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

RP-010366

Title:　　　**Agreed CRs (Release 4) to TS 25.142**

Source:　　　**TSG-RAN WG4**

Agenda item:　8.4.4

WG4 doc	Status WG4	Spec	CR	Phase	Title	Cat	V old	V new
R4-010508	agreed	25.142	59	Rel-4	clarification of transmit intermodulation requirements	F	4.0.0	4.1.0
R4-010507	agreed	25.142	60	Rel-4	CR on subclause 6.6.3 "Spurious emissions"	F	4.0.0	4.1.0
R4-010803	agreed	25.142	63	Rel-4	Application of blocking requirement for 1.28 Mcps	F	4.0.0	4.1.0
R4-010812	agreed	25.142	64	Rel-4	BS EVM definition correction	F	4.0.0	4.1.0

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CHANGE REQUEST

⌘   **25.142 CR 59**   ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

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

Title: ⌘	Clarification of transmit intermodulation requirements	
Source: ⌘	RAN WG4	
Work item code: ⌘	TEI4	***Date:*** ⌘ 21 May 2001

Category: ⌘ **F**	***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: ⌘	Alignment with the corresponding core specification TS 25.105.
Summary of change: ⌘	The frequencies of the interference signals are defined separately for the 3,84 Mcps TDD option and the 1,28 Mcps TDD option.
Consequences if not approved: ⌘	Divergence of the conformance specification from the corresponding core specification.

Clauses affected: ⌘	6.7.1, 6.7.1.1, 6.7.1.2

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

Other comments: ⌘	

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6.7 Transmit intermodulation

6.7.1 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 CDMA modulated interference signal is injected into the antenna connector at a level of 30 dB lower than that of the subject signal.

6.7.1.1 3,84 Mcps TDD option

~~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 CDMA modulated interference signal is injected into the antenna connector at a level of 30 dB lower than that of the subject signal.~~ The frequency of the interference signal shall be ±5 MHz, ±10 MHz and ±15 MHz offset from the subject signal.

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

6.7.1.2 1,28 Mcps TDD option

~~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 CDMA modulated interference signal is injected into the antenna connector at a level of 30 dB lower than that of the subject signal.~~ The frequency of the interference signal shall be ±1,6 MHz, ±3,2 MHz and ±4,8 MHz offset from the subject signal.

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

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CHANGE REQUEST

⌘   **25.142** CR **60**   ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

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

Title: ⌘	Correction of Spurious emissions requirements	
Source: ⌘	RAN WG4	
Work item code: ⌘	TEI4	***Date:*** ⌘ 21 May 2001

Category: ⌘	**F**	***Release:*** ⌘ REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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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: ⌘	Alignment of spurious emissions requirements with the corresponding core specification TS 25.105.
Summary of change: ⌘	References to ITU-R SM.329-7 changed to ITU-R SM.329-8. Change of the upper frequency limit for spurious emissions measurements, Category B, from 12,5 GHz to 12,75 GHz. Splitting of the section on Category A limits into individual subclauses for the 3,84 Mcps TDD option and the 1,28 Mcps option. Introduction of definitions on the frequency range where the requirements apply.
Consequences if not approved: ⌘	Divergence of the version number of Recommendation ITU-R SM.329 referenced in the conformance specification from the corresponding core specification; may lead to difficulties with regional radio equipment regulation procedures.

Clauses affected: ⌘	6.6.3.1, 6.6.3.2.1.1.1 (new), 6.6.3.2.1.1.2 (new), 6.6.3.2.1.2.1, 6.6.3.2.1.2.2
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

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6.6.3   Spurious emissions

6.6.3.1   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.

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

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

6.6.3.2   Minimum Requirements

6.6.3.2.1   Mandatory requirements

The requirements of either subclause 6.6.3.2.1.1 or subclause 6.6.3.2.1.2 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer.

6.6.3.2.1.1   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 SM.329-8 [6], are applied.

