TSG-RAN Meeting #12 *RP-010355*
Stockholm, Sweden, 12 - 15 June 2001

Title: **Agreed CRs (Release '99 and Rel-4 category A) to TS 25.141**

Source: **TSG-RAN WG4**

Agenda item: **8.4.3**

WG4 doc	Status WG4	Spec	CR	Phase	Title	Cat	V old	V new
R4-010607	agreed	25.141	84	R99	CR TS25.141 Measurement uncertainty	F	3.5.0	3.6.0
R4-010783	agreed	25.141	85	Rel-4	CR TS25.141 Measurement uncertainty	A	4.0.0	4.1.0
R4-010813	agreed	25.141	86	R99	ACLR definition	F	3.5.0	3.6.0
R4-010814	agreed	25.141	87	Rel-4	ACLR definition	A	4.0.0	4.1.0
R4-010762	agreed	25.141	88	R99	Clarification of AWGN definition	F	3.5.0	3.6.0
R4-010763	agreed	25.141	89	Rel-4	Clarification of AWGN definition	A	4.0.0	4.1.0
R4-010784	agreed	25.141	90	R99	Corrections to 25.141 specification	F	3.5.0	3.6.0
R4-010785	agreed	25.141	91	Rel-4	Corrections to 25.141 specification	A	4.0.0	4.1.0
R4-010808	agreed	25.141	93	R99	Receiver spurious emission for co-located base stations	F	3.5.0	3.6.0
R4-010811	agreed	25.141	94	Rel-4	Receiver spurious emission for co-located base stations	A	4.0.0	4.1.0
R4-010592	agreed	25.141	95	R99	Correction to core requirement spectrum mask	F	3.5.0	3.6.0
R4-010687	agreed	25.141	96	Rel-4	Correction to core requirement spectrum mask	A	4.0.0	4.1.0

3GPP TSG RAN WG4 Meeting #17 R4-010607

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.141** **CR** **84** ⌘ 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:	⌘	CR TS25.141 Measurement uncertainty
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	25/05/01
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:	⌘	Output from TEM Meeting #04 additional work on measurement uncertainty
Summary of change:	⌘	Various updates
Consequences if not approved:	⌘	Incorrect setting of test limits for conformance testing

Clauses affected:	⌘	4.1.2, 4.1.3
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://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.

4 General test conditions and declarations

The requirements of this clause apply to all applicable tests in this specification.

Many of the tests in this specification measure a parameter relative to a value that is not fully specified in the UTRA specifications. For these tests, the Minimum Requirement is determined relative to a nominal value specified by the manufacturer.

Certain functions of a BS are optional in the UTRA specifications. Some requirements for the BS may be regional as listed in subclause 4.7.

When specified in a test, the manufacturer shall declare the nominal value of a parameter, or whether an option is supported.

4.1 Acceptable uncertainty of Test System

The maximum acceptable uncertainty of the Test System is specified below for each test, where appropriate. The Test System shall enable the stimulus signals in the test case to be adjusted to within the specified tolerance and the equipment under test to be measured with an uncertainty not exceeding the specified values. All tolerances and uncertainties are absolute values, and are valid for a confidence level of 95 %, unless otherwise stated.

A confidence level of 95% is the measurement uncertainty tolerance interval for a specific measurement that contains 95% of the performance of a population of test equipment.

For RF tests, it should be noted that the uncertainties in subclause 4.1 apply to the Test System operating into a nominal 50 ohm load and do not include system effects due to mismatch between the DUT and the Test System.

4.1.1 Measurement of test environments

The measurement accuracy of the BS test environments defined in Subclause 4.4, Test environments shall be.

- Pressure ±5 kPa.
- Temperature ±2 degrees.
- Relative Humidity ±5 %.
- DC Voltage ±1,0 %.
- AC Voltage ±1,5 %.
- Vibration 10 %.
- Vibration frequency 0,1 Hz.

The above values shall apply unless the test environment is otherwise controlled and the specification for the control of the test environment specifies the uncertainty for the parameter.

4.1.2 Measurement of transmitter

Table 4.1: Maximum Test System Uncertainty for transmitter tests

Subclause	Maximum Test System Uncertainty	Derivation of Test System Uncertainty~~Range over which test system uncertainty applies~~
6.2.1 Maximum Output Power	±0.7 dB	
6.2.2 CPICH Power accuracy	± 0.8 dB	~~[Range of cpich relative to Ior]~~
6.3.4 Frequency error	± 12 Hz	~~Measurement results of ±500 Hz~~
6.4.2 Power control steps	± 0.1 dB for one 1 dB step ± 0.1 dB for ten 1 dB steps	Result is difference between two absolute CDP measurements on the power controlled DPCH. Assume BTS output power on all other channels is constant. Assume Test equipment relative power accuracy over the range of the test conditions is perfect, or otherwise included in the system measurement error. For this test the absolute power change is < 3 dB.
6.4.3 Power dynamic range	± 0.2 dB	~~[Ior range and the minimum code power (32)]~~
6.4.4 Total power dynamic range	± 0.3 dB	
6.5.1 Occupied Bandwidth	±100 kHz	Accuracy = ±3*RBW. Assume 30 kHz bandwidth.~~Measurement results of ±1 MHz~~
6.5.2.1 Spectrum emission mask	±1.5 dB Due to carrier leakage, for measurements specified in a 1 MHz bandwidth close to the carrier (4 MHz to 8 MHz), integration of the measurement using several narrower measurements may be necessary in order to achieve the above accuracy.	
6.5.2.2 ACLR	5 MHz ~~5 MHz~~ offset ± 0.8 dB 10 MHz ~~10 MHz~~ offset ± 0.8 dB Note: Impact of measurement period (averaging) and intermod effects in the measurement receiver not yet fully studied. However, the above limits remain valid.	~~Signal power = P_Max~~
6.5.3 Spurious emissions	± 2.0 dB for BS and coexistance bands for results > -60 dBm ± 3.0 dB for results < -60 dBm Outside above range: f≤2.2GHz : ± 1.5 dB 2.2 GHz < f ≤ 4 GHz : ± 2.0 dB f > 4 GHz : ±4.0 dB	
6.6 Transmit intermodulation (interferer requirements)	The value below applies only to the interference signal and is unrelated to the measurement uncertainty of the tests (6.5.2.1, 6.5.2.2 and 6.5.3) which have to be carried out in the presence of the interfer. ~~Need to add formula for uncertainty of the ratio.~~ ± 1.0 dB	~~Not applicable~~The uncertainty of interferer has double th effect on the result due to the frequency offset.
6.7.1 EVM	±2.5 % (for single code)	~~Measurement results from 12.5% to 22.5% at Signal power = P_Max - 3 to P_Max - 18 dB~~
6.7.2 Peak code Domain error	±1.0 dB	~~Measurement results from -36 to –30 dB at signal power = P_Max - 3 to P_Max - 18 dB~~

4.1.3 Measurement of receiver

Table 4.1A: Maximum Test System Uncertainty for receiver tests

Subclause	Maximum Test System Uncertainty[1]	Derivation of Test System Uncertainty~~Range over which test system uncertainty applies~~
7.2 Reference sensitivity level	± 0.7 dB	~~Not applicable~~
7.3 Dynamic range	± 1.2 dB ~~Formula = SQRT(signal level error^2 and AWGN level error^2)~~	~~Not applicable~~Formula = SQRT(signal level error^2 and AWGN level error^2)
7.4 Adjacent channel selectivity	± 1.1 dB ~~Formula = SQRT (wanted_level_error^2 + interferer_level_error^2) + ACLR effect.~~ ~~The ACLR effect is calculated by:~~ ~~(Formula to follow)~~	~~Not applicable~~Formula = SQRT (wanted_level_error^2 + interferer_level_error^2) + ACLR effect. The ACLR effect is calculated by: (Formula to follow)
7.5 Blocking characteristics	~~Formula = SQRT (wanted_level_error^2 + interferer_level_error^2) + ACLR effect + Broadband noise.~~ System error with blocking signal <15 MHz offset: ± 1.4 dB ~~(using ACLR 68 dB, 0.7 dB for signals)~~ Blocking signal >= 15 MHz offset and f ≤ 2.2 GHz: ± 1.1 dB + broadband noise 2.2 GHz < f ≤ 4 GHz : ±1.8 dB f > 4 GHz: ±3.2 dB ~~Assume-130 dBc broadband noise from blocking signal has 0.1 dB effect.~~ ~~Harmonics and spurs of the interferer need to be carefully considered. Perhaps need to avoid harmonics of the interfere that fall on top of the receive channel.~~ ~~For the –15 dBm CW blocking case, filtering of the slocking signal (at least 25 dB) is necessary to elimininate problems with broadband noise.~~	~~Not applicable~~Formula = SQRT (wanted_level_error^2 + interferer_level_error^2) + ACLR effect + Broadband noise. (Assuming ACLR 68 dB, and 0.7 dB for signals) Assume-130 dBc broadband noise from blocking signal has 0.1 dB effect. Harmonics and spurs of the interferer need to be carefully considered. Perhaps need to avoid harmonics of the interfere that fall on top of the receive channel. For the –15 dBm CW blocking case, filtering of the slocking signal (at least 25 dB) is necessary to elimininate problems with broadband noise.
7.6 Intermod Characteristics	~~Formula =~~ ~~$\sqrt{(2 \cdot CW_level_error)^2 + (\text{mod}_level_error)^2 + (wanted_signal_level_error)^2}$~~ ~~(Using CW interferer ±0.5 dB, modulated interfere ±0.5 dB, wanted singal ±0.7 dB)~~ ±1.3 dB	~~Not applicable~~Formula = $\sqrt{(2 \cdot CW_level_error)^2 + (\text{mod}_level_error)^2}$ (Using CW interferer ±0.5 dB, modulated interfere ±0.5 dB, wanted singal ±0.7 dB)
7.7 Spurious Emissions	The Test System uncertainty figures for Spurious emissions apply to the the measurement of the DUT and not any stimulus signals. ± 3.0 dB for BS receive band (-78 dBm) Outside above range: f≤2.2GHz : ± 2.0 dB (-57 dBm) 2.2 GHz < f ≤ 4 GHz : ± 2.0 dB (-47 dBm) f > 4 GHz : ±4.0 dB (-47 dBm)	

Note 1: Unless otherwise noted, only the Test System stimulus error is considered here. The effect of errors in the BER/FER measurements due to finite test duration is not considered.

3GPP TSG RAN WG4 Meeting #17 R4-010783

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v4

CHANGE REQUEST

⌘ 25.141 CR 85 ⌘ ev - ⌘ Current version: 4.0.0 ⌘

*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:	⌘	CR TS25.141 Measurement uncertainty
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	25/05/01
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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Reason for change:	⌘	Output from TEM Meeting #04 additional work on measurement uncertainty
Summary of change:	⌘	Various updates
Consequences if not approved:	⌘	Incorrect setting of test limits for conformance testing

Clauses affected:	⌘	4.1.2, 4.1.3		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	Correspnds to Rel99 CR in R4-010607		

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6.4.2 Power control steps	± 0.1 dB for one 1 dB step ± 0.1 dB for ten 1 dB steps	Result is difference between two absolute CDP measurements on the power controlled DPCH. Assume BTS output power on all other channels is constant. Assume Test equipment relative power accuracy over the range of the test conditions is perfect, or otherwise included in the system measurement error. For this test the absolute power change is < 3 dB.
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6.4.4 Total power dynamic range	± 0.3 dB	
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6.5.2.1 Spectrum emission mask	±1.5 dB Due to carrier leakage, for measurements specified in a 1 MHz bandwidth close to the carrier (4 MHz to 8 MHz), integration of the measurement using several narrower measurements may be necessary in order to achieve the above accuracy.	
6.5.2.2 ACLR	5 MHz ~~5 MHz~~ offset ± 0.8 dB 10 MHz ~~10 MHz~~ offset ± 0.8 dB Note: Impact of measurement period (averaging) and intermod effects in the measurement receiver not yet fully studied. However, the above limits remain valid.	~~Signal power = P_Max~~
6.5.3 Spurious emissions	± 2.0 dB for BS and coexistance bands for results > -60 dBm ± 3.0 dB for results < -60 dBm Outside above range: f≤2.2GHz : ± 1.5 dB 2.2 GHz < f ≤ 4 GHz : ± 2.0 dB f > 4 GHz : ±4.0 dB	
6.6 Transmit intermodulation (interferer requirements)	The value below applies only to the interference signal and is unrelated to the measurement uncertainty of the tests (6.5.2.1, 6.5.2.2 and 6.5.3) which have to be carried out in the presence of the interfer. ~~Need to add formula for uncertainty of the ratio.~~ ± 1.0 dB	~~Not applicable~~The uncertainty of interferer has double th effect on the result due to the frequency offset.
6.7.1 EVM	±2.5 % (for single code)	~~Measurement results from 12.5% to 22.5% at Signal power = P_Max - 3 to P_Max - 18 dB~~
6.7.2 Peak code Domain error	±1.0 dB	~~Measurement results from -36 to –30 dB at signal power = P_Max - 3 to P_Max - 18 dB~~

4.1.3 Measurement of receiver

Table 4.1A: Maximum Test System Uncertainty for receiver tests

Subclause	Maximum Test System Uncertainty[1]	Derivation of Test System Uncertainty~~Range over which test system uncertainty applies~~
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7.3 Dynamic range	± 1.2 dB ~~Formula = SQRT(signal level error^2 and AWGN level error^2)~~	~~Not applicable~~Formula = SQRT(signal level error^2 and AWGN level error^2)
7.4 Adjacent channel selectivity	± 1.1 dB ~~Formula = SQRT (wanted_level_error^2 + interferer_level_error^2) + ACLR effect.~~ ~~The ACLR effect is calculated by:~~ ~~(Formula to follow)~~	~~Not applicable~~Formula = SQRT (wanted_level_error^2 + interferer_level_error^2) + ACLR effect. The ACLR effect is calculated by: (Formula to follow)
7.5 Blocking characteristics	~~Formula = SQRT (wanted_level_error^2 + interferer_level_error^2) + ACLR effect + Broadband noise.~~ System error with blocking signal <15 MHz offset: ± 1.4 dB ~~(using ACLR 68 dB, 0.7 dB for signals)~~ Blocking signal >= 15 MHz offset and f ≤ 2.2 GHz: ± 1.1 dB + broadband noise 2.2 GHz < f ≤ 4 GHz : ±1.8 dB f > 4 GHz: ±3.2 dB ~~Assume-130 dBc broadband noise from blocking signal has 0.1 dB effect.~~ ~~Harmonics and spurs of the interferer need to be carefully considered. Perhaps need to avoid harmonics of the interfere that fall on top of the receive channel.~~ ~~For the –15 dBm CW blocking case, filtering of the slocking signal (at least 25 dB) is necessary to elimininate problems with broadband noise.~~	~~Not applicable~~Formula = SQRT (wanted_level_error^2 + interferer_level_error^2) + ACLR effect + Broadband noise. (Assuming ACLR 68 dB, and 0.7 dB for signals) Assume-130 dBc broadband noise from blocking signal has 0.1 dB effect. Harmonics and spurs of the interferer need to be carefully considered. Perhaps need to avoid harmonics of the interfere that fall on top of the receive channel. For the –15 dBm CW blocking case, filtering of the slocking signal (at least 25 dB) is necessary to elimininate problems with broadband noise.
7.6 Intermod Characteristics	~~Formula =~~ ~~$\sqrt{(2 \cdot CW_level_error)^2 + (\text{mod}_level_error)^2 + (wanted_signal_level_error)^2}$~~ ~~(Using CW interferer ±0.5 dB, modulated interfere ±0.5 dB, wanted singal ±0.7 dB)~~ ±1.3 dB	~~Not applicable~~Formula = $\sqrt{(2 \cdot CW_level_error)^2 + (\text{mod}_level_error)^2}$ (Using CW interferer ±0.5 dB, modulated interfere ±0.5 dB, wanted singal ±0.7 dB)
7.7 Spurious Emissions	The Test System uncertainty figures for Spurious emissions apply to the the measurement of the DUT and not any stimulus signals. ± 3.0 dB for BS receive band (-78 dBm) Outside above range: f≤2.2GHz : ± 2.0 dB (-57 dBm) 2.2 GHz < f ≤ 4 GHz : ± 2.0 dB (-47 dBm) f > 4 GHz : ±4.0 dB (-47 dBm)	

Note 1: Unless otherwise noted, only the Test System stimulus error is considered here. The effect of errors in the BER/FER measurements due to finite test duration is not considered.

