Source: **T1**

Title: **CR's to TS 34.122 v3.5.0 and v4.1.0 for approval**

Agenda item: **5.1.3**

Document for: **Approval**

This document contains 9 CRs to TS 34.122 v3.5.0 and 9 CRs to TS 34.122 v4.1.0. These CRs have been agreed by T1 and are put forward to TSG T for approval.

CRs related to maintenance of R99:

Spec	CR	Rev	Release	Subject	Cat	Version Current	Version -New	Doc-2nd-Level	Workitem
34.122	052		R99	Clarification of AWGN definition	F	3.5.0	3.6.0	T1-010502	
34.122	053		R99	RX spurious emissions	F	3.5.0	3.6.0	T1-010503	
34.122	054		R99	Correction of Spurious emissions	F	3.5.0	3.6.0	T1-010504	
34.122	055		R99	Power and ACLR definition corrections	F	3.5.0	3.6.0	T1-010507	
34.122	056		R99	Out of synchronisation handling	F	3.5.0	3.6.0	T1-010509	
34.122	057		R99	Clarification in Spectrum emission mask section	F	3.5.0	3.6.0	T1-010511	
34.122	058		R99	Changes to blocking characteristics and spurious response test cases	F	3.5.0	3.6.0	T1-010513	
34.122	059		R99	Maximum output power for mulicode transimission	F	3.5.0	3.6.0	T1-010515	
34.122	060		R99	BER/BLER testing based on statistical approach	F	3.5.0	3.6.0	T1-010518	

CRs related to maintenance of Rel-4:

Spec	CR	Rev	Release	Subject	Cat	Version Current	Version -New	Doc-2nd-Level	Workitem
34.122	061		Rel-4	Clarification of AWGN definition	A	4.1.0	4.2.0	T1-010501	TEI
34.122	062		Rel-4	RX spurious emissions	A	4.1.0	4.2.0	T1-010504	TEI
34.122	063		Rel-4	Correction of Spurious emissions	A	4.1.0	4.2.0	T1-010506	TEI
34.122	064		Rel-4	Power and ACLR definition corrections	A	4.1.0	4.2.0	T1-010508	TEI
34.122	065		Rel-4	Out of synchronisation handling	A	4.1.0	4.2.0	T1-010510	TEI
34.122	066		Rel-4	Clarification in Spectrum emission mask section	A	4.1.0	4.2.0	T1-010512	TEI
34.122	067		Rel-4	Changes to blocking characteristics and spurious response test cases	A	4.1.0	4.2.0	T1-010514	TEI
34.122	068		Rel-4	Maximum output power for mulicode transimission	A	4.1.0	4.2.0	T1-010516	TEI
34.122	069		Rel-4	BER/BLER testing based on statistical approach	A	4.1.0	4.2.0	T1-010519	TEI

3GPP TSG-T WG1 Meeting #13
Cancun, Mexico, 29th - 30th November 2001

T1-010501

CR-Form-v5

CHANGE REQUEST

⌘ **34.122** **CR** **061** ⌘ **-** ⌘ Current version: **4.1.0** ⌘

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

Title:	⌘	Clarification of AWGN definition
Source:	⌘	TSG-T WG1 RF-SWG
Work item code:	⌘	TEI
Date:	⌘	29/11/2001
Category:	⌘	**A**
Release:	⌘	Rel-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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D *(editorial modification)*
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Use one of the following releases:

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

Reason for change:	⌘	The existing AWGN definition is incomplete
Summary of change:	⌘	The peak to average ratio of the signal at 0.001% probability and flatness are defined
Consequences if not approved:	⌘	An AWGN signal with insufficient randomness may be used which will artificially improve test results.

Clauses affected:	⌘	7.1 (7.1.2)
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

7 Performance Requirements

7.1 General

The performance requirements for the UE in this clause is specified for the measurement channels specified in annex C and the test environments specified in annex D.

7.1.2 Definition of Additive White Gaussian Noise (AWGN) Interferer

The minimum bandwidth of the AWGN interferer shall be 1.5 times chip rate of the radio access mode. (e.g. 5.76 MHz for a chip rate of 3.84 Mcps). The flatness across this minimum bandwidth shall be less than ±0.5 dB and the peak to average ratio at a probability of 0.001% shall exceed 10 dB.

7.2 Demodulation in static propagation conditions

7.2.1 Demodulation of DCH

7.2.1.1 Definition and applicability

The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Ratio (BLER). The 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 datarates, supported. The data-rate-corresponding requirements shall apply to the UE.

3GPP TSG-T WG1 Meeting #13
Cancun, Mexico, 29th - 30th November 2001

T1-010502

CR-Form-v5

CHANGE REQUEST

⌘ **34.122** **CR** **052** ⌘ **-** ⌘ Current version: **3.5.0** ⌘

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

Title:	⌘	Clarification of AWGN definition
Source:	⌘	TSG-T WG1 RF-SWG
Work item code:	⌘	***Date:*** ⌘ 29/11/2001
Category:	⌘	**F** ***Release:*** ⌘ R99

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

Use one of the following releases:

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

Reason for change:	⌘	The existing AWGN definition is incomplete
Summary of change:	⌘	The peak to average ratio of the signal at 0.001% probability and flatness are defined.
Consequences if not approved:	⌘	An AWGN signal with insufficient randomness may be used which will artificially improve test results.

Clauses affected:	⌘	7.1 (7.1.2)
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

7 Performance Requirements

7.1 General

The performance requirements for the UE in this clause is specified for the measurement channels specified in annex C and the test environments specified in annex D.

7.1.2 Definition of Additive White Gaussian Noise (AWGN) Interferer

The minimum bandwidth of the AWGN interferer shall be 1.5 times chip rate of the radio access mode. (e.g. 5.76 MHz for a chip rate of 3.84 Mcps). The flatness across this minimum bandwidth shall be less than ±0.5 dB and the peak to average ratio at a probability of 0.001% shall exceed 10 dB.

7.2 Demodulation in static propagation conditions

7.2.1 Demodulation of DCH

7.2.1.1 Definition and applicability

The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Ratio (BLER). The 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 datarates, supported. The data-rate-corresponding requirements shall apply to the UE.

CR-Form-v4

CHANGE REQUEST

⌘ **34.122 CR 053** ⌘ ev **-** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘	Usage of CELL_FACH during Rx spurious emission test
Source:	⌘	T1/RF
Work item code:	⌘	***Date:*** ⌘ 28.11.01
Category:	⌘	**F** ***Release:*** ⌘ R99

Use one of the following categories:
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B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
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Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	The "number of DRX is zero" is not supported in idle mode. The Rx spurious emission test therefore requires a long test time. In Cell FACH state the UE shall continuously receive the S-CCPCH. CELL_FACH state is mandatory for the UE.
Summary of change:	⌘	It is proposed to measure the Rx spurious emission in Cell_FACH state.
Consequences if not approved:	⌘	Unnecessary long test time for Rx spurious emission test.

Clauses affected:	⌘	6.8
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

6.8 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 of this test are applicable for all UTRA UE.

6.8.2 Minimum Requirements

The power of any spurious emission shall not exceed:

Table 6.8.2: Receiver spurious emission requirements

Band	Maximum level	Measurement Bandwidth	Note
30 MHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1,9 GHz and 1,92 GHz – 2,01 GHz and 2,025 GHz – 2,11 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the UE.
1,9 GHz – 1,92 GHz and 2,01 GHz – 2,025 GHz and 2,11 GHz – 2,170 GHz	-60 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the UE.
2,170 GHz – 12,75 GHz	-47 dBm	1 MHz	

The normative reference for this requirement is TS 25.102 [1] clause 7.9.

6.8.3 Test purpose

The test purpose is to verify the UE's ability to limit interference caused by receiver spurious emissions to the own and the other systems. The test requirements are tighter than in clause 5.5.3 ((TX) Spurious Emissions) because the time of Receive–Only-Operation is generally much longer than RX-TX-Operation.

6.8.4 Method of test

6.8.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: 1 arbitrary frequency selected between low and high range; see clause G.2.4.

1) Connect the measurement equipment to the UE antenna connector according to figure A.8.

2) RF parameters are setup according to Table [TBD].

3) The UE shall be in the CELL_FACH state

4) The neighbour cell list shall be empty. HCS is not used

5) The timer T305 shall be set to ∞, so that no cell update is triggered during the measurement.

6) Set Qrxlevmin to –105 dBm.

7) Set UE_TXPWR_MAX_RACH such that Pcompensation =0

8) Set $S_{intersearch}$, $S_{intrasearch}$, and $Ssearch_{RAT\ m}$ to zero

Note 1: With the CELL_FACH state (3) in combination with the signalling parameters (4), (5), (6), (7), (8) and the SS level (2) it is ensured that UE continuously receives the S-CCPCH and no cell reselections are performed [see 25.304, subcl. 5.2.3.and 5.2.6]. No transmission of the UE will interfere the measurement.

9~~2~~) The measurement equipment shall measure power through:

- a 100 kHz filter with a approximately gaussian filter-characteristic (typical spectrum analyzer); or
- a 1 MHz filter with a approximately gaussian filter-characteristic (typical spectrum analyzer); or
- a matched filter with a bandwidth equal to the chip frequency 3,84 Mchip/s and rolloff 0,22.

~~3) Enable the UE receiver and set Cell Search Mode on a PCCPCH. Since there is no down link signal, the UE should not pass the Cell Search mode.~~

6.8.4.2 Procedure

Measure the power of spurious emissions by covering the frequency ranges of table 6.8.2. Cover the UTRA/TDD and UTRA/FDD UE receive band in contiguous steps of 200 kHz. Cover the other frequency ranges in contiguous steps of 100 kHz. Apply the corresponding filters of table 6.8.2. The step duration shall be sufficient slow to capture intermittent spurious emissions.

6.8.5 Test requirements

The spurious emissions shall be according to table 6.8.5.

Table 6.8.5: Receiver spurious emission test requirements

Band	Maximum level	Measurement Bandwidth	Note
30 MHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1,9 GHz and 1,92 GHz – 2,01 GHz and 2,025 GHz – 2,11 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the UE.
1,9 GHz – 1,92 GHz and 2,01 GHz – 2,025 GHz and 2,11 GHz – 2,170 GHz	-60 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the UE.
2,170 GHz – 12,75 GHz	-47 dBm	1MHz	

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in Annex F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.4.

CR-Form-v4

CHANGE REQUEST

⌘ **34.122 CR 062** ⌘ ev **-** ⌘ Current version: **4.1.0** ⌘

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

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

Title:	⌘	Usage of CELL_FACH during Rx spurious emission test
Source:	⌘	T1/RF
Work item code:	⌘	TEI
Date:	⌘	28.11.01
Category:	⌘	**A**
Release:	⌘	REL-4

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

Use one of the following releases:

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

Reason for change:	⌘	The "number of DRX is zero" is not supported in idle mode. The Rx spurious emission test therefore requires a long test time. In Cell FACH state the UE shall continuously receive the S-CCPCH. CELL_FACH state is mandatory for the UE.
Summary of change:	⌘	It is proposed to measure the Rx spurious emission in Cell_FACH state.
Consequences if not approved:	⌘	Unnecessary long test time for Rx spurious emission test.
Clauses affected:	⌘	6.8
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

6.8 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 of this test are applicable for all UTRA UE.

6.8.2 Minimum Requirements

6.8.2.1 3,84 Mcps TDD Option

The power of any spurious emission shall not exceed:

Table 6.8.2.1: Receiver spurious emission requirements (3,84 Mcps TDD Option)

Band	Maximum level	Measurement Bandwidth	Note
30 MHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1,9 GHz and 1,92 GHz – 2,01 GHz and 2,025 GHz – 2,11 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5MHz below the first carrier frequency and 12.5MHz above the last carrier frequency used by the UE.
1,9 GHz – 1,92 GHz and 2,01 GHz – 2,025 GHz and 2,11 GHz – 2,170 GHz	-60 dBm	3,84 MHz	With the exception of frequencies between 12,5MHz below the first carrier frequency and 12,5MHz above the last carrier frequency used by the UE.
2,170 GHz – 12,75 GHz	-47 dBm	1 MHz	

The normative reference for this requirement is TS 25.102 [1] clause 7.9.1.1.

6.8.2.2 1,28 Mcps TDD Option

The power of any spurious emission shall not exceed.

Table 6.8.2.2: Receiver spurious emission requirements (1,28Mcps TDD Option)

Band	Maximum level	Measurement Bandwidth	Note
30 MHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1.9 GHz and 1.92 GHz – 2.01 GHz and 2.025 GHz – 2.11 GHz	-47 dBm	1 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the UE.
1.9 GHz – 1.92 GHz and 2.01 GHz – 2.025 GHz and 2.11 GHz – 2.170 GHz	-64 dBm	1,28 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the UE.
2.170 GHz – 12.75 GHz	-47 dBm	1 MHz	

The normative reference for this requirement is TS 25.102 [1] clause 7.9.1.2.

6.8.3 Test purpose

The test purpose is to verify the UE's ability to limit interference caused by receiver spurious emissions to the own and the other systems. The test requirements are tighter than in clause 5.5.3 ((TX) Spurious Emissions) because the time of Receive–Only-Operation is generally much longer than RX-TX-Operation.

6.8.4 Method of test

6.8.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: 1 arbitrary frequency selected between low and high range; see clause G.2.4.

1) Connect the measurement equipment to the UE antenna connector according to figure A.8.

2) RF parameters are setup according to Table [TBD].

3) The UE shall be in the CELL_Fach state

4) The neighbour cell list shall be empty. HCS is not used

5) The timer T305 shall be set to ∞, so that no cell update is triggered during the measurement.

6) Set Qrxlevmin to –105 dBm.

7) Set UE_TXPWR_MAX_RACH such that Pcompensation =0

8) Set $S_{intersearch}$, $S_{intrasearch}$ and $Ssearch_{RAT\ m}$ to zero

Note 1: With the CELL_FACH state (3) in combination with the signalling parameters (4), (5), (6), (7), (8) and the SS level (2) it is ensured that UE continuously receives the S-CCPCH and no cell reselections are performed [see 25.304, subcl. 5.2.3.and 5.2.6]. No transmission of the UE will interfere the measurement.

9~~2~~) The measurement equipment shall measure power through:

- a 100 kHz filter with a approximately gaussian filter-characteristic (typical spectrum analyzer); or
- a 1 MHz filter with a approximately gaussian filter-characteristic (typical spectrum analyzer); or
- a matched filter with a bandwidth equal to the chip frequency 3,84 Mchip/s for the 3,84 Mcps TDD Option and 1,28 Mchips/s for the 1,28 Mcps TDD Option, respectively, and rolloff 0.22.

~~3) Enable the UE receiver and set Cell Search Mode on a PCCPCH. Since there is no down link signal, the UE should not pass the Cell Search mode.~~

6.8.4.2 Procedure

Measure the power of spurious emissions by covering the frequency ranges of table 6.8.2.1 for the 3,84 Mcps TDD Option and table 6.8.2.2 for the 1,28 Mcps TDD Option, respectively. Cover the UTRA/TDD and UTRA/FDD UE receive band in contiguous steps of 200 kHz. Cover the other frequency ranges in contiguous steps of 100 kHz. Apply the corresponding filters of table 6.8.2.1 for the 3,84 Mcps TDD Option and table 6.8.2.2 for the 1,28 Mcps TDD Option, respectively. The step duration shall be sufficient slow to capture intermittent spurious emissions.

6.8.5 Test requirements

6.8.5.1 3,84 Mcps TDD Option

The spurious emissions shall be according to table 6.8.5.1 for the 3,84 Mcps TDD Option.

Table 6.8.5.1: Receiver spurious emission test requirements (3,84 Mcps TDD Option)

Band	Maximum level	Measurement Bandwidth	Note
30 MHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1,9 GHz and 1,92 GHz – 2,01 GHz and 2,025 GHz – 2,11 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the UE.
1,9 GHz – 1,92 GHz and 2,01 GHz – 2,025 GHz and 2,11 GHz – 2,170 GHz	-60 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the UE.
2,170 GHz – 12,75 GHz	-47 dBm	1MHz	

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

6.8.5.2 1,28 Mcps TDD Option

The spurious emissions shall be according to table 6.8.5.2 for the 1,28 Mcps TDD Option.

Table 6.8.5.2: Receiver spurious emission requirements (1,28Mcps TDD Option)

Band	Maximum level	Measurement Bandwidth	Note
30 MHz – 1 GHz	[-57 dBm]	100 kHz	
1 GHz – 1,9 GHz and 1,92 GHz – 2,01 GHz and 2,025 GHz – 2,11 GHz	[-47 dBm]	1 MHz	With the exception of frequencies between 4 MHz below the first carrier frequency and 4 MHz above the last carrier frequency used by the UE.
1,9 GHz – 1,92 GHz and 2,01 GHz – 2,025 GHz and 2,11 GHz – 2,170 GHz	[-64 dBm]	1,28 MHz	With the exception of frequencies between 4 MHz below the first carrier frequency and 4 MHz above the last carrier frequency used by the UE.
2,170 GHz – 12,75 GHz	[-47 dBm]	1 MHz	

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

3GPP TSG T WG1 Meeting #13
Cancun, Mexico, 29-30 November, 2001

T1-010505

CR-Form-v5

CHANGE REQUEST

⌘ **TS 34.122 CR 054** ⌘ **rev -** ⌘ Current version: **3.5.0** ⌘

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

Title:	⌘	Correction of Spurious emission in TS34.122
Source:	⌘	T1/RF
Work item code:	⌘	***Date:*** ⌘ 29 Nov. 2001
Category:	⌘	**F** ***Release:*** ⌘ R99

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

Use one of the following releases:

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

Reason for change:	⌘	Wrong table numbers are described in the notes.
Summary of change:	⌘	Table numbers in the notes of the clause 5.5.3.2 minimum requirements and the clause 5.5.3.5 test requirements are revised.
Consequences if not approved:	⌘	Inconsistency with the core specification is left.

Clauses affected:	⌘	5.5.3
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

5.5.3 Spurious emissions

5.5.3.1 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 [8].

5.5.3.2 Minimum Requirements

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

The normative reference for this requirement is TS 25.102 [1] clause 6.6.3.1.

Table 5.5.3.2a: 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 5.5.3.2b: Additional Spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
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 5.5.3.2a~~b~~ are permitted for each UARFCN used in the measurement.

5.5.3.3 Test purpose

The test purpose is to verify the ability of the UE to limit the interference caused by unwanted transmitter effects to other systems operating at frequencies which are more than 12,5 MHz away from of the UE's carrier frequency.

5.5.3.4 Method of test

5.5.3.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

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 using parameters as specified in table E.3.1.2.

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

5.5.3.4.2 Procedure

Measure the power of the spurious emissions applying measurement filters with bandwidths as specified in the relevant tables of 5.5.3.2. The characteristic of the filters shall be approximately Gaussian (typical spectrum analyzer filters). The center frequency of the filter shall be swept over the frequency bands as given in the tables. The sweep time shall be sufficiently low to capture the active time slots.

5.5.3.5 Test requirements

The spurious emissions measured according to clause 5.5.3.4.2 shall not exceed the limits specified in the relevant tables of 5.5.3.5.a and 5.5.3.5.b.

Table 5.5.3.5a: General Spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Test 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
1GHz ≤ f < 12.75GHZ	1MHz	-30 dBm

Table 5.5.3.5b: Additional Spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Test requirement
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 1: 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 5.5.3.5a~~b~~ are permitted for each UARFCN used in the measurement.