6.6.3.2.1.1.1   3,84 Mcps TDD option

Either 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 power of any spurious emission shall not exceed the maximum level given in Table 6.29.

Table 6.29: BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement bandwidth	Note
9 kHz – 150 kHz	-13 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, s4.1
150 kHz – 30 MHz		10 kHz	Bandwidth as in ITU-R SM.329-8, s4.1
30 MHz – 1 GHz		100 kHz	Bandwidth as in ITU-R SM.329-8, s4.1
1 GHz – 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-8, s2.5 table 1

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.3.1.1.1.1.

6.6.3.2.1.1.2   1,28 Mcps TDD option

Either requirement applies at frequencies within the specified frequency ranges which are more than 4 MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.

The power of any spurious emission shall not exceed the maximum level given in Table 6.29A.

Table 6.29A: BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement bandwidth	Note
9 kHz – 150 kHz	-13 dBm	1 kHz	Bandwidth as in ITU-R SM.329-8, s4.1
150 kHz – 30 MHz		10 kHz	Bandwidth as in ITU-R SM.329-8, s4.1
30 MHz – 1 GHz		100 kHz	Bandwidth as in ITU-R SM.329-8, s4.1
1 GHz – 12,75 GHz		1 MHz	Upper frequency as in ITU-R SM.329-8, s2.5 table 1

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.3.1.1.1.2.

6.6.3.2.1.2   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 SM.329-8 [6], are applied.

6.6.3.2.1.2.1   3,84 Mcps TDD option

Either 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 power of any spurious emission shall not exceed the maximum levels given in Table 6.30.

Table 6.30: 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, s4.1
150 kHz – 30 MHz	-36 dBm	10 kHz	Bandwidth as in ITU-R SM.329-8, s4.1
30 MHz – 1 GHz	-36 dBm	100 kHz	Bandwidth as in ITU-R SM.329-8, s4.1
1 GHz – Fc1 - 60 MHz or Fl - 10 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, s4.1
Fc1 - 60 MHz or Fl - 10 MHz *whichever is the higher* – Fc1 - 50 MHz or Fl -10 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7
Fc1 - 50 MHz or Fl -10 MHz *whichever is the higher* – Fc2 + 50 MHz or Fu +10 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7
Fc2 + 50 MHz or Fu + 10 MHz *whichever is the lower* – Fc2 + 60 MHz or Fu + 10 MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-8, s4.3 and Annex 7
Fc2 + 60 MHz or Fu + 10 MHz *whichever is the lower* – 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-8, s4.1. Upper frequency as in ITU-R SM.329-8, s2.5 table 1

Fc1: Center frequency of emission of the first carrier transmitted by the BS

Fc2: Center frequency of emission of the last carrier transmitted by the BS

Fl : Lower frequency of the band in which TDD operates

Fu : Upper frequency of the band in which TDD operates

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.3.1.2.1.1.

6.6.3.2.1.2.2   1,28 Mcps TDD option

Either requirement applies at frequencies within the specified frequency ranges which are more than 4 MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.

The power of any spurious emission shall not exceed the maximum levels given in Table 6.30A.

Table 6.30A: BS Mandatory spurious emissions limits, Category B for 1,28 Mcps TDD

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	-36 dBm	1 kHz	Bandwidth as in ITU SM.329-87, s4.1
150kHz – 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU SM.329-87, s4.1
30MHz – 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU SM.329-87, s4.1
1GHz ↔ Fc1-19.2 MHz or Fl –3.2 MHz *whichever is the higher*	-30 dBm	1 MHz	Bandwidth as in ITU SM.329-87, s4.1
Fc1 – 19.2 MHz or Fl - 3.2MHz *whichever is the higher* ↔ Fc1 - 16 MHz or Fl –3.2 MHz *whichever is the higher*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-87, s4.1
Fc1 - 16 MHz or Fl –3.2 MHz *whichever is the higher* ↔ Fc2 + 16 MHz or Fu +3.2 MHz *whichever is the lower*	-15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-87, s4.1
Fc2 + 16 MHz or Fu + 3.2MHz *whichever is the lower* ↔ Fc2 +19.2 MHz or Fu + 3.2MHz *whichever is the lower*	-25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-87, s4.1
Fc2 + 19.2 MHz or Fu +3.2 MHz *whichever is the lower* ↔ 12,75 GHz	-30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-87, s4.1. Upper frequency as in ITU-R SM.329-87, s2.56 table 1

