 km/h		Case 3, 120 km/h		Case 4, 3 km/h		Case 5, 50 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]	Relative Delay [ns]	Average Power [dB]
0	0	0	0	0	0	0	0	0	0
976	–10	976	0	260	–3	976	0	976	–10
		20000	0	521	–6				
				781	–9				

Note Case 5 is only used in Requirements for support of RRM.

D.2.3 Moving propagation conditions

The dynamic propagation conditions for the test of the baseband performance are non fading channel models with two taps. The moving propagation condition has two taps, one static, Path0, and one moving, Path1. The time difference between the two paths is according Equation D.2.3.1. The taps have equal strengths and equal phases.



$$\Delta\tau = \left(1 + \frac{A}{2}\left(1 + \sin\left(\Delta\omega \cdot t\right)\right)\right)$$

Figure D.2.3.1: The moving propagation conditions

$$\Delta\tau = B + \frac{A}{2}\left(1 + \sin(\Delta\omega \cdot t)\right) \quad \Delta\tau = \left(1 + \frac{A}{2}\left(1 + \sin(\Delta\omega \cdot t)\right)\right)$$ **Equation D.2.3.1**

The parameters in the equation are shown in.

A	5 µs
B	1 µs
Δω	$40 \cdot 10^{-3}\ s^{-1}$

D.2.4 Birth-Death propagation conditions

The dynamic propagation conditions for the test of the baseband performance is a non fading propagation channel with two taps. The moving propagation condition has two taps, Path1 and Path2 while alternate between 'birth' and 'death'. The positions the paths appear are randomly selected with an equal probability rate and are shown in Figure D.2.4.1.

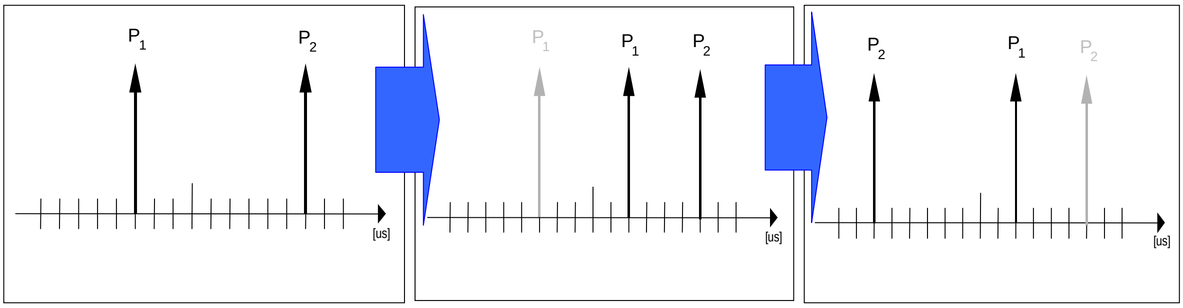


Figure D.2.4.1: Birth death propagation sequence

NOTE:

1. Two paths, Path1 and Path2 are randomly selected from the group [-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5] µs. The paths have equal strengths and equal phases.
2. After 191 ms, Path1 vanishes and reappears immediately at a new location randomly selected from the group [-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5] µs but excludes the point Path2.
3. After additional 191 ms, Path2 vanishes and reappears immediately at a new location randomly selected from the group [-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5] µs but excludes the point Path1.
4. The sequence in 2) and 3) is repeated.

TSG-T WG1 meeting #8 **Document** ***T1-000148***

Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121	**CR**	**030**	Current Version:	3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG	T#9	for approval	X	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)*	USIM		ME	X	UTRAN		Core Network	

Source:	T1/RF	**Date:**	2000-08-31
Subject:	Corrections for Annex E		
3G Work item:			

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in a 2G specification			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:

- The corresponding Annex C "Downlink Physical Channels" in the core specification TS 25.101 was modified according to the CR 25.101-058.

Clauses affected: Annex E

Other specs affected:	Other 3G core specifications		→ List of CRs:
	Other 2G core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

Annex E (normative): Downlink Physical Channels

E.1 General

This Normative annex specifies the downlink physical channels that are needed for setting a connection and channels that are needed during a connection.

E.2 Connection Set-up

Table E.2.1 describes the downlink Physical Channels that are required for connection set up.

Table E.2.1: Downlink Physical Channels required for connection set-up

Physical Channel
CPICH
PCCPCH
SCH
SCCPCH
PICH
AICH
DPCH

E.3 During connection

The following clauses describe the downlink Physical Channels that are transmitted during a connection i.e., when measurements are done. For these measurements the offset between DPCH and SCH shall be zero chips at base station meaning that SCH is overlapping with the first symbols in DPCH in the beginning of DPCH slot structure.

E.3.1 Measurement of Tx Characteristics

Table E.3.1 is applicable for measurements on the Transmitter Characteristics (clause 5) with the exception of subclauses 5.3 (Frequency Stability), 5.4.1 (Open Loop Power Control in the Uplink), and 5.5.2 (Transmit ON/OFF Time mask). For these cases, the power levels of Îor and DPCH are defined individually.

NOTE: Applicability to subclause 5.7 (Power setting in uplink compressed mode) is FFS.

Table E.3.1: Downlink Physical Channels transmitted during a connection

Physical Channel	Power
Îor	–93 dBm / 3.84MHz
CPICH	CPICH_Ec / DPCH_Ec = 7 dB
PCCPCH	PCCPCH_Ec / DPCH_Ec = 5 dB
SCH	SCH_Ec / DPCH_Ec = 5 dB
PICH	PICH_Ec / DPCH_Ec = 2 dB
DPCH	–103.3 dBm / 3.84MHz

E.3.2 Measurement of Rx Characteristics

Table E.3.2 is applicable for measurements on the Receiver Characteristics (clause 6) with the exception of subclause 6.3 (Maximum input level).

Table E.3.2: Downlink Physical Channels transmitted during a connection

Physical Channel	Power
CPICH	CPICH_Ec / DPCH_Ec = 7 dB
PCCPCH	PCCPCH_Ec / DPCH_Ec = 5 dB
SCH	SCH_Ec / DPCH_Ec = 5 dB
PICH	PICH_Ec / DPCH_Ec = 2 dB
DPCH	Test dependent power

E.3.3 Measurement of Performance requirements

Table E.3.3 is applicable for measurements on the Performance requirements (clause 7), including subclause 6.3 (Maximum input level), excluding subclauses 7.6.1 (Demodulation of DCH in open loop transmit diversity mode) and 7.6.2 (Demodulation of DCH in closed loop transmit diversity mode).