NOTE 2: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

3GPP TSG T WG1 Meeting #13
Cancun, Mexico, 29-30 November, 2001

T1-010506

CR-Form-v5

CHANGE REQUEST

⌘ **TS 34.122 CR 063** ⌘ **rev -** ⌘ Current version: **4.1.0** ⌘

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

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

Title:	⌘	Correction of Spurious emission in TS34.122
Source:	⌘	T1/RF
Work item code:	⌘	TEI
Date:	⌘	29 Nov. 2001
Category:	⌘	**A**
Release:	⌘	REL-4

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

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

Reason for change:	⌘	Wrong table numbers are described in the notes.
Summary of change:	⌘	Table numbers in the notes of the clause 5.5.3.2.1 and 5.5.3.2.2 minimum requirements and the clause 5.5.3.5.1 and 5.5.3.5.2 test requirements are revised.
Consequences if not approved:	⌘	Inconsistency with the core specification is left.

Clauses affected:	⌘	5.5.3		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

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

5.5.3 Spurious emissions

5.5.3.1 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 [8].

5.5.3.2 Minimum Requirements

5.5.3.2.1 3,84 Mcps TDD Option

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

The normative reference for this requirement is TS 25.102 [1] clause 6.6.3.1.1.

Table 5.5.3.2.1a: General Spurious emissions requirements (3,84 Mcps TDD Option)

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 5.5.3.2.1b: Additional Spurious emissions requirements (3,84 Mcps TDD Option)

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
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 5.5.3.2.1a~~b~~ are permitted for each UARFCN used in the measurement.

5.5.3.2.2 1,28Mcps TDD Option

These requirements are only applicable for frequencies which are greater than 4 MHz away from the UE center carrier frequency.

The normative reference for this requirement is TS 25.102 [1] clause 6.6.3.1.2.

Table 5.5.3.2.2a : General Spurious emissions requirements (1,28 Mcps TDD Option)

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 5.5.3.2.2b : Additional Spurious emissions requirements (1,28 Mcps TDD Option)

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
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 5.5.3.2.2a~~b~~ are permitted for each UARFCN used in the measurement.

5.5.3.3 Test purpose

5.5.3.3.1 3,84 Mcps Option

The test purpose is to verify the ability of the UE to limit the interference caused by unwanted transmitter effects to other systems operating at frequencies which are more than 12,5 MHz away from of the UE's carrier frequency.

5.5.3.3.2 1,28 Mcps Option

The test purpose is to verify the ability of the UE to limit the interference caused by unwanted transmitter effects to other systems operating at frequencies which are more than 4 MHz away from of the UE's carrier frequency.

5.5.3.4 Method of test

5.5.3.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

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 using parameters as specified in table E.3.1.2.
3) Enter the UE into loopback test mode and start the loopback test.

5.5.3.4.2 Procedure

Measure the power of the spurious emissions applying measurement filters with bandwidths as specified in the relevant tables of 5.5.3.2.1 for 3,84 Mcps TDD Option and tables 5.5.3.2.1 for 1,28 Mcps TDD Option, respectively. The characteristic of the filters shall be approximately Gaussian (typical spectrum analyzer filters). The center frequency of the filter shall be swept over the frequency bands as given in the tables. The sweep time shall be sufficiently low to capture the active time slots.

5.5.3.5 Test requirements

5.5.3.5.1 3,84 Mcps TDD Option

The spurious emissions measured according to clause 5.5 .3.4.2 shall not exceed the limits specified in the relevant tables of 5.5.3.5.1a and 5.5.3.5.1b.

Table 5.5.3.5.1a: General Spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Test 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
1GHz ≤ f < 12.75GHZ	1MHz	-30 dBm

Table 5.5.3.5.1b: Additional Spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Test requirement
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 1: 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 5.5.3.5.1a~~b~~ for the 3,84 Mcps TDD Option are permitted for each UARFCN used in the measurement.

NOTE 2: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

5.5.3.5.2 1,28 Mcps TDD Option

The spurious emissions measured according to clause 5.5.3.4.2 shall not exceed the limits specified in the relevant tables of 5.5.3.5.2a and 5.5.3.5.2b.

Table 5.5.3.5.2a: General Spurious emissions requirements (1,28 Mcps TDD Option)

Frequency Bandwidth	Resolution Bandwidth	Test 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 5.5.3.5.2b: Additional Spurious emissions requirements (1,28 Mcps TDD Option)

Frequency Bandwidth	Resolution Bandwidth	Test requirement
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 1: 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 5.5.3.5.2a~~b~~ for the 1,28 Mcps TDD Option are permitted for each UARFCN used in the measurement.

NOTE 2: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

3GPP TSG T WG1 Meeting #13
Cancun, Mexico, 29-30 November, 2001

T1-010507

CR-Form-v4

CHANGE REQUEST

⌘ **34.122** **CR** 055 ⌘ ev **-** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘	Power and ACLR definition corrections.
Source:	⌘	T1/RF
Work item code:	⌘	***Date:*** ⌘ 28/11/2001
Category:	⌘	**F** ***Release:*** ⌘ Rel99

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

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

Reason for change:	⌘	Corrections of power related entities.
Summary of change:	⌘	Definition of nominal maximum output power, deletion of unused terms. Modification to UE power class definition: use of nominal maximum output power rather than maximum output power. Transmit OFF power is measured over one chip Correction of ACLR definition.
Consequences if not approved:	⌘	Possible misunderstanding of various power definitions and ACLR definition.

Clauses affected:	⌘	5.2 (5.2.1, 5.2.2, 5.2.5) 5.4.2 (5.4.2.1, 5.4.2.2, 5.4.2.5) 5.4.3 (5.4.3.1) 5.5.2.2 (5.5.2.2.1, 5.5.2.2.2, 5.5.2.2.4.2, 5.5.2.2.5)
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	Maintenance of 34.122 according to RAN CR 67

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downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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

5.2 User Equipment maximum output power

5.2.1 Definition and applicability

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

The nominal **output power**~~, Pout,~~ of the UE is the broadband transmit power when averaged (in the sense of thermal power) over the useful part of the TS at the maximum power control setting delivered in to a load with resistance equal to the nominal load impedance.

The requirements in this test apply to all UTRA – TDD- UEs

Notes copied from TS 25.102 clause 6.2.1:

~~NOTE 1: The maximum output power refers to.....~~

NOTE 1~~2~~: For multi-code operation the nominal maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission.

NOTE 2~~3~~: The tolerance allowed ~~of~~ for the nominal maximum power applies ~~is below the prescribed value~~ even at the multi-code transmission mode

NOTE 3~~4~~: For UE using directive antennas for transmission, a class dependent limit will be placed on the maximum EIRP (Equivalent Isotropic Radiated Power).

5.2.2 Minimum Requirements

The error of the UE maximum output power shall not exceed the tolerance shown in tables 5.2.2 a and b for single and multi-code.

Table 5.2.2.a: Maximum Output Power single code

Power Class	Nominal m~~M~~aximum output power	Tolerance
2	+24 dBm	+1dB/-3dB
3	+21 dBm	+2dB/-2dB

Table 5.2.2.b: Maximum Output Power multi code

Power Class	Nominal m~~M~~aximum output power	Tolerance
2	[21] dBm (note)	+1dB/-3dB
3	[18] dBm (note)	+2dB/-2dB
NOTE: These figures are not mentioned in 25.102. Instead there is a note, saying: "For multi-code operation the maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission." The figures are calculated from maximum output power single code (table 5.2.2.a) and UL multicode reference measurement channel (12,2 kbit/s) (annex C.2.2.) containing two code signals with equal level.		

The normative reference for this requirement is TS 25.102 clause 6.2.

5.2.3 Test purpose

For the following reasons:

Limit interference.

Verify that the maximum output power is achievable.

It is the purpose of the test to verify that the UE's maximum output power is within its tolerance limits under all environmental conditions.

5.2.4 Method of test

5.2.4.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

1) Connect the SS to the UE antenna connector as shown in figure A.1.
2) Calls are set up according to the Generic call setup procedure using parameters as specified in tables 5.2.4.a and b.
3) Enter the UE into loopback test mode and start the loopback test.

Table 5.2.4.a: Test parameters for Maximum Output Power single code

Parameter	Value/description
UL Reference measurement channel	12,2kbps, according to annex C.2.1
Uplink Power Control	SS level and signalling values such that UE transmits maximum power.
Data content	real life (sufficient irregular)

Table 5.2.4.b: Test parameters for Maximum Output Power multicode

Parameter	Value/description
Reference measurement channel	Multicode 12,2kbps, according to annex C.2.2
Uplink Power Control	SS level and signalling values such that UE transmits maximum power
Data content	real life (sufficient irregular)

5.2.4.2 Procedure

1) Measure thermal power over the useful part of the burst with a measurement bandwidth of at least 5 MHz.
2) Run step 1) or RF channels Low / Mid / High.

5.2.5 Test Requirements

The output power, measured in step 2) of clause 5.2.4.2, shall not exceed the prescribed tolerance in table 5.2.5 a and b.

Table 5.2.5.a: Maximum Output Power single code

Power Class	Nominal m~~M~~aximum output power	Tolerance
2	+24 dBm	+1,7 dB / -3,7dB
3	+21 dBm	+2,7 dB / -2,7dB

Table 5.2.5.b: Maximum Output Power multi code

Power Class	Nominal m~~M~~aximum output power	Tolerance
2	[21] dBm	+1,7dB / -3,7 dB
3	[18] dBm	+2,7dB / -2,7 dB

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F clause F.4.

5.4.2 Minimum ~~transmit~~ output power

5.4.2.1 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 the uplink power control indicates a minimum transmit output power is required.~~

The normative requirements of this test apply to all types of UTRA- UE.

5.4.2.2 Minimum Requirements

The minimum ~~transmit~~ output ~~-~~power shall be lower than or equal to –44 dBm

The normative reference for this requirement is TS 25.102 [1] clause 6.4.5.1.

5.4.2.3 Test purpose

The test purpose is to verify the ability of the UE to reduce its output power to a specified value.

5.4.2.4 Method of test

5.4.2.4.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

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 using parameters as specified in table E.3.1.2.
3) Enter the UE into loopback test mode and start the loopback test.

5.4.2.4.2 Procedure

1) Configure the UE transmitter to enable power control steps of size 1 dB.

2) Measure power of the UE output signal over the useful part of the active time slot according to annex B.

NOTE: Annex B returns the power in the decision points (displayed as reference power and power offset). This is equivalent to thermal power at the air-interface. Insofar 5.4.2 minimum output power is consistent with 5.2 maximum output power.

3) Configure the UE transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat step 2).

4) Run step 2) for RF channels Low Mid and High.

5.4.2.5 Test requirements

For all measurements, the minimum output ~~transmit~~ power derived in step 3) and 4) of 5.4.2.4.2 shall be below –43 dBm.

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

5.4.3 Transmit OFF power

5.4.3.1 Definition and applicability

Transmit OFF power is defined as the average power measured over one chip when the transmitter is off.The transmit OFF power state is when the UE does not transmit. ~~This parameter is defined as the maximum output transmit power within the channel bandwidth when the transmitter is OFF.~~

The requirements of this test apply to all types of UTRA-UE.

5.4.3.2 Minimum Requirements

The transmit OFF power shall be below –65 dBm.

The normative reference for this requirement is TS 25.102 clause 6.5.1.

5.4.3.3 Test purpose

Refer clause 5.4.4.3.

5.4.3.4 Method of test

Refer clause 5.4.4.4

5.4.3.5 Test requirements

The transmit OFF power shall be below –63,5 dBm.

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4

5.5.2.2 Adjacent Channel Leakage power Ratio (ACLR)

5.5.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the ~~wanted~~ average power centered on the assigned channel frequency to the average power centered on~~in~~ an adjacent channel frequency. In b ~~B~~oth cases the ~~wanted power and adjacent channel~~ power is~~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 in this clause shall apply to all types of UTRA-UE.

5.5.2.2.2 Minimum Requirements

If the adjacent channel power is greater than –50dBm then the ACLR shall be higher ~~better~~ than the value specified in table 5.5.2.2.2.

The normative reference for this requirement is TS 25.102 [1] clause 6.6.2.2.1

Table 5.5.2.2.2: UE ACLR

Power Class	Adjacent channel	ACLR limit
2, 3	UE-channel ± 5 MHz	~~-~~33 dB
2, 3	UE-Channel ± 10 MHz	~~-~~43 dB

5.5.2.2.3 Test purpose

The test purpose is to verify the ability of the UE to limit the interference produced by the transmitted signal to other UTRA receivers operating at the first or second adjacent RF channel.

5.5.2.2.4 Method of test

5.5.2.2.4.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

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 using parameters as specified in table E.3.1.2.
3) Enter the UE into loopback test mode and start the loopback test.

5.5.2.2.4.2 Procedure

1) Measure the ~~wanted transmitted~~ average ~~-~~power centered on the assigned channel frequency of the active timeslot using the method in annex B.
2) Average over TBD time slots.
3) Measure ~~interference~~the power centered on the first lower adjacent channel frequency ~~at the first lower adjacent RF channel (center frequency 5 MHz below the assigned channel frequency of the transmitted signal)~~ over the useful part of the active TS with a measurement filter that has a RRC filter response with a roll off α = 0,22 and a bandwidth equal to the chip rate.
4) Average over TBD time slots.
5) Calculate the ACLR by

~~Transmitted~~ ~~P~~power acc. to 2) / ~~interference~~ ~~P~~power acc. to 4).

6) Repeat steps 3), 4) and 5) for the second lower adjacent RF channel (center frequency 10 MHz below the assigned channel frequency of the transmitted signal) and also for the first and second upper adjacent RF channel (center frequency 5 MHz and 10 MHz, respectively).

5.5.2.2.5 Test requirements

The ACLR calculated in steps 5) and 6) of clause 5.5.2.2.4.2 shall be equal or greater than the limits given in table 5.5.2.2.5.

Table 5.5.2.2.5: UE ACLR

Power Class	Adjacent channel	ACLR limit
2, 3	UE-channel ± 5 MHz	-32.2 dB
2, 3	UE-Channel ± 10 MHz	-42.2 dB

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F.

3GPP TSG T WG1 Meeting #13
Cancun, Mexico, 29-30 November, 2001

T1-010508

CR-Form-v4

CHANGE REQUEST

⌘ **34.122** **CR** 064 ⌘ ev **-** ⌘ Current version: **4.1.0** ⌘

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

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

Title:	⌘	Power and ACLR definition corrections.
Source:	⌘	T1/RF
Work item code:	⌘	TEI
Date:	⌘	28/11/2001
Category:	⌘	**A**
Release:	⌘	Rel 4

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

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

Reason for change:	⌘	Corrections of power related entities.
Summary of change:	⌘	Definition of nominal maximum output power, deletion of unused terms. Modification to UE power class definition: use of nominal maximum output power rather than maximum output power. Transmit OFF power is measured over one chip Correction of ACLR definition.
Consequences if not approved:	⌘	Possible misunderstanding of various power definitions and ACLR definition.

Clauses affected:	⌘	5.2 (5.2.1, 5.2.2, 5.2.5) 5.4.2 (5.4.2.1, 5.4.2.2.1, 5.4.2.2.2, 5.4.2.5.1, 5.4.2.5.2) 5.4.3 (5.4.3.1) 5.5.2.2 (5.5.2.2.1, 5.5.2.2.2.1 5.5.2.2.2.2 5.5.2.2.4.2, 5.5.2.2.5.1 5.5.2.2.5.2)
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	Maintenance of 34.122 according to RAN CR 68 and Cat A CR to T1R010263

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

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

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

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

5.2 User Equipment maximum output power

5.2.1 Definition and applicability

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

The nominal **output power**~~, Pout,~~ of the UE is the broadband transmit power when averaged (in the sense of thermal power) over the useful part of the TS at the maximum power control setting delivered in to a load with resistance equal to the nominal load impedance.

The requirements in this test apply to all UTRA – TDD- UEs

Notes copied from TS 25.102 clause 6.2.1:

~~NOTE 1: The maximum output power refers to the measure of power when averaged over the useful part of the transmit timeslots at the maximum power control setting.~~

NOTE 1~~2~~: For multi-code operation the nominal maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission.

NOTE 2~~3~~: The tolerance allowed for ~~of~~ the nominal maximum power applies~~is below the prescribed value~~ even at the multi-code transmission mode

NOTE 3~~4~~: For UE using directive antennas for transmission, a class dependent limit will be placed on the maximum EIRP (Equivalent Isotropic Radiated Power).

5.2.2 Minimum Requirements

The error of the UE maximum output power shall not exceed the tolerance shown in tables 5.2.2 a and b for single and multi-code.

Table 5.2.2.a: Maximum Output Power single code

Power Class	Nominal m~~M~~aximum output power	Tolerance
1	+30 dBm	+1dB/-3dB
2	+24 dBm	+1dB/-3dB
3	+21 dBm	+2dB/-2dB
4	+10 dBm	+4dB/-4dB

Table 5.2.2.b: Maximum Output Power multi code

Power Class	Nominal m~~M~~aximum output power	Tolerance
1	[+27]dBm (note)	+1dB/-3dB
2	[21] dBm (note)	+1dB/-3dB
3	[18] dBm (note)	+2dB/-2dB
4	[+7] dBm (note)	+4dB/-4dB
NOTE: These figures are not mentioned in 25.102. Instead there is a note, saying: "For multi-code operation the maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission." The figures are calculated from maximum output power single code (table 5.2.2.a) and UL multicode reference measurement channel (12,2 kbit/s) (annex C.2.2.1 for the 3,84 TDD Option and annex C.2.2.2 for the 1,28 Mcps TDD Option, respectively) containing two code signals with equal level.		

The normative reference for this requirement is TS 25.102 [1] clause 6.2.1.

5.2.3 Test purpose

For the following reasons:

Limit interference.

Verify that the maximum output power is achievable.

It is the purpose of the test to verify that the UE's maximum output power is within its tolerance limits under all environmental conditions.

5.2.4 Method of test

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

5.2.4.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

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

2) Calls are set up according to the Generic call setup procedure using parameters as specified in tables 5.2.4.1.1a and b for the 3,84 Mcps TDD Option and in tables 5.2.4.1.2a and b for the 3,84 Mcps TDD Option, respectively.

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

5.2.4.1.1 3,84 Mcps TDD Option

Table 5.2.4.1.1a: Test parameters for Maximum Output Power single code (3,84 Mcps TDD Option)

Parameter	Value/description
UL Reference measurement channel	12,2 kbps, according to annex C.2.1.1
Uplink Power Control	SS level and signalling values such that UE transmits maximum power.
Data content	real life (sufficient irregular)

Table 5.2.4.1.1b: Test parameters for Maximum Output Power multicode (3,84 Mcps TDD Option)

Parameter	Value/description
Reference measurement channel	Multicode 12,2 kbps, according to annex C.2.2.1
Uplink Power Control	SS level and signalling values such that UE transmits maximum power
Data content	real life (sufficient irregular)

5.2.4.1.2 1,28 Mcps TDD Option

Table 5.2.4.1.2a: Test parameters for Maximum Output Power single code (1,28 Mcps TDD Option)

Parameter	Value/description
UL Reference measurement channel	12,2 kbps, according to annex C.2.1.2.
Uplink Power Control	SS level and signalling values such that UE transmits maximum power.
Data content	real life (sufficient irregular)

Table 5.2.4.1.2b: Test parameters for Maximum Output Power multicode (1,28 Mcps TDD Option)

Parameter	Value/description
Reference measurement channel	Multicode 12,2 kbps, according to annex C.2.2.2
Uplink Power Control	SS level and signalling values such that UE transmits maximum power
Data content	real life (sufficient irregular)

5.2.4.2 Procedure

1) Measure thermal power over the useful part of the burst, with a measurement bandwidth of at least 5 MHz related to 3,84 Mcps TDD Option and with a measurement bandwidth of at least 1,6 MHz in case of 1,28 Mcps TDD Option.

