

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

RP-010634

Title: CRs (Rel-4) to TS 25.143

Source TSG RAN WG4

Agenda item: 8.4.4

RAN4 Tdoc	Spec	CR	Title	Cat	Phase	Curr Ver	New Ver
R4-010903	25.143	2	Correct Uncertainties, Precise wording, Editorial changes	F	Rel-4	4.1.0	4.2.0
R4-011091	25.143	3	Editorial changes: spelling, lost pictures	F	Rel-4	4.1.0	4.2.0
R4-011310	25.143	4	Clarification in spectrum emission mask	F	Rel-4	4.1.0	4.2.0

- 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.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

<u>BTS</u>	<u>Base Transceiver Station</u>
<u>CW</u>	<u>Continous Wave (unmodulated signal)</u>
EVM	Error Vector Magnitude
FDD	Frequency Division Duplex
FFS	For Further Study
IMT2000	International Mobile Telecommunication-2000
ITU	International Telecommunication Union
<u>MS</u>	<u>Mobile Station</u>
RF	Radio Frequency
<u>TDD</u>	<u>Time Division Duplex</u>
UARFCN	UTRA Absolute Radio Frequency Channel Number
UMTS	Universal Mobile Telecommunication System
UTRA	Universal Terrestrial Radio Access
WCDMA	Wide band Code Division Multiple Access

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5.1.2 Measurements of Repeater

Table 5.1: Maximum Test System Uncertainty

Subclause	Maximum Test System Uncertainty	Range over which Test System Uncertainty Applies
6.1 Maximum output power	$\pm 0,7$ dB	
7 Frequency error	± 12 Hz	Measurement results of ± 500 Hz
8 Out of band gain	$\pm 0,5$ dB Calibration of test set-up must shall be made without D.U.T. in order to achieve the accuracy	
9.1 Spectrum emission mask	$\pm 1,5$ dB Due to carrier leakage for measurements specified in a 1MHz bandwidth close to the carrier (4 MHz to 8 MHz), integration of the measurement using several narrower bandwidth measurements may be necessary in order to achieve the above accuracy. The interference from the signal generator ACLR must shall be minimum 10 dB below that of a Base Station according to TS25.141	
9.2 Spurious emissions	In UTRA and coexistence receive bands: for results > -60 dBm $\pm 2,0$ dB for results < -60 dBm $\pm 3,0$ dB Outside above range: emission power $f \leq 2,2$ GHz $\pm 1,5$ dB; $2,2$ GHz $< f \leq 4$ GHz $\pm 2,0$ dB; $f > 4$ GHz $\pm 4,0$ dB. The interference from the signal generator ACLR must shall be minimum 10 dB below that of a Base Station according to TS25.141	
10.1 Error vector magnitude	$\pm 2,5$ % (single code applied) ($\pm 2,5$ % measurement error for single code). $5,0$ % EVM in the stimulus signal (single code) will shift the EVM maximum value 0,7% to 18,2%. (RSS repeater EVM and Stimulus EVM.)	Measurement results from 12,5% to 22,5% at signal power = $P_{max} - 3$ dB to $P_{max} - 18$ dB
10.2 Peak code domain error	$\pm 1,1$ dB Formula: RSS measurement error and impedance mismatch error (using $\pm 1,0$ dB measurement error and $\pm 0,5$ dB impedance mismatch error (stimulus side) assuming 14 dB return loss)	Measurement results from -36 dB to -30 dB, at signal power = $P_{max} - 3$ dB to $P_{max} - 18$ dB
11 Input intermodulation Characteristics	$\pm 1,2$ dB Formula: RSS CW1 level error, 2 x CW2 level error, and measurement error (using all errors = $\pm 0,5$ dB)	

5.2 Repeater test tolerances (informative)

The Test Tolerances defined in this subclause have been used to relax the Minimum Requirements in this specification to derive the Test Requirements.

The Test Tolerances are derived from Test System uncertainties, regulatory requirements and criticality to system performance. As a result, the Test Tolerances may sometimes be set to zero.

The test tolerances should not be modified for any reason e.g. to take account of commonly known test system errors (such as mismatch, cable loss, etc.)