3GPP TSG RAN WG4 Meeting #17 **R4-010813**

Gothenburg, Sweden 21st - 25th May 2001

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CHANGE REQUEST

⌘ **25.141** **CR** **86** ⌘ ev **-** ⌘ Current version: **3.5.0** ⌘

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

Title:	⌘	Correction of ACLR definition
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	2001-05-22
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 definition of ACLR is ambiguous.
Summary of change:	⌘	Modified definition of ACLR.
Consequences if not approved:	⌘	The ACLR requirement may be incorrectly applied.

Clauses affected:	⌘	6.5.2.2		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	CR for TS 25.104 attached
Other comments:	⌘			

6.5.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.5.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the ~~transmitted~~ average power centered on the assigned channel frequency to the average power centered on an adjacent channel frequency~~measured after a receiver filter in the adjacent channel(s)~~. In ~~B~~both cases the average ~~transmitted power and the received~~ power ~~are~~ is measured ~~through a matched~~with a filter that has ~~(~~Root Raised Cosine (RRC) filter response with ~~and~~ roll-off α = 0.22~~)~~ ~~with a noise power~~and a bandwidth equal to the chip rate.

The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

6.5.2.2.2 Minimum Requirement

Table 6.19: BS ACLR

BS channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	45 dB
10 MHz	50 dB

The normative reference for this requirement is in TS 25.104 [1] subclause 6.5.2.2

3GPP TSG RAN WG4 Meeting #17 **R4-010814**

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.141** **CR** **87** ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

*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 ACLR definition
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	2001-05-24
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 definition of ACLR is ambiguous.
Summary of change:	⌘	Modified definition of ACLR.
Consequences if not approved:	⌘	The ACLR requirement may be incorrectly applied.

Clauses affected:	⌘	6.5.2.2		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	CR for TS 25.104 attached
Other comments:	⌘	Corresponds to the R99 CR in R4-010759.		

6.5.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.5.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the ~~transmitted~~ average power centered on the assigned channel frequency to the average power centered on an adjacent channel frequency~~measured after a receiver filter in the adjacent channel(s)~~. In ~~B~~both cases the average ~~transmitted power and the received~~ power ~~are~~ is measured ~~through a matched~~with a filter that has ~~(~~Root Raised Cosine (RRC) filter response with ~~and~~ roll-off α = 0.22~~)~~ ~~with a noise power~~and a bandwidth equal to the chip rate.

The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

6.5.2.2.2 Minimum Requirement

Table 6.19: BS ACLR

BS channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	45 dB
10 MHz	50 dB

The normative reference for this requirement is in TS 25.104 [1] subclause 6.5.2.2

3GPP TSG RAN WG4 Meeting #17 R4-010762

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v4

CHANGE REQUEST

⌘ 25.141 CR 88 ⌘ ev - ⌘ Current version: 3.5.0 ⌘

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

Title: ⌘	CR 25.141 Clarification of AWGN definition	
Source: ⌘	RAN WG4	
Work item code: ⌘	TEI	**Date:** ⌘ 24/05/01
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: ⌘	6.1, 7.3		
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.

6.1.1.6.4 S-CCPCH containing PCH

The aggregate 15 x 18 = 270 S-CCPCH bits per frame are filled with a PN9 sequence generated using the primitive trinomial $x^9 + x^4 + 1$. Channelization code of the S-CCPCH is used as the seed for the PN sequence at the start of each frame.

The generator shall be seeded so that the sequence begins with the 8 bit channelization code starting from the LSB, and followed by a ONE.

6.1.2 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.

6.2 Base station output power

Output power, Pout, of the base station is the mean power of one carrier delivered to a load with resistance equal to the nominal load impedance of the transmitter.

Rated output power, PRAT, of the base station is the mean power level per carrier that the manufacturer has declared to be available at the antenna connector.

7.3 Dynamic range

7.3.1 Definition and applicability

Receiver dynamic range is the receiver ability to handle a rise of interference in the reception frequency channel. The receiver shall fulfil a specified BER requirement for a specified sensitivity degradation of the wanted signal in the presence of an interfering AWGN signal in the same reception frequency channel.

~~Minimum bandwidth of AWGN interferer shall be 1.5 times chip rate = 5.76 MHz for a chip rate of 3.84 MHz.~~

3GPP TSG RAN WG4 Meeting #17 R4-010763

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v4

CHANGE REQUEST

⌘ 25.141 CR 89 ⌘ ev - ⌘ Current version: 4.0.0 ⌘

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

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

Title: ⌘	CR 25.141 Clarification of AWGN definition	
Source: ⌘	RAN WG4	
Work item code: ⌘	TEI	**Date:** ⌘ 25/05/01
Category: ⌘	A	**Release:** ⌘ REL-4

Use one of the following categories:
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- ***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: ⌘	6.1, 7.3		
Other specs affected: ⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments: ⌘	Corresponds to Rel99 CR in R4-010762		

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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.

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The aggregate 15 x 18 = 270 S-CCPCH bits per frame are filled with a PN9 sequence generated using the primitive trinomial $x^9 + x^4 + 1$. Channelization code of the S-CCPCH is used as the seed for the PN sequence at the start of each frame.

The generator shall be seeded so that the sequence begins with the 8 bit channelization code starting from the LSB, and followed by a ONE.

6.1.2 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.

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Receiver dynamic range is the receiver ability to handle a rise of interference in the reception frequency channel. The receiver shall fulfil a specified BER requirement for a specified sensitivity degradation of the wanted signal in the presence of an interfering AWGN signal in the same reception frequency channel.

~~Minimum bandwidth of AWGN interferer shall be 1.5 times chip rate - 5.76 MHz for a chip rate of 3.84 MHz.~~

3GPP TSG RAN WG4 Meeting #17 **R4-010784**

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.141** **CR** 90 ⌘ 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 **X** Core Network ☐

Title:	⌘	Corrections to TS25.141 specification
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	28 May 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:	⌘	Errors or discrepancies in the current text
Summary of change:	⌘	Various corrections - Missing values are proposed - Cross-references are corrected…
Consequences if not approved:	⌘	Some test descriptions will remain incorrect or ambiguous

Clauses affected:	⌘	4.1.2, 4.6.2, 6.1.1.2, 6.2.2.4.2, 6.5.2.1.4.1, 6.5.3, 6.6.4.2, 7.1, 7.5, 8.3.4.4
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.

4.1.2 Measurement of transmitter

Table 4.1: Maximum Test System Uncertainty for transmitter tests

Subclause	Maximum Test System Uncertainty	Range over which test system uncertainty applies
6.2.1 Maximum Output Power	±0.7 dB	
6.2.2 CPICH Power accuracy	± 0.8 dB	[Range of cpich relative to Ior]
6.3.4 Frequency error	± 12 Hz	Measurement results of ±500 Hz
6.4.2 Power control steps	± 0.1 dB for one 1 dB step ± 0.1 dB for one 0.5 dB step ± 0.1 dB for ten 1 dB steps ± 0.1 dB for ten 0.5 dB steps	
6.4.3 Power dynamic range	± 0.2 dB	[Ior range and the minimum code power (-32)]
6.4.4 Total power dynamic range	± 0.3 dB	
6.5.1 Occupied Bandwidth	±100 kHz	Measurement results of ±1 MHz
6.5.2.1 Spectrum emission mask	±1.5 dB Due to carrier leakage, for measurements specified in a 1 MHz bandwidth close to the carrier (4 MHz to 8 MHz), integration of the measurement using several narrower measurements may be necessary in order to achieve the above accuracy.	
6.5.2.2 ACLR	5 MHz offset ± 0.8 dB 10 MHz offset ± 0.8 dB Note: Impact of measurement period (averaging) and intermod effects in the measurement receiver not yet fully studied. However, the above limits remain valid.	Signal power = P_Max
6.5.3 Spurious emissions	± 2.0 dB for BS and coexistance bands for results > -60 dBm ± 3.0 dB for results < -60 dBm Outside above range: f≤2.2GHz : ± 1.5 dB 2.2 GHz < f ≤ 4 GHz : ± 2.0 dB f > 4 GHz : ±4.0 dB	
6.6 Transmit intermodulation (interferer requirements)	The value below applies only to the interference signal and is unrelated to the measurement uncertainty of the tests (6.5.2.1, 6.5.2.2 and 6.5.3) which have to be carried out in the presence of the interfer. Need to add formula for uncertainty of the ratio. ± 1.0 dB	Not applicable
6.7.1 EVM	±2.5 % (for single code)	Measurement results from 12.5% to 22.5% at Signal power = P_Max –3 to P_Max – 18 dB
6.7.2 Peak code Domain error	±1.0 dB	Measurement results from -36 to –30 dB at signal power = P_Max –3 to P_Max – 18 dB

4.6 BS Configurations

4.6.1 Receiver diversity

For the tests in clause 7 of the present document, the specified test signals shall be applied to one receiver antenna connector, with the remaining receivers are disabled or their antenna connectors being terminated with 50 Ω.

4.6.2 Duplexers

The requirements of the present document shall be met with a duplexer fitted, if a duplexer is supplied as part of the BS. If the duplexer is supplied as an option by the manufacturer, sufficient tests should be repeated with and without the duplexer fitted to verify that the BS meets the requirements of the present document in both cases.

The following tests should be performed with the duplexer fitted, and without it fitted if this is an option:

1) subclause 6.2.1, base station maximum output power, for the highest static power step only, if this is measured at the antenna connector;

2) subclause 6.5, output RF spectrum emissions; outside the BS transmit band;

3) subclause 6.5.3.4.3~~7~~, protection of the BS receiver;

4) subclause 6.6, transmit intermedulation; for the testing of conformance, the carrier frequencies should be selected to minimize intermodulation products from the transmitters falling in receive channels.

The remaining tests may be performed with or without the duplexer fitted.

NOTE 1: When performing receiver tests with a duplexer fitted, it is important to ensure that the output from the transmitters does not affect the test apparatus. This can be achieved using a combination of attenuators, isolators and filters.

NOTE 2: When duplexers are used, intermodulation products will be generated, not only in the duplexer but also in the antenna system. The intermodulation products generated in the antenna system are not controlled by 3GPP specifications, and may degrade during operation (e.g. due to moisture ingress). Therefore, to ensure continued satisfactory operation of a BS, an operator will normally select ARFCNs to minimize intermodulation products falling on receive channels. For testing of complete conformance, an operator may specify the ARFCNs to be used.

4.6.3 Power supply options

If the BS is supplied with a number of different power supply configurations, it may not be necessary to test RF parameters for each of the power supply options, provided that it can be demonstrated that the range of conditions over which the equipment is tested is at least as great as the range of conditions due to any of the power supply configurations.

This applies particularly if a BS contains a DC rail which can be supplied either externally or from an internal mains power supply. In this case, the conditions of extreme power supply for the mains power supply options can be tested by testing only the external DC supply option. The range of DC input voltages for the test should be sufficient to verify the performance with any of the power supplies, over its range of operating conditions within the BS, including variation of mains input voltage, temperature and output current.

4.6.4 Ancillary RF amplifiers

Ancillary RF amplifier: a piece of equipment, which when connected by RF coaxial cables to the BS, has the primary function to provide amplification between the transmit and/or receive antenna connector of a BS and an antenna without requiring any control signal to fulfil its amplifying function.

The requirements of the present document shall be met with the ancillary RF amplifier fitted. At tests according to clauses 6 and 7 for TX and RX respectively, the ancillary amplifier is connected to the BS by a connecting network (including any cable(s), attenuator(s), etc.) with applicable loss to make sure the appropriate operating conditions of the

ancillary amplifier and the BS. The applicable connecting network loss range is declared by the manufacturer. Other characteristics and the temperature dependence of the attenuation of the connecting network are neglected. The actual attenuation value of the connecting network is chosen for each test as one of the applicable extreme values. The lowest value is used unless otherwise stated.

Sufficient tests should be repeated with the ancillary amplifier fitted and, if it is optional, without the ancillary RF amplifier to verify that the BS meets the requirements of the present document in both cases.

When testing, the following tests should be repeated with the optional ancillary amplifier fitted according to the table below, where x denotes that the test is applicable:

Table 4.3

	Subclause	TX amplifier only	RX amplifier only	TX/RX amplifiers combined (Note)
Receiver Tests	7.2		X	X
	7.5		X	X
	7.6		X	X
	7.7		X	
Transmitter Tests	6.2	X		X
	6.5.1	X		X
	6.5.2.2	X		X
	6.5.3	X		X
	6.6	X		X

NOTE: Combining can be by duplex filters or any other network. The amplifiers can either be in RX or TX branch or in both. Either one of these amplifiers could be a passive network.

In test according to subclauses 6.2 and 7.2 highest applicable attenuation value is applied.

4.6.5 BS using antenna arrays

A BS may be configured with a multiple antenna port connection for some or all of its transceivers or with an antenna array related to one cell (not one array per transceiver). This subclause applies to a BS which meets at least one of the following conditions:

- the transmitter output signals from one or more transceiver appear at more than one antenna port; or
- there is more than one receiver antenna port for a transceiver or per cell and an input signal is required at more than one port for the correct operation of the receiver (NOTE: diversity reception does not meet this requirement) thus the outputs from the transmitters as well as the inputs to the receivers are directly connected to several antennas (known as “aircombining”); or
- transmitters and receivers are connected via duplexers to more than one antenna.

If a BS is used, in normal operation, in conjunction with an antenna system which contains filters or active elements which are necessary to meet the UTRA requirements, the conformance tests may be performed on a system comprising the BS together with these elements, supplied separately for the purposes of testing. In this case, it must be demonstrated that the performance of the configuration under test is representative of the system in normal operation, and the conformance assessment is only applicable when the BS is used with the antenna system.

For conformance testing of such a BS, the following procedure may be used.

4.6.5.1 Receiver tests

For each test, the test signals applied to the receiver antenna connectors shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) specified in the test.

An example of a suitable test configuration is shown in figure 4.1.