2) Run step 1) for RF channels Low / Mid / High.

5.2.5 Test Requirements

The output power, measured in step 2) of clause 5.2.4.2, shall not exceed the prescribed tolerance in table 5.2.5 a and b.

Table 5.2.5.a: Maximum Output Power single code

Power Class	Nominal m~~M~~aximum output power	Tolerance
1	+30 dBm	[+1,7] dB / [-3,7] dB
2	+24 dBm	+1,7 dB / -3,7dB
3	+21 dBm	+2,7 dB / -2,7dB
4	+10 dBm	[+4,7] dB / [-4,7] dB

Table 5.2.5.b: Maximum Output Power multi code

Power Class	Nominal m~~M~~aximum output power	Tolerance
1	[27] dBm	+1,7 dB / -3,7 dB
2	[21] dBm	+1,7dB / -3,7 dB
3	[18] dBm	+2,7dB / -2,7 dB
4	[7] dBm	+4,7 dB / -4,7 dB

NOTE 1: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

NOTE 2: Concerning multicode transmission this test applies only for UE power classes 2 and 3. It is intended, that additional test requirements for UE power classes 1 and 4 in this case are part of a later version of the present document.

5.4.2 Minimum ~~transmit~~ output power

5.4.2.1 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 the uplink power control indicates a minimum transmit output power is required.~~

The normative requirements of this test apply to all types of UTRA- UE.

5.4.2.2 Minimum Requirements

5.4.2.2.1 3,84Mcps TDD Option

The minimum output ~~transmit~~ power shall be lower than or equal to –44 dBm measured with a filter that has a root-raised cosine (RRC) filter response with a roll-off-factor $\alpha = 0.22$ and a bandwidth equal to the chip rate.

The normative reference for this requirement is TS 25.102 [1] clause 6.4.2.1.1.

5.4.2.2.2 1,28Mcps TDD Option

The minimum output ~~transmit~~ power shall be better than–49 dBm measured with a filter that has a root-raised cosine (RRC) filter response with a roll-off-factor $\alpha = 0.22$ and a bandwidth equal to the chip rate.

The normative reference for this requirement is TS 25.102 [1] clause 6.4.2.1.2.

5.4.2.3 Test purpose

The test purpose is to verify the ability of the UE to reduce its output power to a specified value.

5.4.2.4 Method of test

5.4.2.4.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

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 using parameters as specified in table E.3.1.2.
3) Enter the UE into loopback test mode and start the loopback test.

5.4.2.4.2 Procedure

1) Configure the UE transmitter to enable power control steps of size 1 dB.
2) Measure power of the UE output signal over the useful part of the active time slot according to annex B.

NOTE: Annex B returns the power in the decision points (displayed as reference power and power offset). This is equivalent to thermal power at the air-interface. Insofar 5.4.2.2.1 minimum output power for 3,84 Mcps TDD Option and 5.4.2.2.2 minimum output power for 1,28 Mcps TDD Option is consistent with 5.2 maximum output power.

3) Configure the UE transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat step 2).
4) Run step 2) for RF channels Low Mid and High.

5.4.2.5 Test requirements

5.4.2.5.1 3,84 Mcps TDD Option

For all measurements, the minimum output ~~transmit~~ power derived in step 3) and 4) of 5.4.2.4.2 shall be below –43 dBm.

5.4.2.5.2 1,28 Mcps TDD Option

For all measurements, the minimum output ~~transmit~~ power derived in step 3) and 4) of 5.4.2.4.2 shall be below [-48] dBm.

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

5.4.3 Transmit OFF power

5.4.3.1 Definition and applicability

Transmit OFF power is defined as the average power measured over one chip when the transmitter is off.The transmit OFF power state is when the UE does not transmit. ~~This parameter is defined as the maximum output transmit power within the channel bandwidth when the transmitter is OFF.~~

The requirements of this test apply to all types of UTRA-UE.

5.4.3.2 Minimum Requirements

The transmit OFF power shall be below –65 dBm.

The normative reference for this requirement is TS 25.102 clause 6.5.1.

5.4.3.3 Test purpose

Refer clause 5.4.4.3.

5.4.3.4 Method of test

Refer clause 5.4.4.4.

5.4.3.5 Test requirements

The transmit OFF power shall be below –63.5 dBm.

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4

5.5.2.2 Adjacent Channel Leakage power Ratio (ACLR)

5.5.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the ~~wanted~~ power centered on the assigned channel frequency to the average power centered on ~~in~~ an adjacent channel frequency. In b~~B~~oth cases the ~~wanted power and adjacent channel~~ power is ~~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 in this clause shall apply to all types of UTRA-UE.

5.5.2.2.2 Minimum Requirements

5.5.2.2.2.1 3,84Mcps TDD Option

If the adjacent channel power is greater than –50 dBm then the ACLR shall be higher ~~better~~ than the value specified in table 5.5.2.2.2.1.

The normative reference for this requirement is TS 25.102 [1] clause 6.6.2.2.1.1.

Table 5.5.2.2.2.1: UE ACLR (3,84 Mcps TDD Option)

Power Class	Adjacent channel	ACLR limit
2, 3	UE-channel ± 5 MHz	-33 dB
2, 3	UE-Channel ± 10 MHz	-43 dB

5.5.2.2.2.2 1,28Mcps TDD Option

If the adjacent channel power is greater than –55 dBm then the ACLR shall be better than the value specified in table 5.5.2.2.2.2.

The normative reference for this requirement is TS 25.102 [1] clause 6.6.2.2.1.2.

Table 5.5.2.2.2.2: UE ACLR (1,28Mcps TDD Option)

Power Class	adjacent channel	ACLR limit
2, 3	UE channel ± 1.6 MHz	-33 dB
2, 3	UE channel ± 3.2 MHz	-43 dB

NOTE 1: The requirement shall still be met in the presence of switching transients.

NOTE 2: The ACLR requirements reflect what can be achieved with present state of the art technology.

NOTE 3: Requirement on the UE shall be reconsidered when the state of the art technology progresses.

5.5.2.2.3 Test purpose

The test purpose is to verify the ability of the UE to limit the interference produced by the transmitted signal to other UTRA receivers operating at the first or second adjacent RF channel.

5.5.2.2.4 Method of test

5.5.2.2.4.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

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 using parameters as specified in table E.3.1.2.
3) Enter the UE into loopback test mode and start the loopback test.

5.5.2.2.4.2 Procedure

1) Measure the average ~~wanted transmitted~~ power centered on the assigned channel frequency of the active timeslot using the method in annex B.
2) Average over TBD time slots.
3) Measure ~~interference~~ power centered on the first lower adjacent channel frequency ~~at the first lower adjacent RF channel (center frequency 5 MHz for 3,84 Mcps TDD Option and 1.6 MHz for 1,28 Mcps TDD Option, respectively, below the assigned channel frequency of the transmitted signal)~~ over the useful part of the active TS with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate.
4) Average over TBD time slots.
5) Calculate the ACLR by

   ~~Transmitted p~~Power acc. to 2) / ~~interference p~~Power acc. to 4).
6) Repeat steps 3), 4) and 5) for the second lower adjacent RF channel (center frequency 10 MHz for the 3,84 Mcps TDD Option and 3,2 MHz for the 1,28 Mcps TDD Option, respectively, below the assigned channel frequency of the transmitted signal) and also for the first and second upper adjacent RF channel (center frequency 5 MHz for the 3,84 Mcps TDD Option and 1,6 MHz for the 1,28 Mcps TDD Option, respectively, and 10 MHz, for the 3,84 Mcps TDD Option and 3,2 MHz for the 1,28 Mcps TDD Option, respectively).

5.5.2.2.5 Test requirements

5.5.2.2.5.1 3,84 Mcps TDD Option

The ACLR calculated in steps 5) and 6) of clause 5.5.2.2.4.2 shall be equal or greater than the limits given in table 5.5.2.2.5.1 for the 3,84 Mcps TDD Option.

Table 5.5.2.2.5.1: UE ACLR (3,84 Mcps TDD Option)

Power Class	Adjacent channel	ACLR limit
2, 3	UE-channel ± 5 MHz	-32.2 dB
2, 3	UE-Channel ± 10 MHz	-42.2 dB

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F.

5.5.2.2.5.2 1,28 Mcps TDD Option

The ACLR calculated in steps 5) and 6) of clause 5.5.2.2.4.2 shall be equal or greater than the limits given in table 5.5.2.2.5.2 for the 1,28 Mcps TDD Option.

Table 5.5.2.2.5.2: UE ACLR (1,28 Mcps TDD Option)

Power Class	Adjacent channel	ACLR limit
2, 3	UE-channel ± 1.6 MHz	[-32.2] dB
2, 3	UE-Channel ± 3.2 MHz	[-42.2] dB

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F.

3GPP TSG T WG1 Meeting #13
Cancun, Mexico, 29-30 November, 2001

T1-010509

CR-Form-v4

CHANGE REQUEST

⌘ **34.122** **CR** 056 ⌘ ev **-** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘	Out of synch handling
Source:	⌘	T1/RF
Work item code:	⌘	***Date:*** ⌘ 28/11/2001
Category:	⌘ **F**	***Release:*** ⌘ Rel99

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

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

Reason for change:	⌘	Change in 25.102 requires maintenance of the test
Summary of change:	⌘	Text aligned with 25.102
Consequences if not approved:	⌘	Inconsistency between core spec and test spec

Clauses affected:	⌘	5.4.5 (5.4.5.2, 5.4.5.4.1)
Other specs affected:	⌘	☐ Other core specifications ⌘ **X** Test specifications ☐ O&M Specifications
Other comments:	⌘	Maintenance of 34.122 according to RAN CR 69

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

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

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

5.4.5 Out-of-synchronisation handling of output power

5.4.5.1 Definition and applicability

The UE shall monitor the DPCH quality in order to detect a loss of the signal on Layer 1, as specified in TS 25.224. [5] The thresholds Q_{out} and Q_{in} specify at what DPCH quality levels the UE shall shut its power off and when it 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.

The requirement of this clause shall apply to all types of UTRA-UE.

5.4.5.2 Minimum Requirement

When the UE estimates the DPCH quality over the last 160 ms period to be worse than a threshold Q_{out}, the UE shall shut its transmitter off within 40 ms. The UE shall not turn its transmitter on again until the DPCH quality exceeds an acceptable level Q_{in}. When the UE estimates the DPCH quality over the last 160 ms period to be better than a threshold Q_{in}, the UE shall again turn its transmitter on within 40 ms.

The quality levels at the thresholds Q_{out} and Q_{in} correspond to different signal levels depending on the downlink conditions DCH parameters. For the conditions in Table 5.4.5.1.a, a signal with the quality at the level Q_{out} is generated by a ΣDPCH_Ec/Ior ratio of -13 dB, and a signal with Q_{in} by a ΣDPCH_Ec/Ior ratio of -9 dB. In this test, the DL reference measurement channel (12.2) kbps specified in clause C.3.1, where the CRC bits are replaced by data bits, and with static propagation conditions is used.

Table 5.4.5.1: DCH parameters for the Out-of-synch handling test case continuous transmission

Parameter	Unit	Value
$\hat{I}_{or}/I_{oc}$	dB	-1
I_{oc}	dBm/3,84 MHz	-60
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	dB	See figure 5.4.5.1
Information Data Rate	kbps	13
TFCI	-	On

Figure 5.4.5.1 shows an example scenario where the ΣDPCH_Ec/Ior ratio varies from a level where the DPCH is demodulated under normal conditions, down to a level below Q_{out} where the UE shall shut its power off and then back up to a level above Q_{in} where the UE shall turn the power back on.

~~The conditions for when the UE shall shut its transmitter off and when it shall turn it on are defined by the parameters in table 5.4.5.1 together with the DPCH power level as defined in figure 5.4.5.1.~~

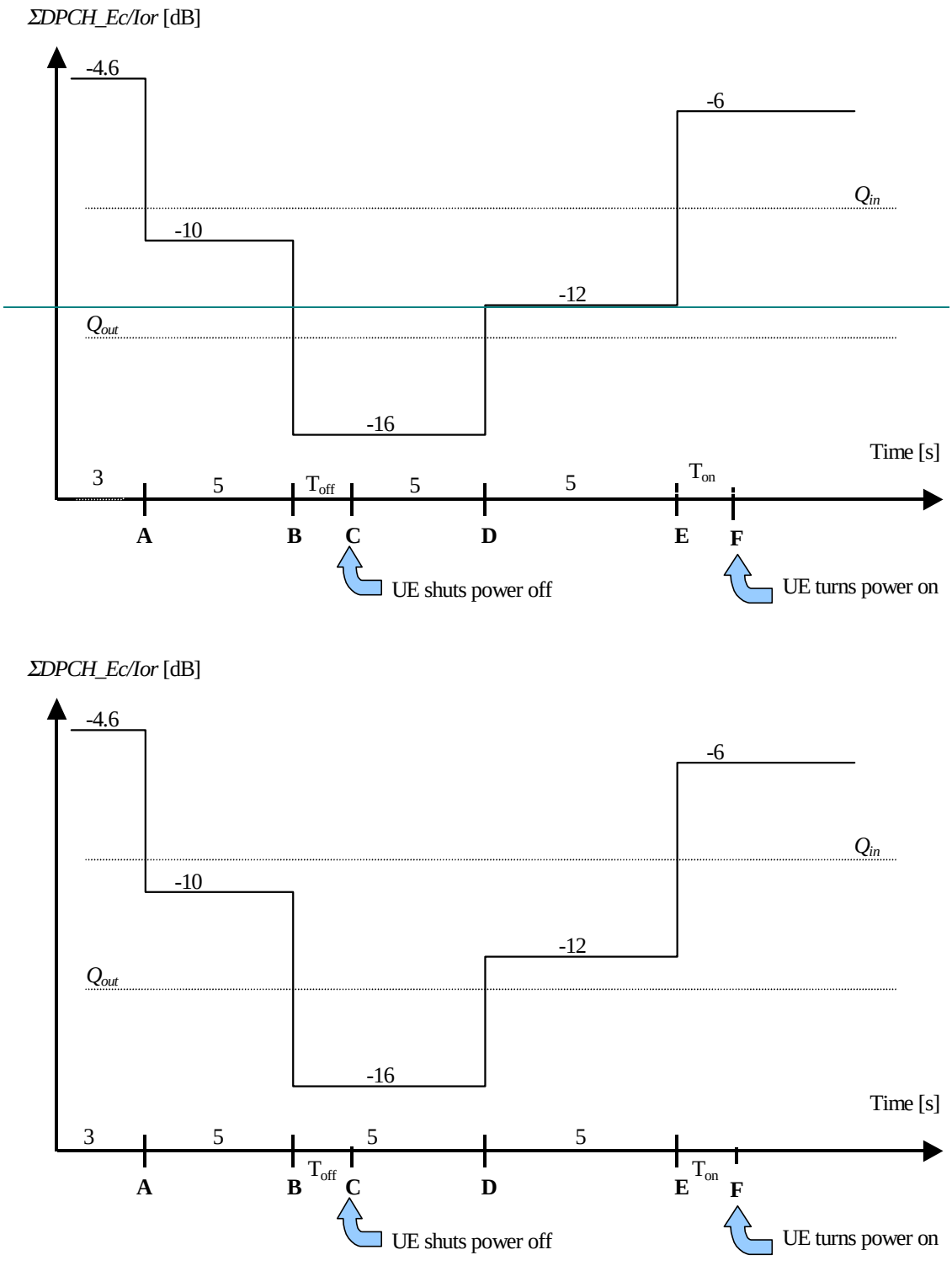

Figure 5.4.5.1: Test case for out-of-synch handling in the UE continuous transmission.

In this test case ~~T~~the requirements for the UE are that:

1) The UE shall not shut its transmitter off before point B.
2) The UE shall shut its transmitter off before point C, which is T_{off} = 200 ms after point B
3) The UE shall not turn its transmitter on between points C and E.
4) The UE shall turn its transmitter on before point F, which is Ton = 200 ms after Point E.

The normative reference for this test is TS 25.102 [1] clause 6.4.3.

5.4.5.3 Test purpose

To verify that the UE monitors the DPCH quality and turns its transmitter on or off according to DPCH level diagram specified in figure5.4.5.1.

5.4.5.4 Method of test

5.4.5.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS to the UE antenna connector as shown in figure A.1.
2) Calls are set up according to the Generic call setup procedure using parameters as specified in table 5.4.5.1
3) Enter the UE into loopback test mode and start the loopback test.
4) The handover triggering level shall be set very high [TBD] to ensure that the beacon channel power never exceeds the value of 10dB above it. Therefore the averaging time for signal quality will always be 160 milliseconds.

5.4.5.4.2 Procedure

1) SS level and signalling values are set that the UE transmits maximum power (see annex E clause E.3.1)
2) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -4.6+0,4 dB and verify that the UE TX signal is on.
3) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -10+0,4 dB and verify that the UE TX signal remains on continuously for at least 5 seconds.
4) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -16-0,4 dB and verify that the UE TX signal turns off 200 ms or earlier with respect to that instant.
5) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -12-0,4 dB and verify that the UE TX signal remains off continuously for at least 5 seconds.
6) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -6+0,4 dB and verify that the UE TX signal is switched on 200 ms or earlier with respect to that instant.

5.4.5.5 Test Requirements

The UE TX on-criterion including tolerance window is derived from the initial conditions and is verified with the method of 5.4.2 minimum transmit power. The UE transmitter is considered to be on if the UE transmitted power is higher than the minimum output power.

The UE TX off criterion including tolerance is verified according to clause 5.4.3 of the present document (Transmit off power). The UE transmitter is considered to be off if the UE transmitted power is lower than the transmit OFF power.

To pass the test, steps 1 through 6 of the procedure must be fulfilled.

5.5 Output RF spectrum emissions

3GPP TSG T WG1 Meeting #13
Cancun, Mexico, 29-30 November, 2001

T1-010510

CR-Form-v4

CHANGE REQUEST

⌘ **34.122** **CR** 065 ⌘ ev **-** ⌘ Current version: **4.1.0** ⌘

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

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

Title:	⌘	Out of synch handling
Source:	⌘	T1/RF
Work item code:	⌘	TEI
Date:	⌘	28/11/2001
Category:	⌘	**A**
Release:	⌘	Rel4

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

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

Reason for change:	⌘	Change in 25.102 requires maintenance of the test
Summary of change:	⌘	Text aligned with 25.102
Consequences if not approved:	⌘	Inconsistency between core spec and test spec

Clauses affected:	⌘	5.4.5 (5.4.5.2.1 , 5.4.5.4.1)
Other specs affected:	⌘	☐ Other core specifications ⌘ **X** Test specifications ☐ O&M Specifications
Other comments:	⌘	Maintenance of 34.122 according to RAN CR 70 and CAT A CR to T1R010265

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

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

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

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

5.4.5 Out-of-synchronisation handling of output power

5.4.5.1 Definition and applicability

The UE shall monitor the DPCH quality in order to detect a loss of the signal on Layer 1, as specified in TS 25.224. [5] The thresholds Q_{out} and Q_{in} specify at what DPCH quality levels the UE shall shut its power off and when it 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.