Table 5.2: Test Tolerance

Subclause	Test Tolerance	Notes
6.1 Maximum output power	0,7 dB	
9.1 Spectrum emission mask	{1,5} dB	
9.2 Spurious emissions	{0} dB	
7 Frequency error	12 Hz	
10.1 Error vector magnitude	{0} %	Target value is shifted due to stimulus EVM
10.2 Peak code domain error	{1,1} dB	
8 Out of band gain	{0,5} dB	
11 Input intermodulation Characteristics	{1,2} dB	

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5.6 Regional requirements

Some requirements in TS 25.143 may only apply in certain regions. Table 5.4 lists all requirements that may be applied differently in different regions.

Table 5.4: List of regional requirements

Sub-clause number	Requirement	Comments
4.1	Frequency bands	Some bands may be applied regionally.
5.24.2	Up-link to down-link frequency Separation	The requirement is applied according to what frequency bands in Clause 5.24.2 that are supported by the Repeater.
6.1	Maximum output power	In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the ranges of conditions defined as normal.
9.1.2	Spectrum emission mask	The mask specified may be mandatory in certain regions. In other regions this mask may not be applied.
9.2.2.1	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.329-7 [4] , are applied.
9.2.2.2	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.329-7 [4] , are applied.
9.2.2.3	Spurious emissions: Co-location with UTRA FDD	This requirement may be applied for the protection of UTRA FDD BS receivers when UTRA FDD BS and UTRA FDD Repeaters are co-located.
9.2.2.4.1	Spurious emissions: Co-existence with GSM 900 –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 FDD Repeaters are deployed.
9.2.2.4.2	Spurious emissions: Co-existence with GSM 900 - Co-location	This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA FDD Repeaters are co-located.
9.2.2.5.1	Spurious emissions: Co-existence with DCS 1800 –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 FDD Repeaters are deployed.
9.2.2.5.2	Spurious emissions: Co-existence with DCS 1800 - Co-location	This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA FDD Repeaters are co-located.
9.2.2.6	Spurious emissions: Co-existence with PHS	This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA FDD Repeaters are deployed.
9.2.2.7.1	Spurious emissions: Co-existence with UTRA TDD–Operation in the same geographic area	This requirement may be applied for the protection of UTRA UE in geographic areas in which both UTRA TDD BS and UTRA FDD Repeaters are deployed.
9.2.2.7.2	Spurious emissions: Co-existence with UTRA TDD - Co-location	This requirement may be applied for the protection of UTRA TDD BS receivers when UTRA TDD BS and UTRA FDD Repeaters are co-located.
11.2	Input intermodulation: Co-existence with GSM 900 and/or DCS 1800	The requirement may be applied when GSM 900 BTS and/or DCS 1800 BTS and UTRA-FDD Repeaters are co-located.

9.1.2 Minimum Requirements

For regions where this clause applies, the requirement shall be met by a repeater's RF-signal output at maximum gain with WCDMA signals in the operating band of the Repeater, at levels that produce the maximum rated output power per channel. In normal conditions as specified in section 5.4.1. emissions shall not exceed the maximum level specified in Table 9.1, Table 9.2, Table 9.3, and Table 9.4 for the appropriate Repeater maximum output power, in the frequency range from $\Delta f = 2,5$ MHz to $f_{\text{offset}_{\text{max}}}$ from the 5 MHz channel, where:

- Δf is the separation between the centre frequency of first or last 5 MHz channel used in the operating band and the nominal -3 dB point of the measuring filter closest to the carrier frequency.
- f_{offset} is the separation between the centre frequency of first or last 5 MHz channel in the operating band and the centre of the measuring filter.
- $f_{\text{offset}_{\text{max}}}$ is either 12,5 MHz or the offset to the UTRA band edge at both up- and down-link as defined in section [5.4.1](#), whichever is the greater.

If the operating band corresponds to three or more consecutive nominal 5 MHz channels, the requirement shall be met with any combination of two WCDMA modulated signals in the repeaters operating band.

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9.2 Spurious emissions

9.2.1 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 Repeater output port.

