TSG RAN Meeting #18 **RP-020802**
New Orleans, US, 3 - 6 December, 2002

Title **CRs (Rel-6) for WI "FDD BS Classification"**
Source **TSG RAN WG4**
Agenda Item **8.1.2**

RAN4 Tdoc	Spec	CR	R	Cat	Rel	Curr Ver	Title	Work Item
R4-021694	25.104	148	1	B	Rel-6	5.4.0	Introduction of Base Station Classes	RInImp-BSClass-FDD
R4-021432	25.133	474		B	Rel-6	5.4.0	RRM requirement changes for FDD Base Station Classification	RInImp-BSClass-FDD
R4-021497	25.133	497		B	Rel-6	5.4.0	Changes in TS25.133 according to FDD Local area BS	RInImp-BSClass-FDD
R4-021695	25.141	249	1	B	Rel-6	5.4.0	Introduction of Base Station Classes	RInImp-BSClass-FDD
R4-021495	25.942	010		B	Rel-6	5.1.0	Blocking scenarios for Medium Range BS in FDD mode	RInImp-BSClass-FDD

3GPP TSG RAN WG4 (Radio) Meeting #25 **R4-021694**

Secaucus, NJ, USA 11 - 15 November, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.104** **CR** **148** ⌘ **rev** **1** ⌘ Current version: **5.4.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of Base Station Classes
Source:	⌘	RAN WG4
Work item code:	⌘	RInImp-BSClass-FDD
Date:	⌘	26/11/2002
Category:	⌘	**B**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The introduction of Medium Range and Local Area base station classes gives a new set of requirements for a set of requirements. The reason is the lower assumed Minimum Couplin Loss for operation of the new classes of BS.
Summary of change:	⌘	The BS classes are described in the introduction and Tables with requirments for the new BS classes are introduced for Frequency error, Reference sensitivity level, Adjacent Channel Selectivity, Blocking and Intermodulation. Multipath fading Case 4 is modified to cover only Wide Area BS.
Consequences if not approved:	⌘	

Clauses affected:	⌘	4.2, 6.3, 7.2, 7.3, 7.4, 7.5, 7.6			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘ CR 249 for TS 25.141
		X		Test specifications	
			X	O&M Specifications	
Other comments:	⌘	This CR is not complete since some values for Local Area BS are missing. The main purpose is to propose a structure for introduction of BS classes.			

4.2 Base station classes

The requirements in this specification apply to Wide Area Base Stations, Medium Range Base Stations and Local Area Base Stations unless otherwise statedbase station intended for general purpose applications.

Wide Area Base Stations are characterised by requirements derived from scenarios with a BS to UE minimum coupling loss equal to 70 dB. The Wide Area Base Station class has the same requirements as the base station for General Purpose application in Release 99, 4 and 5.

Medium Range Base Stations are characterised by requirements derived from scenarios with a BS to UE minimum coupling loss equal to 53 dB.

Local Area Base Stations are characterised by requirements derived from scenarios with a BS to UE minimum coupling loss equal to 45 dB.

In the future further classes of base stations may be defined; the requirements for these may be different than for general purpose applications.

6.3 Frequency error

The same source shall be used for RF frequency and data clock generation.

6.3.1 Minimum requirement

The modulated carrier frequency of the BS shall be accurate to within the accuracy range given in Table 6.0~~± 0.05 ppm~~ observed over a period of one timeslot.

Table 6.0: Frequency error minimum requirement

BS class	Accuracy
Wide Area BS	±0.05 ppm
Medium Range BS	±0.1 ppm
Local Area BS	±0.1 ppm

7.2 Reference sensitivity level

The reference sensitivity level is the minimum mean power received at the antenna connector at which the Bit Error Ratio (BER) shall not exceed the specific value indicated in section 7.2.1.

7.2.1 Minimum requirement

Using the reference measurement channel specification in Annex A, the reference sensitivity level and performance of the BS shall be as specified in Table 7.1.