The requirement of this clause shall apply to all types of UTRA-UE.

5.4.5.2 Minimum Requirement

5.4.5.2.1 3,84 Mcps TDD Option

When the UE estimates the DPCH quality over the last 160 ms period to be worse than a threshold Q_{out}, the UE shall shut its transmitter off within 40 ms. The UE shall not turn its transmitter on again until the DPCH quality exceeds an acceptable level Q_{in}. When the UE estimates the DPCH quality over the last 160 ms period to be better than a threshold Q_{in}, the UE shall again turn its transmitter on within 40 ms.

The quality levels at the thresholds Q_{out} and Q_{in} correspond to different signal levels depending on the downlink conditions DCH parameters. For the conditions in table 5.4.5.2.1, a signal with the quality at the level Q_{out} is generated by a ΣDPCH_Ec/Ior ratio of -13 dB, and a signal with Q_{in} by a ΣDPCH_Ec/Ior ratio of -9 dB. In this test, the DL reference measurement channel (12,2) kbps specified in clause C.3.1, where the CRC bits are replaced by data bits, and with static propagation conditions is used.

Table 5.4.5.2.1: DCH parameters the of Out-of-synch handling test case test case – 3.84 Mcps TDD option – continuous transmission

Parameter	Unit	Value
$\hat{I}_{or}/I_{oc}$	dB	-1
I_{oc}	dBm/3,84 MHz	-60
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	dB	See figure 5.4.5.2.1
Information Data Rate	kbps	13
TFCI	-	On

The quality levels at the thresholds Q_{out} and Q_{in} correspond to different signal levels depending on the downlink conditions DCH parameters. For the conditions in Table 6.4, a signal with the quality at the level Q_{out} can be generated by a ΣDPCH_Ec/Ior ratio of -13 dB, and a signal with Q_{in} by a ΣDPCH_Ec/Ior ratio of -9 dB. In this test, the DL reference measurement channel (12.2) kbps specified in subclauseA.2.2, where the CRC bits are replaced by data bits, and with static propagation conditions is used.

~~The conditions for when the UE shall shut its transmitter off and when it shall turn it on are defined by the parameters in table 5.4.5.1.1 together with the DPCH power level as defined in figure 5.4.5.2.1.~~

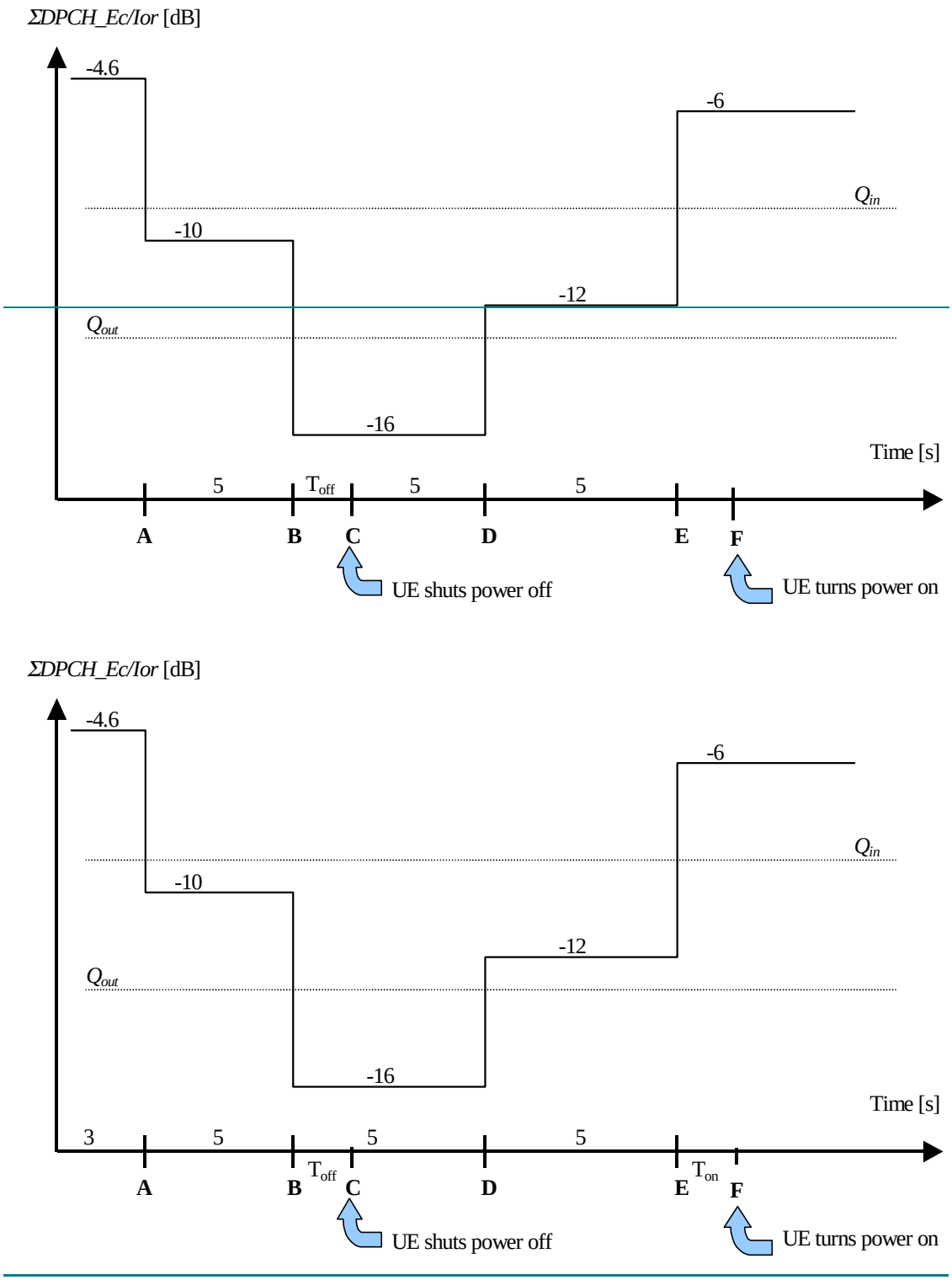

Figure 5.4.5.2.1: Test case for out-of-synch handling in the UE. Conditions apply for 3,84 Mcps TDD Option– continuous transmission

The requirements for the UE are that:

1) The UE shall not shut its transmitter off before point B.
2) The UE shall shut its transmitter off before point C, which is T_{off} = 200 ms after point B
3) The UE shall not turn its transmitter on between points C and E.

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

The normative reference for this test is TS 25.102 [1] clause 6.4.3.1.1.

5.4.5.2.2 1,28 Mcps TDD Option

The parameters in table 5.4.5.2.2 are defined using the DL reference measurement channel (12,2) kbps specified in annex C where the CRC bits are replaced by data bits, and with static propagation conditions.

Table 5.4.5.2.2: DCH parameters for test of Out-of-synch handling

Parameter	Unit	Value
$\hat{I}_{or}/I_{oc}$	dB	-1
I_{oc}	dBm/1,28 MHz	-60
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	dB	See figure 5.4.5.2.2
Information Data Rate	kbps	12,2
TFCI	-	On

The conditions for when the UE shall shut its transmitter off and when it shall turn it on are defined by the parameters in table 5.4.5.1.2 together with the DPCH power level as defined in figure 5.4.5.1.

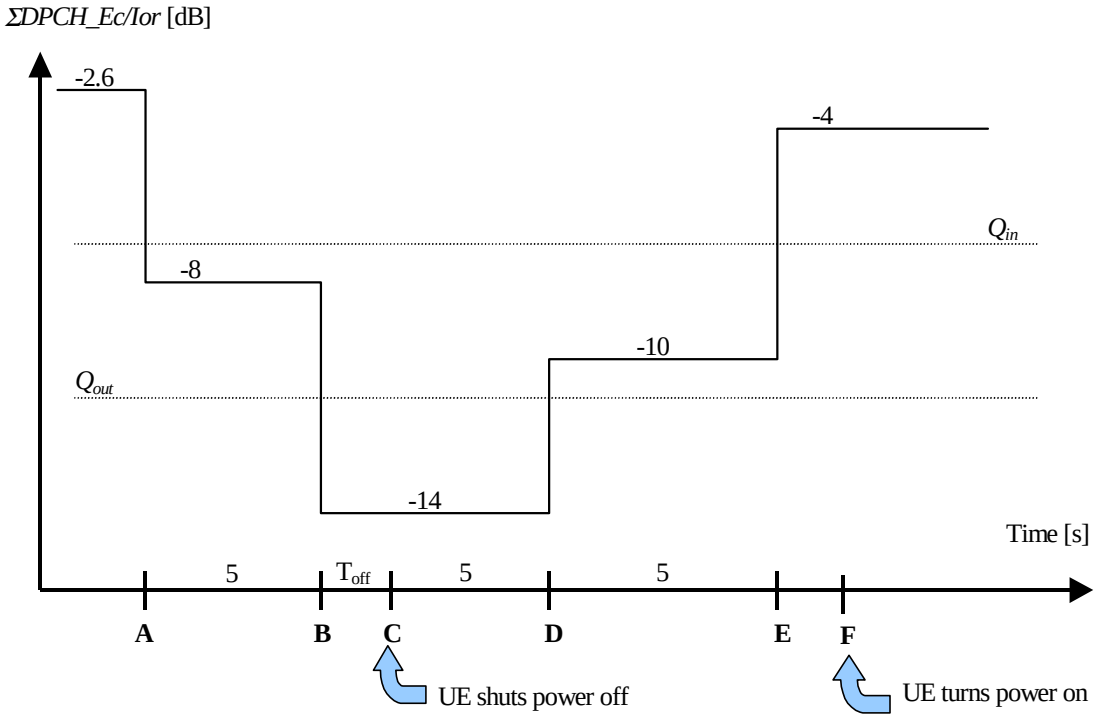

Figure 5.4.5.2.2: Conditions for out-of-synch handling in the UE. The indicated thresholds Q_{out} andQ_{in} are only informative. Conditions apply for 1,28 Mcps TDD Option

The requirements for the UE are that:

1. The UE shall not shut its transmitter off before point B.
2. The UE shall shut its transmitter off before point C, which is T_{off} = 200 ms after point B
3. The UE shall not turn its transmitter on between points C and E.
4. The UE shall turn its transmitter on before point F, which is T_{on} = 200 ms after Point E.

The normative reference for this test is TS 25.102 [1] clause 6.4.3.1.2.

5.4.5.3 Test purpose

To verify that the UE monitors the DPCH quality and turns its transmitter on or off according to DPCH level diagram specified in figure5.4.5.1

5.4.5.4 Method of test

5.4.5.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS to the UE antenna connector as shown in figure A.1.
2) Calls are set up according to the Generic call setup procedure using parameters as specified in table 5.4.5.1
3) Enter the UE into loopback test mode and start the loopback test.
4) The handover triggering level shall be set very high [TBD] to ensure that the beacon channel power never exceeds the value of 10dB above it. Therefore the averaging time for signal quality will always be 160 milliseconds.

5.4.5.4.2 Procedure

5.4.5.4.2.1 3,84 Mcps TDD Option

1) SS level and signalling values are set that the UE transmits maximum power (see annex E clause E.3.1)
2) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -4.6+0,4 dB and verify that the UE TX signal is on.
3) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -10+0,4 dB and verify that the UE TX signal remains on continuously for at least 5 seconds.
4) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -16-0,4 dB and verify that the UE TX signal turns off 200 ms or earlier with respect to that instant.
5) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -12-0,4 dB and verify that the UE TX signal remains off continuously for at least 5 seconds.
6) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -6+0,4 dB and verify that the UE TX signal is switched on 200 ms or earlier with respect to that instant.

5.4.5.4.2.2 1,28 Mcps TDD Option

1) The SS sends continuously Up power control commands to the UE until the UE transmitter power reaches maximum level
2) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -2.6+[0,3] dB and verify that the UE TX signal is on.
3) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -8+[0,3] dB and verify that the UE TX signal remains on continuously for at least 5 seconds.
4) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -14-[0,3] dB and verify that the UE TX signal turns off 200 ms or earlier with respect to that instant.
5) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -10-[0,3] dB and verify that the UE TX signal remains off continuously for at least 5 seconds.
6) Set the SS TX signal quality to $\frac{\Sigma DPCH\_E_c}{I_{or}}$ = -4+[0,3] dB and verify that the UE TX signal is switched on 200 ms or earlier with respect to that instant.

5.4.5.5 Test Requirements

The UE TX on-criterion including tolerance window is derived from the initial conditions and is verified with the method of 5.4.2.4 minimum transmit power related to minimum requirements according to clause 5.4.2.2.1 for 3,84 Mcps TDD Option and 5.4.2.2.2 for 1,28 Mcps TDD Option, respectively. The UE transmitter is considered to be on if the UE transmitted power is higher than the minimum output power.

The UE TX off criterion including tolerance is verified according to clause 5.4.3 of the present document (Transmit off power). The UE transmitter is considered to be off if the UE transmitted power is lower than the transmit OFF power.

To pass the test, steps 1 through 6 of the procedure must be fulfilled.

3GPP TSG T WG1 Meeting #13 **T1-010511**

Cancun, Mexico, 29th - 30th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **34.122** **CR** 057 ⌘ ev **-** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘	Clarification in Spectrum emission mask section
Source:	⌘	T1/RF
Work item code:	⌘	***Date:*** ⌘ 29/11/2001
Category:	⌘	**F** ***Release:*** ⌘ Rel99

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

Use one of the following releases:

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

Reason for change:	⌘	The definition of Δf in the spectrum emission mask is missing.
Summary of change:	⌘	Addition of definition for Δf. Correction of ambiguous terms.
Consequences if not approved:	⌘	Possible misunderstanding of spectrum emission mask requirement.

Clauses affected:	⌘	5.5.2.1.2, 5.5.2.1.5
Other specs affected:	⌘	☐ Other core specifications ⌘ ☒ Test specifications ☐ O&M Specifications
Other comments:	⌘	Maintenance of 34.122 according to RAN CR 73 (Deleted table 5.5.2.1.5 not any more visible due to change trace mode)

How to create CRs using this form:

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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

5.5.2.1 Spectrum emission mask

5.5.2.1.1 Definition and applicability

The spectrum emission mask of the UE is a requirement that applies to frequencies which are between 2,5 and 12,5MHz to both sides of the carrier frequency. The out of channel emission is specified relative to the UE output power in a 3,84 MHz bandwidth.

The requirements of this test apply to all types of UTRA-UE.

5.5.2.1.2 Minimum Requirements

The power of any UE emission shall not exceed the levels specified in table 5.5.2.1.2.

* Δf is the separation between the carrier frequency and the centre of the measuring filter.
** The first and last measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz and 3.485 MHz.

The normative reference for this requirement is TS 25.102 clause 6.6.2.1.1

Table 5.5.2.1.2: Spectrum Emission Mask Requirement

~~Frequency offset from carrier ?~~Δ~~f~~*in MHz	Minimum requirement	Measurement bandwidth
2.5 - 3.5 ~~MHz~~	~~-35 - 15*(Δf – 2.5)~~ ~~dBc~~ $\left\{-35-15\cdot\left(\frac{\Delta f}{MHz}-2.5\right)\right\}dBc$	30 kHz**
3.5 - 7.5 ~~MHz~~	~~-35 - 1*(Δf 3.5)~~ ~~dBc~~ $\left\{-35-1\cdot\left(\frac{\Delta f}{MHz}-3.5\right)\right\}dBc$	1 MHz***
7.5 - 8.5 ~~MHz~~	~~-39 - 10*(Δf – 7.5)~~ ~~dBc~~ $\left\{-39-10\cdot\left(\frac{\Delta f}{MHz}-7.5\right)\right\}dBc$	1 MHz***
8.5 - 12.5	-49 dBc	1 MHz***
*** The first and last measurement position with a 1 MHz filter is at Δf equals to 4 MHz and 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth.		
The lower limit shall be –50dBm/3.84 MHz or the minimum requirement presented in this table which ever is the higher.		

~~NOTE 1: The first and last measurement position with a 30 kHz filter is 2,515 MHz and 3,485 MHz.~~

~~NOTE 2: The first and last measurement position with a 1 MHz filter is 4 MHz and 12 MHz.~~

~~NOTE 3: The lower limit shall be –50dBm/3,84 MHz or which ever is higher.~~

5.5.2.1.3 Test purpose

This test supplements Occupied Bandwidth (verifying the spectral concentration of the UE's emissions) and Adjacent Channel Leakage Ratio (simulating the perception of other UTRA receivers) in a system independent way. It is the purpose of this test to limit interferences to other systems (wideband or narrowband).

5.5.2.1.4 Method of test

5.5.2.1.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, high range; see clause G.2.4.

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 using parameters as specified in table E.3.1.2.
3) Enter the UE into loopback test mode and start the loopback test.

* Δf is the separation between the carrier frequency and the centre of the measuring filter.

** The first and last measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz and 3.485 MHz.

5.5.2.1.4.2 Procedure

1) Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 5.5.2.1.2. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filter shall be stepped in contiguous steps according to table 5.5.2.1.2. The step duration shall be sufficient slow to capture the active TS. The measured power shall be recorded for each step.
2) Measure the wanted output power according to annex B.
3) Display the results of 1) in dBc with respect to 2).

5.5.2.1.5 Test requirements

The result 5.5.2.1.4.2 step 3) shall fulfil the requirements of table 5.5.2.1.5.

Table 5.5.2.1.5: Spectrum Emission Mask Requirement

Δf* in MHz	Minimum requirement	Measurement bandwidth
2.5 - 3.5	$\left\{-33.5-15\cdot\left(\frac{\Delta f}{MHz}-2.5\right)\right\}dBc$	30 kHz**
3.5 - 7.5	$\left\{-33.5-1\cdot\left(\frac{\Delta f}{MHz}-3.5\right)\right\}dBc$	1 MHz***
7.5 - 8.5	$\left\{-37.5-10\cdot\left(\frac{\Delta f}{MHz}-7.5\right)\right\}dBc$	1 MHz***
8.5 - 12.5	-47.5 dBc	1 MHz***

*** The first and last measurement position with a 1 MHz filter is at Δf equals to 4 MHz and 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth.
The lower limit shall be –48.5dBm/3.84 MHz or the minimum requirement presented in this table which ever is the higher.

~~NOTE 1: The first and last measurement position with a 30 kHz filter is 2.515 MHz and 3.485 MHz.~~

~~NOTE 2: The first and last measurement position with a 1 MHz filter is 4 MHz and 12 MHz.~~

~~NOTE 3: The lower limit shall be –48,5dBm/3,84 MHz or which ever is higher~~

NOTE ~~4~~: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

3GPP TSG T WG1 Meeting #13 **T1-010512**

Cancun, Mexico, 29th - 30th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **34.122** **CR** 066 ⌘ ev **-** ⌘ Current version: **4.1.0** ⌘

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

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

Title:	⌘	Clarification in Spectrum emission mask section
Source:	⌘	T1/RF
Work item code:	⌘	TEI
Date:	⌘	29/11/2001
Category:	⌘	**A**
Release:	⌘	Rel4

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

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

Reason for change:	⌘	The definition of Δf in the spectrum emission mask is missing.
Summary of change:	⌘	Addition of definition for Δf. Correction of ambiguous terms.
Consequences if not approved:	⌘	Possible misunderstanding of spectrum emission mask requirement.