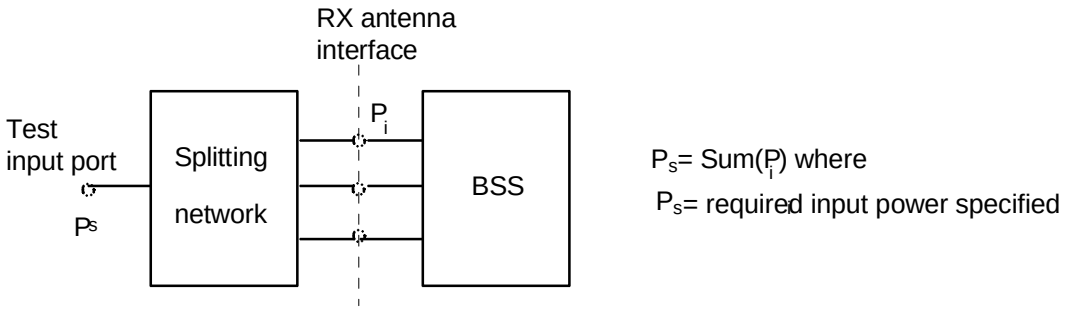

Figure 4.1: Receiver test set-up

For spurious emissions from the receiver antenna connector, the test may be performed separately for each receiver antenna connector.

4.6.5.2 Transmitter tests

For each test, the test signals applied to the transmitter antenna connectors **(P_i)** shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) **(P_s)** specified in the test. This may be assessed by separately measuring the signals emitted by each antenna connector and summing the results, or by combining the signals and performing a single measurement. The characteristics (e.g. amplitude and phase) of the combining network should be such that the power of the combined signal is maximised.

An example of a suitable test configuration is shown in figure 4.2.

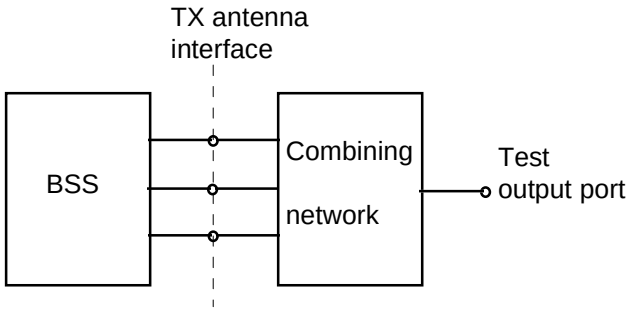

Figure 4.2: Transmitter test set-up

For Intermodulation attenuation, the test may be performed separately for each transmitter antenna connector.

4.7 Regional requirements

Some requirements in TS 25.141 may only apply in certain regions. Table 4.4 lists all requirements that may be applied differently in different regions.

Table 4.4: List of regional requirements

Subclause number	Requirement	Comments
3.4.1	Frequency bands	Some bands may be applied regionally.
3.4.2	Tx-Rx Frequency Separation	The requirement is applied according to what frequency bands in subclause 3.4.1 that are supported by the BS.
4.2	Test Tolerances * (*: This regional requirement should be reviewed to check its necessity every TSG RAN meeting.)	Until the time the non-zero test tolerances are reflected in the Japanese regulations, shared risk against core specification value with test tolerance of zero may be applied provisionally for the following minimum requirements as regional requirement in Japan. - 6.2.1.2 Base station maximum output power - 6.3 Frequency error - 6.4.2 Power control steps - 6.4.3 Power control dynamic range - 6.4.4 Total power dynamic range - 6.5.2.2 Adjacent Channel Leakage power Ratio(ACLR) - 6.7.2 Peak code Domain error - 7.2 Receiver sensitivity Level
6.2.1.2	Base station output power	In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the ranges defined for the Normal test environment in subclause 4.4.1.
6.5.2.1	Spectrum emission mask	The mask specified may be mandatory in certain regions. In other regions this mask may not be applied.
6.5.3.4.1~~5~~	Spurious emissions (Category A)	These requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied.
6.5.3.4.2~~6~~	Spurious emissions (Category B)	These requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied.
6.5.3.4.4~~8~~.1	Co-existence with GSM900 – Operation in the same geographic area	This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and UTRA are deployed.
6.5.3.4.4~~8~~.2	Co-existence with GSM900 – Co-located base stations	This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located.
6.5.3.4.5~~9~~.1	Co-existence with DCS1800 – Operation in the same geographic area	This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and UTRA are deployed.
6.5.3.4.5~~9~~.2	Co-existence with DCS1800 – Co-located base stations	This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located.
6.5.3.4.6~~10~~	Co-existence with PHS	This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA are deployed.
6.5.3.4.7~~11~~	Co-.existence with services in adjacent frequency bands	This requirement may be applied for the protection in bands adjacent to 2110-2170 MHz, as defined in subclause 3.4.1(a) and 1930-1990 MHz, as defined in subclause 3.4.1(b) in geographic areas in which both an adjacent band service and UTRA are deployed.
6.5.3.4.8~~12~~.1	Co-existence with UTRA TDD – Operation in the same geographic area	This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.
6.5.3.4.8~~12~~.2	Co-existence with UTRA TDD – Co-located base stations	This requirement may be applied for the protection of UTRA-TDD BS receivers when UTRA-TDD BS and UTRA FDD BS are co-located.
7.5	Blocking characteristic	The requirement is applied according to what

		frequency bands in subclause 3.4.1 that are supported by the BS.
7.5	Blocking characteristics	This requirement may be applied for the protection of UTRA FDD BS receivers when UTRA FDD BS and GSM 900/DCS1800 BS are co-located.

6.1.1.2 Test Model 2

This model shall be used for tests on:

- —output power dynamics.
- CPICH power accuracy.

Table 6.3: Test Model 2 Active Channels

Type	Number of Channels	Fraction of Power (%)	Level setting (dB)	Channelization Code	Timing offset (x256T_{chip})
P-CCPCH+SCH	1	10	-10	1	0
Primary CPICH	1	10	-10	0	0
PICH	1	5	-13	16	120
S-CCPCH containing PCH (SF=256)	1	5	-13	3	150
DPCH (SF=128)	3	2 x 10,1 x 50	2 x –10, 1 x –3	24, 72, 120	1, 7, 2

6.2.2 CPICH power accuracy

6.2.2.1 Definition and applicability

CPICH power accuracy is defined as the maximum deviation between the ordered channel power and the power in that channel measured at the TX antenna interface. The requirement is applicable for all BS types.

6.2.2.2 Minimum Requirement

The measured CPICH power shall be within ±2.1dB of the ordered absolute value. The normative reference for this requirement is in TS 25.104 [1] subclause 6.4.4

6.2.2.3 Test purpose

The purpose of the test is to verify, that the BS under test delivers CPICH power within margins, thereby allowing reliable cell planning and operation.

6.2.2.4 Method of test

6.2.2.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Connect BS to code domain analyser as shown in annex B.
2) Disable inner loop power control.
3) Set-up BS transmission at maximum total power as specified by the supplier. Channel set-up shall be according to subclause 6.1.1.2.

6.2.2.4.2 Procedure

1) Measure the power in the PCCPCH and PCPICH according to annex E.

~~2) Repeat the measurement for all other applicable temperatures and supply voltages.~~

6.2.2.5 Test Requirement

The measured CPICH power shall be within ±2.9dB of the ordered absolute value

.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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

6.5.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and adjacent channel leakage power ratio for the transmitter.

6.5.2.1 Spectrum emission mask

6.5.2.1.1 Definitions and applicability

The mask defined in Tables 6.3 to 6.6 below may be mandatory in certain regions. In other regions this mask may not be applied.

6.5.2.1.2 Minimum Requirements

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 6.11 to 6.14 for the appropriate BS maximum output power, in the frequency range from Δf =2.5 MHz to f_offset_{max} from the carrier frequency, where:

- Δf is the separation between the carrier frequency and the nominal –3dB point of the measuring filter closest to the carrier frequency.
- f_offset is the separation between the carrier frequency and the centre of the measurement filter;
- f_offset_{max} is either 12.5 MHz or the offset to the UMTS Tx band edge as defined in subclause 3.4.1, whichever is the greater.

Table 6.11: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
$2.5 \le \Delta f < 2.7$ MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
$2.7 \le \Delta f < 3.5$ MHz	2.715MHz ≤ f_offset < 3.515MHz	- 14 – 15·(f_offset- 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26 dBm	30 kHz
$3.5 \le \Delta f < 7.5$ MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
$7.5 \le \Delta f$ MHz	8.0 MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.12: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
$2.5 \le \Delta f < 2.7$ MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
$2.7 \le \Delta f < 3.5$ MHz	2.715MHz ≤ f_offset < 3.515MHz	-14 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-24.5 dBm	30 kHz
$3.5 \le \Delta f < 7.5$ MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
$7.5 \le \Delta f$ MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 56 dBm	1 MHz

Table 6.13: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm

Frequency offset of measurement filter – 3dB point,Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	P – 53 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	P – 53 – 15·(f_offset – 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	P – 65 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	P – 52 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 56 dBm	1 MHz

Table 6.14: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-22 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-22 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-34 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-21 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	-25 dBm	1 MHz

The normative reference for this requirement is in TS 25.104 [1] subclause 6.6.2.1

6.5.2.1.3 Test purpose

This test measures the emissions of the BS, close to the assigned channel bandwidth of the wanted signal, while the transmitter is in operation.

6.5.2.1.4 Method of test

6.5.2.1.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Set-up the equipment as shown in annex B~~A~~.

2) Measurements with an offset from the carrier centre frequency between 2,515 MHz and 4.0 MHz shall use a 30 kHz measurement bandwidth.

3) Measurements with an offset from the carrier centre frequency between 4.0 MHz and (f_offset_{max} – 500 kHz).shall use a 1 MHz measurement bandwidth. The 1MHz measurement bandwidth may be calculated by integrating multiple 50 kHz or narrower filter measurements

4) Detection mode: True RMS.

6.5.2.1.4.2 Procedures

1) Set the BS to transmit a signal in accordance to test model 1, subclause 6.2.1.1.1 at the manufacturer's specified maximum output power.

2) Measure the emission at the specified frequencies with specified measurement bandwidth and note that the measured value does not exceed the specified value.

6.5.2.1.5 Test requirements

The measurement result in step 2 of 6.5.2.1.4.2 shall not exceed the maximum level specified in tables 6.15 to 6.18 for the appropriate BS maximum output power.

Table 6.15: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-12.5 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	- 12.5 – 15·(f_offset- 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-24.5 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-11.5 dBm	1 MHz
7.5 ≤ Δf MHz	8.0 MHz ≤ f_offset < f_offset_{max}	-11.5 dBm	1 MHz

Table 6.16: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-12.5 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-12.5 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-24.5 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-11.5 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 54.5 dBm	1 MHz

Table 6.17: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm

Frequency offset of measurement filter – 3dB point,Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	P – 51.5 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	P – 51.5 – 15·(f_offset – 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	P – 63.5 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	P – 50.5 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 54.5 dBm	1 MHz

Table 6.18: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-20.5 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-20.5 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-32.5 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-19.5 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	-23.5 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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

6.5.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.5.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the transmitted power to the power measured after a receiver filter in the adjacent channel(s). Both the transmitted power and the received power are measured through a matched filter (Root Raised Cosine and roll-off 0.22) with a noise power bandwidth equal to the chip rate. The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

6.5.2.2.2 Minimum Requirement

Table 6.19: BS ACLR

BS channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	45 dB
10 MHz	50 dB

The normative reference for this requirement is in TS 25.104 [1] subclause 6.5.2.2

6.5.2.2.3 Test purpose

To verify that the adjacent channel leakage power ratio requirement shall be met as specified in subclause 6.5.2.2.2.

6.5.2.2.4 Method of test

6.5.2.2.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Connect measurement device to the base station RF output port as shown in annex B.
2) The measurement device characteristics shall be:
   - measurement filter bandwidth: defined in subclause 6.5.2.2.1;
   - detection mode: true RMS voltage or true average power.
3) Set the base station to transmit a signal modulated in accordance with 6.1.1.1 Test model 1. Total power at the RF output port shall be the maximum output power as specified by the manufacturer.
4) Set carrier frequency within the frequency band supported by BS. Minimum carrier spacing shall be 5 MHz and maximum carrier spacing shall be specified by manufacturer.

6.5.2.2.4.2 Procedure

1) Measure Adjacent channel leakage power ratio for 5 MHz and 10 MHz offsets both side of channel frequency. In multiple carrier case only offset frequencies below the lowest and above the highest carrier frequency used shall be measured.
2) All RF channel configurations supported by BS shall be verified.

6.5.2.2.5 Test Requirement

The measurement result in step 1 of 6.5.2.2.4.2 shall not be less than the ACLR limit specified in tables 6.19

Table 6.19: BS ACLR

BS channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	44.2 dB
10 MHz	49.2 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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

6.5.3 Spurious emissions

6.5.3.1 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. This is measured at the base station RF output port.

The requirement applies at frequencies within the specified frequency ranges, which are more than 12.5 MHz under the first carrier frequency used or more than 12.5 MHz above the last carrier frequency used.

The requirements of either subclause 6.5.3.4.1 or subclause 6.5.3.4.2 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

Unless otherwise stated, all requirements are measured as mean power (RMS).

6.5.3.2 (void)~~Test purpose~~

~~This test measures conducted spurious emission from the BS transmitter antenna connector, while the transmitter is in operation.~~

6.5.3.3 (void)~~Test case~~

~~Test environment: normal; see subclause 4.4.1.~~

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

~~The BS shall be configured with transmitters active at their maximum output power for all transmission modes foreseen by the manufacturer's specification.~~

~~Set the base station to transmit a signal as stated in subclause 6.1.1.1. Total power at the RF Output port shall be the nominal power as specified by the manufacturer.~~

~~The transmitter antenna connector shall be connected to a measurement receiver with the same characteristic impedance, using an attenuator or directional coupler if necessary.~~

~~The detecting device shall be configured with a measurement bandwidth as stated in the tables.~~

6.5.3.4 Minimum Requirements

6.5.3.4.1 Spurious emissions (Category A)

The following requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation [4], are applied.

6.5.3.4.1.1 Minimum Requirement

The power of any spurious emission shall be attenuated by at least the minimum requirement.

Table 6.16: BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement Bandwidth	Note
9 kHz to 150 kHz	-13 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
150 kHz to 30 MHz		10 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
30 MHz to 1 GHz		100 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
1 GHz to 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-8, subclause 2.5 Table 1

6.5.3.4.2 Spurious emissions (Category B)

The following requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation [4], are applied.

6.5.3.4.2.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.17: BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9 kHz ↔ 150 kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
150 kHz ↔ 30 MHz	- 36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
30 MHz ↔ 1 GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
1 GHz ↔ Fc1 – 60 MHz or 2 100 MHz *Whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
Fc1 – 60 MHz or 2 100 MHz whichever is the higher ↔ Fc1 – 50 MHz or 2 100 MHz whichever is the higher	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc1 – 50 MHz or 2100 MHz whichever is the higher ↔ Fc2 + 50 MHz or 2180 MHz whichever is the lower	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc2 + 50 MHz or 2180 MHz whichever is the lower ↔ Fc2 + 60 MHz or 2 180 MHz Whichever is the lower	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc2 + 60 MHz or 2 180 MHz *Whichever is the lower* ↔ 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1. Upper frequency as in ITU-R SM.329-8, subclause 2.5, Table 1
Fc1: Center frequency of first carrier frequency used. Fc2: Center frequency of last carrier frequency used.			