The requirements of either subclause 0 or subclause 0 shall apply whatever the type of Repeater considered (one or several operating bands). It applies for all configurations foreseen by the manufacturer's specification.

Either requirement applies at frequencies within the specified frequency ranges that are more than 12,5 MHz below the centre frequency of the first 5 MHz channel or more than 12,5 MHz above the centre frequency of the last 5 MHz channel in the operating band.

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

9.2.2 Minimum Requirements

[In normal conditions as specified in section 5.4.1 the following requirements shall be met.](#)

9.2.2.1 Spurious emission (Category A)

The following requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [4], are applied.

At maximum Repeater gain, with WCDMA signals in the operating band of the Repeater, at levels that produce the maximum rated output power per channel, the power of any spurious emission shall not exceed the limits specified in Table 9.9.

When the power in all channels is increased by 10 dB the requirements shall still be met.

The measurements shall apply both with or without an input signal applied.

NOTE 1: If the operating band corresponds to three or more consecutive nominal 5 MHz channels, the requirement shall be met with any combination of two WCDMA modulated signals in the repeaters operating band.

Table 9.9: Up-link and down-link: MandatoryGeneral spurious emissions limits, Category A

Band	Maximum level	Measurement Bandwidth	Note
9kHz – 150kHz	-13 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
150kHz – 30MHz		10 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
30MHz – 1GHz		100 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
1GHz – 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-8 [4], s2.6

9.2.2.2 Minimum requirement (Category B)

The following requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-8 [4], are applied.

At maximum Repeater gain, with WCDMA signals in the operating band of the Repeater, at levels that produce the maximum rated power output per channel, the power of any spurious emission shall not exceed the limits specified in Table 9.10 and Table 9.11 for the down- and up-link, respectively.

When the power in all channels is increased by 10 dB the requirements shall still be met.

The measurements shall apply both with or without an input signal applied.

NOTE 1: If the operating band corresponds to three or more consecutive nominal 5 MHz channels, the requirement shall be met with any combination of two WCDMA modulated signals in the repeaters operating band.

Table 9.10: Down-link: MandatoryGeneral spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz ↔ 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
150kHz ↔ 30MHz	-36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
30MHz ↔ 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
1GHz ↔ Fc1 - 60 MHz or 2100 MHz <i>whichever is the higher</i>	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
Fc1 – 60 MHz or 2100 MHz <i>whichever is the higher</i> ↔ Fc1 – 50 MHz or 2100 MHz <i>whichever is the higher</i>	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8 [4], s4.1
Fc1 – 50 MHz or 2100 MHz <i>whichever is the higher</i> ↔ Fc2 + 50 MHz or 2180 MHz <i>whichever is the lower</i>	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8 [4], s4.1
Fc2 + 50 MHz or 2180 MHz <i>whichever is the lower</i> ↔ Fc2 + 60 MHz or 2180 MHz <i>whichever is the lower</i>	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8 [4], s4.1
Fc2 + 60 MHz or 2180 MHz <i>whichever is the lower</i> ↔ 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1. Upper frequency as in ITU-R SM.329-8 [4], s2.6

Table 9.11: Up-link: GeneralMandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz ↔ 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
150kHz ↔ 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
30MHz ↔ 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
1GHz ↔ Fc1 - 60 MHz or 1910 MHz <i>whichever is the higher</i>	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1
Fc1 – 60 MHz or 1910 MHz <i>whichever is the higher</i> ↔ Fc1 – 50 MHz or 1910 MHz <i>whichever is the higher</i>	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8 [4], s4.1
Fc1 – 50 MHz or 1910 MHz <i>whichever is the higher</i> ↔ Fc2 + 50 MHz or 1990 MHz <i>whichever is the lower</i>	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8 [4], s4.1
Fc2 + 50 MHz or 1990 MHz <i>whichever is the lower</i> ↔ Fc2 + 60 MHz or 1990 MHz <i>whichever is the lower</i>	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8 [4], s4.1
Fc2 + 60 MHz or 1990 MHz <i>whichever is the lower</i> ↔ 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8 [4], s4.1. Upper frequency as in ITU-R SM.329-8 [4], s2.6

Fc1: Centre frequency of emission of the first 5 MHz channel in an operating band.