Clauses affected:	⌘	5.5.2.1 (5.5.2.1.2.1, 5.5.2.1.5.1)
Other specs affected:	⌘	☐ Other core specifications ⌘ ☒ Test specifications ☐ O&M Specifications
Other comments:	⌘	Maintenance of 34.122 according to RAN CR 74 Corresponding RAN Cat A CR to T1R010269

How to create CRs using this form:

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

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

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

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

5.5.2.1 Spectrum emission mask

5.5.2.1.1 Definition and applicability

5.5.2.1.1.1 3,84 Mcps TDD Option

The spectrum emission mask of the UE is a requirement that applies to frequencies which are between 2,5 and 12,5MHz to both sides of the carrier frequency. The out of channel emission is specified relative to the UE output power in a 3,84 MHz bandwidth.

The requirements of this test apply to all types of UTRA-UE.

5.5.2.1.1.2 1,28 Mcps TDD Option

The spectrum emission mask of the UE applies to frequencies, which are between 0,8 and 4,0MHz from a carrier frequency. The out of channel emission is specified relative to the UE output power measured in a 1,28 MHz bandwidth.

5.5.2.1.2 Minimum Requirements

5.5.2.1.2.1 3,84 Mcps TDD Option

The power of any UE emission shall not exceed the levels specified in table 5.5.2.1.2.1.

The normative reference for this requirement is TS 25.102 clause 6.6.2.1.1.1.

Table 5.5.2.1.2.1: Spectrum Emission Mask Requirement (3,84 Mcps TDD Option)

~~Frequency offset from carrier ?f~~ Δf* in MHz	Minimum requirement	Measurement bandwidth
2.5 - 3.5 ~~MHz~~	~~-35 -15*(Δf – 2.5) dBc~~ $\left\{-35-15\cdot\left(\frac{\Delta f}{MHz}-2.5\right)\right\}dBc$	30 kHz**
3.5 - 7.5 ~~MHz~~	~~-35 - 1*(Δf -3.5) dBc~~ $\left\{-35-1\cdot\left(\frac{\Delta f}{MHz}-3.5\right)\right\}dBc$	1 MHz***
7.5 - 8.5 ~~MHz~~	~~-39 - 10*(Δf – 7.5) dBc~~ $\left\{-39-10\cdot\left(\frac{\Delta f}{MHz}-7.5\right)\right\}dBc$	1 MHz ***
8.5 - 12.5 ~~MHz~~	-49 dBc	1 MHz
* Δf is the separation between the carrier frequency and the centre of the measuring filter.		
** The first and last measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz and 3.485 MHz		
*** The first and last measurement position with a 1 MHz filter is at Δf equals to 4 MHz and 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth.		
The lower limit shall be –50dBm/3.84 MHz or the minimum requirement presented in this table which ever is the higher.		

~~NOTE 1: The first and last measurement position with a 30 kHz filter is 2.515 MHz and 3.485 MHz.~~

~~NOTE 2: The first and last measurement position with a 1 MHz filter is 4 MHz and 12 MHz.~~

~~NOTE 3: The lower limit shall be –50dBm/3,84 MHz or which ever is higher.~~

5.5.2.1.2.2 1,28 Mcps TDD Option

The power of any UE emission shall not exceed the levels specified in table 5.5.2.1.2.2.

The normative reference for this requirement is TS 25.102 clause 6.6.2.1.1.2.

Table 5.5.2.1.2.2: Spectrum Emission Mask Requirement (1,28 Mcps TDD Option)

Frequency offset from carrier Δf	Minimum requirement	Measurement bandwidth
0.8 MHz	-35 dBc	30 kHz
0.8-1.8 MHz	-35 – 14*(Δf-0.8) dBc	30 kHz
1.8-2.4 MHz	-49 – 25*(Δf-1.8)dBc	30 kHz
2.4 – 4.0MHz	-49 dBc	1MHz

NOTE 1: The first and last measurement position with a 30 kHz filter is 0,815 MHz and 2,385 MHz.

NOTE 2: The first and last measurement position with a 1 MHz filter is 2,9MHz and 3,5MHz.

NOTE 3: The lower limit shall be –55dBm/1,28 MHz or which ever is the higher.

5.5.2.1.3 Test purpose

This test supplements Occupied Bandwidth (verifying the spectral concentration of the UE's emissions) and Adjacent Channel Leakage Ratio (simulating the perception of other UTRA receivers) in a system independent way. It is the purpose of this test to limit interferences to other systems (wideband or narrowband).

5.5.2.1.4 Method of test

5.5.2.1.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, high range; see clause G.2.4.

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 using parameters as specified in table E.3.1.2.
3) Enter the UE into loopback test mode and start the loopback test.

5.5.2.1.4.2 Procedure

1) Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 5.5..2.1.2.1 for the 3,84 Mcps TDD Option and 5.5.2.1.2.2 for the 1,28 Mcps TDD Option, respectively. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filter shall be stepped in contiguous steps according to table 5.5.2.1.2.1 for the 3,84 Mcps TDD Option and 5.5.2.1.2.2 for the 1,28 Mcps TDD Option, respectively. The step duration shall be sufficient slow to capture the active TS. The measured power shall be recorded for each step.
2) Measure the wanted output power according to annex B.
3) Display the results of 1) in dBc with respect to 2).

5.5.2.1.5 Test requirements

5.5.2.1.5.1 3,84 Mcps TDD Option

The result 5.5.2.1.4.2. step 3) shall fulfil the requirements of table 5.5.2.1.5.1.

Table 5.5.2.1.5.1: Spectrum Emission Mask Requirement (3,84 Mcps TDD Option)

~~Frequency offset from carrier ?f~~ Δf* in MHz	Minimum requirement	Measurement bandwidth
2.5 - 3.5 ~~MHz~~	~~-33.5 -15*(Δf – 2.5) dBc~~ $\left\{-33.5-15\cdot\left(\frac{\Delta f}{MHz}-2.5\right)\right\}dBc$	30 kHz
3.5 - 7.5 ~~MHz~~	~~-33.5 -1*(Δf 3.5) dBc~~ $\left\{-33.5-1\cdot\left(\frac{\Delta f}{MHz}-3.5\right)\right\}dBc$	1 MHz
7.5 - 8.5 ~~MHz~~	~~-37.5 - 10*(Δf – 7.5) dBc~~ $\left\{-37.5-10\cdot\left(\frac{\Delta f}{MHz}-7.5\right)\right\}dBc$	1 MHz
8.5 - 12.5 ~~MHz~~	-47.5 dBc	1 MHz
* Δf is the separation between the carrier frequency and the centre of the measuring filter.		
** The first and last measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz and 3.485 MHz		
*** The first and last measurement position with a 1 MHz filter is at Δf equals to 4 MHz and 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth.		
The lower limit shall be –48.5dBm/3.84 MHz or the minimum requirement presented in this table which ever is the higher.		

~~Note:~~

~~NOTE 1: The first and last measurement position with a 30 kHz filter is 2.515 MHz and 3.485 MHz.~~

~~NOTE 2: The first and last measurement position with a 1 MHz filter is 4 MHz and 12 MHz.~~

~~NOTE 3: The lower limit shall be –48.5dBm/3,84 MHz or which ever is higher.~~

NOTE ~~4~~: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in Annex F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.4.

5.5.2.1.5.2 1,28 Mcps TDD Option

The result 5.5.2.1.4.2. step 3) shall fulfil the requirements of table 5.5.2.1.5.2.

Table 5.5.2.1.5.2: Spectrum Emission Mask Requirement (1,28 Mcps TDD Option)

Frequency offset from carrier Δf	Minimum requirement	Measurement bandwidth
0.8 MHz	[-33.5] dBc	30 kHz
0.8-1.8 MHz	[-33.5]– 14*(Δf-0.8) dBc	30 kHz
1.8-2.4 MHz	[-47.5] – 25*(Δf-1.8)dBc	30 kHz
2.4 – 4.0MHz	[-47.5] dBc	1 MHz

NOTE 1: The first and last measurement position with a 30 kHz filter is 0.815 MHz and 2.385 MHz.

NOTE 2: The first and last measurement position with a 1 MHz filter is 2.9MHz and 3.5MHz.

NOTE 3: The lower limit shall be [– 53.5] dBm/1,28 MHz or which ever is the higher.

NOTE 4: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in Annex F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.4.

3GPP TSG-T WG1 Meeting #13
Cancun, Mexico, 29th-30th November, 2001

Tdoc T1-010513

CR-Form-v5

CHANGE REQUEST

⌘ **34.122** **CR** **058** ⌘ **rev** **-** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘	Changes to blocking characteristics and spurious response test cases (TS 34.122 v.3.5.0)
Source:	⌘	T1/RF
Work item code:	⌘	***Date:*** ⌘ 2001-Nov-29
Category:	⌘	**F** ***Release:*** ⌘ R99

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

Use one of the following releases:

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

Reason for change:	⌘	Frequencies to be tested are not equal in blocking characteristics and spurious response test case. Anyhow, the spurious response frequencies for spurious response test case are determined in blocking characteristic (out-of band case) test case.
Summary of change:	⌘	It is proposed to change frequency to be tested for blocking out-of-band case from "1 arbitrary frequency selected between low and high range" to "1 arbitrary frequency chosen from the low, mid or high range".
Consequences if not approved:	⌘	If tested frequency in blocking characteristics and spurious response test case is not same, spurious response test case can not be performed.

Clauses affected:	⌘	6.5, 6.6		
Other specs affected:	⌘	☐ Other core specifications ☒ Test specifications ☐ O&M Specifications	⌘	TS 34.121
Other comments:	⌘			

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

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

Table 6.4.5: Test parameters for Adjacent Channel Selectivity

Parameter	Unit	Level
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	dB	0
$\hat{I}_{or}$	dBm/3,84 MHz	-91
I_{oac}	dBm/3,84 MHz	-52
F_{uw} offset	MHz	+5 or -5

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

6.5 Blocking Characteristics

6.5.1 Definition and applicability

The blocking characteristics is a measure of the receiver 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 of this test apply to all UTRA UE.

6.5.2 Minimum Requirements

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

The normative reference for this requirement is TS 25.102 clause 7.6.1.

Table 6.5.2a: In-band blocking

Parameter	Offset 1	Offset 2	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	**0**	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3,84 MHz
$I_{blocking}$ (modulated)	-56	-44	dBm/3,84 MHz
F_{uw} offset	+10 or -10	+15 or -15	MHz

Table 6.5.2b: Out of band blocking

Parameter	Band 1	Band 2	Band 3	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3,84 MHz
$I_{blocking}$ (CW)	-44	-30	-15	dBm
F_{uw} For operation in frequency bands as definded in clause 4.2(a)	1840 <f <1885 1935 <f <1995 2040 <f <2085	1815 <f <1840 2085 <f <2110	1< f <1815 2110< f <12750	MHz
F_{uw} For operation in frequency bands as definded in clause 4.2(b)	1790 < f < 1835 2005 < f < 2050	1765 < f < 1790 2050 < f < 2075	1 < f < 1765 2075 < f < 12750	MHz
F_{uw} For operation in frequency bands as definded in clause 4.2(c)	1850 < f < 1895 1945 < f < 1990	1825 < f < 1850 1990 < f < 2015	1 < f < 1825 2015 < f < 12750	MHz

NOTE 1: For operation referenced in 4.2(a), from 1885 <f< 1900 MHz, 1920 <f< 1935 MHz, 1995 <f< 2010 MHz and 2025<f< 2040 MHz , the appropriate in-band blocking or adjacent channel selectivity in clause 6.5.2 shall be applied.

NOTE 2: For operation referenced in 4.2(b), from 1835 < f < 1850 MHz and 1990< f < 2005 MHz, the appropriate in-band blocking or adjacent channel selectivity in clause 6.5.2 shall be applied.

NOTE 3: For operation referenced in 4.2(c), from 1895 < f < 1910 MHz and 1930< f < 1945 MHz, the appropriate in-band blocking or adjacent channel selectivity in clause 6.5.2 shall be applied.

6.5.3 Test purpose

"The test stresses the ability of the UE receiver to withstand high-level interference from unwanted signals at frequency offsets of 10 MHz or more, without undue degradation of its sensitivity."

6.5.4 Method of test

6.5.4.1 Initial conditions

For in-band case:

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

For out-of-band case:

Test environment: normal; see clauses G.2.1 and G.2.2.

~~Frequencies~~ Frequency to be tested: 1 arbitrary frequency chosen from the low, mid or high range~~selected between low and high range~~; see clause G.2.4.

1) Connect the SS and the interfering Signal generator to the antenna connector as shown in figure A.5.

2) A call is set up according to the Generic call setup procedure.

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

6.5.4.2 Procedure

1) The wanted signal frequency channel is set into the middle of the band.

2) The interfering Signal Generator is stepped through the frequency range indicated in table 6.5.2.a. with a step size of 1 MHz.

3) The interference signal shall be equivalent to a continuously running wideband CDMA signal with one code and chip frequency 3,84 Mchip/s and rolloff 0,22.

4) Measure the BER of the wanted signal received from the UE at the SS for each step of the interferer.

5) Repeat the inband blocking for wanted frequency channels low–band and high-band.

6) The wanted signal frequency channel is set into the middle of the band.

7) The interfering Signal Generator is stepped through the frequency range indicated in table 6.4.2.b with a step size of 1 MHz.

8) The interference signal is a CW signal.

9) Measure the BER of the wanted signal received from the UE at the SS for each step of the interferer.

NOTE: Due to the large amount of time-consuming BER tests it is recommended to speed up a single BER test by reducing the 0.001-BER confidence level [10 000 bits under test or 10 errors] for screening the critical frequencies. Critical frequencies must be identified using standard BER confidence level. [30 000 bits or 30 errors].

6.5.5 Test requirements

The measured BER, derived in step 4) and 5), shall not exceed 0,001 (without exception) under test conditions described in table 6.5.5a.

The measured BER, derived in step 9), shall not exceed 0,001 except for up to 24 different frequencies of the interfering signal under test conditions described in table 6.5.5b.

These frequencies are further processed in clause 5.6 Spurious response.

Table 6.5.5a: Test conditions In-band blocking

Parameter	Offset 1	Offset 2	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3,84 MHz
$I_{blocking}$ (modulated)	-56	-44	dBm/3,84 MHz

Table 6.5.5b: Test conditions Out of band blocking

Parameter	Band 1	Band 2	Band 3	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3,84 MHz
$I_{blocking}$ (CW)	-44	-30	-15	dBm

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

6.6 Spurious Response

6.6.1 Definition and applicability

Spurious response is a measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the blocking limit is not met.

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

6.6.2 Minimum Requirements

The BER shall not exceed 0,001 for the parameters specified in table 6.6.2.

The normative reference for this requirement is TS 25.102 [1] clause 7.7.1

Table 6.6.2: Spurious Response

Parameter	Value	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{o}$	<REFSENS> + 3	dBm/3,84 MHz
$I_{blocking}$ (CW)	-44	dBm
F_{uw}	Spurious response frequencies	MHz

6.6.3 Test purpose

Spurious response frequencies, identified in the blocking test, are measured against a less stringent test requirement. The test stresses the ability of the receiver to withstand high level interference signals without undue degradation of its sensitivity due to the receiver's frequency conversion concept.

6.6.4 Method of test

6.6.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

~~Frequencies~~ Frequency to be tested: the same frequency as chosen in subclause 6.5.4.1 for Blocking characteristics out-of-band case.~~low range, high range; see clause G.2.4.~~

1) Connect the SS and the unwanted signal to the UE antenna connector as shown in figure A.6.

2) A call is set up according to the Generic call setup procedure.

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

6.6.4.2 Procedure

1) Repeat the wanted signal frequency setting from the blocking test. Set the level according to table 6.6.2.

2) Repeat the frequency settings of the interferer signal, at which the blocking test failed. Set the level according to table 6.6.5.

3) Measure the BER of DCH received from the UE at the SS for each of the settings 1) and 2).

6.6.5 Test requirements

The measured BER, derived in step 3), shall not exceed 0,001 under. test conditions described in table 6.6.5.

Table 6.6.5: Test Parameters Spurious Response

Parameter	Value	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_o$	<REFSENS> + 3	dBm/3,84 MHz
$I_{blocking}$ (CW)	-44	dBm
F_{uw}	Spurious response frequencies	MHz

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

3GPP TSG-T WG1 Meeting #13
Cancun, Mexico, 29th-30th November, 2001

Tdoc T1-010514

CR-Form-v5

CHANGE REQUEST

⌘ **34.122** **CR** **067** ⌘ **rev** **-** ⌘ Current version: **4.1.0** ⌘

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

Title:	⌘	Changes to blocking characteristics and spurious response test cases (TS 34.122 v.4.1.0)
Source:	⌘	T1/RF
Work item code:	⌘	TEI
Date:	⌘	2001-Nov-29
Category:	⌘	**A**
Release:	⌘	REL-4

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

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

Reason for change:	⌘	Frequencies to be tested are not equal in blocking characteristics and spurious response test case. Anyhow, the spurious response frequencies for spurious response test case are determined in blocking characteristic (out-of band case) test case.
Summary of change:	⌘	It is proposed to change frequency to be tested for blocking out-of-band case from "1 arbitrary frequency selected between low and high range" to "1 arbitrary frequency chosen from the low, mid or high range".
Consequences if not approved:	⌘	If tested frequency in blocking characteristics and spurious response test case is not same, spurious response test case can not be performed.

Clauses affected:	⌘	6.5, 6.6		
Other specs affected:	⌘	☐ Other core specifications ☒ Test specifications ☐ O&M Specifications	⌘	TS 34.121
Other comments:	⌘			

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

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

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

6.4.5.2 1,28 Mcps TDD Option

The measured BER, derived in step 2), shall not exceed 0,001 under conditions described in table 6.4.5.2 for the 1,28 Mcps TDD Option.

Table 6.4.5.2: Test parameters for Adjacent Channel Selectivity (1,28Mcps TDD Option)

Parameter	Unit	Level
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	dB	0
$\hat{I}_{or}$	dBm/1,28MHz	[-91]
I_{oac}	dBm/1,28 MHz	[-54]
F_{uw} offset	MHz	[+1.6 or –1.6]

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

6.5 Blocking Characteristics

6.5.1 Definition and applicability

The blocking characteristics is a measure of the receiver 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 of this test apply to all UTRA UE.

6.5.2 Minimum Requirements

6.5.2.1 3,84 Mcps TDD Option

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

The normative reference for this requirement is TS 25.102 clause 7.6.1.1.