Table 7.1: BS reference sensitivity levels

BS Class	Reference measurement channel data rate	BS reference sensitivity level (dBm)	BER
Wide Area BS	12.2 kbps	-121	BER shall not exceed 0.001
Medium Range BS	12.2 kbps	-111	BER shall not exceed 0.001
Local Area BS	12.2 kbps	-107	BER shall not exceed 0.001

7.3 Dynamic range

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.

7.3.1 Minimum requirement

The BER shall not exceed 0.001 for the parameters specified in Table 7.2.

Table 7.2: Dynamic range

Parameter	Level Wide Area BS	Level Medium Range BS	Level Local Area BS	Unit
Reference measurement channel data rate	12.2	12.2	12.2	kbps
Wanted signal mean power	-91	-81	-77	dBm
Interfering AWGN signal	-73	-63	-59	dBm/3.84 MHz

7.4 Adjacent Channel Selectivity (ACS)

Adjacent channel selectivity (ACS) is a measure of the receiver ability to receive a wanted signal at is assigned channel frequency in the presence of a single code W-CDMA modulated adjacent channel signal at a given frequency offset from the center frequency of the assigned channel. ACS is the ratio of the receiver filter attenuation on the assigned channel frequency to the receiver filter attenuation on the adjacent channel(s).

7.4.1 Minimum requirement

The BER shall not exceed 0.001 for the parameters specified in Table 7.3.

Table 7.3: Adjacent channel selectivity

Parameter	Level Wide Area BS	Level Medium Range BS	Level Local Area BS	Unit
Data rate	12.2	12.2	12.2	kbps
Wanted signal mean power	-115	-105	-101	dBm
Interfering signal mean power	-52	-42	-38	dBm
Fuw offset (Modulated)	5	5	5	MHz

7.4.2 Minimum requirement – Co-location with UTRA-TDD

The current state-of-the-art technology does not allow a single generic solution for co-location with UTRA-TDD on adjacent frequencies for 30dB BS-BS minimum coupling loss.

Further information and analysis for this scenario can be found in TR 25.942 [4].

7.5 Blocking characteristics

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 applies as specified in the tables 7.4 to 7.5B below, using a 1 MHz step size.

7.5.1 Minimum requirement

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 7.4: Blocking performance requirement for Wide Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	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 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
II	1850 - 1910 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
III	1710 – 1785 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier

Table 7.4A: Blocking performance requirement for Medium range BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	1920 - 1980 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1900 - 1920 MHz 1980 - 2000 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier
II	1850 - 1910 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier
III	1710 – 1785 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier

Table 7.4B: Blocking performance requirement for Local Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	1920 - 1980 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1900 - 1920 MHz 1980 - 2000 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier
II	1850 - 1910 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier
III	1710 – 1785 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier

Table 7.5: Blocking performance requirement (narrowband) for Wide Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 47 dBm	-115 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 47 dBm	-115 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [5].					

Table 7.5A: Blocking performance requirement (narrowband) for Medium Range BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 42 dBm	-105 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 42 dBm	-105 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [5].					

Table 7.5B: Blocking performance requirement (narrowband) for Local Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 37 dBm	-101 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 37 dBm	-101 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [5].					

7.6 Intermodulation characteristics

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

7.6.1 Minimum requirement

The static reference performance as specified in clause 7.2.1 ~~should~~ shall be met for a Wide Area BS when the following signals are coupled to BS antenna input:

- A wanted signal at the assigned channel frequency with a mean power of -115 dBm.
- Two interfering signals with the following parameters.

Table 7.6: Intermodulation performance requirement

Operating band	Interfering Signal mean power	Offset	Type of Interfering Signal
I, II, III	- 48 dBm	10 MHz	CW signal
	- 48 dBm	20 MHz	WCDMA signal with one code

Table 7.6A: Narrowband intermodulation performance requirement

Operating band	Interfering Signal mean power	Offset	Type of Interfering Signal
II, III	- 47 dBm	3.5 MHz	CW signal
	- 47 dBm	5.9 MHz	GMSK modulated*
* GMSK as defined in TS45.004			

The static reference performance as specified in clause 7.2.1 shall be met for a Medium Range BS when the following signals are coupled to BS antenna input:

- A wanted signal at the assigned channel frequency with a mean power of -105 dBm.
- Two interfering signals with the following parameters.