6.5.3.4.3 Protection of the BS receiver

This requirement may be applied in order to prevent the receiver of the BS being desensitised by emissions from the BS transmitter which are coupled between the antennas of the BS.

This requirement assumes the scenario described in [2]. For different scenarios, the manufacturer may declare a different requirement.

This requirement is not applicable to antenna ports which are used for both transmission and reception (e.g. which have an internal duplexer).

NOTE: In this case, the measurement of Reference Sensitivity will directly show any desensitization of the receiver.

6.5.3.4.3.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.18: BS Spurious emissions limits for protection of the BS receiver

Band	Maximum Level	Measurement Bandwidth	Note
1 920 MHz to 1 980 MHz For operation in Frequency Bands defined in subclause 3.4.1(a)	-96 dBm	100 kHz	
1 850 MHz to 1 910 MHz For operation in Frequency Bands defined in subclause 3.4.1(b)	-96 dBm	100kHz	

6.5.3.4.4 Co-existence with GSM 900

6.5.3.4.4.1 Operation in the same geographic area

This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and UTRA are deployed.

This requirement assumes the scenario described in [2]. For different scenarios, the manufacturer may declare a different requirement.

6.5.3.4.4.1.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.19: BS Spurious emissions limits for BS in geographic coverage area of GSM 900

Band	Maximum Level	Measurement Bandwidth	Note
921 MHz to 960 MHz	-57 dBm	100 kHz	

6.5.3.4.4.2 Co-located base stations

This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located.

6.5.3.4.4.2.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.20: BS Spurious emissions limits for protection of the BTS receiver

Band	Maximum Level	Measurement Bandwidth	Note
876 MHz to 915 MHz	–98 dBm	100 kHz	

6.5.3.4.5 Co-existence with DCS 1800

6.5.3.4.5.1 Operation in the same geographic area

This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and UTRA are deployed.

This requirement assumes the scenario described in [2]. For different scenarios, the manufacturer may declare a different requirement.

6.5.3.4.5.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.21: BS Spurious emissions limits for BS in geographic coverage area of DCS 1800

Band	Maximum Level	Measurement Bandwidth	Note
1 805 MHz to 1 880 MHz	-47 dBm	100 kHz	

6.5.3.4.5.2 Co-located basestations

This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located.

6.5.3.4.5.2.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.22: BS Spurious emissions limits for BS co-located with DCS 1800 BTS

Band	Maximum Level	Measurement Bandwidth	Note
1 710 MHz to 1 785 MHz	-98 dBm	100 kHz	

6.5.3.4.6 Co-existence with PHS

This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA are deployed.

6.5.3.4.6.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.23: BS Spurious emissions limits for BS in geographic coverage area of PHS

Band	Maximum Level	Measurement Bandwidth	Note
1 893,5 MHz to 1 919,60 MHz	-41 dBm	300 kHz	

6.5.3.4.7 Co-existence with services in adjacent frequency bands

This requirement may be applied for the protection in bands adjacent to 2 110 MHz to 2 170 MHz, as defined in subclause 3.4.1(a) and 1 930 MHz to 1 990 MHz, as defined in subclause 3.4.1(b) in geographic areas in which both an adjacent band service and UTRA are deployed.

6.5.3.4.7.1 Minimum requirement

The power of any spurious emission shall not exceed.

Table 6.24: BS spurious emissions limits for protection of adjacent band services

Band (f)	Maximum Level	Measurement Bandwidth	Note
2 100 MHz to 2 105 MHz For operation in frequency bands as defined in subclause 3.4.1(a)	-30 + 3,4 (f - 2 100 MHz) dBm	1 MHz	
2 175 MHz to 2 180 MHz For operation in frequency bands as defined in subclause 3.4.1(a)	-30 + 3,4 (2 180 MHz - f) dBm	1 MHz	
1 920 MHz to 1 925 MHz For operation in frequency bands as defined in subclause 3.4.1(b)	-30 + 3,4 (f – 1 920 MHz) dBm	1 MHz	
1 995 MHz to 2 000 MHz For operation in frequency bands as defined in subclause 3.4.1(b)	-30 +3,4 (2 000 MHz – f) dBm	1 MHz	

6.5.3.4.8 Co-existence with UTRA-TDD

6.5.3.4.8.1 Operation in the same geographic area

This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.

6.5.3.4.8.1.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.25: BS Spurious emissions limits for BS in geographic coverage area of UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1 900 MHz to 1 920 MHz	-52 dBm	1 MHz	
2 010 MHz to 2 025 MHz	-52 dBm	1 MHz	

6.5.3.4.8.2 Co-located base stations

This requirement may be applied for the protection of UTRA-TDD BS receivers when UTRA-TDD BS and UTRA FDD BS are co-located.

6.5.3.4.8.2.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.26: BS Spurious emissions limits for BS co-located with UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1 900 MHz to 1 920 MHz	–86 dBm	1 MHz	
2 010 MHz to 2 025 MHz	–86 dBm	1 MHz	

6.5.3.5 Test purpose

This test measures conducted spurious emission from the BS transmitter antenna connector, while the transmitter is in operation.

6.5.3.6 Method of Test

6.5.3.6.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Connect the BS antenna connector to a measurement receiver using an attenuator or a directional coupler if necessary

2) Measurements shall use a measurement bandwidth in accordance to the tables in section 6.5.3.4.

3) Detection mode: True RMS.

4) Configure the BS with transmitters active at their maximum output power for all transmission modes foreseen by the manufacturer's specification.

6.5.3.6.2 Procedure

1) Set the BS to transmit a signal in accordance to test model 1, subclause 6.1.1.1 at the manufacturer's specified maximum output power.

2) Measure the emission at the specified frequencies with specified measurement bandwidth and note that the measured value does not exceed the specified value.

6.5.3.7 Test requirements

The measurement result in step 2 of 6.5.3.6.2 shall not exceed the maximum level specified in tables 6.27 to 6.37 if applicable for the BS under test.

6.5.3.7.1 Spurious emissions (Category A)

Table 6.27: BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement Bandwidth	Note
9 kHz to 150 kHz	-13 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
150 kHz to 30 MHz		10 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
30 MHz to 1 GHz		100 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
1 GHz to 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-8, subclause 2.5 Table 1

6.5.3.7.2 Spurious emissions (Category B)

Table 6.28: BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9 kHz ↔ 150 kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
150 kHz ↔ 30 MHz	- 36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
30 MHz ↔ 1 GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
1 GHz ↔ Fc1 – 60 MHz or 2 100 MHz *Whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
Fc1 – 60 MHz or 2 100 MHz whichever is the higher ↔ Fc1 – 50 MHz or 2 100 MHz whichever is the higher	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc1 – 50 MHz or 2100 MHz whichever is the higher ↔ Fc2 + 50 MHz or 2180 MHz whichever is the lower	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc2 + 50 MHz or 2180 MHz whichever is the lower ↔ Fc2 + 60 MHz or 2 180 MHz Whichever is the lower	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc2 + 60 MHz or 2 180 MHz *Whichever is the lower* ↔ 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1. Upper frequency as in ITU-R SM.329-8, subclause 2.5, Table 1
Fc1: Center frequency of first carrier frequency used. Fc2: Center frequency of last carrier frequency used.			

6.5.3.7.3 Protection of the BS receiver

Table 6.29: BS Spurious emissions limits for protection of the BS receiver

Band	Maximum Level	Measurement Bandwidth	Note
1 920 MHz to 1 980 MHz For operation in Frequency Bands defined in subclause 3.4.1(a)	-96 dBm	100 kHz	
1 850 MHz to 1 910 MHz For operation in Frequency Bands defined in subclause 3.4.1(b)	-96 dBm	100kHz	

6.5.3.7.4 Co-existence with GSM 900

6.5.3.7.4.1 Operation in the same geographic area

Table 6.30: BS Spurious emissions limits for BS in geographic coverage area of GSM 900

Band	Maximum Level	Measurement Bandwidth	Note
921 MHz to 960 MHz	-57 dBm	100 kHz	

6.5.3.7.4.2 Co-located base stations

Table 6.31: BS Spurious emissions limits for protection of the BTS receiver

Band	Maximum Level	Measurement Bandwidth	Note
876 MHz to 915 MHz	–98 dBm	100 kHz	

6.5.3.7.5 Co-existence with DCS 1800

6.5.3.7.5.1 Operation in the same geographic area

Table 6.32: BS Spurious emissions limits for BS in geographic coverage area of DCS 1800

Band	Maximum Level	Measurement Bandwidth	Note
1 805 MHz to 1 880 MHz	-47 dBm	100 kHz	

6.5.3.7.5.2 Co-located basestations

Table 6.33: BS Spurious emissions limits for BS co-located with DCS 1800 BTS

Band	Maximum Level	Measurement Bandwidth	Note
1 710 MHz to 1 785 MHz	-98 dBm	100 kHz	

6.5.3.7.6 Co-existence with PHS

Table 6.34: BS Spurious emissions limits for BS in geographic coverage area of PHS

Band	Maximum Level	Measurement Bandwidth	Note
1 893,5 MHz to 1 919,60 MHz	-41 dBm	300 kHz	

6.5.3.7.7 Co-existence with services in adjacent frequency bands

Table 6.35: BS spurious emissions limits for protection of adjacent band services

Band (f)	Maximum Level	Measurement Bandwidth	Note
2 100 MHz to 2 105 MHz For operation in frequency bands as defined in subclause 3.4.1(a)	-30 + 3,4 (f - 2 100 MHz) dBm	1 MHz	
2 175 MHz to 2 180 MHz For operation in frequency bands as defined in subclause 3.4.1(a)	-30 + 3,4 (2 180 MHz - f) dBm	1 MHz	
1 920 MHz to 1 925 MHz For operation in frequency bands as defined in subclause 3.4.1(b)	-30 + 3,4 (f – 1 920 MHz) dBm	1 MHz	
1 995 MHz to 2 000 MHz For operation in frequency bands as defined in subclause 3.4.1(b)	-30 +3,4 (2 000 MHz – f) dBm	1 MHz	

6.5.3.7.8 Co-existence with UTRA-TDD

6.5.3.7.8.1 Operation in the same geographic area

Table 6.36: BS Spurious emissions limits for BS in geographic coverage area of UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1 900 MHz to 1 920 MHz	-52 dBm	1 MHz	
2 010 MHz to 2 025 MHz	-52 dBm	1 MHz	

6.5.3.7.8.2 Co-located base stations

Table 6.37: BS Spurious emissions limits for BS co-located with UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1 900 MHz to 1 920 MHz	–86 dBm	1 MHz	
2 010 MHz to 2 025 MHz	–86 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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

6.6 Transmit intermodulation

6.6.1 Definition and applicability

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

The transmit intermodulation level is the power of the intermodulation products when a WCDMA modulated interference signal is injected into an antenna connector at a level of 30 dB lower than that of the wanted signal. The frequency of the interference signal shall be 5 MHz, 10 MHz and 15 MHz offset below the first or above the last carrier frequency used.

The requirements are applicable for single carrier BS.

6.6.2 Minimum Requirement

The transmit intermodulation level shall not exceed the out of band emission or the spurious emission requirements of subclauses 6.5.2 and 6.5.3.

The normative reference for this requirement is in TS 25.104 [1] subclause 6.7

6.6.3 Test purpose

The test purpose is to verify the ability of the BS transmitter to restrict the generation of intermodulation products in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna to below specified levels.

6.6.4 Method of test

6.6.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Test set-up in accordance to annex B.

6.6.4.2 Procedures

1) Generate the wanted signal in accordance to test model 1, subclause 6.1.1.1 at specified maximum BS output power.

2) Generate the interference signal in accordance to test model 1, subclause 6.1.1.1 ~~(WCDMA signal as specified in the table 6.1 and 6.2 (Test model 1))~~ with frequency offset of 5 MHz relative to the wanted signal ~~in accordance to test model 2, subclause 6.1.1.2~~.

3) Adjust ATT1 so the level of the WCDMA modulated interference signal is as defined in subclause 6.6.

4) Perform the out of band emission test as specified in subclause 6.5.2.

5) Perform the spurious emission test as specified in subclause 6.5.3.

6) Verify that the emission level does not exceed the required level with the exception of interference signal frequencies.

7) Repeat the test for interference frequency off set of -5 MHz.

8) Repeat the test for interference frequency off set of ±10 MHz and ±15 MHz.

6.6.5 Test Requirements

The WCDMA modulated interference signal shall be 30 dB below the wanted signal.

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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F

7 Receiver characteristics

7.1 General

Unless otherwise stated, all tests in this clause shall be performed at the BS antenna connector (test port A) with a full complement of transceivers for the configuration in normal operating conditions. If any external apparatus such as a RX amplifier, a diplexer, a filter or the combination of such devices is used, the tests according to subclauses 4.6.2 and/or 4.6.4, depending on the device added, shall be performed to ensure that the requirements are met at test port B.

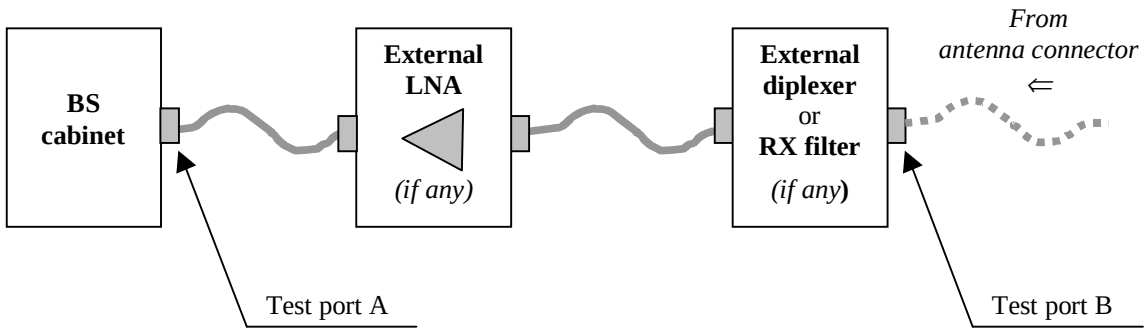

Figure 7.1: Receiver test ports

The tests in clause 7 assume that the receiver is not equipped with diversity. For receivers with diversity, unless otherwise stated, tests shall be performed by applying the specified signals to one of the receiver inputs, and terminating or disabling the other(s). The tests and requirements are otherwise unchanged.

In all the relevant subclauses in this clause all Bit Error Ratio (BER), Residual BER (RBER) and Block Error Ratio (BLER) measurements shall be carried out according to the general rules for statistical testing ~~in annex A~~ defined in ITU-T Recommendation O.153 [5].

If external BER measurement is not used then the internal BER calculation shall be used instead. When internal BER calculation is used, the requirements of the verification test according to 7.8 shall be met in advance.

In tests performed with signal generators a synchronization signal may be provided, from the base station to the signal generator, to enable correct timing of the wanted signal.

7.5 Blocking characteristics

7.5.1 Definition and applicability

The blocking characteristics is a measure of the receiver ability to receive a wanted signal at is assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels. The blocking performance requirement appliesshall apply at all frequencies as specified in tables 7.4(a) to 7.4(d).

The requirements in this subclauseTable 7.4(a) or 7.4(b) shall apply to base stations intended for general-purpose applications, depending on which frequency band is used. The requirements in Tables 7.4 (c) and 7.4 (d) may be applied apply when the FDD BS for operation in frequency bands in subclause 3.4.1(a) is co-located with GSM900 or DCS1800 BTS respectively.