Table 6.5.2.1a: In-band blocking (3,84 Mcps TDD Option)

Parameter	Offset 1	Offset 2	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3,84 MHz
$I_{blocking}$ (modulated)	-56	-44	dBm/3,84 MHz
F_{uw} offset	+10 or -10	+15 or -15	MHz

Table 6.5.2.1b: Out of band blocking (3,84 Mcps TDD Option)

Parameter	Band 1	Band 2	Band 3	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3,84 MHz
$I_{blocking}$ (CW)	-44	-30	-15	dBm
F_{uw} For operation in frequency bands as definded in clause 4.2(a)	1840 <f <1885 1935 <f <1995 2040 <f <2085	1815 <f <1840 2085 <f <2110	1< f <1815 2110< f <12750	MHz
F_{uw} For operation in frequency bands as definded in clause 4.2(b)	1790 < f < 1835 2005 < f < 2050	1765 < f < 1790 2050 < f < 2075	1 < f < 1765 2075 < f < 12750	MHz
F_{uw} For operation in frequency bands as definded in clause 4.2(c)	1850 < f < 1895 1945 < f < 1990	1825 < f < 1850 1990 < f < 2015	1 < f < 1825 2015 < f < 12750	MHz

NOTE 1: For operation referenced in 4.2(a), from 1885 <f< 1900 MHz, 1920 <f< 1935 MHz, 1995 <f< 2010 MHz and 2025<f< 2040 MHz , the appropriate in-band blocking or adjacent channel selectivity in clause 6.4.2.1 shall be applied.

NOTE 2: For operation referenced in 4.2(b), from 1835 < f < 1850 MHz and 1990< f < 2005 MHz, the appropriate in-band blocking or adjacent channel selectivity in clause 6.4.2.1 shall be applied.

NOTE 3: For operation referenced in 4.2(c), from 1895 < f < 1910 MHz and 1930< f < 1945 MHz, the appropriate in-band blocking or adjacent channel selectivity in clause 6.4.2.1 shall be applied.

6.5.2.2 1,28 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in table 6.5.2.2a and table 6.5.2.2b.

The normative reference for this requirement is 3G TS 25.102 [1] clause 7.6.1.2.

Table 6.5.2.2a: In-band blocking (1,28Mcps TDD Option)

Parameter	Offset	Offset	Unit
Wanted Signal Level	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/1,28 MHz
Unwanted Signal Level (modulated)	-61	-49	dBm/1,28 MHz
F_{uw} (offset)	+3.2 or –3.2	+4.8 or –4.8	MHz

Table 6.5.2.2b: Out of band blocking (1,28Mcps TDD Option)

Parameter	Band 1	Band 2	Band 3	Unit
Wanted Signal Level	<REFSENS> + 3 dB	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/1,28 MHz
Unwanted Signal Level (CW)	-44	-30	-15	dBm
F_{uw} For operation in frequency bands as definded in clause 4.2(a)	1840 <f <1895.2 1924.8 <f <2005.2 2029.8 <f <2085	1815 <f <1840 2085 <f <2110	1< f <1815 2110< f <12750	MHz
F_{uw} For operation in frequency bands as definded in clause 4.2(b)	1790 < f < 1845.2 1994.8 < f < 2050	1765 < f < 1790 2050 < f < 2075	1 < f < 1765 2075 < f < 12750	MHz
F_{uw} For operation in frequency bands as definded in clause 4.2(c)	1850 < f < 1905.2 1934.8 < f < 1990	1825 < f < 1850 1990 < f < 2015	1 < f < 1825 2015 < f < 12750	MHz

NOTE 1: For operation referenced in 4.2(a), from 1895.2 <f< 1900 MHz, 1920 <f< 1924.8 MHz, 2005.2 <f< 2010 MHz and 2025<f< 2029.8 MHz , the appropriate in-band blocking or adjacent channel selectivity in clause 6.4.2.2shall be applied.

NOTE 2: For operation referenced in 4.2(b), from 1845.2 < f < 1850 MHz and 1990< f < 1994.8 MHz, the appropriate in-band blocking or adjacent channel selectivity in clause 6.4.2.2 shall be applied.

NOTE 3: For operation referenced in 4.2(c), from 1905.2 < f < 1910 MHz and 1930< f < 1934.8 MHz, the appropriate in-band blocking or adjacent channel selectivity in clause 6.4.2.2 shall be applied.

6.5.3 Test purpose

"The test stresses the ability of the UE receiver to withstand high-level interference from unwanted signals at frequency offsets of 10 MHz or more, without undue degradation of its sensitivity."

6.5.4 Method of test

6.5.4.1 Initial conditions

For in-band case:

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

For out-of-band case:

Test environment: normal; see clauses G.2.1 and G.2.2.

~~Frequencies~~ Frequency to be tested: 1 arbitrary frequency chosen from the low, mid or high range~~selected between low and high range~~; see clause G.2.4.

1) Connect the SS and the interfering Signal generator to the antenna connector as shown in figure A.5.

2) A call is set up according to the Generic call setup procedure.

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

6.5.4.2 Procedure

1) The wanted signal frequency channel is set into the middle of the band.

2) The interfering Signal Generator is stepped through the frequency range indicated in table 6.5.2.1a for the 3,84 Mcps TDD Option and table 6.5.2.2a for the 1,28 Mcps TDD Option, respectively with a step size of 1 MHz.

3) The interference signal shall be equivalent to a continuously running wideband CDMA signal with one code and chip frequency 3,84 Mchip/s for the 3,84 Mcps TDD Option and 1,28 Mchp/s for the 1,28 Mcps TDD Option, respectively and rolloff 0.22.

4) Measure the BER of the wanted signal received from the UE at the SS for each step of the interferer.

5) Repeat the inband blocking for wanted frequency channels low–band and high-band.

6) The wanted signal frequency channel is set into the middle of the band.

7) The interfering Signal Generator is stepped through the frequency range indicated in table 6.4.2.1b for the 3,84 Mcps TDD Option and table 6.4.2.2b for the 1,28 Mcps TDD Option, respectively with a step size of 1 MHz.

8) The interference signal is a CW signal.

9) Measure the BER of the wanted signal received from the UE at the SS for each step of the interferer.

NOTE: Due to the large amount of time-consuming BER tests it is recommended to speed up a single BER test by reducing the 0.001-BER confidence level [10 000 bits under test or 10 errors] for screening the critical frequencies. Critical frequencies must be identified using standard BER confidence level. [30 000 bits or 30 errors].

6.5.5 Test requirements

6.5.5.1 3,84 Mcps TDD Option

The measured BER, derived in step 4) and 5), shall not exceed 0,001 (without exception) under test conditions described in table 6.5.5.1a.

The measured BER, derived in step 9), shall not exceed 0,001 except for up to 24 different frequencies of the interfering signal under test conditions described in table 6.5.5.1b.

These frequencies are further processed in clause 6.6 Spurious response.

Table 6.5.5.1a: Test conditions In-band blocking (3,84 Mcps TDD Option)

Parameter	Offset 1	Offset 2	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3,84 MHz
$I_{blocking}$ (modulated)	-56	-44	dBm/3,84 MHz

Table 6.5.5.1b: Test conditions Out of band blocking (3,84 Mcps TDD Option)

Parameter	Band 1	Band 2	Band 3	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	0	dB

$\hat{I}_{or}$	<REFSENS> + 3 dB	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/3,84 MHz
$I_{blocking}$ (CW)	-44	-30	-15	dBm

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

6.5.5.2 1,28 Mcps TDD Option

The measured BER, derived in step 4) and 5), shall not exceed 0,001 (without exception) under test conditions described in table 6.5.5.2a.

The measured BER, derived in step 9), shall not exceed 0,001 except for up to 24 different frequencies of the interfering signal under test conditions described in table 6.5.5.2b.

These frequencies are further processed in clause 6.6 Spurious response.

Table 6.5.5.2a: Test conditions In-band blocking (1,28 Mcps TDD Option)

Parameter	Offset 1	Offset 2	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	dB
$\hat{I}_{or}$	[<REFSENS> + 3 dB]	[<REFSENS> + 3 dB]	dBm/1,28 MHz
$I_{blocking}$ (modulated)	[-56]	[-44]	dBm/1,28 MHz

Table 6.5.5.2b: Test conditions Out of band blocking (3,84 Mcps TDD Option)

Parameter	Band 1	Band 2	Band 3	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	0	0	dB
$\hat{I}_{or}$	[<REFSENS> + 3 dB]	[<REFSENS> + 3 dB]	[<REFSENS> + 3 dB]	dBm/1,28 MHz
$I_{blocking}$ (CW)	[-44]	[-30]	[-15]	dBm

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4

6.6 Spurious Response

6.6.1 Definition and applicability

Spurious response is a measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the blocking limit is not met.

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

6.6.2 Minimum Requirements

6.6.2.1 3,84 Mcps TDD Option

The BER shall not exceed 0,001 for the parameters specified in table 6.6.2.1.

The normative reference for this requirement is TS 25.102 clause 7.7.1.1.

Table 6.6.2.1: Spurious Response (3,84 Mcps TDD Option)

Parameter	Value	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_o$	<REFSENS> + 3	dBm/3,84 MHz
$I_{blocking}$ (CW)	-44	dBm
F_{uw}	Spurious response frequencies	MHz

6.6.2.2 1,28 Mcps TDD Option

The BER shall not exceed 0.001 for the parameters specified in table 6.6.2.2.

Table 6.6.2.2: Spurious Response (1,28Mcps TDD Option)

Parameter	Level	Unit
Wanted Signal Level	<REFSENS> + 3 dB	dBm/1,28 MHz
Unwanted Signal Level (CW)	-44	dBm
F_{uw}	Spurious response frequencies	MHz

6.6.3 Test purpose

Spurious response frequencies, identified in the blocking test, are measured against a less stringent test requirement. The test stresses the ability of the receiver to withstand high level interference signals without undue degradation of its sensitivity due to the receiver's frequency conversion concept.

6.6.4 Method of test

6.6.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

~~Frequencies~~ Frequency to be tested: the same frequency as chosen in subclause 6.5.4.1 for Blocking characteristics out-of-band case.~~low range, high range; see clause G.2.4.~~

1) Connect the SS and the unwanted signal to the UE antenna connector as shown in figure A.6.

2) A call is set up according to the Generic call setup procedure.

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

6.6.4.2 Procedure

1) Repeat the wanted signal frequency setting from the blocking test. Set the level according to table 6.6.2.1 for the 3,84 Mcps TDD Option and table 6.6.2.2 for the 1,28 Mcps TDD Option, respectively.

2) Repeat the frequency settings of the interferer signal, at which the blocking test failed. Set the level according to table 6.6.5.1 for the 3,84 Mcps TDD Option and table 6.6.5.2 for the 1,28 Mcps TDD Option, respectively.

3) Measure the BER of DCH received from the UE at the SS for each of the settings 1) and 2).

6.6.5 Test requirements

6.6.5.1 3,84 Mcps TDD

The measured BER, derived in step 3), shall not exceed 0,001 under. test conditions described in table 6.6.5.1 for the 3,84 Mcps TDD Option.

Table 6.6.5.1: Test Parameters Spurious Response (3,84 Mcps TDD Option)

Parameter	Value	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{o}$	<REFSENS> + 3	dBm/3,84 MHz
$I_{blocking}$ (CW)	-44	dBm
F_{uw}	Spurious response frequencies	MHz

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

6.6.5.2 1,28 Mcps TDD

The measured BER, derived in step 3), shall not exceed 0,001 under test conditions described in table 6.6.5.2 for the 1,28 Mcps TDD Option.

Table 6.6.5.2: Test Parameters Spurious Response (1,28 Mcps TDD Option)

Parameter	Value	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{o}$	[<REFSENS> + 3]	dBm/1,28 MHz
$I_{blocking}$ (CW)	[-44]	dBm
F_{uw}	Spurious response frequencies	MHz

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

3GPP TSG-T WG1 Meeting #13 **T1-010515**

Cancun, Mexico, 29th - 30th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **34.122** **CR** 059 ⌘ ev **-** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘	Maximum Output Power for Multi-code Transmissions
Source:	⌘	T1/RF
Work item code:	⌘	***Date:*** ⌘ 29/11/2001
Category:	⌘	**F** ***Release:*** ⌘ Rel99

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

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

Reason for change:	⌘	Requirement for maximum output power for multi-code transmissions is in brackets
Summary of change:	⌘	Removal of brackets for maximum output power for multi-code transmissions
Consequences if not approved:	⌘	Requirement for maximum output power for multi-code transmission would not be finalized.
Clauses affected:	⌘	5.2.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	Maintenance of 34.122 according to RAN CR 67

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

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

5.2 User Equipment 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 **output power**, Pout, of the UE is the power when averaged (in the sense of thermal power) over the useful part of the TS at the maximum power control setting delivered in to a load with resistance equal to the nominal load impedance.

The requirements in this test apply to all UTRA – TDD- UEs

Notes copied from TS 25.102 clause 6.2.1:

NOTE 1: The maximum output power refers to.....

NOTE 2: For multi-code operation the maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission.

NOTE 3: The tolerance of the maximum power is below the prescribed value even at the multi-code transmission mode

NOTE 4: For UE using directive antennas for transmission, a class dependent limit will be placed on the maximum EIRP (Equivalent Isotropic Radiated Power).

5.2.2 Minimum Requirements

The error of the UE maximum output power shall not exceed the tolerance shown in tables 5.2.2 a and b for single and multi-code.

Table 5.2.2.a: Maximum Output Power single code

Power Class	Maximum output power	Tolerance
2	+24 dBm	+1dB/-3dB
3	+21 dBm	+2dB/-2dB

Table 5.2.2.b: Maximum Output Power multi code

Power Class	Maximum output power	Tolerance
2	~~[~~21~~]~~ dBm (note)	+1dB/-3dB
3	~~[~~18~~]~~ dBm (note)	+2dB/-2dB
NOTE: These figures are not mentioned in 25.102. Instead there is a note, saying: "For multi-code operation the maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission." The figures are calculated from maximum output power single code (table 5.2.2.a) and UL multicode reference measurement channel (12,2 kbit/s) (annex C.2.2.) containing two code signals with equal level.		

The normative reference for this requirement is TS 25.102 clause 6.2.

5.2.3 Test purpose

For the following reasons:

Limit interference.

Verify that the maximum output power is achievable.

It is the purpose of the test to verify that the UE's maximum output power is within its tolerance limits under all environmental conditions.

5.2.4 Method of test

5.2.4.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

1) Connect the SS to the UE antenna connector as shown in figure A.1.
2) Calls are set up according to the Generic call setup procedure using parameters as specified in tables 5.2.4.a and b.
3) Enter the UE into loopback test mode and start the loopback test.

Table 5.2.4.a: Test parameters for Maximum Output Power single code

Parameter	Value/description
UL Reference measurement channel	12,2kbps, according to annex C.2.1
Uplink Power Control	SS level and signalling values such that UE transmits maximum power.
Data content	real life (sufficient irregular)

Table 5.2.4.b: Test parameters for Maximum Output Power multicode

Parameter	Value/description
Reference measurement channel	Multicode 12,2kbps, according to annex C.2.2
Uplink Power Control	SS level and signalling values such that UE transmits maximum power
Data content	real life (sufficient irregular)

5.2.4.2 Procedure

1) Measure thermal power over the useful part of the burst with a measurement bandwidth of at least 5 MHz.
2) Run step 1) or RF channels Low / Mid / High.

5.2.5 Test Requirements

The output power, measured in step 2) of clause 5.2.4.2, shall not exceed the prescribed tolerance in table 5.2.5 a and b.

Table 5.2.5.a: Maximum Output Power single code

Power Class	Maximum output power	Tolerance
2	+24 dBm	+1,7 dB / -3,7dB
3	+21 dBm	+2,7 dB / -2,7dB

Table 5.2.5.b: Maximum Output Power multi code

Power Class	Maximum output power	Tolerance
2	~~[~~21~~]~~ dBm	+1,7dB / -3,7 dB
3	~~[~~18~~]~~ dBm	+2,7dB / -2,7 dB

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F clause F.4.

3GPP TSG-T WG1 Meeting #13 **T1-010516**

Cancun, Mexico, 29th - 30th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **34.122** **CR** 068 ⌘ ev **-** ⌘ Current version: **4.1.0** ⌘

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

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

Title:	⌘	Maximum Output Power for Multi-code Transmissions
Source:	⌘	T1/RF
Work item code:	⌘	TEI
Date:	⌘	29/11/2001
Category:	⌘	**A**
Release:	⌘	Rel 4

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

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

Reason for change:	⌘	Requirement for maximum output power for multi-code transmissions is in brackets
Summary of change:	⌘	Removal of brackets for maximum output power for multi-code transmissions
Consequences if not approved:	⌘	Requirement for maximum output power for multi-code transmission would not be finalized.

Clauses affected:	⌘	5.2.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	Maintenance of 34.122 according to RAN CR 68 and Cat A CR to T1R010263

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

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

5.2 User Equipment 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 **output power**, Pout, of the UE is the power when averaged (in the sense of thermal power) over the useful part of the TS at the maximum power control setting delivered in to a load with resistance equal to the nominal load impedance.

The requirements in this test apply to all UTRA – TDD- UEs

Notes copied from TS 25.102 clause 6.2.1:

NOTE 1: The maximum output power refers to the measure of power when averaged over the useful part of the transmit timeslots at the maximum power control setting.

NOTE 2: For multi-code operation the maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission.

NOTE 3: The tolerance of the maximum power is below the prescribed value even at the multi-code transmission mode

NOTE 4: For UE using directive antennas for transmission, a class dependent limit will be placed on the maximum EIRP (Equivalent Isotropic Radiated Power).

5.2.2 Minimum Requirements

The error of the UE maximum output power shall not exceed the tolerance shown in tables 5.2.2 a and b for single and multi-code.

Table 5.2.2.a: Maximum Output Power single code

Power Class	Maximum output power	Tolerance
1	+30 dBm	+1dB/-3dB
2	+24 dBm	+1dB/-3dB
3	+21 dBm	+2dB/-2dB
4	+10 dBm	+4dB/-4dB

Table 5.2.2.b: Maximum Output Power multi code

Power Class	Maximum output power	Tolerance
1	~~[~~+27~~]~~dBm (note)	+1dB/-3dB
2	~~[~~21~~]~~ dBm (note)	+1dB/-3dB
3	~~[~~18~~]~~ dBm (note)	+2dB/-2dB
4	~~[~~+7~~]~~ dBm (note)	+4dB/-4dB
NOTE: These figures are not mentioned in 25.102. Instead there is a note, saying: "For multi-code operation the maximum output power will be reduced by the difference of peak to average ratio between single and multi-code transmission." The figures are calculated from maximum output power single code (table 5.2.2.a) and UL multicode reference measurement channel (12,2 kbit/s) (annex C.2.2.1 for the 3,84 TDD Option and annex C.2.2.2 for the 1,28 Mcps TDD Option, respectively) containing two code signals with equal level.		

The normative reference for this requirement is TS 25.102 [1] clause 6.2.1.

5.2.3 Test purpose

For the following reasons:

Limit interference.

Verify that the maximum output power is achievable.

It is the purpose of the test to verify that the UE's maximum output power is within its tolerance limits under all environmental conditions.

5.2.4 Method of test

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

5.2.4.1 Initial conditions

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; see clauses G.2.1 and G.2.2.

Frequencies to be tested: low range, mid range, high range; see clause G.2.4.

1) Connect the SS to the UE antenna connector as shown in figure A.1.
2) Calls are set up according to the Generic call setup procedure using parameters as specified in tables 5.2.4.1.1a and b for the 3,84 Mcps TDD Option and in tables 5.2.4.1.2a and b for the 3,84 Mcps TDD Option, respectively.
3) Enter the UE into loopback test mode and start the loopback test.