Table 7.6B: Intermodulation performance requirement

Operating band	Interfering Signal mean power	Offset	Type of Interfering Signal
I, II, III	- 44 dBm	10 MHz	CW signal
	- 44 dBm	20 MHz	WCDMA signal with one code

Table 7.6C: Narrowband intermodulation performance requirement

Operating band	Interfering Signal mean power	Offset	Type of Interfering Signal
II, III	- 43 dBm	3.5 MHz	CW signal
	- 43 dBm	5.9 MHz	GMSK modulated*
* GMSK as defined in TS45.004			

The static reference performance as specified in clause 7.2.1 shall be met for a Local Area BS when the following signals are coupled to BS antenna input:

- A wanted signal at the assigned channel frequency with a mean power of –101 dBm.
- Two interfering signals with the following parameters.

Table 7.6D: Intermodulation performance requirement

Operating band	Interfering Signal mean power	Offset	Type of Interfering Signal
I, II, III	-38 dBm	10 MHz	CW signal
	-38 dBm	20 MHz	WCDMA signal with one code

Table 7.6E: Narrowband intermodulation performance requirement

Operating band	Interfering Signal mean power	Offset	Type of Interfering Signal
II, III	-37 dBm	3.5 MHz	CW signal
	-37 dBm	5.9 MHz	GMSK modulated*
* GMSK as defined in TS45.004			

3GPP TSG RAN WG4 (Radio) Meeting #25 **R4-021432**

Secaucus, NJ, USA 11 - 15 November, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.133** **CR** **474** ⌘ **rev** ⌘ Current version: **5.4.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	RRM requirement changes for FDD Base Station Classification
Source:	⌘	RAN WG4
Work item code:	⌘	RInImp-BSClass-FDD
Date:	⌘	26/11/2002
Category:	⌘	**B**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	After the introduction of a new class “Medium Range BS (micro)” for FDD Base Station, a differentiation in the receiver sensitivity for the different classes has been also introduced. This shall be reflected in the RRM requirements as well.
Summary of change:	⌘	Differentiate the Received Total Wideband Power with figures for the Wide Area BS and Medium Range BS classes, in order to align to the two corresponding values of the receiver sensitivity.
Consequences if not approved:	⌘	The specified requirements for Received Total Wideband Power in section 9.2.1 will not be corresponding to the different FDD Base Station classes.

Clauses affected:	⌘	9.2.1

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	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.

9.2.1 Received total wideband power

The measurement period shall be 100 ms.

9.2.1.1 Absolute accuracy requirement

Table 9.35

~~Parameter~~	~~Unit~~	~~Accuracy [dB]~~	~~Conditions~~ ~~Range~~
~~Io~~	~~dBm/3.84 MHz~~	~~± 4~~	~~-103<= Io <= -74 dBm/3.84 MHz~~

Parameter	Unit	Accuracy [dB]	Conditions Io [dBm/3.84 MHz]	BS Class
Received Total Wideband Power Io	dBm/3.84 MHz	± 4	-103.. -74	Wide Area BS
Received Total Wideband Power Io	dBm/3.84 MHz	± 4	-93.. -64	Medium Range BS

9.2.1.2 Relative accuracy requirement

The relative accuracy is defined as the Received total wideband power measured at one frequency compared to the Received total wideband power measured from the same frequency at a different time.

Table 9.36

~~Parameter~~	~~Unit~~	~~Accuracy [dB]~~	~~Conditions~~ ~~Range~~
~~Io~~	~~dBm/3.84 MHz~~	~~± 0.5~~	~~For changes <= ±5.0dB and -103 <= Io <= -74dBm/3.84 MHz~~

Parameter	Unit	Accuracy [dB]	Conditions Io [dBm/3.84 MHz]	BS Class
Received Total Wideband Power Io	dBm/3.84 MHz	± 0.5	-103.. -74 AND for changes ≤ ±5.0dB	Wide Area BS
Received Total Wideband Power Io	dBm/3.84 MHz	± 0.5	-93.. -64 AND for changes ≤ ±5.0dB	Medium Range BS

9.2.1.3 Received total wideband power measurement report mapping

The reporting range for *Received total wideband power (RTWP)* is from -112 ... -50 dBm.