Table E.3.3: Downlink Physical Channels transmitted during a connection[1]

Physical Channel	Power	Note
P-CPICH	P-CPICH_Ec/Ior = –10 dB	Use of P-CPICH or S-CPICH as phase reference is specified for each requirement and is also set by higher layer signalling.
S-CPICH	S-CPICH_Ec/Ior = –10 dB	When S-CPICH is the phase reference in a test condition, the phase of S-CPICH shall be 180 degrees offset from the phase of P-CPICH. When S-CPICH is not the phase reference, it is not transmitted.
PCCPCH	PCCPCH_Ec/Ior = –12 dB	
SCH	SCH_Ec/Ior = –12 dB	This power shall be divided equally between Primary and Secondary Synchronous channels
PICH	PICH_Ec/Ior = –15 dB	
DPCH	Test dependent power	When S-CPICH is the phase reference in a test condition, the phase of DPCH shall be 180 degrees offset from the phase of P-CPICH.
OCNS	Necessary power so that total transmit power spectral density of BS (Ior) adds to one	

E.3.4 Connection with open-loop transmit diversity mode

Table E.3.4 is applicable for measurements for subclause 7.6.1(Demodulation of DCH in open loop transmit diversity mode)

[1] Power levels are based on the assumption that multipath propagation conditions and noise source representing interference from other cells Ioc are turned on after the call set-up phase.

Table E.3.4: Downlink Physical Channels transmitted during a connection[2]

Physical Channel	Power	Note
P-CPICH (antenna 1)	P-CPICH_E_{c1}/I_{or} = –13 dB	1. Total P-CPICH_E_c/I_{or} = –10 dB
P-CPICH (antenna 2)	P-CPICH_E_{c2}/I_{or} = –13 dB	
PCCPCH (antenna 1)	PCCPCH_E_{c1}/I_{or} = –15 dB	1. STTD applied 2. Total PCCPCH_E_c/I_{or} = –12 dB
PCCPCH (antenna 2)	PCCPCH_E_{c2}/I_{or} = –15 dB	
SCH (antenna 1 / 2)	SCH_E_c/I_{or} = –12 dB	1. TSTD applied. 2. This power shall be divided equally between Primary and Secondary Synchronous channels
PICH (antenna 1)	PICH_E_{c1}/I_{or} = –18 dB	1. STTD applied 2. Total PICH_E_c/I_{or} = –15 dB
PICH (antenna 2)	PICH_E_{c2}/I_{or} = –18 dB	
DPCH	Test dependent power	1. STTD applied 2. Total power from both antennas
OCNS	Necessary power so that total transmit power spectral density of BS (I_{or}) adds to one	1. This power shall be divided equally between antennas

E.3.5 Connection with closed loop transmit diversity mode

Table E.3.5 is applicable for measurements for subclause 7.6.2 (Demodulation of DCH in closed loop transmit diversity mode)

Table E.3.5: Downlink Physical Channels transmitted during a connection[3]

Physical Channel	Power	Note
P-CPICH (antenna 1)	P-CPICH_Ec1/Ior= –13 dB	1. Total P-CPICH_Ec/Ior = –10 dB
P-CPICH (antenna 2)	P-CPICH_Ec2/Ior= –13 dB	
PCCPCH (antenna 1)	PCCPCH_Ec1/Ior = –15 dB	1. STTD applied
PCCPCH (antenna 2)	PCCPCH_Ec2/Ior = –15 dB	1. STTD applied, total PCCPCH_Ec/Ior = –12 dB
SCH (antenna 1 / 2)	SCH_Ec/Ior = –12 dB	1. TSTD applied
PICH (antenna 1)	PICH_Ec1/Ior = –18 dB	1. STTD applied 2. STTD applied, total PICH_Ec/Ior = –15 dB
PICH (antenna 2)	PICH_Ec2/Ior = –18 dB	
DPCH	Test dependent power	1. Total power from both antennas
OCNS	Necessary power so that total transmit power spectral density of BS (Ior) adds to one	1. This power shall be divided equally between antennas

[2] Power levels are based on the assumption that multipath propagation conditions and noise source representing interference from other cells Ioc are turned on after the call set-up phase.

[3] Power levels are based on the assumption that multipath propagation conditions and noise source representing interference from other cells Ioc are turned on after the call set-up phase.

TSG-T WG1 meeting #8 | ***Document* T1-000149**

Naantali, Finland, 31st Aug- 1st Sep, 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.121 CR 031 Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG	T#9	for approval	X	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: *(at least one should be marked with an X)*	USIM		ME	X	UTRAN		Core Network	

Source:	T1/RF	**Date:**	2000-08-31

Subject:	Corrections for Transmit ON/OFF Power, Change of TFC and Power setting in uplink compressed mode
3G Work item:	

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in a 2G specification			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:

- The corresponding clause 6.5 "Transmit ON/OFF power" in the core specification TS 25.101 were modified according to the CRs 25.101-052, 054 and 055.
- Removal of unnecessary test parameters.

Clauses affected: 5.5, 5.6, 5.7

Other specs affected:	Other 3G core specifications		→ List of CRs:
	Other 2G core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

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 Toff = [200] ms after point B.
3. The UE shall not turn its transmitter on between points C and E.
4. The UE may turn its transmitter on after point E.

The reference for this requirement is [1] TS 25.101 subclause 6.4.4.1.

5.4.4.3 Test purpose

[TBD]

5.4.4.4 Method of test

5.4.4.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.
2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.4.4.2.
3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

Table 5.4.4.2: Test parameters for test of Out-of-synch handling

Parameter	Level / Status	Unit

5.4.4.4.2 Procedure

[TBD]

5.4.4.5 Test requirements

[TBD]

5.5 Transmit ON/OFF Power

5.5.1 Transmit OFF Power

5.5.1.1 Definition and applicability

The transmit OFF power state is when the UE does not transmit except during uplink ~~DTX~~compressed mode. This parameter is defined as the maximum output transmit power within the channel bandwidth when the transmitter is OFF.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.5.1.2 Conformance requirements

The transmit OFF power is defined as an averaged power at least in a timeslot duration, excluding any transient periods, measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The requirement for the transmit OFF power shall be better than –56 dBm.

The reference for this requirement is [1] TS 25.101 subclause 6.5.1.1.

5.5.1.3 Test purpose

To verify that the UE transmit OFF power is below –56 dBm.

An excess transmit OFF power increases the interference to other channels, and decreases the system capacity.

5.5.1.4 Method of test

This test is also covered by subclause 5.5.2 Transmit ON/OFF Time mask.

5.5.1.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Annex E.3.1.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

5.5.1.4.2 Procedure

1) Send release message to the UE to stop transmitting.

2) Measure the leakage power within the transmission band from the UE by the Tester.

5.5.1.5 Test requirements

The measured leakage power, derived in step 2), shall be below –56 dBm.