5.2.4.1.1 3,84 Mcps TDD Option

Table 5.2.4.1.1a: Test parameters for Maximum Output Power single code (3,84 Mcps TDD Option)

Parameter	Value/description
UL Reference measurement channel	12,2 kbps, according to annex C.2.1.1
Uplink Power Control	SS level and signalling values such that UE transmits maximum power.
Data content	real life (sufficient irregular)

Table 5.2.4.1.1b: Test parameters for Maximum Output Power multicode (3,84 Mcps TDD Option)

Parameter	Value/description
Reference measurement channel	Multicode 12,2 kbps, according to annex C.2.2.1
Uplink Power Control	SS level and signalling values such that UE transmits maximum power
Data content	real life (sufficient irregular)

5.2.4.1.2 1,28 Mcps TDD Option

Table 5.2.4.1.2a: Test parameters for Maximum Output Power single code (1,28 Mcps TDD Option)

Parameter	Value/description
UL Reference measurement channel	12,2 kbps, according to annex C.2.1.2.
Uplink Power Control	SS level and signalling values such that UE transmits maximum power.
Data content	real life (sufficient irregular)

Table 5.2.4.1.2b: Test parameters for Maximum Output Power multicode (1,28 Mcps TDD Option)

Parameter	Value/description
Reference measurement channel	Multicode 12,2 kbps, according to annex C.2.2.2
Uplink Power Control	SS level and signalling values such that UE transmits maximum power
Data content	real life (sufficient irregular)

5.2.4.2 Procedure

1) Measure thermal power over the useful part of the burst, with a measurement bandwidth of at least 5 MHz related to 3,84 Mcps TDD Option and with a measurement bandwidth of at least 1,6 MHz in case of 1,28 Mcps TDD Option.

2) Run step 1) for RF channels Low / Mid / High.

5.2.5 Test Requirements

The output power, measured in step 2) of clause 5.2.4.2, shall not exceed the prescribed tolerance in table 5.2.5 a and b.

Table 5.2.5.a: Maximum Output Power single code

Power Class	Maximum output power	Tolerance
1	+30 dBm	[+1,7] dB / [-3,7] dB
2	+24 dBm	+1,7 dB / -3,7dB
3	+21 dBm	+2,7 dB / -2,7dB
4	+10 dBm	[+4,7] dB / [-4,7] dB

Table 5.2.5.b: Maximum Output Power multi code

Power Class	Maximum output power	Tolerance
1	~~[~~27~~]~~ dBm	+1,7 dB / -3,7 dB
2	~~[~~21~~]~~ dBm	+1,7dB / -3,7 dB
3	~~[~~18~~]~~ dBm	+2,7dB / -2,7 dB
4	~~[~~7~~]~~ dBm	+4,7 dB / -4,7 dB

NOTE 1: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in annex F clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex F clause F.4.

NOTE 2: Concerning multicode transmission this test applies only for UE power classes 2 and 3. It is intended, that additional test requirements for UE power classes 1 and 4 in this case are part of a later version of the present document.

3GPP TSG-T1 Meeting #13 ***T1(01)0518***
Cancun, Mexico, 29th – 30th Nov 2001

CR-Form-v3

CHANGE REQUEST

⌘ **34.122 CR 060** ⌘ rev **-** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘	BER/BLER testing based on statistical approach (TS34.122)
Source:	⌘	T1/RF
Work item code:	⌘	***Date:*** ⌘ Nov.-26-2001
Category:	⌘	**F** ***Release:*** ⌘ R99

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

Use one of the following releases:

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

Reason for change:	⌘	BER/BLER measurement has statistical nature. The current Test Requirement specifies only a single value without statistical policy.
Summary of change:	⌘	It introduces the statistical requirements and provides most of the relevant parameters to fulfil the statistical requirements for BER BLER tests
Consequences if not approved:	⌘	Statistical approach for BER/BLER varies test by test. An inconsistent approach may cause a result, which is not reliable from the viewpoint of statistical theory.

Clauses affected:	⌘	6.1, 7.1, Annex-F.6
Other specs affected:	⌘	☐ Other core specifications ⌘
		☐ Test specifications
		☐ O&M Specifications
Other comments:	⌘	

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6 Receiver Characteristics

6.1 General

Receiving performance test of the UE is implemented during communicating with the SS via air interface. The procedure uses normal call protocol until the UE is communicating on traffic channel basically. (Refer to TS 34.108 [3] Common Test Environments for User Equipment (UE) Conformance Testing.) On the traffic channel, the UE provides special function for testing that is described in Logical Test Interface and the UE is tested using this function. (Refer to TS 34.109 [3] Logical Test Interface (FDD/TDD) Special conformance testing functions.)

Unless otherwise stated the receiver characteristics are specified at the antenna connector of the UE. For UE(s) with an integral antenna only, a reference antenna with a gain of 0 dBi is assumed. UE with an integral antenna may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. Receiver characteristics for UE(s) with multiple antennas/antenna connectors are for further study.

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 the present document. It is recognized that different requirements and test methods are likely to be required for the different types of UE.

All the parameters in clause 6 are defined using the DL reference measurement channel (12.2 kbps) specified in clause C.3.3.

All Bit Error ratio (BER) measurements in clause 6 shall be performed according to the general rules for statistical testing in Annex F.6

7 Performance Requirements

7.1 General

The performance requirements for the UE in this clause is specified for the measurement channels specified in annex C and the test environments specified in annex D.

All Block Error ratio (BLER) measurements in clause 7 shall be performed according to the general rules for statistical testing in Annex F.6

F.6 General rules for statistical testing

~~[TBD]~~

F.6.1 Statistical testing of receiver BER/BLER performance

F.6.1.1 Error Definition

1) Bit Error Ratio (BER)

The Bit Error Ratio is defined as the ratio of the bits wrongly received to all data bits sent. The bits are the information bits above the convolutional/turbo decoder

2) Block Error Ratio (BLER)

A Block Error Ratio is defined as the ratio of the number of erroneous blocks received to the total number of blocks sent. An erroneous block is defined as a Transport Block, the cyclic redundancy check (CRC) of which is wrong.

F.6.1.2 Test Method

Each test is performed in the following manner:

a) Setup the required test conditions.

b) Record the number of samples tested and the number of occurred events (bit error or block error)

c) Stop the test at a stop criterion which is minimum test time or an early pass or an early fail event.

d) Once the test is stopped decide according to the pass fail decision rules (subclause F.6.1.7)

F.6.1.3 Test Criteria

The test shall fulfil the following requirements:

a) good pass fail decision

1) to keep reasonably low the probability (risk) of passing a bad unit for each individual test;

2) to have high probability of passing a good unit for each individual test;

b) good balance between testtime and statistical significance

3) to perform measurements with a high degree of statistical significance;

4) to keep the test time as low as possible.

F.6.1.4 Calculation assumptions

It is assumed, that error events are independent statistical events. Due to the memory of the convolutional / turbo coder in the BER tests this is not quite true. Due to lack of information the assumption of independent error events is applied.

In the BLER test with fading there is the memory of the multipath fading channel which interferes the statistical independency. Independent error events are assumed but a minimum test time is introduced to average fluctuations of the multipath fading channel.

The formulas, applied to describe the BER BLER test, are primarily based on the following experiment:
(1) After having observed a certain number of errors (**ne**) the number of samples are counted to calculate BER BLER.
Provisions are made (note 1) such that the complementary experiment is valid as well:
(2) After a certain number of samples (**ns**) the number of errors, occurred, are counted to calculate BER BLER.
Experiment (1) stipulates to use the following Chi Square Distribution with degree of freedom ne:
2*dchisq(2*NE,2*ne) for all calculations.
(NE: average of the distribution)

F.6.1.5 Definition of good pass fail decision.

This is defined by the probability of wrong decision D. The probability of a correct decision is 1-D

The probability (risk) to fail a good DUT shall be <= D according to the following definition: A DUT is failed, accepting a probability of <= D that the DUT is still better than the specified error ratio (Test requirement)

The probability to pass a bad DUT shall be <= D according to the following definition: A DUT is passed, accepting a probability of <= D that the DUT is still worse than M times the specified error ratio. (M>=1 is the bad DUT factor)

This definitions lead to an early pass and an early fail limit:

Early fail: ber>= $berlim_{fail}$

$$ber\lim_{fail}(D,ne)=\frac{2*ne}{qchisq(D,2*ne)} \quad (1)$$

For ne>[5]

Early pass: ber <=$berlimbad_{pass}$

$$ber\lim bad_{pass}(D,ne)=\frac{2*ne*M}{qchisq(1-D,2*ne)} \quad (2)$$

For ne >=1

With

ber (normalized BER,BLER): BER,BLER according to F.6.1.1 divided by Test requirement

D: wrong decision probability see table F.6.1.8

ne: Number of error events

M: bad DUT factor see table F.6.1.8

qchisq: inverse cumulative chi squared distribution

F.6.1.6. Good balance between testtime and statistical significance

3 independent test parameters are introduced into the test and shown in Table F.6.1.6.1. These are the obvious basis of testtime and statistical significance. From the first two of them three dependent test parameters are derived. The third independent test parameter is justified separately.

Table F.6.1.6.1 independent and dependent test parameters

Independent test parameters			Dependent test parameters		
Test Parameter	Value	Reference	Test parameter	Value	Reference
Target number of error events	[200]	Table F.6.1.8	Early pass/fail condition	curves	Subclause F.6.1.5 Figure 6.1.9
Probability of wrong pass/fail decision D	[0.2%] [0.02%, Note 3]	Subclause F.6.1.5	Bad DUT factor M	[1.5]	Table 6.1.8
			Test limit factor TL	[1.24]	Table 6.1.8
Minimum test time		Table F.6.1.6.2			

The minimum test time is derived from the following justification:

1) For no propagation conditions and static propagation condition

No early fail calculated from fractional number of errors <1 see note 1

2) For multipath fading condition

No stop of the test until [10] wavelengths are crossed during relevant UE reception timeslots *) with the speed given in the fading profile. *) relevant for BER BLER testing

Table F.6.1.6.2 : minimum Test time

Fading profile	**Minimum test time**
Multipath propagation 3 km/h	[1.8 s*15/TSRX*)]
Multipath propagation 50 km/h	[0.1 s*15/TSRX]
Multipath propagation 120 km/h	[45 ms*15/TSRX]

Multipath propagation 250 km/h	[22ms*15/TSRX]
*) TSRX = The number of relevant UE reception timeslots per frame, relevant for BER BLER test	

15/ TSRX forms the prolongation factor and depend on the user data rate

Table F.6.1.6.3 : Prolongation factor for minimum Test time

User Data rate	TSRX
12.2 kbit/s	1
64 kbit/s	1
144 kbit/s	1
384 kbit/s	3

In table F.6.1.8 the minimum test time is converted in minimum number of samples

F.6.1.7. Pass fail decision rules

No decision is allowed before the minimum test time is elapsed

1) If minimum Test time < time for target number of error events then the following applies: The required confidence level (= correct decision probability 1-D) shall be achieved. This is fulfilled at an early pass or early fail event.

For BER: For every TTI (Transmit Time Interval) sum up the number of bits (ns) and the number if errors (ne) from the beginning of the test, including the artificial error at the beginning of the test (Note 1) and calculate BER.

If BER is above the early fail limit, fail the DUT.
If BER is below the early pass limit, pass the DUT.
Otherwise continue the test

For BLER: For every block sum up the number of blocks (ns) and the number if erroneous blocks (ne) from the beginning of the test, including the artificial error at the beginning of the test (Note 1) and calculate BLER.

If BLER is below the early pass limit, pass the DUT.
If BLER is above the early fail limit, fail the DUT.
Otherwise continue the test

2) If the minimum test time >= time for target error events, then the test runs for the minimum test time and the decision is done by comparing the result with the test limit.

F.6.1.8. Test conditions for BER,BLER tests

Table F.6.1.8: Test conditions for a single BER/BLER tests

Type of test (BER)	Propagation conditions	Test requirement (BER/BLER)	Test limit (BER/BLER) = Test requirement (BER/BLER) x TL TL	Target number of error events (time)	Minimum number of samples	Prob that good unit will fail = Prob that bad unit will pass [%]	Bad unit BER/BLER factor M
Reference Sensitivity Level	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]
Maximum Input Level	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]
Adjacent Channel Selectivity	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]
Blocking Characteristics Pass condition Note 2	-	0.001	[1.262]	[252] (16.6s)	Note 1	[0.2]	[1.5]
Blocking Characteristics Fail condition Note 2	-	0.001	[1.262]	[252] (16.6s)	Note 1	[0.02]	[1.5]
Spurious Response	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]
Intermodulation Characteristics	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]

Table F.6.1.8-2: Test conditions for BLER tests **Type of test (BLER)**	**Information Bit rate**	**Test requirement (BER/BLER)**	**Test limit (BER/BLER) = Test requirement (BER/BLER) x TL** **TL**	**Target number of error events** (time)	**Minimum number of samples**	**Prob that bad unit will pass = Prob that good unit will fail [%]**	**Bad unit BER/BLER factor M**
Demodulation in Static Propagation conditions	12.2 64 144 384	0.01 0.1 0.01 0.1 0.01 0.1 0.01	[1.24]	[200] (322.6s) (32.3s) (322.6s) (32.3s) (322.6s) (16.1s) (161.3s)	Note1	[0.2]	[1.5]
Demodulation of DCH in Multi-path Fading conditions							
3km/h (Case 1, Case 2)	12.2 64 144 384	0.01 0.1 0.01 0.1 0.01 0.1 0.01	[1.24]	[200] (322.6s) (32.3s) (322.6s) (32.3s) (322.6s) (16.1s) (161.3s)	[1350] [1350] [1350] [1350] [1350] [450] [450]	[0.2]	[1.5]
120 km/h (Case3)	12.2 64 144 384	0.01 0.1 0.01 0.1 0.01 0.1 0.01	[1.24]	[200] (322.6s) (32.3s) (322.6s) (32.3s) (322.6s) (16.1s) (161.3s)	[34] [34] [34] [34] [34] [12] [12]	[0.2]	[1.5]
250 km/h							
Power control in the downlink				Not applicable			

F.6.1.9 Practical Use (informative)

See figure F.6.1.9:

The early fail limit represents formula (1) in F.6.1.5 The range of validity is [ne>5, >6 in case of blocking test] to [ne =200]

The early pass limit represents the formula (2) in F.6.1.5 The range of validity is ne=1 to [ne =200]. See note 1

The intersection co-ordinates of both curves are : Target number of errors ne = [200] and test limit TL = [1.24]

The range of validity for TL is ne>200

A typical BER BLER test, calculated form the number of samples and errors (F.6.1.2.(b)) using experimental method (1) or (2) (see F.6.1.4. calculation assumptions) runs along the yellow trajectory. With an errorless sample the trajectory goes down vertically. With an erroneous sample it goes up right. The tester checks if the BER BLER test intersects the early fail or early pass limits. The real time processing can be reduced by the following actions:

BLER is calculated only in case of an error event.
BER is calculated only in case of an error event within a TTI.

So the early fail limit cannot be missed by errorless samples.

The check against the early pass limit may be done by transforming formula (2) in F.6.1.5 such that the tester checks against a Limit-Number-of-samples (NL(ne)) depending on the current number of errors.

Early pass if

$$NL(ne) \geq \frac{qchisq(1-D, 2*ne)}{2*TR*M}$$

TR: test requirement (0.001)

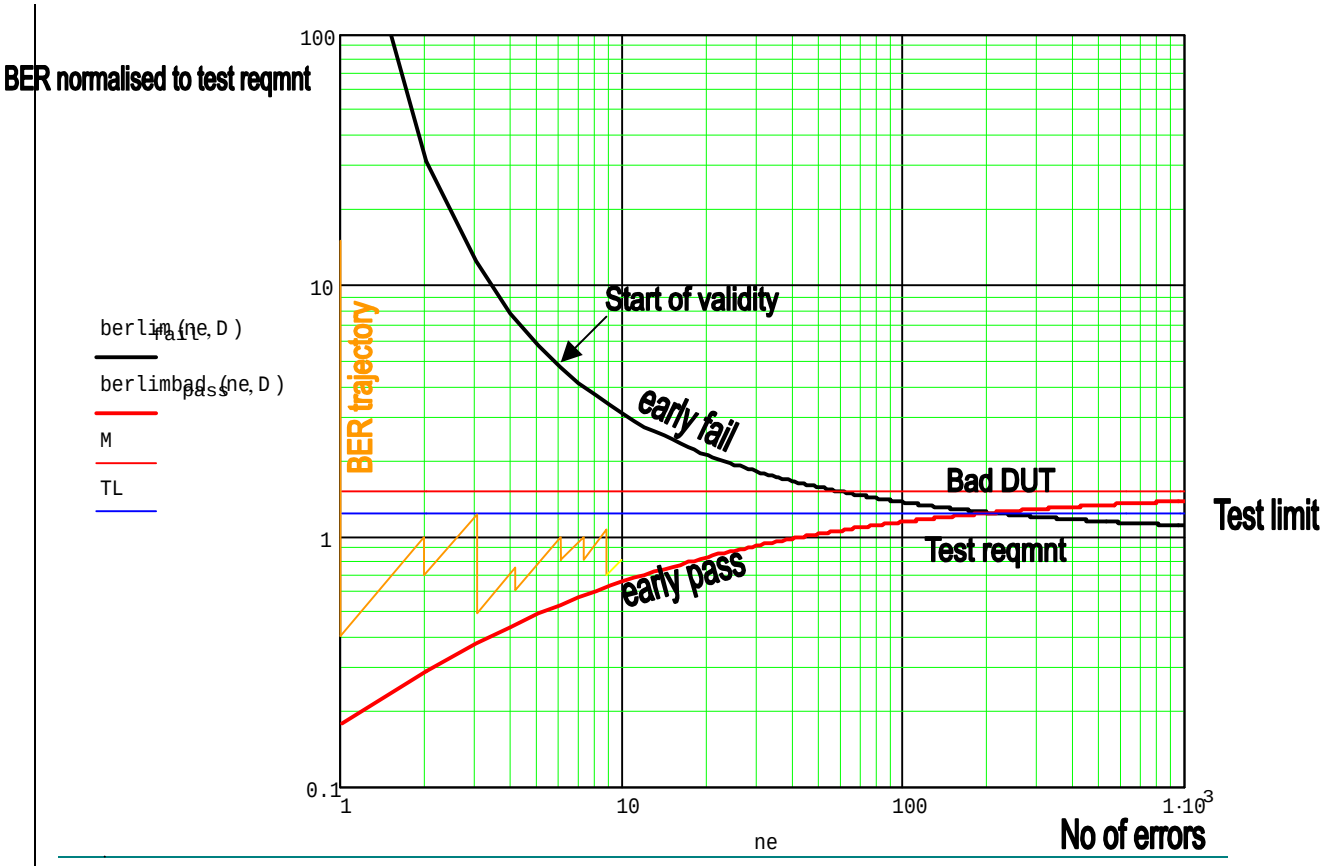
BER normalised to test reqmnt
100
10
1
0.1
1
10
100
1·10^3
ne
No of errors
berlim (ne, D)
fail
berlimbad (ne, D)
pass
M
TL
BER trajectory
Start of validity
early fail
Bad DUT
Test reqmnt
Test limit
early pass

Figure F.6.1.9

Note 1: At the beginning of the test, one artificial erroneous sample is introduced. This ensures that an ideal DUT meets the valid range of the early pass limit. In addition this ensures that the complementary experiment (F.6.1.4. bullet point (2)) is applicable as well.