Fc2: Centre frequency of emission of the last 5 MHz channel in an operating band.

9.2.2.3.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 9.812: UTRA Repeater Spurious emissions limits for protection of co-located UTRA FDD BS receiver

Band	Maximum Level	Measurement Bandwidth	Note
1920 - 1980MHz For operation in Frequency Bands defined in sub-clause 54.2(a)	-96 dBm	100 kHz	
1850-1910 MHz For operation in Frequency Bands defined in sub-clause 54.2(b)	-96 dBm	100kHz	

9.2.2.4.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 9.913: UTRA Repeater Spurious emissions limits in geographic coverage area of GSM 900 MS receiver

9.2.2.4.2.1 Minimum requirement

The power of any spurious emission shall not exceed:

Table 9.4014: UTRA Repeater Spurious emissions limits for Repeater co-located with GSM 900 BTS receiver

9.2.2.5.1.1 Minimum requirement

The power of any spurious emission shall not exceed:

Table 9.4115: UTRA Repeater Spurious emissions limits in geographic coverage area of DCS 1800 MS receiver

9.2.2.5.2.1 Minimum requirement

The power of any spurious emission shall not exceed:

Table 9.4216: UTRA Repeater Spurious emissions limits for Repeater co-located with DCS 1800 BTS

9.2.2.6.1 Minimum requirement

The power of any spurious emission shall not exceed:

Table 9.4317: UTRA Repeater Spurious emissions limits for in geographic coverage area of PHS

9.2.2.7.1.1 Minimum requirement

The power of any spurious emission shall not exceed:

Table 9.4418: UTRA Repeater Spurious emissions limits in geographic coverage area of UTRA-TDD

9.2.2.7.2.1 Minimum requirement

The power of any spurious emission shall not exceed:

Table 9.4519: UTRA Repeater Spurious emissions limits for protection of co-located UTRA TDD BS receiver

11.2.1 **MandatoryGeneral** requirement

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.1 : General input intermodulation requirement

f_offset	Interfering Signal Levels	Type of signals	Measurement bandwidth
3,5 MHz	-40 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.1, the power in the operating band shall not increase by more than 10 dB at the output of the Repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

11.4 Method of test

11.4.1 Initial conditions

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

~~2.~~ Set the Repeater to maximum gain.

~~3.~~ Connect two signal generators with a combining circuit or one signal generator with the ability to generate several ew-CW carriers to the input. Set averaging to 1 second.

~~4.~~ Connect a spectrum analyser to the output of the Repeater. Set the resolution bandwidth to 1 MHz in the centre of the operating band.

11.4.2 Procedure

- Adjust the frequency of the input signals, either below or above the operating band, so that the lowest order intermodulation product is positioned in the centre of the operating band, according to ~~section-subclause~~ 11.2.
- Take the measurement of the rise of the output signal.
- Repeat the measurement for the opposite path of the Repeater.

11.5.1 General requirement

In normal conditions as specified in section 5.4.1 the intermodulation performance should be met when the following signals are applied to the Repeater:

Table 11.3: General input intermodulation requirement

f_offset	Interfering Signal Levels	Type of signals	Measurement bandwidth
3,5 MHz	-40 dBm	2 CW carriers	1 MHz

For the parameters specified in table 11.3, the power in the operating band shall not increase by more than 11,2 dB at the output of the Repeater as measured in the centre of the operating band, compared to the level obtained without interfering signals applied.

A.8 Input intermodulation

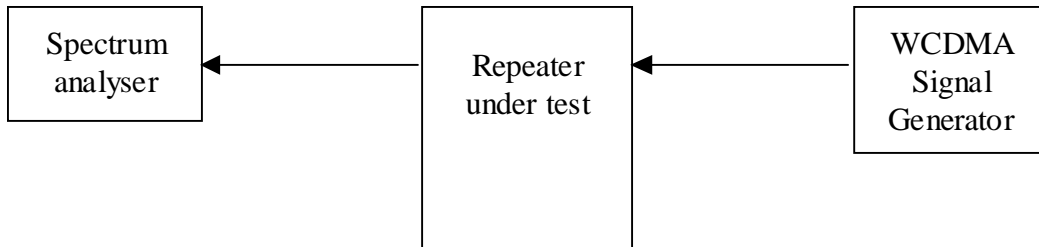


Figure A.8: Measuring system set-up for input intermodulation.