7.5.2 Minimum Requirements

The BER shall not exceed 0.001 for the parameters specified in table 7.4.

Table 7.4(a): Blocking characteristics for operation in frequency bands in subclause 3.4.1(a)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1 920 MHz to 1 980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 900 MHz to 1 920 MHz 1 980 MHz to 2 000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 MHz to 1 900 MHz and 2 000 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

Table 7.4(b): Blocking performance requirement for operation in frequency bands in subclause 3.4.1(b)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1 850 MHz to 1 910 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 830 MHz to 1 850 MHz 1 910 MHz to 1 930 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 MHz to 1 830 MHz 1 930 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

Table 7.4(c) : Blocking performance requirement for operation in frequency bands in sub-clause 3.4.1.(a) when co-located with GSM900

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1920 - 1980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1900 - 1920 MHz 1980 - 2000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 – 925 MHz and 960 - 1900 MHz, and 2000 MHz – 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
9215 -960 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4(d) : Blocking performance requirement for operation in frequency bands in sub-clause 3.4.1(ab)) when co-located with DCS1800

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1920 - 1980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1900 - 1920 MHz 1980 - 2000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 – 1805 MHz and 1880 - 1900 MHz, and 2000 MHz – 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
1805 – 1880 MHz	+16 dBm	-115 dBm	—	CW carrier

The normative reference for these requirements is in TS 25.104[1] su-bclause 7.5

7.5.3 Test purpose

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

7.5.4 Method of test

7.5.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

RF channels to be tested: M see subclause 4.8. The BS shall be configured to operate as close to the centre of the operating band as possible.

1) Connect WCDMA signal generator at the assigned channel frequency of the wanted signal and a signal generator to the antenna connector of one Rx port.

2) Terminate any other Rx port not under test.

3) Transmit a signal from the WCDMA signal generator to the BS. The characteristics of the signal shall be set according to the UL reference measurement channel (12,2 kbit/s) specified in annex A subclause A.2.1. The level of the WCDMA signal measured at the BS antenna connector shall be set to the level specified in subclause 7.5.5.

7.5.4.2 Procedure

1) Set the signal generator to produce an interfering signal at a frequency offset Fuw from the assigned channel frequency of the wanted signal which is given by:

$$Fuw = \pm (n \times 1\ MHz),$$

where n shall be increased in integer steps from n = 10 up to such a value that the center frequency of the interfering signal covers the range from 1 MHz to 12,75 GHz. The interfering signal level measured at the antenna connector shall be set in dependency of its center frequency, as specified in table 7.4A. The type of the interfering signal is either equivalent to a continuous WCDMA signal with one code of chip frequency 3,84 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off $\alpha = 0,22$, or a CW signal; see table 7.4A.

2) Measure the BER of the wanted signal at the BS receiver.

NOTE: The test procedure as defined in steps (1) and (2) requests to carry out more than 10 000 BER measurements. To reduce the time needed for these measurements, it may be appropriate to conduct the test in two phases: During phase 1, BER measurements are made on all center frequencies of the interfering signal as requested but with a reduced confidence level, with the aim to identify those frequencies which require more detailed investigation. In phase 2, detailed measurements are made only at those critical frequencies identified before, applying the required confidence level.

3) Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) to (2).

<Editor's note: The above NOTE is taken from proposal for TDD specification (R4-99789). Precise parameters for this 2-phase measurement shall be specified. >

7.5.5 Test Requirements

The BER shall not exceed 0.001 for the parameters specified in table 7.4A.

Table 7.4A(a): Blocking characteristics for operation in frequency bands in subclause 3.4.1(a)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1 920 MHz to 1 980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 900 MHz to 1 920 MHz 1 980 MHz to 2 000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 MHz to 1 900 MHz and 2 000 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

Table 7.4A(b): Blocking performance requirement for operation in frequency bands in subclause 3.4.1(b)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1 850 MHz to 1 910 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 830 MHz to 1 850 MHz 1 910 MHz to 1 930 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 MHz to 1 830 MHz 1 930 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

Table 7.4A(c) : Blocking performance requirement for operation in frequency bands in sub-clause 3.4.1.(a) when co-located with GSM900

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
921 -960 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4A(d) : Blocking performance requirement for operation in frequency bands in sub-clause 3.4.1(ab)) when co-located with DCS1800

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1805 – 1880 MHz	+16 dBm	-115 dBm	—	CW carrier

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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

8.3.4 Multipath fading Case 4

8.3.4.1 Definition and applicability

The performance requirement of DCH in multipath fading Case 4 is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified E_b/N_0 limit. The BLER is calculated for each of the measurement channels supported by the base station.

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

8.3.4.2 Conformance requirement

The BLER should not exceed the limit for the E_b/N_0 specified in table 8.8A.

Table 8.8A: Performance requirements in multipath Case 4 channel

Measurement channel data rate (R_b)	E_b/N_0 for required BLER < 10^{-1}	E_b/N_0 for required BLER < 10^{-2}	E_b/N_0 for required BLER < 10^{-3}
12.2 kbps	n.a	10.2 dB	11.0 dB
64 kbps	6.4 dB	6.8 dB	7.1 dB
144 kbps	5.8 dB	6.2 dB	6.6 dB
384 kbps	6.2 dB	6.6 dB	7.2 dB

The reference for this requirement is TS 25.104 subclause 8.3.4.1.

8.3.4.3 Test purpose

The test shall verify the receivers ability to receive the test signal under fast fading propagation conditions with a BLER not exceeding a specified limit.

8.3.4.4 Method of test

8.3.4.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

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

8.3.4.4.2 Procedure

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

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

4) The multipath fading emulators shall be configured according to the corresponding channel model defined in annex D.

5) Adjust the equipment so that required E_b/N_0 specified in table 8.8A is achieved. To achieve the specified E_b/N_O, the wanted signal level at the BS input should be adjusted to: $-84+10*\text{Log10}(R_b/3.84*10^6)+E_b/N_0$ [dBm]. The wanted signal levels at the BS input for the specified E_b/N_0 levels in table 8.8A is found in table 8.8B.

Table 8.8B: Performance requirements in multipath Case 4 channel

Measurement channel data rate (R_b)	Wanted signal level for required BLER < 10^{-1}	Wanted signal level for required BLER < 10^{-2}	Wanted signal level for required BLER < 10^{-3}
12.2 kbps	n.a	-98.8 dBm	-98.0 dBm
64 kbps	-95.4 dBm	-95.0 dBm	-94.7 dBm
144 kbps	-92.5 dBm	-92.1 dBm	-91.7 dBm
384 kbps	-87.8 dBm	-87.4 dBm	-86.8 dBm

6) For each of the data rates in table 8.8A applicable for the base station, measure the BLER

8.3.4.5 Test requirements

The BLER measured according to subclause 8.3.4.4.2 shall not exceed the limits specified in table 8.8A.

3GPP TSG RAN WG4 Meeting #17 **R4-010785**

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.141** **CR** 91 ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

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

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

Title:	⌘	Corrections to TS25.141 specification
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	28 May 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:	⌘	Errors or discrepancies in the current text
Summary of change:	⌘	Various corrections - Missing values are proposed - Cross-references are corrected…
Consequences if not approved:	⌘	Some test descriptions will remain incorrect or ambiguous

Clauses affected:	⌘	4.1.2, 4.6.2, 6.1.1.2, 6.2.2.4.2, 6.5.2.1.4.1, 6.5.3, 6.6.4.2, 7.1, 7.5, 8.3.4.4
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://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.

4.1.2 Measurement of transmitter

Table 4.1: Maximum Test System Uncertainty for transmitter tests

Subclause	Maximum Test System Uncertainty	Range over which test system uncertainty applies
6.2.1 Maximum Output Power	±0.7 dB	
6.2.2 CPICH Power accuracy	± 0.8 dB	[Range of cpich relative to Ior]
6.3.4 Frequency error	± 12 Hz	Measurement results of ±500 Hz
6.4.2 Power control steps	± 0.1 dB for one 1 dB step ± 0.1 dB for one 0.5 dB step ± 0.1 dB for ten 1 dB steps ± 0.1 dB for ten 0.5 dB steps	
6.4.3 Power dynamic range	± 0.2 dB	[Ior range and the minimum code power (-32)]
6.4.4 Total power dynamic range	± 0.3 dB	
6.5.1 Occupied Bandwidth	±100 kHz	Measurement results of ±1 MHz
6.5.2.1 Spectrum emission mask	±1.5 dB Due to carrier leakage, for measurements specified in a 1 MHz bandwidth close to the carrier (4 MHz to 8 MHz), integration of the measurement using several narrower measurements may be necessary in order to achieve the above accuracy.	
6.5.2.2 ACLR	5 MHz offset ± 0.8 dB 10 MHz offset ± 0.8 dB Note: Impact of measurement period (averaging) and intermod effects in the measurement receiver not yet fully studied. However, the above limits remain valid.	Signal power = P_Max
6.5.3 Spurious emissions	± 2.0 dB for BS and coexistance bands for results > -60 dBm ± 3.0 dB for results < -60 dBm Outside above range: f≤2.2GHz : ± 1.5 dB 2.2 GHz < f ≤ 4 GHz : ± 2.0 dB f > 4 GHz : ±4.0 dB	
6.6 Transmit intermodulation (interferer requirements)	The value below applies only to the interference signal and is unrelated to the measurement uncertainty of the tests (6.5.2.1, 6.5.2.2 and 6.5.3) which have to be carried out in the presence of the interfer. Need to add formula for uncertainty of the ratio. ± 1.0 dB	Not applicable
6.7.1 EVM	±2.5 % (for single code)	Measurement results from 12.5% to 22.5% at Signal power = P_Max –3 to P_Max – 18 dB
6.7.2 Peak code Domain error	±1.0 dB	Measurement results from -36 to –30 dB at signal power = P_Max –3 to P_Max – 18 dB

4.6 BS Configurations

4.6.1 Receiver diversity

For the tests in clause 7 of the present document, the specified test signals shall be applied to one receiver antenna connector, with the remaining receivers are disabled or their antenna connectors being terminated with 50 Ω.

4.6.2 Duplexers

The requirements of the present document shall be met with a duplexer fitted, if a duplexer is supplied as part of the BS. If the duplexer is supplied as an option by the manufacturer, sufficient tests should be repeated with and without the duplexer fitted to verify that the BS meets the requirements of the present document in both cases.

The following tests should be performed with the duplexer fitted, and without it fitted if this is an option:

1) subclause 6.2.1, base station maximum output power, for the highest static power step only, if this is measured at the antenna connector;

2) subclause 6.5, output RF spectrum emissions; outside the BS transmit band;

3) subclause 6.5.3.4.3~~7~~, protection of the BS receiver;

4) subclause 6.6, transmit intermedulation; for the testing of conformance, the carrier frequencies should be selected to minimize intermodulation products from the transmitters falling in receive channels.

The remaining tests may be performed with or without the duplexer fitted.

NOTE 1: When performing receiver tests with a duplexer fitted, it is important to ensure that the output from the transmitters does not affect the test apparatus. This can be achieved using a combination of attenuators, isolators and filters.

NOTE 2: When duplexers are used, intermodulation products will be generated, not only in the duplexer but also in the antenna system. The intermodulation products generated in the antenna system are not controlled by 3GPP specifications, and may degrade during operation (e.g. due to moisture ingress). Therefore, to ensure continued satisfactory operation of a BS, an operator will normally select ARFCNs to minimize intermodulation products falling on receive channels. For testing of complete conformance, an operator may specify the ARFCNs to be used.

4.6.3 Power supply options

If the BS is supplied with a number of different power supply configurations, it may not be necessary to test RF parameters for each of the power supply options, provided that it can be demonstrated that the range of conditions over which the equipment is tested is at least as great as the range of conditions due to any of the power supply configurations.

This applies particularly if a BS contains a DC rail which can be supplied either externally or from an internal mains power supply. In this case, the conditions of extreme power supply for the mains power supply options can be tested by testing only the external DC supply option. The range of DC input voltages for the test should be sufficient to verify the performance with any of the power supplies, over its range of operating conditions within the BS, including variation of mains input voltage, temperature and output current.

4.6.4 Ancillary RF amplifiers

Ancillary RF amplifier: a piece of equipment, which when connected by RF coaxial cables to the BS, has the primary function to provide amplification between the transmit and/or receive antenna connector of a BS and an antenna without requiring any control signal to fulfil its amplifying function.

The requirements of the present document shall be met with the ancillary RF amplifier fitted. At tests according to clauses 6 and 7 for TX and RX respectively, the ancillary amplifier is connected to the BS by a connecting network (including any cable(s), attenuator(s), etc.) with applicable loss to make sure the appropriate operating conditions of the

ancillary amplifier and the BS. The applicable connecting network loss range is declared by the manufacturer. Other characteristics and the temperature dependence of the attenuation of the connecting network are neglected. The actual attenuation value of the connecting network is chosen for each test as one of the applicable extreme values. The lowest value is used unless otherwise stated.

Sufficient tests should be repeated with the ancillary amplifier fitted and, if it is optional, without the ancillary RF amplifier to verify that the BS meets the requirements of the present document in both cases.

When testing, the following tests should be repeated with the optional ancillary amplifier fitted according to the table below, where x denotes that the test is applicable:

Table 4.3

	Subclause	TX amplifier only	RX amplifier only	TX/RX amplifiers combined (Note)
Receiver Tests	7.2		X	X
	7.5		X	X
	7.6		X	X
	7.7		X	
Transmitter Tests	6.2	X		X
	6.5.1	X		X
	6.5.2.2	X		X
	6.5.3	X		X
	6.6	X		X

NOTE: Combining can be by duplex filters or any other network. The amplifiers can either be in RX or TX branch or in both. Either one of these amplifiers could be a passive network.

In test according to subclauses 6.2 and 7.2 highest applicable attenuation value is applied.

4.6.5 BS using antenna arrays

A BS may be configured with a multiple antenna port connection for some or all of its transceivers or with an antenna array related to one cell (not one array per transceiver). This subclause applies to a BS which meets at least one of the following conditions:

- the transmitter output signals from one or more transceiver appear at more than one antenna port; or
- there is more than one receiver antenna port for a transceiver or per cell and an input signal is required at more than one port for the correct operation of the receiver (NOTE: diversity reception does not meet this requirement) thus the outputs from the transmitters as well as the inputs to the receivers are directly connected to several antennas (known as “aircombining”); or
- transmitters and receivers are connected via duplexers to more than one antenna.

If a BS is used, in normal operation, in conjunction with an antenna system which contains filters or active elements which are necessary to meet the UTRA requirements, the conformance tests may be performed on a system comprising the BS together with these elements, supplied separately for the purposes of testing. In this case, it must be demonstrated that the performance of the configuration under test is representative of the system in normal operation, and the conformance assessment is only applicable when the BS is used with the antenna system.

For conformance testing of such a BS, the following procedure may be used.

4.6.5.1 Receiver tests

For each test, the test signals applied to the receiver antenna connectors shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) specified in the test.

An example of a suitable test configuration is shown in figure 4.1.