Fc1: Center frequency of emission of the first carrier transmitted by the BS

Fc2: Center frequency of emission of the last carrier transmitted by the BS

Fl : Lower frequency of the band in which TDD operates

Fu : Upper frequency of the band in which TDD operates

The reference for this requirement is TS 25.105 subclause 6.6.3.1.2.1.2.

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CHANGE REQUEST

| ⌘ | **25.142** CR **63** | ⌘ | ⌘ev | **-** | ⌘ | Current version: | **4.0.0** | ⌘ |

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

Title: ⌘	Application of blocking requirement for 1.28 Mcps TDD	
Source: ⌘	RAN WG4	
Work item code: ⌘	LCRTDD-RF	***Date:*** ⌘ 22.05.2001

Category: ⌘	**F**	***Release:*** ⌘ REL-4

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F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
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Use <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: ⌘	It is not clear in the spec which part of the blocking requirement is mandatory and which one is an optional (regional) requirement. Missing blocking requirements in case of co-location with GSM/DCS for 1.28 Mcps TDD option.
Summary of change: ⌘	1. Introduction is made neutral and the common part (1.28 Mcps TDD option.) of the blocking characteristics is made mandatory. 2. Creation of "General Requirements" section Addition of blocking requirements in case of co-location with GSM/DCS for 1.28 Mcps TDD option.The co-location band with GSM900 is also modified to include R-GSM band.
Consequences if not approved: ⌘	The specification may be incorrectly applied and it may lead to performance degradation for R-GSM.

Clauses affected: ⌘	7.5.1.2 (NEW SECTIONS) 7.5.2.2.1 and 7.5.2.2.2
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

7.5.1.2   1,28 Mcps TDD option

The blocking characteristics is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels. The blocking performance requirement shall apply at all frequencies as applies to interfering signals with center frequency within the ranges specified in tables 7.6A, 7.7A or 7.8A, 7.9A and 7.10A respectively, using a 1 MHz step size.

The requirements in Table 7.6A, 7.7A or 7.8A apply to base stations intended for general-purpose applications, depending on which frequency band is used. The additional requirements in Tables 7.9A and 7.10A may be applied for the protection of TDD BS receivers when GSM900 and/or DCS1800 BTS are co-located with UTRA TDD BS.

NEXT CHANGED SECTION

7.5.2.2 1,28 Mcps TDD option

7.5.2.2.1 General requirements

The static reference performance as specified in clause 7.2 ~~should~~ shall be met with a wanted and an interfering signal coupled to the BS antenna input using the parameters specified in tables 7.6A,7.7A or 7.8A, respectively.

Table 7.6A: Blocking requirements for operating bands defined in subclause 4.2 a) for 1,28 Mcps TDD

Center frequency of interfering signal	Interfering signal level	Wanted signal level	Minimum offset of interfering signal	Type of interfering signal
1900 – 1920 MHz, 2010 – 2025 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28 Mcps TDD signal with one code
1880 – 1900 MHz, 1990 – 2010 MHz, 2025 – 2045 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28 Mcps TDD signal with one code
1920 – 1980 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28 Mcps TDD signal with one code
1 - 1880 MHz, 1980 – 1990 MHz, 2045 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 7.7A: Blocking requirements for operating bands defined in subclause 4.2 b)for 1,28 Mcps TDD