5.5.2 Transmit ON/OFF Time mask

5.5.2.1 Definition and applicability

The time mask for transmit ON/OFF defines the ramping time allowed for the UE between transmit OFF power and transmit ON power. Possible ON/OFF scenarios are PRACH, CPCH or uplink ~~slotted~~compressed mode

The requirements and this test apply to all types of UTRA for the FDD UE.

5.5.2.2 Conformance requirements

The transmit power levels versus time ~~should~~shall meet the mask specified in Figure 5.5.1 for PRACH preambles, and the mask in Figure 5.5.2 for all other cases. The signal is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

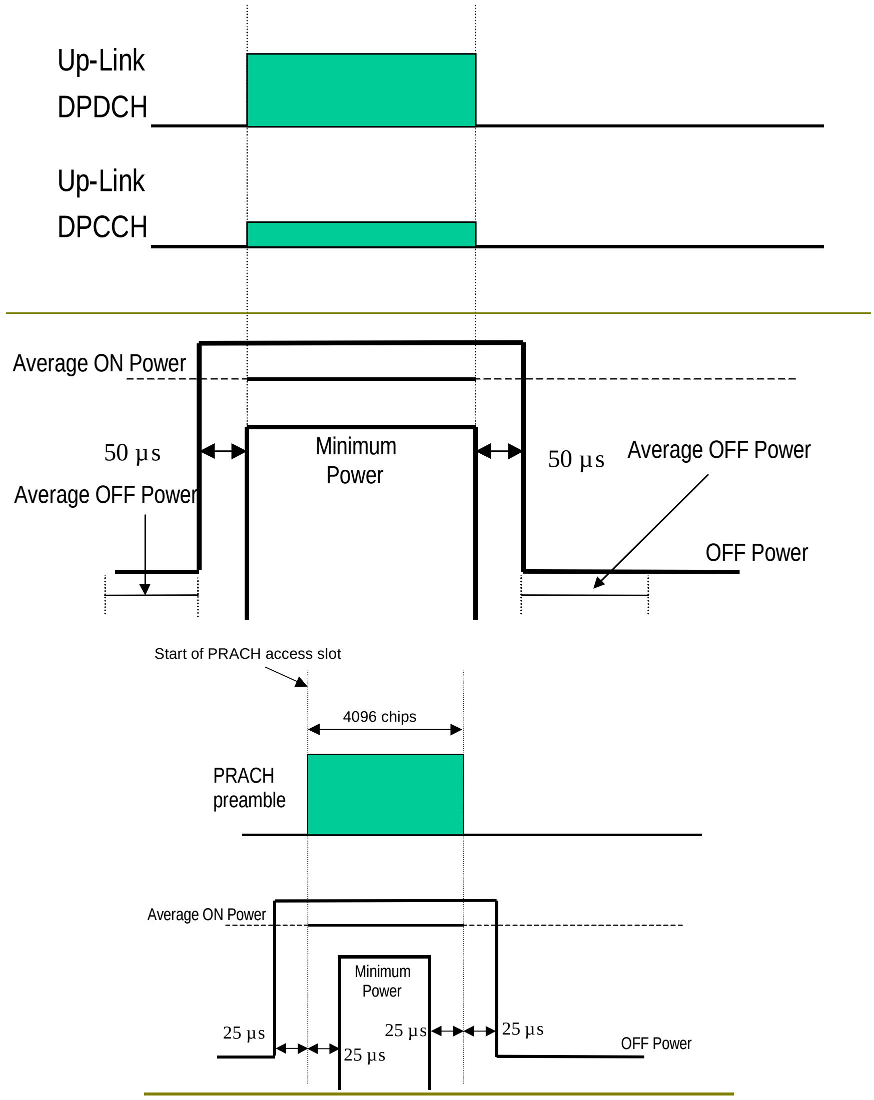


Figure 5.5.1: Transmit ON/OFF template for PRACH preambles

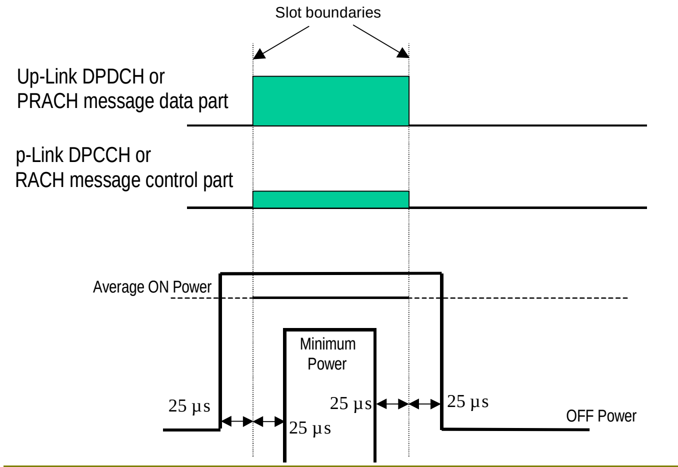


Figure 5.5.2: Transmit ON/OFF template for all other On/Off cases

OFF Power is defined in 5.5.1.

ON power is defined as either case as follows. The specification depends on each possible case.

- First preamble of PRACH: Open loop accuracy (~~subclause 5.4.1~~Table 5.4.1.1).

- During preamble ramping of the RACH and between final RACH preamble and RACH message part ~~compressed mode~~: Accuracy depending on size of the ~~power step~~required power difference (~~subclause 5.6~~Table 5.5.2.1).
- After transmission gaps in compressed mode: Accuracy as in Table 5.7.1.
- Power step to Maximum Power: Maximum power accuracy (~~subclause 5.2~~Table 5.2.1).

Table 5.5.2.1: Transmitter power difference tolerance for RACH preamble ramping, and between final RACH preamble and RACH message part

Power difference size ΔP [dB]	Transmitter power difference tolerance [dB]
0	+/- 1 dB
1	+/- 1 dB
2	+/- 1.5 dB
3	+/- 2 dB
$4 \le \Delta P \le 10$	+/- 2.5 dB
$11 \le \Delta P \le 15$	+/- 3.5 dB
$16 \le \Delta P \le 20$	+/- 4.5 dB
$21 \le \Delta P$	+/- 6.5 dB

The reference for this requirement is [1] TS 25.101 subclause 6.5.2.1.

This is tested using PRACH operation.

The minimum requirement for ON power is defined in subclause 5.4.1.2.

The minimum requirement for OFF power is defined in subclause 5.5.1.2.

Note: The main objective for this test case is to check the ramp-up/down power shape. A test case using the first preamble of PRACH is enough to cover the objective.

5.5.2.3 Test purpose

To verify that the UE transmit ON/OFF power levels versus time meets the described mask shown in Figure 5.5.1 and Figure 5.5.2.

An excess error of transmit ON/OFF response increases the interference to other channels, or increases transmission errors in the up link own channel.