Due to the nature of the test, namely discrete error events, the early fail condition shall not be valid, when fractional errors <1 are used to calculate the early fail limit: Any early fail decision is postponed until number of errors ne >[5]. In the blocking test any early fail decision is postponed until number of errors ne >[6].

Note2: D=[0.2%] is intended to be used for a test containing a few BER/BLER tests (e.g. receiver sensitivity is repeated 12 times). For a test containing many BER/BLER tests (e.g. blocking test) this value is not appropriate for a single BER/BLER test.

The blocking test contains approx. 12750 single BER tests. A DUT on the limit will fail approx. 25 to 26 times due to statistical reasons (wrong decision probability [0.2]%). 24 fails are allowed in the blocking test but they are reserved for spurious responses. This shall be solved by the following rule:

All passes (based on D=[0.2]%) are accepted, including the wrong decisions due to statistical reasons.

An early fail limit based on D=[0.02%] instead of [0.2%] is established, that ensures that wrong decisions due to statistical reasons are reduced to 2 to 3.

These asymmetric test conditions ensure that a DUT on the test limit consumes hardly more test time for a blocking test than in the symmetric case and on the other hand discriminates sufficiently between statistical fails and spurious response cases.

3GPP TSG-T1 Meeting #13
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CR-Form-v3

CHANGE REQUEST

⌘ **34.122** **CR** **069** ⌘ rev **-** ⌘ Current version: **4.1.0** ⌘

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

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

Title:	⌘	BER/BLER testing based on statistical approach (TS34.122)
Source:	⌘	T1/RF
Work item code:	⌘	TEI
Date:	⌘	Nov.-26-2001
Category:	⌘	**A**
Release:	⌘	REL-4

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

Use one of the following releases:

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

Reason for change:	⌘	BER/BLER measurement has statistical nature. The current Test Requirement specifies only a single value without statistical policy.
Summary of change:	⌘	It introduces the statistical requirements and provides most of the relevant parameters to fulfil the statistical requirements for BER BLER tests
Consequences if not approved:	⌘	Statistical approach for BER/BLER varies test by test. An inconsistent approach may cause a result, which is not reliable from the viewpoint of statistical theory.

Clauses affected:	⌘	6.1, 7.1, Annex-F.6
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6 Receiver Characteristics

6.1 General

Receiving performance test of the UE is implemented during communicating with the SS via air interface. The procedure uses normal call protocol until the UE is communicating on traffic channel basically. (Refer to TS 34.108 [3] Common Test Environments for User Equipment (UE) Conformance Testing.) On the traffic channel, the UE provides special function for testing that is described in Logical Test Interface and the UE is tested using this function. (Refer to TS 34.109 [3] Logical Test Interface (FDD/TDD) Special conformance testing functions.)

Unless otherwise stated the receiver characteristics are specified at the antenna connector of the UE. For UE(s) with an integral antenna only, a reference antenna with a gain of 0 dBi is assumed. UE with an integral antenna may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. Receiver characteristics for UE(s) with multiple antennas/antenna connectors are for further study.

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 the present document. It is recognized that different requirements and test methods are likely to be required for the different types of UE.

All the parameters in clause 6 are defined using the DL reference measurement channel (12,2 kbps) specified in clause C.3.3.

All Bit Error ratio (BER) measurements in clause 6 shall be performed according to the general rules for statistical testing in Annex F.6

7 Performance Requirements

7.1 General

The performance requirements for the UE in this clause is specified for the measurement channels specified in annex C and the test environments specified in annex D.

All Block Error ratio (BLER) measurements in clause 7 shall be performed according to the general rules for statistical testing in Annex F.6

F.6 General rules for statistical testing

~~[TBD]~~

F.6.1 Statistical testing of receiver BER/BLER performance

F.6.1.1 Error Definition

1) Bit Error Ratio (BER)

The Bit Error Ratio is defined as the ratio of the bits wrongly received to all data bits sent. The bits are the information bits above the convolutional/turbo decoder

2) Block Error Ratio (BLER)

A Block Error Ratio is defined as the ratio of the number of erroneous blocks received to the total number of blocks sent. An erroneous block is defined as a Transport Block, the cyclic redundancy check (CRC) of which is wrong.

F.6.1.2 Test Method

Each test is performed in the following manner:

a) Setup the required test conditions.

b) Record the number of samples tested and the number of occurred events (bit error or block error)

c) Stop the test at a stop criterion which is minimum test time or an early pass or an early fail event.

d) Once the test is stopped decide according to the pass fail decision rules (subclause F.6.1.7)

F.6.1.3 Test Criteria

The test shall fulfil the following requirements:

a) good pass fail decision

1) to keep reasonably low the probability (risk) of passing a bad unit for each individual test;

2) to have high probability of passing a good unit for each individual test;

b) good balance between testtime and statistical significance

3) to perform measurements with a high degree of statistical significance;

4) to keep the test time as low as possible.

F.6.1.4 Calculation assumptions

It is assumed, that error events are independent statistical events. Due to the memory of the convolutional / turbo coder in the BER tests this is not quite true. Due to lack of information the assumption of independent error events is applied.

In the BLER test with fading there is the memory of the multipath fading channel which interferes the statistical independency. Independent error events are assumed but a minimum test time is introduced to average fluctuations of the multipath fading channel.

The formulas, applied to describe the BER BLER test, are primarily based on the following experiment:
(1) After having observed a certain number of errors (**ne**) the number of samples are counted to calculate BER BLER.
Provisions are made (note 1) such that the complementary experiment is valid as well:
(2) After a certain number of samples (**ns**) the number of errors, occurred, are counted to calculate BER BLER.
Experiment (1) stipulates to use the following Chi Square Distribution with degree of freedom ne:
2*dchisq(2*NE,2*ne) for all calculations.
(NE: average of the distribution)

F.6.1.5 Definition of good pass fail decision.

This is defined by the probability of wrong decision D. The probability of a correct decision is 1-D

The probability (risk) to fail a good DUT shall be <= D according to the following definition: A DUT is failed, accepting a probability of <= D that the DUT is still better than the specified error ratio (Test requirement)

The probability to pass a bad DUT shall be <= D according to the following definition: A DUT is passed, accepting a probability of <= D that the DUT is still worse than M times the specified error ratio. (M>=1 is the bad DUT factor)

This definitions lead to an early pass and an early fail limit:

Early fail: ber>= $berlim_{fail}$

$$ber\lim_{fail}(D,ne) = \frac{2*ne}{qchisq(D,2*ne)} \quad (1)$$

For ne>[5]

Early pass: ber <=$berlimbad_{pass}$

$$ber\lim bad_{pass}(D,ne) = \frac{2*ne*M}{qchisq(1-D,2*ne)} \quad (2)$$

For ne >=1

With

ber (normalized BER,BLER): BER,BLER according to F.6.1.1 divided by Test requirement

D: wrong decision probability see table F.6.1.8

ne: Number of error events

M: bad DUT factor see table F.6.1.8

qchisq: inverse cumulative chi squared distribution

F.6.1.6. Good balance between testtime and statistical significance

3 independent test parameters are introduced into the test and shown in Table F.6.1.6.1. These are the obvious basis of testtime and statistical significance. From the first two of them three dependent test parameters are derived. The third independent test parameter is justified separately.

Table F.6.1.6.1 independent and dependent test parameters

Independent test parameters			Dependent test parameters		
Test Parameter	Value	Reference	Test parameter	Value	Reference
Target number of error events	[200]	Table F.6.1.8	Early pass/fail condition	curves	Subclause F.6.1.5 Figure 6.1.9
Probability of wrong pass/fail decision D	[0.2%] [0.02%, Note 3]	Subclause F.6.1.5	Bad DUT factor M	[1.5]	Table 6.1.8
			Test limit factor TL	[1.24]	Table 6.1.8
Minimum test time		Table F.6.1.6.2			

The minimum test time is derived from the following justification:

1) For no propagation conditions and static propagation condition

No early fail calculated from fractional number of errors <1 see note 1

2) For multipath fading condition

No stop of the test until [10] wavelengths are crossed during relevant UE reception timeslots, relevant for BER BLER testing, with the speed given in the fading profile.

Table F.6.1.6.2 : minimum Test time

Fading profile	**Minimum test time**
Multipath propagation 3 km/h	[1.8 s*TSPF/TSRX*)]
Multipath propagation 50 km/h	[0.1 s* TSPF/TSRX]
Multipath propagation 120 km/h	[45 ms* TSPF/TSRX]

Multipath propagation 250 km/h	[22ms* TSPF/TSRX]
*) TSPF = Time slots per frame, TSRX = relevant UE reception timeslots per frame, relevant for the BER BLER test	

TSPF and TSRX form the prolongation factor and depend on the user data rate and the TDD Option (3.84 Mchip/s or 1.28 Mchip/s

Table F.6.1.6.3 : Prolongation factor for minimum Test time

User Data rate	TSPF/TSRX for TDD 3.84 Mchip/s	TSPF/TSRX for TDD 1.28 Mchip/s
12.2 kbit/s	15/1	7/1
64 kbit/s	15/1	7/1
144 kbit/s	15/1	7/2
384 kbit/s	15/3	7/4

In table F.6.1.8 the minimum test time is converted in minimum number of samples

F.6.1.7. Pass fail decision rules

No decision is allowed before the minimum test time is elapsed

1) If minimum Test time < time for target number of error events then the following applies: The required confidence level (= correct decision probability 1-D) shall be achieved. This is fulfilled at an early pass or early fail event.

For BER: For every TTI (Transmit Time Interval) sum up the number of bits (ns) and the number if errors (ne) from the beginning of the test, including the artificial error at the beginning of the test (Note 1) and calculate BER.

If BER is above the early fail limit, fail the DUT.
If BER is below the early pass limit, pass the DUT.
Otherwise continue the test

For BLER: For every block sum up the number of blocks (ns) and the number if erroneous blocks (ne) from the beginning of the test, including the artificial error at the beginning of the test (Note 1) and calculate BLER.

If BLER is below the early pass limit, pass the DUT.
If BLER is above the early fail limit, fail the DUT.
Otherwise continue the test

2) If the minimum test time >= time for target error events, then the test runs for the minimum test time and the decision is done by comparing the result with the test limit.

F.6.1.8. Test conditions for BER,BLER tests

Table F.6.1.8: Test conditions for a single BER/BLER tests

Type of test (BER)	Propagation conditions	Test requirement (BER/BLER)	Test limit (BER/BLER) = Test requirement (BER/BLER) x TL TL	Target number of error events (time)	Minimum number of samples	Prob that good unit will fail = Prob that bad unit will pass [%]	Bad unit BER/BLER factor M
Reference Sensitivity Level	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]
Maximum Input Level	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]
Adjacent Channel Selectivity	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]
Blocking Characteristics Pass condition Note 2	-	0.001	[1.262]	[252] (16.6s)	Note 1	[0.2]	[1.5]
Blocking Characteristics Fail condition Note 2	-	0.001	[1.262]	[252] (16.6s)	Note 1	[0.02]	[1.5]
Spurious Response	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]
Intermodulation Characteristics	-	0.001	[1.24]	[200] (13.2s)	Note 1	[0.2]	[1.5]

Table F.6.1.8-2: Test conditions for BLER tests **Type of test (BLER)**	**Information Bit rate**	**Test requirement (BER/BLER)**	**Test limit (BER/BLER) = Test requirement (BER/BLER) x TL** **TL**	**Target number of error events** (time)	**Minimum number of samples** **TDD 3.84 Mchip/s**	**Minimum number of samples** **TDD 1.28 Mchip/s**	**Prob that b unit will pa = Prob tha good unit w fail [%]**
Demodulation in Static Propagation conditions	12.2 64 144 384	0.01 0.1 0.01 0.1 0.01 0.1 0.01	[1.24]	[200] (322.6s) (32.3s) (322.6s) (32.3s) (322.6s) (16.1s) (161.3s)	Note1	Note1	[0.2]
Demodulation of DCH in Multi-path Fading conditions							
3km/h (Case 1, Case 2)	12.2 64 144 384	0.01 0.1 0.01 0.1 0.01 0.1 0.01	[1.24]	[200] (322.6s) (32.3s) (322.6s) (32.3s) (322.6s) (16.1s) (161.3s)	[1350] [1350] [1350] [1350] [1350] [450] [450]	[630] [630] [630] [315] [315] [178] [178]	[0.2]
120 km/h (Case3)	12.2 64 144 384	0.01 0.1 0.01 0.1 0.01 0.1 0.01	[1.24]	[200] (322.6s) (32.3s) (322.6s) (32.3s) (322.6s) (16.1s) (161.3s)	[34] [34] [34] [34] [34] [12] [12]	[16] [16] [16] [8] [8] [4] [4]	[0.2]
250 km/h							
Power control in the downlink				Not applicable			

F.6.1.9 Practical Use (informative)

See figure F.6.1.9:

The early fail limit represents formula (1) in F.6.1.5 The range of validity is [ne>5, >6 in case of blocking test] to [ne =200]

The early pass limit represents the formula (2) in F.6.1.5 The range of validity is ne=1 to [ne =200]. See note 1

The intersection co-ordinates of both curves are : Target number of errors ne = [200] and test limit TL = [1.24]

The range of validity for TL is ne>200

A typical BER BLER test, calculated form the number of samples and errors (F.6.1.2.(b)) using experimental method (1) or (2) (see F.6.1.4. calculation assumptions) runs along the yellow trajectory. With an errorless sample the trajectory goes down vertically. With an erroneous sample it goes up right. The tester checks if the BER BLER test intersects the early fail or early pass limits. The real time processing can be reduced by the following actions:

BLER is calculated only in case of an error event.
BER is calculated only in case of an error event within a TTI.

So the early fail limit cannot be missed by errorless samples.

The check against the early pass limit may be done by transforming formula (2) in F.6.1.5 such that the tester checks against a Limit-Number-of-samples (NL(ne)) depending on the current number of errors.

Early pass if

$$NL(ne) \geq \frac{qchisq(1-D, 2*ne)}{2*TR*M}$$

TR: test requirement (0.001)

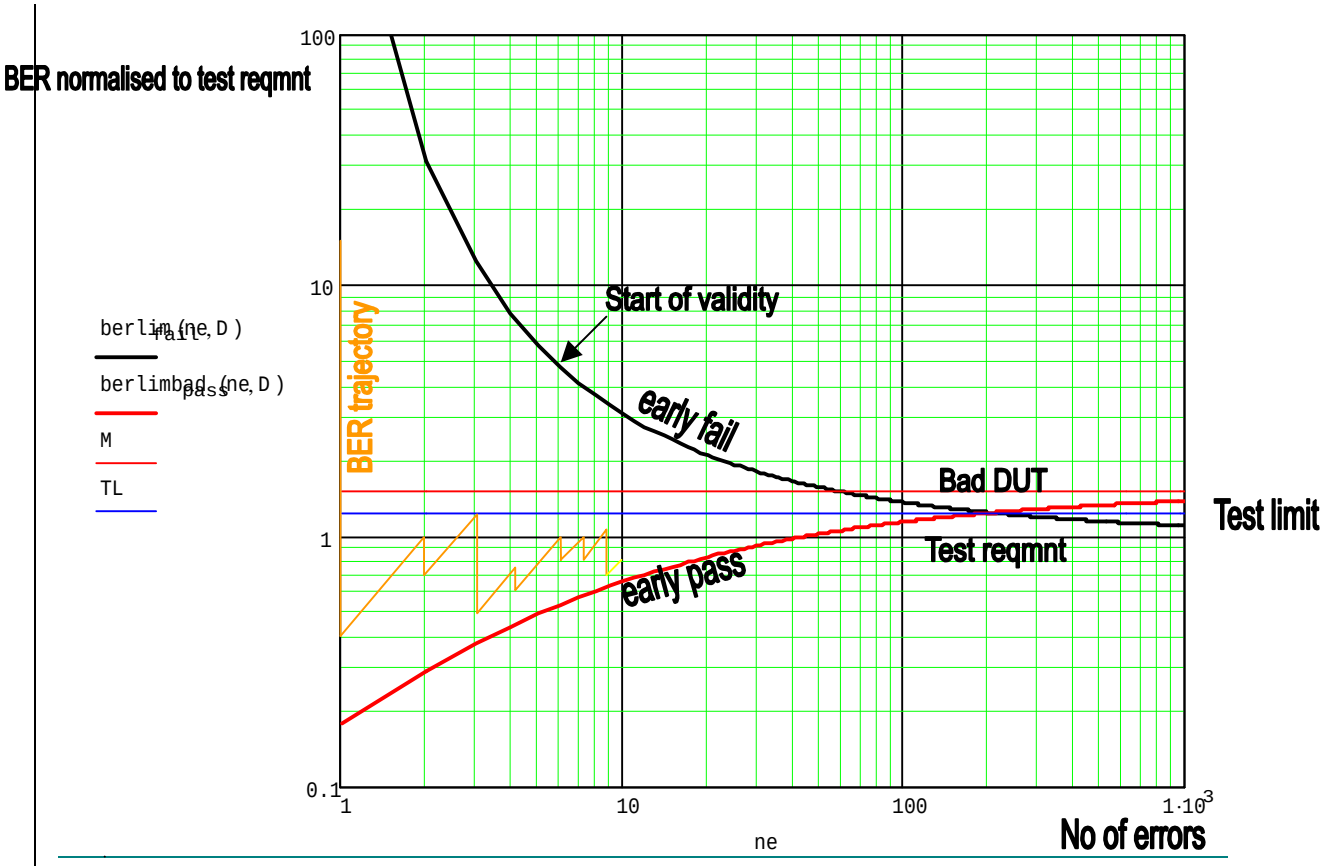
BER normalised to test reqmnt
100
10
1
0.1
1
10
100
1·10^3
ne
No of errors
berlim_fail(ne, D)
berlimbad_pass(ne, D)
M
TL
BER trajectory
Start of validity
early fail
Bad DUT
Test limit
Test reqmnt
early pass

Figure F.6.1.9

Note 1: At the beginning of the test, an artificial error is introduced. This ensures that an ideal DUT meets the valid range of the early pass limit. In addition this ensures that the complementary experiment (F.6.1.4. bullet point (2)) is applicable as well.

Due to the nature of the test, namely discrete error events, the early fail condition shall not be valid, when fractional errors <1 are used to calculate the early fail limit: Any early fail decision is postponed until number of errors ne >[5]. In the blocking test any early fail decision is postponed until number of errors ne >[6].

Note2: D=[0.2%] is intended to be used for a test containing a few BER/BLER tests (e.g. receiver sensitivity is repeated 12 times). For a test containing many BER/BLER tests (e.g. blocking test) this value is not appropriate for a single BER/BLER test.

The blocking test contains approx. 12750 single BER tests. A DUT on the limit will fail approx. 25 to 26 times due to statistical reasons (wrong decision probability [0.2]%). 24 fails are allowed in the blocking test but they are reserved for spurious responses. This shall be solved by the following rule:

All passes (based on D=[0.2]%) are accepted, including the wrong decisions due to statistical reasons.

An early fail limit based on D=[0.02%] instead of [0.2%] is established, that ensures that wrong decisions due to statistical reasons are reduced to 2 to 3.

These asymmetric test conditions ensure that a DUT on the test limit consumes hardly more test time for a blocking test than in the symmetric case and on the other hand discriminates sufficiently between statistical fails and spurious response cases.