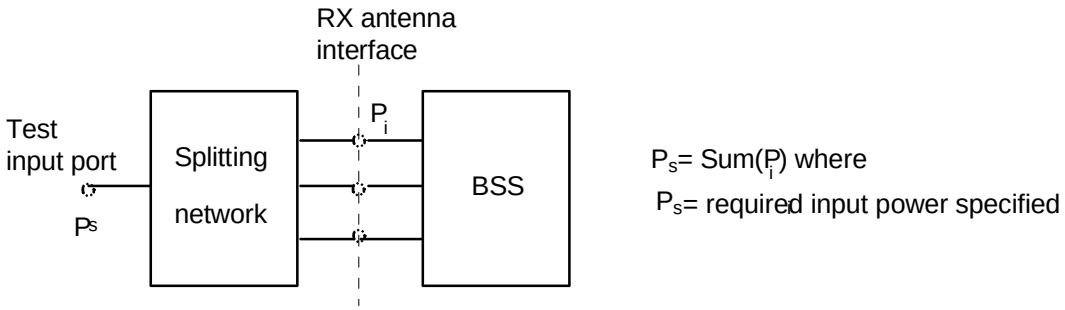

Figure 4.1: Receiver test set-up

For spurious emissions from the receiver antenna connector, the test may be performed separately for each receiver antenna connector.

4.6.5.2 Transmitter tests

For each test, the test signals applied to the transmitter antenna connectors **(P_i)** shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) **(P_s)** specified in the test. This may be assessed by separately measuring the signals emitted by each antenna connector and summing the results, or by combining the signals and performing a single measurement. The characteristics (e.g. amplitude and phase) of the combining network should be such that the power of the combined signal is maximised.

An example of a suitable test configuration is shown in figure 4.2.

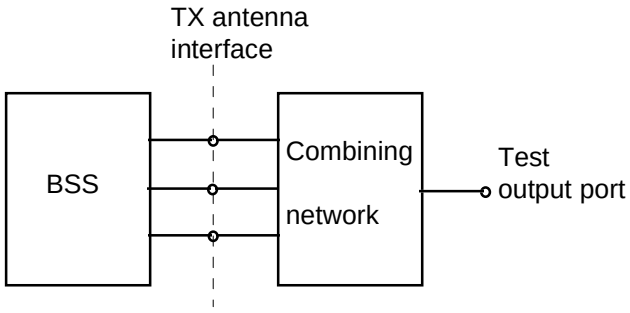

Figure 4.2: Transmitter test set-up

For Intermodulation attenuation, the test may be performed separately for each transmitter antenna connector.

4.7 Regional requirements

Some requirements in TS 25.141 may only apply in certain regions. Table 4.4 lists all requirements that may be applied differently in different regions.

Table 4.4: List of regional requirements

Subclause number	Requirement	Comments
3.4.1	Frequency bands	Some bands may be applied regionally.
3.4.2	Tx-Rx Frequency Separation	The requirement is applied according to what frequency bands in subclause 3.4.1 that are supported by the BS.
4.2	Test Tolerances * (*: This regional requirement should be reviewed to check its necessity every TSG RAN meeting.)	Until the time the non-zero test tolerances are reflected in the Japanese regulations, shared risk against core specification value with test tolerance of zero may be applied provisionally for the following minimum requirements as regional requirement in Japan. - 6.2.1.2 Base station maximum output power - 6.3 Frequency error - 6.4.2 Power control steps - 6.4.3 Power control dynamic range - 6.4.4 Total power dynamic range - 6.5.2.2 Adjacent Channel Leakage power Ratio(ACLR) - 6.7.2 Peak code Domain error - 7.2 Receiver sensitivity Level
6.2.1.2	Base station output power	In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the ranges defined for the Normal test environment in subclause 4.4.1.
6.5.2.1	Spectrum emission mask	The mask specified may be mandatory in certain regions. In other regions this mask may not be applied.
6.5.3.4.1~~5~~	Spurious emissions (Category A)	These requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied.
6.5.3.4.2~~6~~	Spurious emissions (Category B)	These requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [1], are applied.
6.5.3.4.4~~8~~.1	Co-existence with GSM900 – Operation in the same geographic area	This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and UTRA are deployed.
6.5.3.4.4~~8~~.2	Co-existence with GSM900 – Co-located base stations	This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located.
6.5.3.4.5~~9~~.1	Co-existence with DCS1800 – Operation in the same geographic area	This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and UTRA are deployed.
6.5.3.4.5~~9~~.2	Co-existence with DCS1800 – Co-located base stations	This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located.
6.5.3.4.6~~10~~	Co-existence with PHS	This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA are deployed.
6.5.3.4.7~~11~~	Co-.existence with services in adjacent frequency bands	This requirement may be applied for the protection in bands adjacent to 2110-2170 MHz, as defined in subclause 3.4.1(a) and 1930-1990 MHz, as defined in subclause 3.4.1(b) in geographic areas in which both an adjacent band service and UTRA are deployed.
6.5.3.4.8~~12~~.1	Co-existence with UTRA TDD – Operation in the same geographic area	This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.
6.5.3.4.8~~12~~.2	Co-existence with UTRA TDD – Co-located base stations	This requirement may be applied for the protection of UTRA-TDD BS receivers when UTRA-TDD BS and UTRA FDD BS are co-located.
7.5	Blocking characteristic	The requirement is applied according to what

		frequency bands in subclause 3.4.1 that are supported by the BS.
7.5	Blocking characteristics	This requirement may be applied for the protection of UTRA FDD BS receivers when UTRA FDD BS and GSM 900/DCS1800 BS are co-located.

6.1.1.2 Test Model 2

This model shall be used for tests on:

- —output power dynamics.
- CPICH power accuracy.

Table 6.3: Test Model 2 Active Channels

Type	Number of Channels	Fraction of Power (%)	Level setting (dB)	Channelization Code	Timing offset (x256T_{chip})
P-CCPCH+SCH	1	10	-10	1	0
Primary CPICH	1	10	-10	0	0
PICH	1	5	-13	16	120
S-CCPCH containing PCH (SF=256)	1	5	-13	3	150
DPCH (SF=128)	3	2 x 10,1 x 50	2 x –10, 1 x –3	24, 72, 120	1, 7, 2

6.2.2 CPICH power accuracy

6.2.2.1 Definition and applicability

CPICH power accuracy is defined as the maximum deviation between the ordered channel power and the power in that channel measured at the TX antenna interface. The requirement is applicable for all BS types.

6.2.2.2 Minimum Requirement

The measured CPICH power shall be within ±2.1dB of the ordered absolute value. The normative reference for this requirement is in TS 25.104 [1] subclause 6.4.4

6.2.2.3 Test purpose

The purpose of the test is to verify, that the BS under test delivers CPICH power within margins, thereby allowing reliable cell planning and operation.

6.2.2.4 Method of test

6.2.2.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Connect BS to code domain analyser as shown in annex B.
2) Disable inner loop power control.
3) Set-up BS transmission at maximum total power as specified by the supplier. Channel set-up shall be according to subclause 6.1.1.2.

6.2.2.4.2 Procedure

1) Measure the power in the PCCPCH and PCPICH according to annex E.

~~2) Repeat the measurement for all other applicable temperatures and supply voltages.~~

6.2.2.5 Test Requirement

The measured CPICH power shall be within ±2.9dB of the ordered absolute value

.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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

6.5.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and adjacent channel leakage power ratio for the transmitter.

6.5.2.1 Spectrum emission mask

6.5.2.1.1 Definitions and applicability

The mask defined in Tables 6.3 to 6.6 below may be mandatory in certain regions. In other regions this mask may not be applied.

6.5.2.1.2 Minimum Requirements

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 6.11 to 6.14 for the appropriate BS maximum output power, in the frequency range from Δf =2.5 MHz to f_offset_{max} from the carrier frequency, where:

- Δf is the separation between the carrier frequency and the nominal –3dB point of the measuring filter closest to the carrier frequency.
- f_offset is the separation between the carrier frequency and the centre of the measurement filter;
- f_offset_{max} is either 12.5 MHz or the offset to the UMTS Tx band edge as defined in subclause 3.4.1, whichever is the greater.

Table 6.11: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
$2.5 \le \Delta f < 2.7$ MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
$2.7 \le \Delta f < 3.5$ MHz	2.715MHz ≤ f_offset < 3.515MHz	- 14 – 15·(f_offset- 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26 dBm	30 kHz
$3.5 \le \Delta f < 7.5$ MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
$7.5 \le \Delta f$ MHz	8.0 MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.12: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
$2.5 \le \Delta f < 2.7$ MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
$2.7 \le \Delta f < 3.5$ MHz	2.715MHz ≤ f_offset < 3.515MHz	-14 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-24.5 dBm	30 kHz
$3.5 \le \Delta f < 7.5$ MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
$7.5 \le \Delta f$ MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 56 dBm	1 MHz

Table 6.13: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm

Frequency offset of measurement filter – 3dB point,Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	P – 53 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	P – 53 – 15·(f_offset – 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	P – 65 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	P – 52 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 56 dBm	1 MHz

Table 6.14: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-22 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-22 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-34 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-21 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	-25 dBm	1 MHz

The normative reference for this requirement is in TS 25.104 [1] subclause 6.6.2.1

6.5.2.1.3 Test purpose

This test measures the emissions of the BS, close to the assigned channel bandwidth of the wanted signal, while the transmitter is in operation.

6.5.2.1.4 Method of test

6.5.2.1.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Set-up the equipment as shown in annex B~~A~~.

2) Measurements with an offset from the carrier centre frequency between 2,515 MHz and 4.0 MHz shall use a 30 kHz measurement bandwidth.

3) Measurements with an offset from the carrier centre frequency between 4.0 MHz and (f_offset_{max} – 500 kHz).shall use a 1 MHz measurement bandwidth. The 1MHz measurement bandwidth may be calculated by integrating multiple 50 kHz or narrower filter measurements

4) Detection mode: True RMS.

6.5.2.1.4.2 Procedures

1) Set the BS to transmit a signal in accordance to test model 1, subclause 6.2.1.1.1 at the manufacturer's specified maximum output power.

2) Measure the emission at the specified frequencies with specified measurement bandwidth and note that the measured value does not exceed the specified value.

6.5.2.1.5 Test requirements

The measurement result in step 2 of 6.5.2.1.4.2 shall not exceed the maximum level specified in tables 6.15 to 6.18 for the appropriate BS maximum output power.

Table 6.15: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-12.5 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	- 12.5 – 15·(f_offset- 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-24.5 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-11.5 dBm	1 MHz
7.5 ≤ Δf MHz	8.0 MHz ≤ f_offset < f_offset_{max}	-11.5 dBm	1 MHz

Table 6.16: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-12.5 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-12.5 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-24.5 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-11.5 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 54.5 dBm	1 MHz

Table 6.17: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm

Frequency offset of measurement filter – 3dB point,Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	P – 51.5 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	P – 51.5 – 15·(f_offset – 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	P – 63.5 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	P – 50.5 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 54.5 dBm	1 MHz

Table 6.18: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-20.5 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-20.5 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-32.5 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-19.5 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	-23.5 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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

6.5.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.5.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the transmitted power to the power measured after a receiver filter in the adjacent channel(s). Both the transmitted power and the received power are measured through a matched filter (Root Raised Cosine and roll-off 0.22) with a noise power bandwidth equal to the chip rate. The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

6.5.2.2.2 Minimum Requirement

Table 6.19: BS ACLR

BS channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	45 dB
10 MHz	50 dB

The normative reference for this requirement is in TS 25.104 [1] subclause 6.5.2.2

6.5.2.2.3 Test purpose

To verify that the adjacent channel leakage power ratio requirement shall be met as specified in subclause 6.5.2.2.2.

6.5.2.2.4 Method of test

6.5.2.2.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Connect measurement device to the base station RF output port as shown in annex B.
2) The measurement device characteristics shall be:
   - measurement filter bandwidth: defined in subclause 6.5.2.2.1;
   - detection mode: true RMS voltage or true average power.
3) Set the base station to transmit a signal modulated in accordance with 6.1.1.1 Test model 1. Total power at the RF output port shall be the maximum output power as specified by the manufacturer.
4) Set carrier frequency within the frequency band supported by BS. Minimum carrier spacing shall be 5 MHz and maximum carrier spacing shall be specified by manufacturer.

6.5.2.2.4.2 Procedure

1) Measure Adjacent channel leakage power ratio for 5 MHz and 10 MHz offsets both side of channel frequency. In multiple carrier case only offset frequencies below the lowest and above the highest carrier frequency used shall be measured.
2) All RF channel configurations supported by BS shall be verified.

6.5.2.2.5 Test Requirement

The measurement result in step 1 of 6.5.2.2.4.2 shall not be less than the ACLR limit specified in tables 6.19

Table 6.19: BS ACLR

BS channel offset below the first or above the last carrier frequency used	ACLR limit
5 MHz	44.2 dB
10 MHz	49.2 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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

6.5.3 Spurious emissions

6.5.3.1 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. This is measured at the base station RF output port.

The requirement applies at frequencies within the specified frequency ranges, which are more than 12.5 MHz under the first carrier frequency used or more than 12.5 MHz above the last carrier frequency used.

The requirements of either subclause 6.5.3.4.1 or subclause 6.5.3.4.2 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

Unless otherwise stated, all requirements are measured as mean power (RMS).

6.5.3.2 (void)~~Test purpose~~

~~This test measures conducted spurious emission from the BS transmitter antenna connector, while the transmitter is in operation.~~

6.5.3.3 (void)~~Test case~~

~~Test environment: normal; see subclause 4.4.1.~~

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

~~The BS shall be configured with transmitters active at their maximum output power for all transmission modes foreseen by the manufacturer's specification.~~

~~Set the base station to transmit a signal as stated in subclause 6.1.1.1. Total power at the RF Output port shall be the nominal power as specified by the manufacturer.~~

~~The transmitter antenna connector shall be connected to a measurement receiver with the same characteristic impedance, using an attenuator or directional coupler if necessary.~~

~~The detecting device shall be configured with a measurement bandwidth as stated in the tables.~~

6.5.3.4 Minimum Requirements

6.5.3.4.1 Spurious emissions (Category A)

The following requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation [4], are applied.

6.5.3.4.1.1 Minimum Requirement

The power of any spurious emission shall be attenuated by at least the minimum requirement.

Table 6.16: BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement Bandwidth	Note
9 kHz to 150 kHz	-13 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
150 kHz to 30 MHz		10 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
30 MHz to 1 GHz		100 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
1 GHz to 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-8, subclause 2.5 Table 1

6.5.3.4.2 Spurious emissions (Category B)

The following requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation [4], are applied.

6.5.3.4.2.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.17: BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9 kHz ↔ 150 kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
150 kHz ↔ 30 MHz	- 36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
30 MHz ↔ 1 GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
1 GHz ↔ Fc1 – 60 MHz or 2 100 MHz *Whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
Fc1 – 60 MHz or 2 100 MHz whichever is the higher ↔ Fc1 – 50 MHz or 2 100 MHz whichever is the higher	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc1 – 50 MHz or 2100 MHz whichever is the higher ↔ Fc2 + 50 MHz or 2180 MHz whichever is the lower	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc2 + 50 MHz or 2180 MHz whichever is the lower ↔ Fc2 + 60 MHz or 2 180 MHz Whichever is the lower	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc2 + 60 MHz or 2 180 MHz *Whichever is the lower* ↔ 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1. Upper frequency as in ITU-R SM.329-8, subclause 2.5, Table 1
Fc1: Center frequency of first carrier frequency used. Fc2: Center frequency of last carrier frequency used.			