5.5.2.4 Method of test

5.5.2.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.
2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Table 5.5.2.~~1~~2.

   The RACH procedure within the call setup is used for the test.

See [3] TS 34.108 for details regarding generic call setup procedure.

Table 5.5.2.~~1~~2: Test parameters for Transmit ON/OFF Time mask (UE)

Parameter	Level / Status	Unit
$\hat{I}_{or}$	See Table 5.5.2.2	dBm / 3.84 MHz
~~Inner Loop Power Control~~	~~Disabled~~	

Table 5.5.2.~~2~~3: Test parameters for Transmit ON/OFF Time mask (SS)

Parameter	Upper dynamic range	middle	Sensitivity level
$\hat{I}_{or}$ 3)	[–25.0 dBm / 3.84 MHz]	[–65.7 dBm / 3.84 MHz]	[–106.7 dBm / 3.84 MHz]
CPICH_RSCP 3),4)	[–28.3 dBm]	[–69 dBm]	[–110 dBm]
Primary CPICH DL TX power	[+25 dBm]	[+31 dBm]	[+19 dBm]
Simulated path loss = Primary CPICH DL TX power – CPICH_RSCP	[+53.3 dB]	[+100 dB]	[+129 dB]
UL interference	[–75 dB~~m~~]	[–101 dB~~m~~]	[–110 dB~~m~~]
Constant Value	[–10 dB]	[–10 dB]	[–10 dB]
Expected nominal UE TX power	[–31.7 dBm]	[–11 dBm]	[+9 dBm] 2)

NOTE 1: While the SS transmit power shall cover the receiver input dynamic range, the logical parameters: broadcasted transmit power, I_{BTS}, constant factor are chosen to achieve a UE TX power, located within the TX output power dynamic range of a class 4 UE.

NOTE 2: Nominal TX output power 9 dBm allows to check the open loop power algorithm within the entire tolerance range (9 dBm ± 12 dB; 9dBm + 12dB = 21dBm = max power class 4).

NOTE 3: The power level of SCCPCH should be defined because SCCPCH is transmitted instead of DPCH during Preamble RACH transmission period. Currently, it is assumed that Table E.3.1 is utilised for DL physical channel condition. The power level of SCCPCH is temporarily set to the same as DL DPCH. However, it is necessary to check whether the above SCCPCH level is enough to establish a connection with the reference measurement channels.

NOTE 4: The purpose of this parameter is to calculate the Expected nominal UE TX power.

5.5.2.4.2 Procedure

1) Set the TX output level of the SS to obtain $\hat{I}_{or}$ at the UE antenna connector. $\hat{I}_{or}$ shall be according to Table 5.5.2.~~2~~3 ([–25 dBm / 3.84 MHz]).
2) Measure the RACH output power of the UE according to Annex B. The measurements shall not include the transient periods.
3) Measure OFF power immediate before and after RACH (ON power) except transient period.
4) Repeat the above measurement for all SS levels in Table 5.5.2.~~2~~3.

5.5.2.5 Test requirements

The deviation with respect to the Expected nominal UE TX power (Table 5.5.2.~~2~~3), derived in step 2), shall not exceed the prescribed tolerance in Table 5.4.1.1. (Subclause 5.4.1.2).

The measured leakage power, derived in step 3), shall be below –56 dBm. (Subclause 5.5.1.2).

5.6 Change of TFC

5.6.1 Definition and applicability

A change of TFC (Transport Format Combination) in uplink means that the power in the uplink varies according to the change in data rate. DTX, where the DPCH is turned off, is a special case of variable data, which is used to minimise the interference between UE(s) by reducing the UE transmit power when voice, user or control information is not present.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.6.2 Conformance requirements

A change of output power is required when the TFC, and thereby the data rate, is changed. The ratio of the amplitude between the DPDCH codes and the DPCCH code will vary. The power step due to a change in TFC shall be calculated in the UE so that the power transmitted on the DPCCH shall follow the inner loop power control. The step in total transmitted power ~~step~~(DPCCH + DPDCH) shall then be rounded to the closest integer dB value. A power step exactly half-way between two integer values shall be rounded to the closest integer of greater magnitude. The accuracy of the power step, given the step size is specified in Table 5.6.1. The power change ~~by~~due to a change in TFC is defined as the relative power difference~~s~~ between the average~~d~~ power of the original (reference) timeslot and the average~~d~~ power of the target timeslot~~ without~~, not including the transient duration. ~~And they are~~The transient duration is from 25µs before the slot boundary to 25µs after the slot boundary. The power is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

Table 5.6.1: Transmitter power step tolerance

Power control step size (Up or down) ΔP [dB]	Transmitter power step tolerance
0	+/– 0.5 dB
1	+/– 0.5 dB
2	+/– 1.0 dB
3	+/– 1.5 dB
4 ≤ ΔP ≤ ~~10~~10	+/– 2.0 dB
11 ≤ ΔP ≤ ~~15~~15	+/– 3.0 dB
16 ≤ ΔP ≤ 20	+/– 4.0 dB
21 ≤ ΔP	+/– 6.0 dB

Clause C.2.1 defines the UL reference measurement channels (12,2 kbps) for TX test and the power ratio between DPCCH and DPDCH as –~~6~~ 5.46 dB. Therefore, only one power control step size is selected as minimum requirement from Table 5.6.1. The accuracy of the power step, given the step size is specified in Table 5.6.2.

Table 5.6.2: Transmitter power step tolerance for test

Quantized amplitude ratios β_c and β_d	Power control step size (Up or down) ΔP [dB]	Transmitter power step tolerance
$\beta_c = 0.5333$, $\beta_d = 1.0$	7	+/– 2 dB

The transmit power levels versus time ~~should~~shall meet the mask specified in Figure 5.6.1.~~ When power increases the power step shall be performed before the frame boundary, when power decreases the power step shall be performed after the frame boundary.~~