Annex B (informative): Derivation of Test Requirements

The Test Requirements in this specification have been calculated by relaxing the Minimum Requirements of the core specification using the Test Tolerances defined in subclause 5.2. When the Test Tolerance is zero, the Test Requirement will be the same as the Minimum Requirement. When the Test Tolerance is non-zero, the Test Requirements will differ from the Minimum Requirements, and the formula used for this relaxation is given in table B.1.

Table B.1: Derivation of Test Requirements

Clause number	Title	Minimum Requirement in TS 25.106	Test Tolerance (TT)	Test Requirement in TS 25.143
6.1	Maximum output power	In normal conditions Table 6.1	0,7 dB	Formula: Upper limit + TT Lower limit - TT In normal conditions refer to Table 6.3
		In extreme conditions Table 6.2		In extreme conditions refer to Table 6.4
9.1	Spectrum emission mask	Tables 9.1, 9.2, 9.3 and 9.4: "Maximum level" = X dB	{1,5} dB	Formula: Maximum level + TT Refer to tables 9.5, 9.6, 9.7 and 9.8
7	Frequency stability	7.1 minimum requirement	12 Hz	Formula: Relative error + TT Refer to 7.5 Test requirements
8	Out of Band Gain	Table 8.1: Out of band gain limits	{0,5} dB	Formula: Maximum level + TT Refer to table 8.2
9.2	Spurious emissions	Tables 9.5, to 9.15	{0 dB}	
10.1	Error Vector Magnitude	10.1.1 Minimum requirement	{0} %	Formula: RSS Stimulus EVM and Repeater EVM to get target EVM Refer to 10.1.5 Test requirements
10.2	Peak code domain error	10.2.1 Minimum requirement	{1,1 dB}	Formula: Maximum error + TT Refer to 10.2.5 Test requirements

Annex C (informative): Acceptable uncertainty of Test Equipment

This informative annex specifies the critical parameters of the components of an overall Test System (e.g. signal generators, signal analysers etc.) which are necessary when assembling a Test System which complies with subclause 5.1 Acceptable uncertainty of Test System. These Test Equipment parameters are fundamental to the accuracy of the overall Test System and are unlikely to be improved upon through System Calibration.

Table C.1: Equipment accuracy

Test	Equipment accuracy	Test condition
6.1 Maximum output power	Not critical	
9.1 Spectrum emission mask	Not critical	
9.2 Spurious emissions	Not critical	
11 Input intermodulation (interferer requirement)	Not critical	
7 Frequency error	$\pm 10 \text{ Hz} + \text{timebase} = \pm 12 \text{ Hz}$	Range 0 to 500 Hz. (This is to allow for UE range that at 0,1 PPM is larger than BTS).
10.1 Error vector magnitude	$\pm 2,5 \%$ (for single code)	P_Max-3 to P_Max – 18 dB Applies for reading from 10% to 25%.
10.2 Peak code domain error		
8 Out of band gain		
11 Input intermodulation Characteristics		

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

CR-Form-v4

CHANGE REQUEST

⌘ **25.143 CR 3** ⌘ ev **-** ⌘ Current version: **4.1.0** ⌘

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

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

Title:	⌘ Editorial changes: Add lost drawings, spelling corrections	
Source:	⌘ RAN WG4	
Work item code:	⌘ RInImp-REP	Date: ⌘ 20.08.2001
Category:	⌘ F Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Release: ⌘ Rel-4 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

Reason for change:	⌘ Editorial corrections required: From Gothenborg R4-010726.doc to the new version of the TS25.143 v4.1.0 after Gothenborg some boxes in the drawing of the appendix disappeared. Spelling corrections.
Summary of change:	⌘ Correction of the drawings in the appendix and spelling improved.
Consequences if not approved:	⌘ Drawings are not complete. Spelling is wrong.