In table 9.37 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.37

Reported value	Measured quantity value	Unit
RTWP_LEV _000	RTWP < -112.0	dBm
RTWP_LEV _001	-112.0 ≤ RTWP < -111.9	dBm
RTWP_LEV _002	-111.9 ≤ RTWP < -111.8	dBm
…	…	…
RTWP_LEV _619	-50.2 ≤ RTWP < -50.1	dBm
RTWP_LEV _620	-50.1 ≤ RTWP < -50.0	dBm
RTWP_LEV _621	-50.0 ≤ RTWP	dBm

3GPP TSG RAN WG4 (Radio) Meeting #25 **R4-021497**

Secaucus, NJ, USA 11 - 15 November, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.133** **CR** **497** ⌘ **rev** ⌘ Current version: **5.4.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Changes in TS25.133 according to FDD Local area BS
Source:	⌘	RAN WG4
Work item code:	⌘	RInImp-BSClass-FDD
Date:	⌘	26/11/2002
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The local area base station has a 14 dB difference in sensitivity requirement with respect to the wide area BS. This has to be reflected in the conditions for UTRAN uplink measurements and in the reporting ranges. Measurement Received total wideband power should be aligned with the Wide area BS.
Summary of change:	⌘	BS class column added to UTRAN measurement Received total wideband power. Local area BS requirements added. Condition range shifted by 14 dB for Local atrea BS.
Consequences if not approved:	⌘	There will be no specific requirements for Local area BS. Condition range won't be aligned with range in Wide area BS.
Clauses affected:	⌘	9.2.1.1; 9.2.1.2

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘

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9.2.1 Received total wideband power

The measurement period shall be 100 ms.

9.2.1.1 Absolute accuracy requirement

Table 9.35

Parameter	Unit	Accuracy [dB]	Conditions	BS class
			Range	
Io	dBm/3.84 MHz	± 4	–103<= Io <= -74 dBm/3.84 MHz	Wide area BS
Io	dBm/3.84 MHz	± 4	–89<= Io <= -60 dBm/3.84 MHz	Local area BS

9.2.1.2 Relative accuracy requirement

The relative accuracy is defined as the Received total wideband power measured at one frequency compared to the Received total wideband power measured from the same frequency at a different time.

Table 9.36

Parameter	Unit	Accuracy [dB]	Conditions	BS class
			Range	
Io	dBm/3.84 MHz	± 0.5-	For changes <= ±5.0dB and –103 <= Io <= -74dBm/3.84 MHz	Wide area BS
Io	dBm/3.84 MHz	± 0.5-	For changes <= ±5.0dB and –89 <= Io <= -60dBm/3.84 MHz	Local area BS

9.2.1.3 Received total wideband power measurement report mapping

The reporting range for *Received total wideband power (RTWP)* is from -112 ... -50 dBm.

In table 9.37 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.37

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RTWP_LEV _002	-111.9 ≤ RTWP < -111.8	dBm
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RTWP_LEV _619	-50.2 ≤ RTWP < -50.1	dBm
RTWP_LEV _620	-50.1 ≤ RTWP < -50.0	dBm
RTWP_LEV _621	-50.0 ≤ RTWP	dBm

3GPP TSG RAN WG4 (Radio) Meeting #25 **R4-021695**

Secaucus, NJ, USA 11 - 15 November, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.141** **CR** **249** ⌘ **rev** **1** ⌘ Current version: **5.4.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of Base Station Classes
Source:	⌘	RAN WG4
Work item code:	⌘	RInImp-BSClass-FDD
Date:	⌘	26/11/2002
Category:	⌘	**B**
Release:	⌘	Rel-6

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Rel-6	*(Release 6)*

Reason for change:	⌘	The introduction of Medium Range and Local Area base station classes gives a new set of requirements for a set of requirements. The reason is the lower assumed Minimum Couplin Loss for operation of the new classes of BS.
Summary of change:	⌘	The BS classes are described in the introduction and Tables with requirments for the new BS classes are introduced for Frequency error, Reference sensitivity level, Adjacent Channel Selectivity, Blocking and Intermodulation. Multipath fading Case 4 is modified to cover only Wide Area BS.
Consequences if not approved:	⌘	

Clauses affected:	⌘	4.3A, 6.3, 7.2, 7.3, 7.4, 7.5, 7.6

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	CR 148 for TS 25.104
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	This CR is not complete since some values for Local Area BS are missing. The main purpose is to propose a structure for introduction of BS classes.