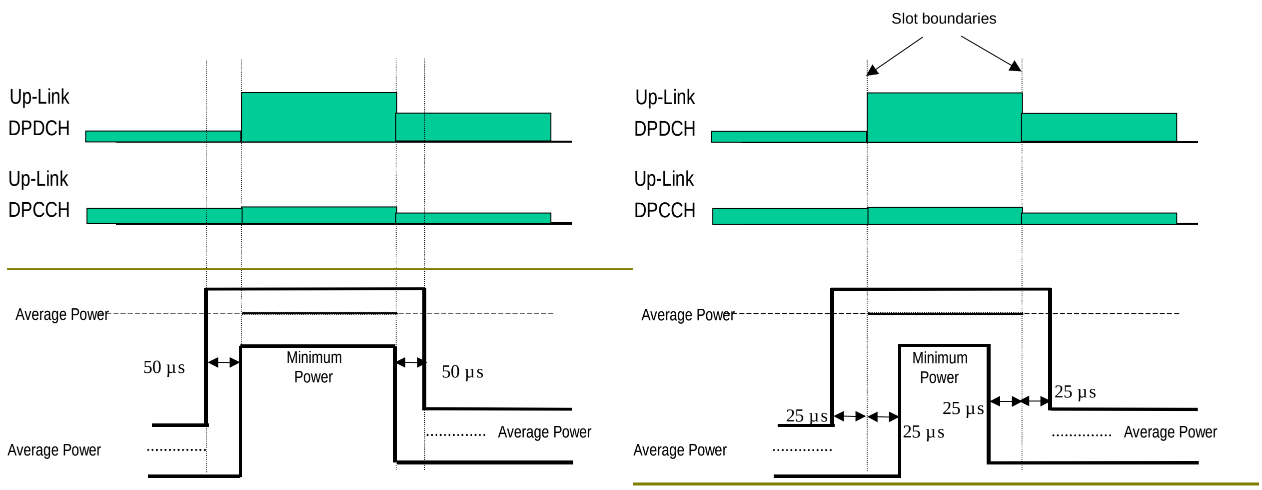


Figure 5.6.1: Transmit template during TFC change

The UL reference measurement channel (12.2 kbps) is a fixed rate channel. Therefore, DTX, where the DPDCH is turned off, is tested, as shown in Figure 5.6.2.

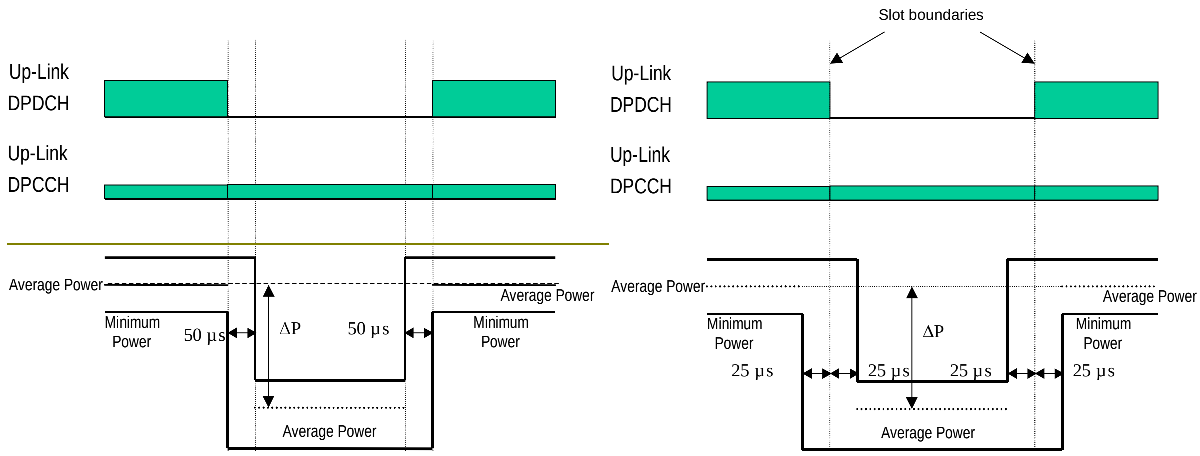


Figure 5.6.2: Transmit template during DTX

The reference for this requirement is [1] TS 25.101 subclause 6.5.3.1.

5.6.3 Test purpose

To verify that the tolerance of power control step size does not exceed the described value shown in Table 5.6.2.

To verify that the DTX ON/OFF power levels versus time meets the described mask shown in Figure 5.6.2.

5.6.4 Method of test

5.6.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure, and RF parameters are set up according to Annex E. The Uplink DPCH Power Control Info shall specify the Power Control Algorithm as algorithm 2 for interpreting TPC commands.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

5.6.4.2 Procedure

1) Set the attenuation in the downlink signal ($\hat{I}_{or}$) to yield an open loop output power, measured at the UE antenna connector, of 0 dBm.

2) Send alternating "0" and "1" TPC commands in the downlink so as to satisfy the condition of obtaining TPC_cmd = 0.

3) Measure the average output power at the antenna connector of the UE by Tester in two cases, both DPDCH and DPCCH are ON and only DPCCH is ON. The measurements shall not include the transient periods.

5.6.5 Test requirements

The difference in mean output power between DPDCH ON and OFF, derived in step 3), shall not exceed the prescribed range in Table 5.6.2.

5.7 Power setting in uplink compressed mode

5.7.1 Definition and applicability

Compressed mode in uplink means that the power in uplink is changed.

The requirements and this test apply to all types of UTRA for the FDD UE.

5.7.2 Conformance requirements

A change of output power is required during uplink compressed frames since the transmission of data is performed in a shorter interval. The ratio of the amplitude between the DPDCH codes and the DPCCH code will also vary. The power step due to compressed mode shall be calculated in the UE so that the energy transmitted on the pilot bits during each transmitted slot shall follow the inner loop power control.

Thereby ~~the power step during the transmitted part of a compressed frame~~, the power during compressed mode, and immediately afterwards, shall be such that the power on the DPCCH follows the steps due to inner loop power control ~~with an additional power offset during a compressed frame of Npilot,N / Npilot,C where Npilot,C is the number of pilot bits per slot when in compressed mode, and Npilot,N is the number of pilot bits per slot in normal mode~~combined with additional steps of $10\mathrm{Log}_{10}(N_{pilot.prev} / N_{pilot.curr})$ dB where $N_{pilot.prev}$ is the number of pilot bits in the previously transmitted slot, and $N_{pilot.curr}$ is the current number of pilot bits per slot.

The resulting step in total transmitted power (DPCCH +DPDCH) shall then be rounded to the closest integer dB value. A power step exactly half-way between two integer values shall be rounded to the closest integer of greatest magnitude. The accuracy of the power step, given the step size, is specified in Table 5.6.1 in subclause 5.6.2. The power step is defined as the relative power difference between the average power of the original (reference) timeslot and the average power of the target timeslot, when neither the original timeslot nor the reference timeslot are in a transmission gap. The transient duration is not included, and is from 25μs before the slot boundary to 25μs after the slot boundary. The relative power is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off α = 0.22 and a bandwidth equal to the chip rate.

In addition to any power change due to the ratio ~~$N_{pilot,N}$~~$N_{pilot.prev}$ / ~~$N_{pilot,C}$~~$N_{pilot.curr}$, the average power of the DPCCH in the first slot after a compressed mode transmission gap shall differ from the average power in the last slot before the transmission gap by an amount Δ_{RESUME}, where Δ_{RESUME} is calculated as described in subclause 5.1.2.3 of [5] TS 25.214.