Clauses affected:	⌘ 3.3, 5.1.2, 11.4.2, Annex 3, Annex 4, Annex 5, Annex B, Annex C,
Other specs affected:	⌘ <input type="checkbox"/> Other core specifications ⌘ <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications
Other comments:	⌘

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- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://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.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

BTS	Base Transceiver Station
CW	Continuous Wave (unmodulated signal)

5.1.2 Measurements of Repeater

Table 5.1: Maximum Test System Uncertainty

Subclause	Maximum Test System Uncertainty	Range over which Test System Uncertainty Applies
.....		
11 Input intermodulation Characteristics	$\pm 1,2$ dB Formula: RSS CW1 level error, 2 x CW2 level error, and measurement error (using all errors = $\pm 0,5$ dB)	

11.4.2 Procedure

1. Adjust the frequency of the input signals, either below or above the operating band, so that the lowest order intermodulation product is positioned in the centre of the operating band, according to subclause 11.2.

A.3 Out of band gain

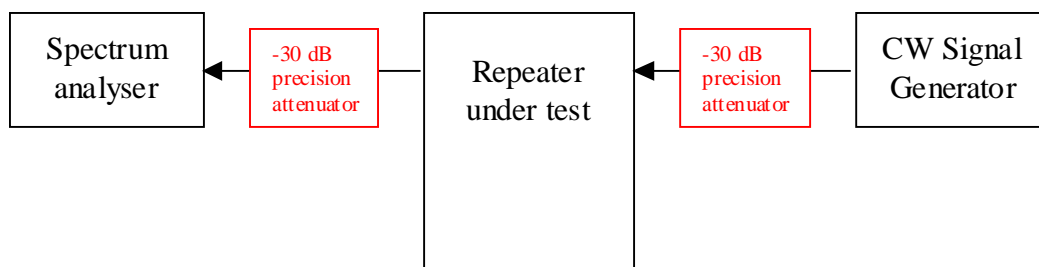


Figure A.1: Measuring system set-up for out of band gain.

A.4 Unwanted emission: Spectrum emission mask

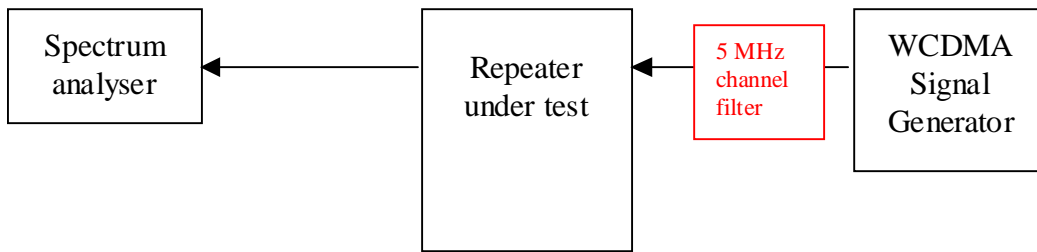


Figure A.2: Measuring system Set-up for unwanted emission: spectrum emission mask.

Note that a repeater is a bi-directional device. The signal generator may need protection.

A.5 Unwanted emission: Spurious emission

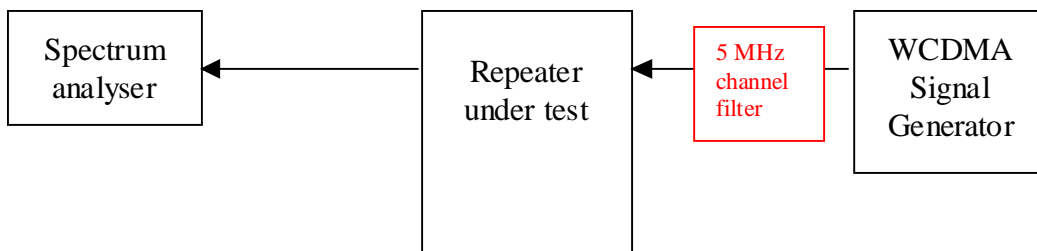


Figure A.3: Measuring system set-up for unwanted emission: spurious emission.