4.3A Base station classes~~Output power and determination of power class~~

The requirements in the present document apply to Wide Area Base Stations, Medium Range Base Stations and Local Area Base Stations unless otherwise stated ~~base station intended for general purpose applications~~.

Wide Area Base Stations are characterised by requirements derived from scenarios with a BS to UE minimum coupling loss equal to 70 dB. The Wide Area Base Station class has the same requirements as the base station for General Purpose application in Release 99, 4 and 5.

Medium Range Base Stations are characterised by requirements derived from scenarios with a BS to UE minimum coupling loss equal to 53 dB.

Local Area Base Stations are characterised by requirements derived from scenarios with a BS to UE minimum coupling loss equal to 45 dB.

The manufacturer shall declare the intended class of the BS under test.

~~In the future further classes of base stations may be defined; the requirements for these may be different than for general purpose applications.~~

6.3 Frequency error

6.3.1 Definition and applicability

Frequency error is the measure of the difference between the actual BS transmit frequency and the assigned frequency. The same source shall be used for RF frequency and data clock generation.

It is not possible to verify by testing that the data clock is derived from the same frequency source as used for RF generation. This may be confirmed by a manufacturers declaration

6.3.2 Minimum Requirement

The Frequency Error shall be within the accuracy range given in Table 6.8A observed over a period of one timeslot ~~± 0.05 PPM~~.

Table 6.8A: Frequency error minimum requirement

BS class	Accuracy
Wide Area BS	±0.05 ppm
Medium Range BS	±0.1 ppm
Local Area BS	±0.1 ppm

The normative reference for this requirement is in TS 25.104 [1] subclause 6.3.

6.3.3 Test purpose

To verify that the Frequency Error is within the limit specified in 6.3.2

6.3.4 Method of test

Requirement is tested together with Error Vector Magnitude test, as described in subclause 6.7.1.4.

6.3.5 Test requirement

The Frequency Error shall be between the minimum and maximum value specified in Table 6.8B ~~within the range (– 0.05 PPM – 12 Hz) to (+0.05 PPM + 12 Hz)~~.

Table 6.8B: Frequency error test requirement

BS class	Minimum frequency error	Maximum frequency error
Wide Area BS	-0.05 ppm - 12 Hz	+0.05 ppm + 12 Hz
Medium Range BS	-0.1 ppm - 12 Hz	+0.1 ppm + 12 Hz
Local Area BS	-0.1 ppm - 12 Hz	+0.1 ppm + 12 Hz

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.

7.2 Reference sensitivity level

7.2.1 Definition and applicability

The reference sensitivity level is the minimum mean power received at the antenna connector at which the BER shall not exceed the specific value indicated in subclause 7.2.2. The test is set up according to Figure B.7 and performed without interfering signal power applied to the BS antenna connector . For duplex operation , the measurement configuration principle is indicated for one duplex branch in Figure B.7. For internal BER calculation an example of the test connection is as shown in figure B.7. The reference point for signal power is at the input of the receiver (antenna connector).

7.2.2 Minimum Requirement

The BER shall not exceed 0,001 for the parameters specified in table 7.1.

Table 7.1: BS reference sensitivity levels

BS class	Reference measurement channel data rate	BS reference sensitivity level (dBm)	BER
Wide Area BS	12,2 kbps	-121	BER shall not exceed 0,001
Medium Range BS	12,2 kbps	-111	BER shall not exceed 0,001
Local Area BS	12,2 kbps	-107	BER shall not exceed 0,001

The normative reference for this requirement is in TS 25.104[1] subclause 7.2.

7.2.3 Test purpose

To verify that at the BS Reference sensitivity level the BER shall not exceed the specified limit.