The resulting difference in the total transmitted power (DPCCH + DPDCH) shall then be rounded to the closest integer dB value. A power difference exactly half-way between two integer values shall be rounded to the closest integer of greatest magnitude. The accuracy of the resulting difference in the total transmitted power (DPCCH + DPDCH) after a transmission gap of up to 14 slots shall be as specified in Table 5.7.1.

Table 5.7.1: Transmitter power difference tolerance after a transmission gap of up to 14 slots

Tolerance on required difference in total transmitter power after a transmission gap
+/- 3 dB

~~The combined power step shall then be rounded to the closest integer dB value. The accuracy of the power step, given the step size is specified in Table 5.6.1 in paragraph 5.6.2.~~ The power ~~step~~difference is defined as the relative power difference~~s~~ between the average power of the original (reference) timeslot before the transmission gap and ~~-~~the average~~d~~ power of the target timeslot after the transmission gap, not including the transient durations. The transient durations at the start and end of the transmission gaps are each from 25μs before the slot boundary to 25μs after the slot boundary. ~~During the compress mode, the average should be done in only either power ON duration.~~ The relative power is measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off α = 0.22 and a bandwidth equal to the chip rate.

The transmit power levels versus time shall meet the mask specified in Figure 5.7.1. ~~When power increases the power step shall be performed before the actual slot boundary, when power decreases the power step shall be performed after the actual slot boundary.~~

The reference for this requirement is [1] TS 25.101 subclause 6.5.4.1.

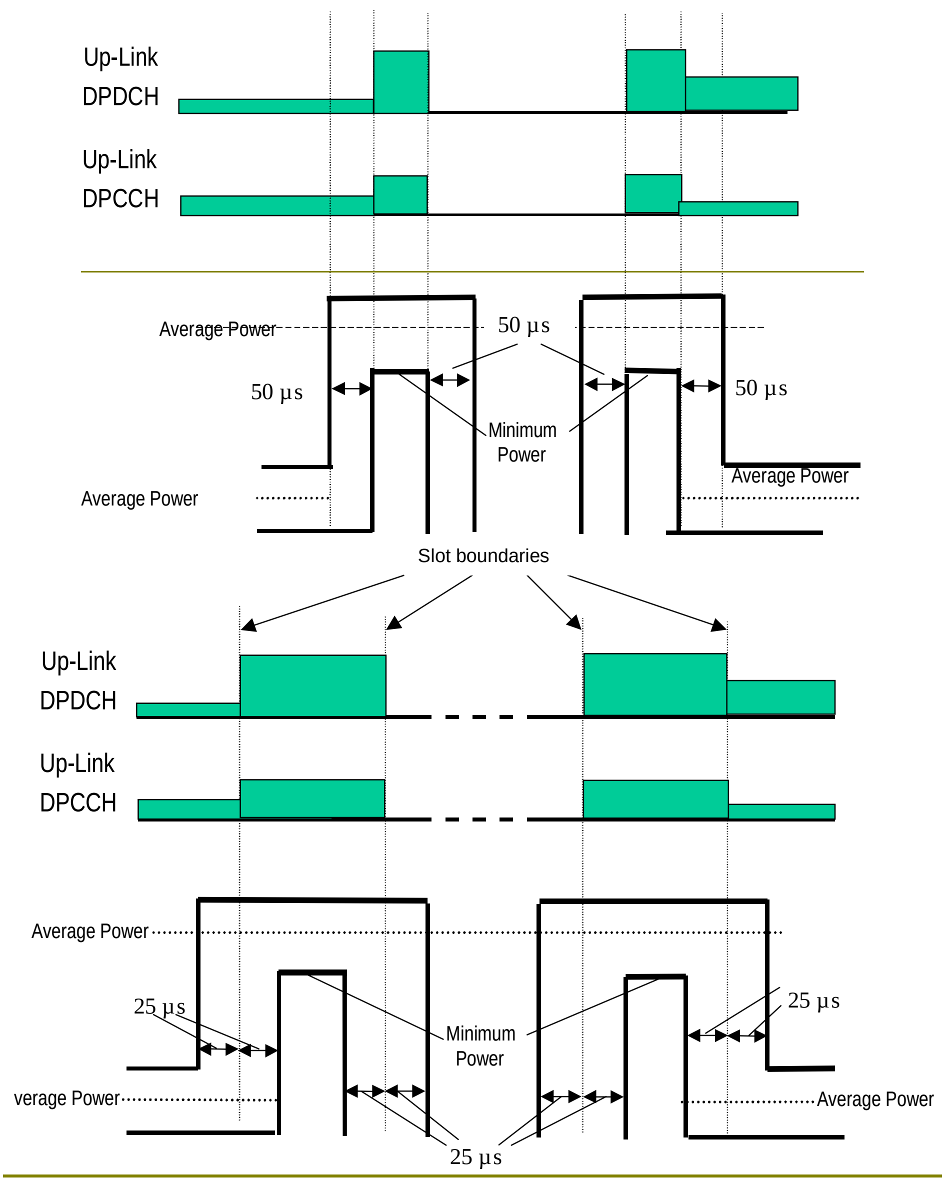


Figure 5.7.1: Transmit template during Compressed mode

The mean power in the transmission gaps, not including the 50 µs transition periods, shall be less than –56 dBm. The reference for this requirement is [1] TS 25.101 subclause 6.5.1.1.

For RPL (Recovery Period Length) slots after the transmission gap, where RPL is the minimum out of the transmission gap length and 7 slots, the UE shall use the power control algorithm and step size specified by the signalled Power Control Mode, as detailed in TS 25.214 subclause 5.1.2.3.

When nominal 3 dB power control steps are used in the recovery period, the transmitter output power steps due to inner loop power control shall be within the range shown in Table 5.7.2, and the transmitter average output power step due to inner loop power control shall be within the range shown in Table 5.7.3, excluding any other power changes due, for example, to changes in spreading factor or number of pilot bits.

Table 5.7.2: Transmitter power control range for 3dB step size

TPC_cmd	Transmitter power control range for 3dB step size	
	Lower	Upper
+ 1	+1.5 dB	+4.5 dB
0	–0.5 dB	+0.5 dB
– 1	–1.5 dB	–4.5 dB

Table 5.7.3: Transmitter average power control range for 3dB step size

TPC_cmd group	Transmitter power control range after 7 equal TPC_cmd groups	
	Lower	Upper
+ 1	+16 dB	+26 dB
0	–2 dB	+2 dB
– 1	–16 dB	–26 dB

The reference for this requirement is [1] TS 25.101 subclause 6.4.2.1.1.

5.7.3 Test purpose

To verify that the changes in uplink transmit power in compressed mode are within the prescribed tolerances.