Note that a repeater is a bi-directional device. The signal generator may need protection.

Table B.1: Derivation of Test Requirements

Clause number	Title	Minimum Requirement in TS 25.106	Test Tolerance (TT)	Test Requirement in TS 25.143
6.1	Maximum output power	In normal conditions Table 6.1	0,7 dB	Formula: Upper limit + TT Lower limit - TT
		In extreme conditions Table 6.2		In normal conditions refer to Table 6.3 In extreme conditions refer to Table 6.4

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10.1	Error Vector Magnitude	10.1.1 Minimum requirement	0 %	Formula: RSS Stimulus EVM and Repeater EVM to get target EVM Refer to 10.1.5 Test requirements
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Annex C (informative): Acceptable uncertainty of Test Equipment

This informative annex specifies the critical parameters of the components of an overall Test System (e.g. signal generators, signal analysers etc.) which are necessary when assembling a Test System which complies with subclause 5.1 Acceptable uncertainty of Test System. These Test Equipment parameters are fundamental to the accuracy of the overall Test System and are unlikely to be improved upon through System Calibration.

CHANGE REQUEST

⌘ **25.143 CR 4** ⌘ ev **-** ⌘ Current version: **4.1.0** ⌘

For [HELP](#) on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

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

Title:	⌘ Clarification in Spectrum emission mask section		
Source:	⌘ RAN WG4		
Work item code:	⌘ RInImp-REP	Date:	⌘ 04.09.2001
Category:	⌘ F	Release:	⌘ Rel-4
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2 (GSM Phase 2)	
	A (corresponds to a correction in an earlier release)	R96 (Release 1996)	
	B (addition of feature),	R97 (Release 1997)	
	C (functional modification of feature)	R98 (Release 1998)	
	D (editorial modification)	R99 (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		REL-4 (Release 4)
			REL-5 (Release 5)

Reason for change:	⌘ Undefined terms (f_offset and Δf) in section 9.1.2.
Summary of change:	⌘ Addition of definition of missing terms. Correction of mask boundary equations
Consequences if not approved:	⌘ Misunderstanding of spectrum emission mask requirements.

Clauses affected:	⌘ 9.1.2	
Other specs affected:	⌘ <input checked="" type="checkbox"/> Other core specifications	⌘ TS 25.106
	<input type="checkbox"/> Test specifications	
	<input type="checkbox"/> 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.

9 Unwanted emission

9.1 Spectrum emission mask

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 for the transmitter.

NOTE: This subclause may be mandatory in certain regions. In other regions this mask may not be applied.

9.1.1 Definitions and applicability

The masks defined in Table 9.1, Table 9.2, Table 9.3, and Table 9.4 below may be mandatory in certain regions. In other regions this mask may not be applied.

9.1.2 Minimum Requirements

For regions where this clause applies, the requirement shall be met by a repeater's RF-signal output at maximum gain with WCDMA signals in the operating band of the Repeater, at levels that produce the maximum rated output power per channel. In normal conditions as specified in section 5.4.1 emissions shall not exceed the maximum level specified in Table 9.1, Table 9.2, Table 9.3, and Table 9.4 for the appropriate Repeater maximum output power, in the frequency range from $\Delta f = 2,5$ MHz to $f_{\text{offset}_{\text{max}}}\Delta f_{\text{max}}$ from the 5 MHz channel, where:

- Δf is the separation between the centre frequency of first or last 5 MHz channel used in the operating band and the nominal -3 dB point of the measuring filter closest to the carrier frequency.
- f_{offset} is the separation between the centre frequency of first or last 5 MHz channel in the operating band and the centre of the measuring filter.
- $f_{\text{offset}_{\text{max}}}$ is either 12,5 MHz or the offset to the UTRA band edge at both up- and down-link as defined in section 5.1, whichever is the greater.

- Δf_{max} is equal to $f_{\text{offset}_{\text{max}}}$ minus half of the bandwidth of the measurement filter.