7.2.4 Method of testing

7.2.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1

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

The following additional tests shall be performed:

a) On each of B, M and T, the test shall be performed under extreme power supply as defined in subclause 4.4.2

NOTE: Tests under extreme power supply also test extreme temperature.

1) Connect BS to be tested to RF signal source.

2) Set frequency.

3) Start transmit 12,2kbps DPCH with reference measurement channel defined in annex A to the BS under test (PN-9 data sequence or longer).

4) Disable TPC function.

7.2.4.2 Procedure

1) Calculate BER from at least 30000 received data bits.

2) Set the test signal mean power as specified in table 7.1A.

3) Measure BER.

7.2.5 Test requirement

The BER measurement result in step 3 of 7.2.4.2 shall not be greater than the limit specified in table 7.1A.

Table 7.1A: BS reference sensitivity levels

BS class	Reference measurement channel data rate	BS reference sensitivity level (dBm)	BER
Wide Area BS	12,2 kbps	-120.3	BER shall not exceed 0,001
Medium Range BS	12,2 kbps	-110.3	BER shall not exceed 0,001
Local Area BS	12,2 kbps	-106.3	BER shall not exceed 0,001

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.

7.3 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.

7.3.2 Minimum Requirement

The BER shall not exceed 0,001 for the parameters specified in table 7.2.

Table 7.2: Dynamic range

Parameter	Level Wide Area BS	Level Medium Range BS	Level Local Area BS	Unit
Reference measurement channel data rate	12.2	12.2	12.2	kbps
Wanted signal mean power	-91	-81	-77	dBm
Interfering AWGN signal	-73	-63	-59	dBm/3.84 MHz

The normative reference for this requirement is in TS 25.104[1] subclause 7.3

7.3.3 Test purpose

The test purpose is to verify the ability of the BS to receive a single-code test signal of maximum with a BER not exceeding a specified limit.

7.3.4 Method of test

7.3.4.1 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 test equipment as shown in annex B.

7.3.4.2 Procedure

1) Adjust the signal generator for the wanted signal as specified in Table 7.2A.

2) Adjust the AWGN generator level as specified in Table 7.2A and set the frequency to the same frequency as the tested channel.

3) Measure the BER for the tested service and verify that it is below the specified level.

Repeat the measurement for the other RX port.

7.3.5 Test Requirements

The BER measurement result in step 3 of 7.3.4.2 shall not be greater than 0,001 using the parameters specified in tables 7.2A.

Table 7.2A: Dynamic range

Parameter	Level Wide Area BS	Level Medium Range BS	Level Local Area BS	Unit
Reference measurement channel data rate	12.2	12.2	12.2	kbps
Wanted signal mean power	-89.8	-79.8	-75.8	dBm
Interfering AWGN signal	-73	-63	-59	dBm/3.84 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.

7.4 Adjacent Channel Selectivity (ACS)

7.4.1 Definition and applicability

Adjacent channel selectivity (ACS) is a measure of the receiver ability to receive a wanted signal at is assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the center frequency of the assigned channel. ACS is the ratio of the receiver filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

The interference signal is offset from the wanted signal and QPSK modulated by a pseudo random binary sequence uncorrelated to the wanted signal.

7.4.2 Minimum Requirement

The BER shall not exceed 0.001 for the parameters specified in the table 7.3.

Table 7.3: Adjacent channel selectivity

Parameter	Level Wide Area BS	Level Medium Range BS	Level Local Area BS	Unit
Reference measurement channel data rate	12.2	12.2	12.2	kbps
Wanted signal mean power	-115	-105	-101	dBm
Interfering signal mean power	-52	-42	-38	dBm
Fuw (Modulated)	±5	5	5	MHz

The normative reference for this requirement is in TS 25.104[1] subclause 7.4.

7.4.3 Test purpose

The test purpose is to verify the ability of the BS receiver filter to suppress interfering signals in the channels adjacent to the wanted channel.

7.4.4 Method of test

7.4.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

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

7.4.4.2 Procedure

1) Generate the wanted signal and adjust the ATT1 to set the input level to the base station under test to the level specified in table 7.3A.