6.5.3.4.3 Protection of the BS receiver

This requirement may be applied in order to prevent the receiver of the BS being desensitised by emissions from the BS transmitter which are coupled between the antennas of the BS.

This requirement assumes the scenario described in [2]. For different scenarios, the manufacturer may declare a different requirement.

This requirement is not applicable to antenna ports which are used for both transmission and reception (e.g. which have an internal duplexer).

NOTE: In this case, the measurement of Reference Sensitivity will directly show any desensitization of the receiver.

6.5.3.4.3.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.18: BS Spurious emissions limits for protection of the BS receiver

Band	Maximum Level	Measurement Bandwidth	Note
1 920 MHz to 1 980 MHz For operation in Frequency Bands defined in subclause 3.4.1(a)	-96 dBm	100 kHz	
1 850 MHz to 1 910 MHz For operation in Frequency Bands defined in subclause 3.4.1(b)	-96 dBm	100kHz	

6.5.3.4.4 Co-existence with GSM 900

6.5.3.4.4.1 Operation in the same geographic area

This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and UTRA are deployed.

This requirement assumes the scenario described in [2]. For different scenarios, the manufacturer may declare a different requirement.

6.5.3.4.4.1.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.19: BS Spurious emissions limits for BS in geographic coverage area of GSM 900

Band	Maximum Level	Measurement Bandwidth	Note
921 MHz to 960 MHz	-57 dBm	100 kHz	

6.5.3.4.4.2 Co-located base stations

This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located.

6.5.3.4.4.2.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.20: BS Spurious emissions limits for protection of the BTS receiver

Band	Maximum Level	Measurement Bandwidth	Note
876 MHz to 915 MHz	–98 dBm	100 kHz	

6.5.3.4.5 Co-existence with DCS 1800

6.5.3.4.5.1 Operation in the same geographic area

This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and UTRA are deployed.

This requirement assumes the scenario described in [2]. For different scenarios, the manufacturer may declare a different requirement.

6.5.3.4.5.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.21: BS Spurious emissions limits for BS in geographic coverage area of DCS 1800

Band	Maximum Level	Measurement Bandwidth	Note
1 805 MHz to 1 880 MHz	-47 dBm	100 kHz	

6.5.3.4.5.2 Co-located basestations

This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located.

6.5.3.4.5.2.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.22: BS Spurious emissions limits for BS co-located with DCS 1800 BTS

Band	Maximum Level	Measurement Bandwidth	Note
1 710 MHz to 1 785 MHz	-98 dBm	100 kHz	

6.5.3.4.6 Co-existence with PHS

This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA are deployed.

6.5.3.4.6.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.23: BS Spurious emissions limits for BS in geographic coverage area of PHS

Band	Maximum Level	Measurement Bandwidth	Note
1 893,5 MHz to 1 919,60 MHz	-41 dBm	300 kHz	

6.5.3.4.7 Co-existence with services in adjacent frequency bands

This requirement may be applied for the protection in bands adjacent to 2 110 MHz to 2 170 MHz, as defined in subclause 3.4.1(a) and 1 930 MHz to 1 990 MHz, as defined in subclause 3.4.1(b) in geographic areas in which both an adjacent band service and UTRA are deployed.

6.5.3.4.7.1 Minimum requirement

The power of any spurious emission shall not exceed.

Table 6.24: BS spurious emissions limits for protection of adjacent band services

Band (f)	Maximum Level	Measurement Bandwidth	Note
2 100 MHz to 2 105 MHz For operation in frequency bands as defined in subclause 3.4.1(a)	-30 + 3,4 (f - 2 100 MHz) dBm	1 MHz	
2 175 MHz to 2 180 MHz For operation in frequency bands as defined in subclause 3.4.1(a)	-30 + 3,4 (2 180 MHz - f) dBm	1 MHz	
1 920 MHz to 1 925 MHz For operation in frequency bands as defined in subclause 3.4.1(b)	-30 + 3,4 (f – 1 920 MHz) dBm	1 MHz	
1 995 MHz to 2 000 MHz For operation in frequency bands as defined in subclause 3.4.1(b)	-30 +3,4 (2 000 MHz – f) dBm	1 MHz	

6.5.3.4.8 Co-existence with UTRA-TDD

6.5.3.4.8.1 Operation in the same geographic area

This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.

6.5.3.4.8.1.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.25: BS Spurious emissions limits for BS in geographic coverage area of UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1 900 MHz to 1 920 MHz	-52 dBm	1 MHz	
2 010 MHz to 2 025 MHz	-52 dBm	1 MHz	

6.5.3.4.8.2 Co-located base stations

This requirement may be applied for the protection of UTRA-TDD BS receivers when UTRA-TDD BS and UTRA FDD BS are co-located.

6.5.3.4.8.2.1 Minimum Requirement

The power of any spurious emission shall not exceed.

Table 6.26: BS Spurious emissions limits for BS co-located with UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1 900 MHz to 1 920 MHz	–86 dBm	1 MHz	
2 010 MHz to 2 025 MHz	–86 dBm	1 MHz	

6.5.3.5 Test purpose

This test measures conducted spurious emission from the BS transmitter antenna connector, while the transmitter is in operation.

6.5.3.6 Method of Test

6.5.3.6.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Connect the BS antenna connector to a measurement receiver using an attenuator or a directional coupler if necessary

2) Measurements shall use a measurement bandwidth in accordance to the tables in section 6.5.3.4.

3) Detection mode: True RMS.

4) Configure the BS with transmitters active at their maximum output power for all transmission modes foreseen by the manufacturer's specification.

6.5.3.6.2 Procedure

1) Set the BS to transmit a signal in accordance to test model 1, subclause 6.1.1.1 at the manufacturer's specified maximum output power.

2) Measure the emission at the specified frequencies with specified measurement bandwidth and note that the measured value does not exceed the specified value.

6.5.3.7 Test requirements

The measurement result in step 2 of 6.5.3.6.2 shall not exceed the maximum level specified in tables 6.27 to 6.37 if applicable for the BS under test.

6.5.3.7.1 Spurious emissions (Category A)

Table 6.27: BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement Bandwidth	Note
9 kHz to 150 kHz	-13 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
150 kHz to 30 MHz		10 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
30 MHz to 1 GHz		100 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
1 GHz to 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-8, subclause 2.5 Table 1

6.5.3.7.2 Spurious emissions (Category B)

Table 6.28: BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9 kHz ↔ 150 kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
150 kHz ↔ 30 MHz	- 36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
30 MHz ↔ 1 GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
1 GHz ↔ Fc1 – 60 MHz or 2 100 MHz *Whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1
Fc1 – 60 MHz or 2 100 MHz whichever is the higher ↔ Fc1 – 50 MHz or 2 100 MHz whichever is the higher	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc1 – 50 MHz or 2100 MHz whichever is the higher ↔ Fc2 + 50 MHz or 2180 MHz whichever is the lower	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc2 + 50 MHz or 2180 MHz whichever is the lower ↔ Fc2 + 60 MHz or 2 180 MHz Whichever is the lower	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, subclause 4.3 and Annex 7
Fc2 + 60 MHz or 2 180 MHz *Whichever is the lower* ↔ 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, subclause 4.1. Upper frequency as in ITU-R SM.329-8, subclause 2.5, Table 1
Fc1: Center frequency of first carrier frequency used. Fc2: Center frequency of last carrier frequency used.			

6.5.3.7.3 Protection of the BS receiver

Table 6.29: BS Spurious emissions limits for protection of the BS receiver

Band	Maximum Level	Measurement Bandwidth	Note
1 920 MHz to 1 980 MHz For operation in Frequency Bands defined in subclause 3.4.1(a)	-96 dBm	100 kHz	
1 850 MHz to 1 910 MHz For operation in Frequency Bands defined in subclause 3.4.1(b)	-96 dBm	100kHz	

6.5.3.7.4 Co-existence with GSM 900

6.5.3.7.4.1 Operation in the same geographic area

Table 6.30: BS Spurious emissions limits for BS in geographic coverage area of GSM 900

Band	Maximum Level	Measurement Bandwidth	Note
921 MHz to 960 MHz	-57 dBm	100 kHz	

6.5.3.7.4.2 Co-located base stations

Table 6.31: BS Spurious emissions limits for protection of the BTS receiver

Band	Maximum Level	Measurement Bandwidth	Note
876 MHz to 915 MHz	–98 dBm	100 kHz	

6.5.3.7.5 Co-existence with DCS 1800

6.5.3.7.5.1 Operation in the same geographic area

Table 6.32: BS Spurious emissions limits for BS in geographic coverage area of DCS 1800

Band	Maximum Level	Measurement Bandwidth	Note
1 805 MHz to 1 880 MHz	-47 dBm	100 kHz	

6.5.3.7.5.2 Co-located basestations

Table 6.33: BS Spurious emissions limits for BS co-located with DCS 1800 BTS

Band	Maximum Level	Measurement Bandwidth	Note
1 710 MHz to 1 785 MHz	-98 dBm	100 kHz	

6.5.3.7.6 Co-existence with PHS

Table 6.34: BS Spurious emissions limits for BS in geographic coverage area of PHS

Band	Maximum Level	Measurement Bandwidth	Note
1 893,5 MHz to 1 919,60 MHz	-41 dBm	300 kHz	

6.5.3.7.7 Co-existence with services in adjacent frequency bands

Table 6.35: BS spurious emissions limits for protection of adjacent band services

Band (f)	Maximum Level	Measurement Bandwidth	Note
2 100 MHz to 2 105 MHz For operation in frequency bands as defined in subclause 3.4.1(a)	-30 + 3,4 (f - 2 100 MHz) dBm	1 MHz	
2 175 MHz to 2 180 MHz For operation in frequency bands as defined in subclause 3.4.1(a)	-30 + 3,4 (2 180 MHz - f) dBm	1 MHz	
1 920 MHz to 1 925 MHz For operation in frequency bands as defined in subclause 3.4.1(b)	-30 + 3,4 (f – 1 920 MHz) dBm	1 MHz	
1 995 MHz to 2 000 MHz For operation in frequency bands as defined in subclause 3.4.1(b)	-30 +3,4 (2 000 MHz – f) dBm	1 MHz	

6.5.3.7.8 Co-existence with UTRA-TDD

6.5.3.7.8.1 Operation in the same geographic area

Table 6.36: BS Spurious emissions limits for BS in geographic coverage area of UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1 900 MHz to 1 920 MHz	-52 dBm	1 MHz	
2 010 MHz to 2 025 MHz	-52 dBm	1 MHz	

6.5.3.7.8.2 Co-located base stations

Table 6.37: BS Spurious emissions limits for BS co-located with UTRA-TDD

Band	Maximum Level	Measurement Bandwidth	Note
1 900 MHz to 1 920 MHz	–86 dBm	1 MHz	
2 010 MHz to 2 025 MHz	–86 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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

6.6 Transmit intermodulation

6.6.1 Definition and applicability

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

The transmit intermodulation level is the power of the intermodulation products when a WCDMA modulated interference signal is injected into an antenna connector at a level of 30 dB lower than that of the wanted signal. The frequency of the interference signal shall be 5 MHz, 10 MHz and 15 MHz offset below the first or above the last carrier frequency used.

The requirements are applicable for single carrier BS.

6.6.2 Minimum Requirement

The transmit intermodulation level shall not exceed the out of band emission or the spurious emission requirements of subclauses 6.5.2 and 6.5.3.

The normative reference for this requirement is in TS 25.104 [1] subclause 6.7

6.6.3 Test purpose

The test purpose is to verify the ability of the BS transmitter to restrict the generation of intermodulation products in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna to below specified levels.

6.6.4 Method of test

6.6.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

1) Test set-up in accordance to annex B.

6.6.4.2 Procedures

1) Generate the wanted signal in accordance to test model 1, subclause 6.1.1.1 at specified maximum BS output power.

2) Generate the interference signal in accordance to test model 1, subclause 6.1.1.1 ~~(WCDMA signal as specified in the table 6.1 and 6.2 (Test model 1))~~ with frequency offset of 5 MHz relative to the wanted signal ~~in accordance to test model 2, subclause 6.1.1.2~~.

3) Adjust ATT1 so the level of the WCDMA modulated interference signal is as defined in subclause 6.6.

4) Perform the out of band emission test as specified in subclause 6.5.2.

5) Perform the spurious emission test as specified in subclause 6.5.3.

6) Verify that the emission level does not exceed the required level with the exception of interference signal frequencies.

7) Repeat the test for interference frequency off set of -5 MHz.

8) Repeat the test for interference frequency off set of ±10 MHz and ±15 MHz.

6.6.5 Test Requirements

The WCDMA modulated interference signal shall be 30 dB below the wanted signal.

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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F

7 Receiver characteristics

7.1 General

Unless otherwise stated, all tests in this clause shall be performed at the BS antenna connector (test port A) with a full complement of transceivers for the configuration in normal operating conditions. If any external apparatus such as a RX amplifier, a diplexer, a filter or the combination of such devices is used, the tests according to subclauses 4.6.2 and/or 4.6.4, depending on the device added, shall be performed to ensure that the requirements are met at test port B.

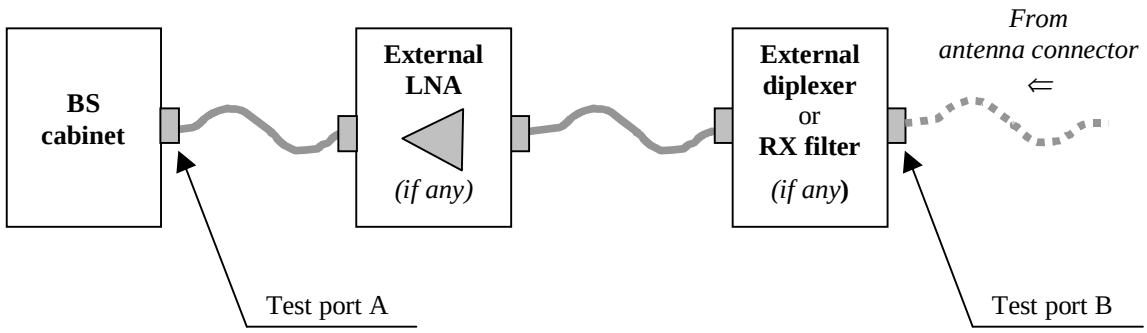

Figure 7.1: Receiver test ports

The tests in clause 7 assume that the receiver is not equipped with diversity. For receivers with diversity, unless otherwise stated, tests shall be performed by applying the specified signals to one of the receiver inputs, and terminating or disabling the other(s). The tests and requirements are otherwise unchanged.

In all the relevant subclauses in this clause all Bit Error Ratio (BER), Residual BER (RBER) and Block Error Ratio (BLER) measurements shall be carried out according to the general rules for statistical testing ~~in annex A~~ defined in ITU-T Recommendation O.153 [5].

If external BER measurement is not used then the internal BER calculation shall be used instead. When internal BER calculation is used, the requirements of the verification test according to 7.8 shall be met in advance.

In tests performed with signal generators a synchronization signal may be provided, from the base station to the signal generator, to enable correct timing of the wanted signal.

7.5 Blocking characteristics

7.5.1 Definition and applicability

The blocking characteristics is a measure of the receiver ability to receive a wanted signal at is assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels. The blocking performance requirement appliesshall apply at all frequencies as specified in tables 7.4(a) to 7.4(d).