Excess error in transmit power setting in compressed mode increases the interference to other channels, or increases transmission errors in the uplink.

5.7.4 Method of test

5.7.4.1 Initial conditions

1) Connect the SS to the UE antenna connector as shown in Figure A.1.

2) A call is set up according to the Generic call setup procedure~~, and RF parameters are set up according to Table 5.7.4~~. The 12.2 kbps UL reference measurement channel is used, with gain factors $\beta_c = 0.5333$ and $\beta_d = 1$.

3) Enter the UE into loopback test mode and start the loopback test.

See [3] TS 34.108 and [4] TS 34.109 for details regarding generic call setup procedure and loopback test.

~~**Table 5.7.4: Test parameters for Power Setting in Uplink Compressed Mode**~~

~~Parameter~~	~~Level / Status~~	~~Unit~~
~~Inner Loop Power Control~~	~~Enabled~~	

5.7.4.2 Procedure

<Editor's Note: The following procedure and test requirements are still under discussion. This might not be consistent with the core specification TS25.101 until the next revision.>

1) Set the attenuation in the downlink signal (Îor) to yield an open loop output power, measured at the UE antenna connector, of –10 dBm.

2) Signal the uplink power control parameters to use Algorithm 1 and a step size of 2 dB.

3) Use Slot Format #0 on the uplink DPCCH.

4) During the time period between CFN #57 and CFN #253, signal the following sets of compressed mode parameters. These sets of compressed mode parameters define 5 compressed mode patterns which are used for the test between CFN #254 and CFN #56.

Pattern A

This set of compressed mode parameters results in a set of 5 uplink frames in which the first 2 frames are compressed, with a 10-slot transmission gap beginning at the 11th slot of the first compressed frame, as shown in Figure 5.7.2.

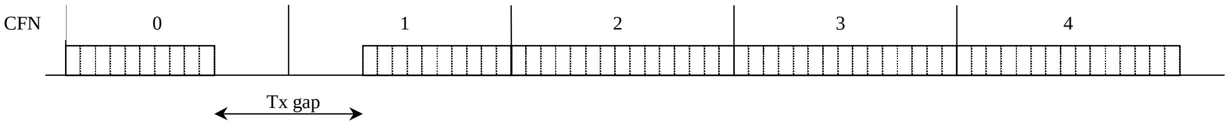


Figure 5.7.2: Pattern A for compressed mode test

This is used to test the implementation of PRM = 0 and PCM = 0.

Parameter	Value
TGL	10 slots
CFN	0
SN	10
TGP1	5 frames
TGD	0
PD	5 frames
PCM	0
PRM	0
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

Pattern B

This set of compressed mode parameters results in a series of 10 sets of 3 frames in which the first 2 frames in each set are compressed, with a 10-slot transmission gap beginning at the 11th slot of the first compressed frame.

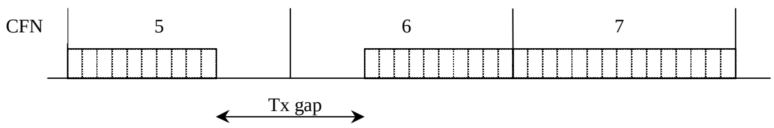


Figure 5.7.3: Pattern B for compressed mode test

This is used to test the implementation of 3dB output power steps and PCM = 1.

Parameter	Value
TGL	10 slots
CFN	5
SN	10
TGP1	3
TGD	0
PD	30
PCM	1
PRM	0
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

Pattern C

This set of compressed mode parameters results in 4 sets of 4 frames in which the first 2 frames in each set are compressed, with a 10-slot transmission gap beginning at the 11th slot of the first compressed frame.

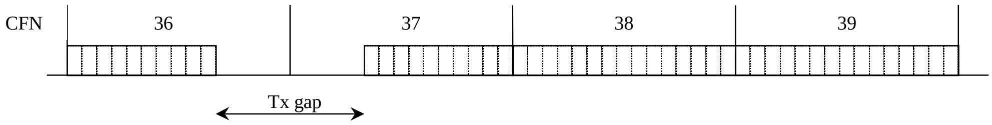


Figure 5.7.4: Pattern C for compressed mode test

This is used to test the implementation of PRM = 1.

Parameter	Value
TGL	10 slots
CFN	36
SN	10
TGP1	4
TGD	0
PD	16
PCM	0
PRM	1
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

Pattern D

This set of compressed mode parameters results in a set of 2 frames in which the first frame is compressed, with a 4-slot transmission gap beginning in the 1st slot of the compressed frame.

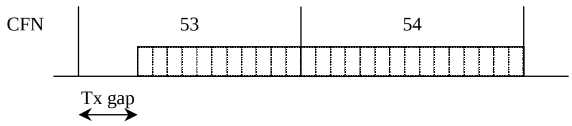


Figure 5.7.5: Pattern D for compressed mode test

This is used to test the implementation of a transmission gap at the start of a frame.

Parameter	Value
TGL	4 slots
CFN	53
SN	0
TGP1	2
TGD	0
PD	2
PCM	0
PRM	1
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

Pattern E

This set of compressed mode parameters results in a set of 2 frames in which the first frame is compressed, with a 4-slot transmission gap beginning at the 12th slot of the compressed frame.

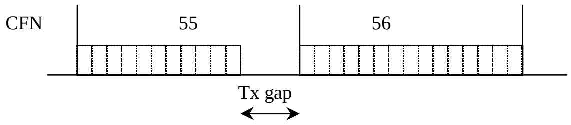


Figure 5.7.6: Pattern E for compressed mode test

This is used to test the implementation of a transmission gap at the end of a frame.

Parameter	Value
TGL	4 slots
CFN	55
SN	11
TGP1	2
TGD	0
PD	2
PCM	0
PRM	1
UL/DL Mode	UL/DL
Compressed Mode Method	SF/2
Scrambling code change	No code change
Downlink frame type	A
DeltaSIR	0
DeltaSIRafter	0

5) Transmit TPC commands on the downlink as follows:

CFN	TPC commands in downlink	Compressed Mode Pattern
254 (and all previous even-numbered CFNs)	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
255 (and all previous odd-numbered CFNs)	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
0	0 1 1 1 1 1 1 1 1 1 - - - - -	A
1	- - - - - 0 0 0 0 0 0 0 0 0 1	
2	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
3	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
4	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
5, 8, 11, 14, 17	1 1 1 1 1 1 1 1 1 1 - - - - -	B
6, 9, 12, 15, 18	- - - - - 0 0 0 0 0 0 0 1 0 1	
7, 10, 13, 16, 19	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
20	1 0 1 0 1 0 1 0 1 0 - - - - -	
23, 26, 29, 32	0 0 0 0 0 0 0 0 0 0 - - - - -	
21, 24, 27, 30, 33	- - - - - 1 1 1 1 1 1 1 0 1 0	
22, 25, 28, 31, 34	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
35	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
36	1 0 0 0 0 0 0 0 0 0 - - - - -	C
37	- - - - - 1 1 1 0 1 0 1 0 1 0	
38	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
39	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
40	1 0 0 0 0 0 0 0 0 0 - - - - -	
41	- - - - - 0 0 0 0 0 0 0 1 0 1	
42	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
43	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
44, 48	0 1 1 1 1 1 1 1 1 1 - - - - -	
45, 49	- - - - - 0 0 0 1 0 1 0 1 0 1	
46, 50	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	
47, 51	1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
52	1 1 1 1 1 1 0 1 0 1 0 1 0 1 0	
53	- - - - 0 1 0 1 0 1 0 1 0 1 0	D
54	1 0 1 0 1 0 1 0 1 0 1 1 1 1 1	
55	1 1 0 1 0 1 0 1 0 1 0 - - - -	E
56	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	

6) Measure the mean output power in every slot (not including 50 µs transition periods) which is:

- the last slot before a compressed frame; *or*

- the first slot in a compressed frame; *or*
- the last slot before a transmission gap; *or*
- the first slot after a transmission gap; *or*
- the last slot of a compressed frame; *or*
- the first slot after a compressed frame.

Measure the mean output power in every uplink transmission gap (not including 50 µs transition periods).

5.7.5 Test requirements

For ease of reference, the following uplink output power measurements are defined in Figure 5.7.7. In this figure:

- P_i is the mean power in the uplink transmission gap, excluding the 50 µs transient periods.

When the transmission gap is not at the beginning of a compressed frame:

- P_a is the mean power in the last slot before the compressed frame (or pair of compressed frames), excluding the 50 µs transient period.
- P_b is the mean power in the first slot of the compressed frame.
- P_c is the mean power in the last slot before the transmission gap.

When the transmission gap is not at the end of a compressed frame:

- P_d is the mean power in the first slot after the transmission gap.
- P_e is the mean power in the last slot of the compressed frame.
- P_f is the mean power in the first slot after the compressed frame (or pair of compressed frames), excluding the 50 µs transient period.

When the transmission gap is at the beginning of the compressed frame:

- P_g is the mean power in the last slot before the compressed frame.

When the transmission gap is at the end of the compressed frame:

- P_h is the mean power in the first slot after the compressed frame.

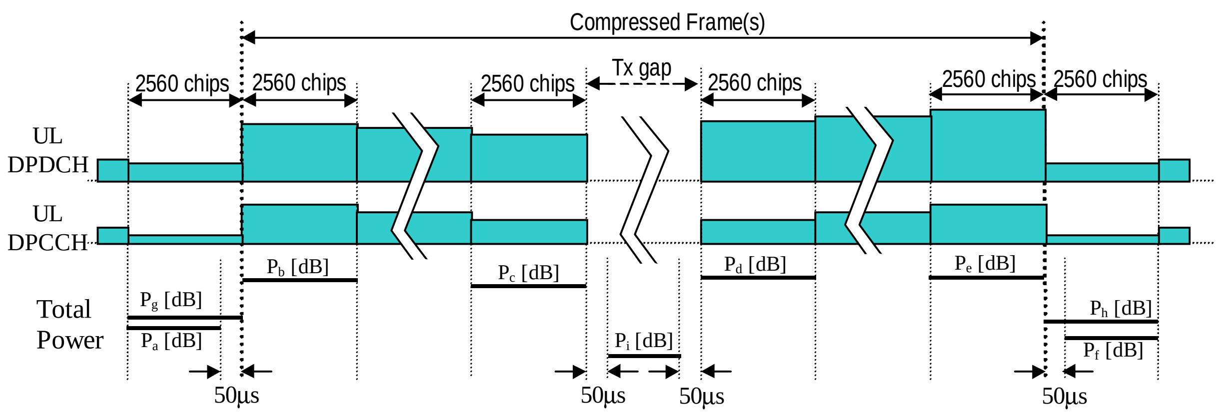


Figure 5.7.7: Uplink transmit power in uplink compressed mode

1. In CFNs 0, 23, 26, 29, 32, 44 and 48, $P_b - P_a$ should be within the range 4 ± 2 dB.
2. In CFNs 5, 8, 11, 14, 17, 20, 36 and 40 $P_b - P_a$ should be within the range 0 ± 0.5 dB.
3. In CFNs 1, 6, 9, 12, 15, 18, 21, 24, 27, 30 and 33, $P_d - P_c$ should be within the range 0 ± 0.5 dB.

4. In CFNs 0, 1, 5, 6, 8, 9, 11, 12, 14, 15, 17, 18, 20, 21, 23, 24, 26, 27, 29, 30, 32, 33, 36, 37, 40, 41, 44, 45, 48, 49, 53 and 55, P_i should be less than –56 dBm.

5. In CFNs 2, 7, 10, 13, 16, 19, 42, 46 and 50, $P_f - P_e$ should be within the range 0 ± 0.5 dB.

6. In CFNs 22, 25, 28, 31, 34, 38 and 54, $P_f - P_e$ should be within the range – 4 ± 2 dB.

7. In slots 5-12 of CFN 1, the difference in mean output power between adjacent slots should be within the range given in Table 5.4.2.1 for TPC_cmd = −1 with a 2 dB step size.

8. In slots 5-12 of CFNs 6, 9, 12, 15 and 18, the difference in mean output power between adjacent slots should be within the range given in Table 5.7.2 for TPC_cmd = –1.

9. In slots 5-12 of CFNs 6, 9, 12, 15 and 18, the change in mean output power over the 7 slots should be within the range given in Table 5.7.3 for TPC_cmd = –1.

10. In slots 5-12 of CFNs 21, 24, 27, 30 and 33, the difference in mean output power between adjacent slots should be within the range given in Table 5.7.2 for TPC_cmd = 1.

11. In slots 5-12 of CFNs 21, 24, 27, 30 and 33, the change in mean output power over the 7 slots should be within the range given in Table 5.7.3 for TPC_cmd = –1.

12. In CFN 37, $P_d - P_c$ should be within the range +12 ± 3 dB.

13. In CFN 41, $P_d - P_c$ should be within the range +13 ± 3 dB.

14. In CFN 45, $P_d - P_c$ should be within the range –12 ± 3 dB.

15. In CFN 49, $P_d - P_c$ should be within the range –13 ± 3 dB.

16. In CFN 53, $P_d - P_g$ should be within the range –3 ± 1.5 dB.

17. In CFN 55, $P_b - P_a$ should be within the range +4 ± 2 dB.

18. In CFN 56, $P_h - P_c$ should be within the range –6 ± 2 dB.