2) Set-up the interference signal at the adjacent channel frequency and adjust the ATT2 to obtain the specified level of interference signal at the base station input defined in table 7.3A. Note that the interference signal shall have an ACLR of at least 63 dB in order to eliminate the impact of interference signal adjacent channel leakage power on the ACS measurement.

3) Measure the BER.

4) Repeat the test for the port, which was terminated.

7.4.5 Test Requirements

The BER measurement result in step 3 of 7.4.4.2 shall not be greater than 0,001 using the parameters specified in table 7.3A.

Table 7.3A: Adjacent channel selectivity

Parameter	Level Wide Area BS	Level Medium Range BS	Level Local Area BS	Unit
Reference measurement channel data rate	12.2	12.2	12.2	kbps
Wanted signal mean power	-115	-105	-101	dBm
Interfering signal mean power	-52	-42	-38	dBm
Fuw (Modulated)	±5	5	5	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.

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 applies as specified in tables 7.4(a) to 7.4(g).

The requirements in Table 7.4(a) shall apply to base stations intended for general-purpose applications, depending on which frequency band is used. The requirements in Tables 7.4 (b) to 7.4 (g) may be applied when the FDD BS is co-located with GSM900, GSM850, PCS1900 and/or BS operation in DCS1800 band (UTRA or GSM).

7.5.2 Minimum Requirements

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

Table 7.4(a1): Blocking characteristics for Wide Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	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 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
II	1850 - 1910 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
III	1710 – 1785 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier

Table 7.4(a2): Blocking characteristics for Medium Range BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	1920 - 1980 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1900 - 1920 MHz 1980 - 2000 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier
II	1850 - 1910 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier
III	1710 – 1785 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier

Table 7.4(a3): Blocking characteristics for Local Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	1920 - 1980 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1900 - 1920 MHz 1980 - 2000 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier

II	1850 - 1910 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier
III	1710 – 1785 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier

Table 7.4(b): Blocking performance requirement when co-located with GSM900

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I, III	921 -960 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4(c): Blocking performance requirement for operation when co-located with BTS operating inDCS1800 band (GSM or UTRA)

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I, III	1805 – 1880 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4(d): Blocking performance requirement for operation when co-located with UTRA BS operating in Frequency band I

Operating band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
III	2110 – 2170 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4(e): Blocking performance requirement for operation when co-located with PCS1900 BTS

Operating band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1930 – 1990 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4(f): Blocking performance requirement (narrowband) for Wide Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 47 dBm	-115 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 47 dBm	-115 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [12].					

Table 7.4(f): Blocking performance requirement (narrowband) for Medium range BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 42 dBm	-105 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 42 dBm	-105 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [12].					

Table 7.4(f): Blocking performance requirement (narrowband) for Local Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 37 dBm	-101 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 37 dBm	-101 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [12].					

Table 7.4(g): Blocking performance requirement for operation when co-located with GSM850 BTS

Operating band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	869 – 894 MHz	+16 dBm	-115 dBm	—	CW carrier

The normative reference for these requirements is in TS 25.104[1] subclause 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) Adjust the signal generators to the type of interfering signals and the frequency offsets as specified in Tables 7.4A(a) to 7.4A(f). Note that the GMSK modulated interfering signal shall have an ACLR of at least 72 dB in order to eliminate the impact of interference signal adjacent channel leakage power on the blocking characteristics measurement. For the tests defined in Table 7.4A(a), the interfering signal shall be at a frequency offset Fuw from the assigned channel frequency of the wanted signal which is given by:

Fuw = ± (n x 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.

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).