Center frequency of interfering signal	Interfering signal level	Wanted signal level	Minimum offset of interfering signal	Type of interfering signal
1850 – 1990 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28 Mcps TDD signal with one code
1830 – 1850 MHz, 1990 – 2010 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28 Mcps TDD signal with one code
1 – 1830 MHz, 2010 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 7.8A: Blocking requirements for operating bands defined in subclause 4.2 c)for 1,28 Mcps TDD

Center frequency of interfering signal	Interfering signal level	Wanted signal level	Minimum offset of interfering signal	Type of interfering signal
1910 – 1930 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28 Mcps TDD signal with one code
1890 – 1910 MHz, 1930 – 1950 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	1,28 Mcps TDD signal with one code
1 – 1890 MHz, 1950 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

The normative reference for this requirement is TS 25.105 [1] subclause 7.5.

7.5.2.2.2 Co-location with GSM900 and/or DCS 1800

This additional blocking requirement may be applied for the protection of TDD BS receivers when GSM900 and/or DCS1800 BTS are co-located with UTRA TDD BS.

The blocking performance requirement applies to interfering signals with center frequency within the ranges specified in the tables below, using a 1MHz step size.

In case this additional blocking requirement is applied, the static reference performance as specified in clause 7.2.1 shall be met with a wanted and an interfering signal coupled to BS antenna input using the following parameters.

Table 7.9A: Additional blocking requirements for operating bands defined in 4.2(a) when co-located with GSM900

Centre Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
921 – 960 MHz	+16 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 7.10A: Additional blocking requirements for operating bands defined in 4.2(a) 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	+16 dBm	<REFSENS> + 6 dB	—	CW carrier

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CHANGE REQUEST

⌘	**25.142** CR **64**	⌘ ev **-** ⌘	Current version:	**4.0.0**	⌘

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

Title:	⌘	BS EVM definition correction

Source:	⌘	RAN WG4

Work item code: ⌘	TEI4	**Date:** ⌘	22.05.2001

Category:	⌘	**F**	**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)*
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Use one of the following releases:
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R98   *(Release 1998)*
R99   *(Release 1999)*
REL-4   *(Release 4)*
REL-5   *(Release 5)*

Reason for change: ⌘	Current definition of EVM does not take into account 1.28 Mcps TDD option.

Summary of change: ⌘	The definition is corrected to take into account both modes.

Consequences if not approved:	⌘	Ambiguity and errors in the EVM definition may lead to non-consistent measurement results.

Clauses affected:	⌘	6.8.1.1

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

Other comments:	⌘	

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6.8 Transmit Modulation

6.8.1 Modulation accuracy

6.8.1.1 Definition and applicability

The Error Vector Magnitude is a measure of the difference between the reference waveform and the measured waveform. This difference is called the error vector. Both waveforms pass through a matched Root Raised Cosine filter with bandwidth 3,84 MHz corresponding to the considered chip rate and roll-off α =0,22. Both waveforms are then further modified by selecting the frequency, absolute phase, absolute amplitude and chip clock timing so as to minimise the error vector. The EVM result is defined as the square root of the ratio of the mean error vector power to the mean reference power expressed as a %. The measurement interval is one timeslot. The requirement is valid over the total power dynamic range as specified in 25.105 subclause 6.4.3. See Annex C of this specification for further details.

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

NOTE: The theoretical modulated waveform shall be calculated on the basis that the transmit pulse shaping filter is a root-raised cosine (RRC) with roll-off α =0,22 in the frequency domain. The impulse response of the chip impulse filter $RC_0(t)$ is

$$RC_0(t) = \frac{\sin\left(\pi \frac{t}{T_C}(1-\alpha)\right) + 4\alpha \frac{t}{T_C}\cos\left(\pi \frac{t}{T_C}(1+\alpha)\right)}{\pi \frac{t}{T_C}\left(1 - \left(4\alpha \frac{t}{T_C}\right)^2\right)}$$

Where the roll-off factor $\alpha = 0,22$ and T_C is the chip duration