The requirements in this subclauseTable 7.4(a) or 7.4(b) shall apply to base stations intended for general-purpose applications, depending on which frequency band is used. The requirements in Tables 7.4 (c) and 7.4 (d) may be applied apply when the FDD BS for operation in frequency bands in subclause 3.4.1(a) is co-located with GSM900 or DCS1800 BTS respectively.

7.5.2 Minimum Requirements

The BER shall not exceed 0.001 for the parameters specified in table 7.4.

Table 7.4(a): Blocking characteristics for operation in frequency bands in subclause 3.4.1(a)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1 920 MHz to 1 980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 900 MHz to 1 920 MHz 1 980 MHz to 2 000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 MHz to 1 900 MHz and 2 000 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

Table 7.4(b): Blocking performance requirement for operation in frequency bands in subclause 3.4.1(b)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1 850 MHz to 1 910 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 830 MHz to 1 850 MHz 1 910 MHz to 1 930 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 MHz to 1 830 MHz 1 930 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

Table 7.4(c) : Blocking performance requirement for operation in frequency bands in sub-clause 3.4.1.(a) when co-located with GSM900

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1920 - 1980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1900 - 1920 MHz 1980 - 2000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 – 925 MHz and 960 - 1900 MHz, and 2000 MHz – 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
9215 -960 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4(d) : Blocking performance requirement for operation in frequency bands in sub-clause 3.4.1(ab)) when co-located with DCS1800

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1920 - 1980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1900 - 1920 MHz 1980 - 2000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 – 1805 MHz and 1880 - 1900 MHz, and 2000 MHz – 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
1805 – 1880 MHz	+16 dBm	-115 dBm	—	CW carrier

The normative reference for these requirements is in TS 25.104[1] su-bclause 7.5

7.5.3 Test purpose

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

7.5.4 Method of test

7.5.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

RF channels to be tested: M see subclause 4.8. The BS shall be configured to operate as close to the centre of the operating band as possible.

1) Connect WCDMA signal generator at the assigned channel frequency of the wanted signal and a signal generator to the antenna connector of one Rx port.

2) Terminate any other Rx port not under test.

3) Transmit a signal from the WCDMA signal generator to the BS. The characteristics of the signal shall be set according to the UL reference measurement channel (12,2 kbit/s) specified in annex A subclause A.2.1. The level of the WCDMA signal measured at the BS antenna connector shall be set to the level specified in subclause 7.5.5.

7.5.4.2 Procedure

1) Set the signal generator to produce an interfering signal at a frequency offset Fuw from the assigned channel frequency of the wanted signal which is given by:

$$Fuw = \pm (n \times 1\ MHz),$$

where n shall be increased in integer steps from n = 10 up to such a value that the center frequency of the interfering signal covers the range from 1 MHz to 12,75 GHz. The interfering signal level measured at the antenna connector shall be set in dependency of its center frequency, as specified in table 7.4A. The type of the interfering signal is either equivalent to a continuous WCDMA signal with one code of chip frequency 3,84 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off $\alpha = 0,22$, or a CW signal; see table 7.4A.

2) Measure the BER of the wanted signal at the BS receiver.

NOTE: The test procedure as defined in steps (1) and (2) requests to carry out more than 10 000 BER measurements. To reduce the time needed for these measurements, it may be appropriate to conduct the test in two phases: During phase 1, BER measurements are made on all center frequencies of the interfering signal as requested but with a reduced confidence level, with the aim to identify those frequencies which require more detailed investigation. In phase 2, detailed measurements are made only at those critical frequencies identified before, applying the required confidence level.

3) Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) to (2).

<Editor's note: The above NOTE is taken from proposal for TDD specification (R4-99789). Precise parameters for this 2-phase measurement shall be specified. >

7.5.5 Test Requirements

The BER shall not exceed 0.001 for the parameters specified in table 7.4A.

Table 7.4A(a): Blocking characteristics for operation in frequency bands in subclause 3.4.1(a)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1 920 MHz to 1 980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 900 MHz to 1 920 MHz 1 980 MHz to 2 000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 MHz to 1 900 MHz and 2 000 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

Table 7.4A(b): Blocking performance requirement for operation in frequency bands in subclause 3.4.1(b)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1 850 MHz to 1 910 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 830 MHz to 1 850 MHz 1 910 MHz to 1 930 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
1 MHz to 1 830 MHz 1 930 MHz to 12 750 MHz	-15 dBm	-115 dBm	-	CW carrier

Table 7.4A(c) : Blocking performance requirement for operation in frequency bands in sub-clause 3.4.1.(a) when co-located with GSM900

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
921 -960 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4A(d) : Blocking performance requirement for operation in frequency bands in sub-clause 3.4.1(ab)) when co-located with DCS1800

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1805 – 1880 MHz	+16 dBm	-115 dBm	—	CW carrier

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 subclause 4.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex F.

8.3.4 Multipath fading Case 4

8.3.4.1 Definition and applicability

The performance requirement of DCH in multipath fading Case 4 is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified E_b/N_0 limit. The BLER is calculated for each of the measurement channels supported by the base station.

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

8.3.4.2 Conformance requirement

The BLER should not exceed the limit for the E_b/N_0 specified in table 8.8A.

Table 8.8A: Performance requirements in multipath Case 4 channel

Measurement channel data rate (R_b)	E_b/N_0 for required BLER < 10^{-1}	E_b/N_0 for required BLER < 10^{-2}	E_b/N_0 for required BLER < 10^{-3}
12.2 kbps	n.a	10.2 dB	11.0 dB
64 kbps	6.4 dB	6.8 dB	7.1 dB
144 kbps	5.8 dB	6.2 dB	6.6 dB
384 kbps	6.2 dB	6.6 dB	7.2 dB

The reference for this requirement is TS 25.104 subclause 8.3.4.1.

8.3.4.3 Test purpose

The test shall verify the receivers ability to receive the test signal under fast fading propagation conditions with a BLER not exceeding a specified limit.

8.3.4.4 Method of test

8.3.4.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

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

8.3.4.4.2 Procedure

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

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

4) The multipath fading emulators shall be configured according to the corresponding channel model defined in annex D.

5) Adjust the equipment so that required E_b/N_0 specified in table 8.8A is achieved. To achieve the specified E_b/N_O, the wanted signal level at the BS input should be adjusted to: $-84+10*\text{Log10}(R_b/3.84*10^6)+E_b/N_0$ [dBm]. The wanted signal levels at the BS input for the specified E_b/N_0 levels in table 8.8A is found in table 8.8B.

Table 8.8B: Performance requirements in multipath Case 4 channel

Measurement channel data rate (R_b)	Wanted signal level for required BLER < 10^{-1}	Wanted signal level for required BLER < 10^{-2}	Wanted signal level for required BLER < 10^{-3}
12.2 kbps	n.a	-98.8 dBm	-98.0 dBm
64 kbps	-95.4 dBm	-95.0 dBm	-94.7 dBm
144 kbps	-92.5 dBm	-92.1 dBm	-91.7 dBm
384 kbps	-87.8 dBm	-87.4 dBm	-86.8 dBm

6) For each of the data rates in table 8.8A applicable for the base station, measure the BLER

8.3.4.5 Test requirements

The BLER measured according to subclause 8.3.4.4.2 shall not exceed the limits specified in table 8.8A.

3GPP TSG RAN WG4 Meeting #17 **R4-010808**

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **25.141** **CR** **93** ⌘ rev **-** ⌘ Current version: **3.5.0** ⌘

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

Title:	⌘	Receiver spurious emission for co-located base stations
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	2001-04-25
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)*
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Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

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

Reason for change:	⌘	In case of separate RX and TX antenna port the receiver is currently allowed to have more spurious emission than the transmitter in case of co-located base stations.
Summary of change:	⌘	Adding requirements for receiver spurious emission in case of separate RX and TX antenna port. The requirements are in line with the current transmitter requirements for co-located base stations.
Consequences if not approved:	⌘	Reduced performance of the co-located base station caused by receiver spurious emission.

Clauses affected:	⌘	7.7.1, 7.7.2		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	3GPP TS 25.104 v3.6.0 (2001-03)
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.

7.7 Spurious Emissions

7.7.1 Definition and applicability

The spurious emission power is the power of the emissions generated or amplified in a receiver that appears at the BS antenna connector. The requirements apply to all BS with separate RX and TX antenna port. The test shall be performed when both TX and RX are on with the TX port terminated.

For all BS with common RX and TX antenna port the transmitter spurious emission as specified in subclause 6.~~6~~5.3 is valid.

7.7.2 Minimum Requirements

The power of any spurious emission shall not exceed:

Table 7.6: Spurious emission minimum requirement

Band	Maximum level	Measurement Bandwidth	Note
1900 – 1980 MHz and 2010 – 2025 MHz	-78 dBm	3.84 MHz	
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 12.75 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 BS.

In addition to the requirements in table 7.6, the co-existence requirements for co-located base stations in subclauses 6.5.3.4.4.2, 6.5.3.4.5.2 and 6.5.3.4.8.2 may also be applied.

The normative reference for this requirement is in TS 25.104[1] subclause 7.7

3GPP TSG RAN WG4 Meeting #17 **R4-010811**

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v3

CHANGE REQUEST

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

Title:	⌘	Receiver spurious emission for co-located base stations
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	2001-04-25
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
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- ***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)*
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R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	In case of separate RX and TX antenna port the receiver is currently allowed to have more spurious emission than the transmitter in case of co-located base stations.
Summary of change:	⌘	Adding requirements for receiver spurious emission in case of separate RX and TX antenna port. The requirements are in line with the current transmitter requirements for co-located base stations.
Consequences if not approved:	⌘	Reduced performance of the co-located base station caused by receiver spurious emission.

Clauses affected:	⌘	7.7.1, 7.7.2		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	3GPP TS 25.104 V4.0.0 (2001-03)
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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.

7.7 Spurious Emissions

7.7.1 Definition and applicability

The spurious emission power is the power of the emissions generated or amplified in a receiver that appears at the BS antenna connector. The requirements apply to all BS with separate RX and TX antenna port. The test shall be performed when both TX and RX are on with the TX port terminated.

For all BS with common RX and TX antenna port the transmitter spurious emission as specified in subclause 6.~~6~~5.3 is valid.

7.7.2 Minimum Requirements

The power of any spurious emission shall not exceed:

Table 7.6: Spurious emission minimum requirement

Band	Maximum level	Measurement Bandwidth	Note
1900 – 1980 MHz and 2010 – 2025 MHz	-78 dBm	3.84 MHz	
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 12.75 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 BS.

In addition to the requirements in table 7.6, the co-existence requirements for co-located base stations in subclauses 6.5.3.4.4.2, 6.5.3.4.5.2 and 6.5.3.4.8.2 may also be applied.

The normative reference for this requirement is in TS 25.104[1] subclause 7.7

3GPP TSG RAN WG4 Meeting #17 **R4-010592**

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **25.141** **CR** **95** ⌘ 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:	⌘	Correction to core requirement spectrum mask
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	2001-03-29
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:	⌘	The core requirement for the spectrum mask has by mistake a test tolerance included.
Summary of change:	⌘	The core requirement for the spectrum mask in Table 6.12 is aligned with TS 25.104 (-26 dBm in the third entry).
Consequences if not approved:	⌘	The test requirements for spectrum mask will be incorrect.

Clauses affected:	⌘	6.5.2.1
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
	⌘	
Other comments:	⌘	

6.5.2.1 Spectrum emission mask

6.5.2.1.1 Definitions and applicability

The mask defined in Tables 6.3 to 6.6 below may be mandatory in certain regions. In other regions this mask may not be applied.

6.5.2.1.2 Minimum Requirements

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 6.11 to 6.14 for the appropriate BS maximum output power, in the frequency range from Δf =2.5 MHz to f_offset_{max} from the carrier frequency, where:

- Δf is the separation between the carrier frequency and the nominal –3dB point of the measuring filter closest to the carrier frequency.
- f_offset is the separation between the carrier frequency and the centre of the measurement filter;
- f_offset_{max} is either 12.5 MHz or the offset to the UMTS Tx band edge as defined in subclause 3.4.1, whichever is the greater.

Table 6.11: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	- 14 – 15·(f_offset- 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
7.5 ≤ Δf MHz	8.0 MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.12: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-14 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26~~24.5~~ dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 56 dBm	1 MHz

Table 6.13: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm

Frequency offset of measurement filter – 3dB point,Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	P – 53 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	P – 53 – 15·(f_offset – 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	P – 65 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	P – 52 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 56 dBm	1 MHz

Table 6.14: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-22 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-22 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-34 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-21 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	-25 dBm	1 MHz

The normative reference for this requirement is in TS 25.104 [1] subclause 6.6.2.1

3GPP TSG RAN WG4 Meeting #17 **R4-010687**

Gothenburg, Sweden 21st - 25th May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **25.141** **CR** **96** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*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 to core requirement spectrum mask
Source:	⌘	RAN WG4
Work item code:	⌘	TEI
Date:	⌘	2001-05-22
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:	⌘	The core requirement for the spectrum mask has by mistake a test tolerance included.
Summary of change:	⌘	The core requirement for the spectrum mask in Table 6.12 is aligned with TS 25.104 (-26 dBm in the third entry).
Consequences if not approved:	⌘	The test requirements for spectrum mask will be incorrect.

Clauses affected:	⌘	6.5.2.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	The corresponding R99 CR is in Tdoc R4-010592.

6.5.2.1 Spectrum emission mask

6.5.2.1.1 Definitions and applicability

The mask defined in Tables 6.3 to 6.6 below may be mandatory in certain regions. In other regions this mask may not be applied.

6.5.2.1.2 Minimum Requirements

For regions where this clause applies, the requirement shall be met by a base station transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions shall not exceed the maximum level specified in tables 6.11 to 6.14 for the appropriate BS maximum output power, in the frequency range from Δf =2.5 MHz to f_offset_{max} from the carrier frequency, where:

- Δf is the separation between the carrier frequency and the nominal –3dB point of the measuring filter closest to the carrier frequency.
- f_offset is the separation between the carrier frequency and the centre of the measurement filter;
- f_offset_{max} is either 12.5 MHz or the offset to the UMTS Tx band edge as defined in subclause 3.4.1, whichever is the greater.

Table 6.11: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
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2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	- 14 – 15·(f_offset- 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
7.5 ≤ Δf MHz	8.0 MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.12: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-14 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-14 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-26~~24.5~~ dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-13 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 56 dBm	1 MHz

Table 6.13: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm

Frequency offset of measurement filter – 3dB point,Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	P – 53 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	P – 53 – 15·(f_offset – 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	P – 65 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	P – 52 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	P – 56 dBm	1 MHz

Table 6.14: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 ≤ Δf < 2.7 MHz	2.515MHz ≤ f_offset < 2.715MHz	-22 dBm	30 kHz
2.7 ≤ Δf < 3.5 MHz	2.715MHz ≤ f_offset < 3.515MHz	-22 – 15·(f_offset - 2.715) dBm	30 kHz
	3.515MHz ≤ f_offset < 4.0MHz	-34 dBm	30 kHz
3.5 ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0MHz	-21 dBm	1 MHz
7.5 ≤ Δf MHz	8.0MHz ≤ f_offset < f_offset_{max}	-25 dBm	1 MHz

The normative reference for this requirement is in TS 25.104 [1] subclause 6.6.2.1