If the operating band corresponds to three or more consecutive nominal 5 MHz channels, the requirement shall be met with any combination of two WCDMA modulated signals in the repeaters operating band.

Table 9.1: Spectrum emission mask values, maximum output power $P \geq 43$ dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Maximum level	Measurement bandwidth
$2,5 \leq \Delta f < 2,7$ MHz	$2,515\text{MHz} \leq f_{\text{offset}} < 2,715\text{MHz}$	-14 dBm	30 kHz
$2,7 \leq \Delta f < 3,5$ MHz	$2,715\text{MHz} \leq f_{\text{offset}} < 3,515\text{MHz}$	$-14 - 15 \cdot (f_{\text{offset}} - 2,715)$ dBm	30 kHz
	$3,515\text{MHz} \leq f_{\text{offset}} < 4,0\text{MHz}$	-26 dBm	30 kHz
$3,5 \leq \Delta f < 7,5$ MHz	$4,0 \text{ MHz} \leq f_{\text{offset}} < 8,0\text{MHz}$	-13 dBm	1 MHz
$7,5 \leq \Delta f$ MHz	$8,0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 dBm	1 MHz

Table 9.2: Spectrum emission mask values, maximum output power $39 \leq P < 43$ dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Maximum level	Measurement bandwidth
$2,5 \leq \Delta f < 2,7$ MHz	$2,515\text{MHz} \leq f_{\text{offset}} < 2,715\text{MHz}$	-14 dBm	30 kHz
$2,7 \leq \Delta f < 3,5$ MHz	$2,715\text{MHz} \leq f_{\text{offset}} < 3,515\text{MHz}$	$-14 - 15 \cdot (f_{\text{offset}} - 2,715)$ dBm	30 kHz
	$3,515\text{MHz} \leq f_{\text{offset}} < 4,0\text{MHz}$	-26 dBm	30 kHz
$3,5 \leq \Delta f < 7,5$ MHz	$4,0 \text{ MHz} \leq f_{\text{offset}} < 8,0\text{MHz}$	-13 dBm	1 MHz
$7,5 \leq \Delta f$ MHz	$8,0\text{MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 56$ dBm	1 MHz

Table 9.3: Spectrum emission mask values, maximum output power $31 \leq P < 39$ dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Maximum level	Measurement bandwidth
$2,5 \leq \Delta f < 2,7$ MHz	$2,515\text{MHz} \leq f_{\text{offset}} < 2,715\text{MHz}$	$P - 53$ dBm	30 kHz
$2,7 \leq \Delta f < 3,5$ MHz	$2,715\text{MHz} \leq f_{\text{offset}} < 3,515\text{MHz}$	$P - 53 - 15 \cdot (f_{\text{offset}} - 2,715)$ dBm	30 kHz
	$3,515\text{MHz} \leq f_{\text{offset}} < 4,0\text{MHz}$	$P - 65$ dBm	30 kHz
$3,5 \leq \Delta f < 7,5$ MHz	$4,0 \text{ MHz} \leq f_{\text{offset}} < 8,0\text{MHz}$	$P - 52$ dBm	1 MHz
$7,5 \leq \Delta f$ MHz	$8,0\text{MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 56$ dBm	1 MHz

Table 9.4: Spectrum emission mask values, 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
$2,5 \leq \Delta f < 2,7$ MHz	$2,515\text{MHz} \leq f_{\text{offset}} < 2,715\text{MHz}$	-22 dBm	30 kHz
$2,7 \leq \Delta f < 3,5$ MHz	$2,715\text{MHz} \leq f_{\text{offset}} < 3,515\text{MHz}$	$-22 - 15 \cdot (f_{\text{offset}} - 2,715)$ dBm	30 kHz
	$3,515\text{MHz} \leq f_{\text{offset}} < 4,0\text{MHz}$	-34 dBm	30 kHz
$3,5 \leq \Delta f < 7,5$ MHz	$4,0 \text{ MHz} \leq f_{\text{offset}} < 8,0\text{MHz}$	-21 dBm	1 MHz
$7,5 \leq \Delta f$ MHz	$8,0\text{MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-25 dBm	1 MHz