7.5.5 Test Requirements

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

Table 7.4A(a1): Blocking characteristics for Wide Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	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 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
II	1850 - 1910 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
III	1710 – 1785 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier

Table 7.4A(a2): Blocking characteristics for Medium Range BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	1920 - 1980 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1900 - 1920 MHz 1980 - 2000 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code

	1 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier
II	1850 - 1910 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier
III	1710 – 1785 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-35 dBm	-105 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-105 dBm	—	CW carrier

Table 7.4A(a3): Blocking characteristics for Local Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	1920 - 1980 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1900 - 1920 MHz 1980 - 2000 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier
II	1850 - 1910 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1830 - 1850 MHz 1910 - 1930 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier
III	1710 – 1785 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1690 - 1710 MHz 1785 – 1805 MHz	-30 dBm	-101 dBm	10 MHz	WCDMA signal with one code
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-101 dBm	—	CW carrier

Table 7.4A(b): Blocking performance requirementwhen co-located with GSM900

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I, III	921 -960 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4A(c): Blocking performance requirement when co-located with Base Station operating in DCS1800 band (GSM or UTRA)

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I, III	1805 – 1880 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4A(d): Blocking performance requirement for operation when co-located with UTRA BS operating in Frequency band I

Operating band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
III	2110 – 2170 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4A(e): Blocking performance requirement for operation when co-located with PCS1900 BTS

Operating band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1930 – 1990 MHz	+16 dBm	-115 dBm	—	CW carrier

Table 7.4A(f): Blocking performance requirement (narrowband) for Wide Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 47 dBm	-115 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 47 dBm	-115 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [12].					

Table 7.4A(f): Blocking performance requirement (narrowband) for Medium range BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 42 dBm	-105 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 42 dBm	-105 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [12].					

Table 7.4A(f): Blocking performance requirement (narrowband) for Local Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 37 dBm	-101 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 37 dBm	-101 dBm	2.8 MHz	GMSK modulated*
* GMSK modulation as defined in TS 45.004 [12].					

Table 7.4A(g): Blocking performance requirement for operation when co-located with GSM850 BTS

Operating band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	869 – 894 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.

7.6 Intermodulation characteristics

7.6.1 Definition and applicability

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

7.6.2 Minimum Requirement

The intermodulation performance ~~should~~ shall be met when the following signals are applied to the receiver.

Table 7.5(a): Interferer signals for intermodulation performance requirement

Operating Band	Type of Signal	Offset	Signal mean power Wide Area BS	Signal mean power Medium Range BS	Signal mean power Local Area BS
I, II, III	Wanted signal	-	-115 dBm	-105 dBm	-101 dBm
	CW signal	10 MHz	-48 dBm	-44 dBm	-38 dBm
	WCDMA signal with one code	20 MHz	-48 dBm	-44 dBm	-38 dBm

Table 7.5(b): Narrowband intermodulation performance requirement

Operating band	Type of Signal	Offset	Signal mean power Wide Area BS~~level~~	Signal mean power Medium Range BS	Signal mean power Local Area BS
II, III	Wanted signal	-	-115 dBm	-105 dBm	-101 dBm
	CW signal	3.5 MHz	- 47 dBm	- 43 dBm	-37 dBm
	GMSK modulated*	5.9 MHz	- 47 dBm	- 43 dBm	-37 dBm
* GMSK as defined in TS 45.004 [12].					

The BER for wanted signal shall not exceed 0,001 for the parameters specified in table 7.5.

The normative reference for this requirement is in TS 25.104 [1] subclause 7.6

7.6.3 Test purpose

The test purpose is to verify the ability of the BS receiver to inhibit the generation of intermodulation products in its non-linear elements caused by the presence of two high-level interfering signals at frequencies with a specific relationship to the frequency of the wanted signal.

7.6.4 Method of test

7.6.4.1 Initial conditions

Test environment: normal; see subclause 4.4.1.

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

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

7.6.4.2 Procedures

1) Generate the wanted signal (reference signal) and adjust ATT1 to set the signal level to the BS under test to the level specified in table 7.5A.

2) Adjust the signal generators to the type of interfering signals and the frequency offsets as specified in Tables 7.5A(a) and 7.5A(b). Note that the GMSK modulated interfering signal shall have an ACLR of at least 72 dB in order to eliminate the impact of interference signal adjacent channel leakage power on the intermodulation characteristics measurement.

3) Adjust the ATT2 and ATT3 to obtain the specified level of interference signal at the BS input.

4) Measure the BER

5) Repeat the whole test for the port which was terminated.

7.6.5 Test requirements

The intermodulation performance ~~should~~ shall be met when the following signals are applied to the receiver.

Table 7.5A(a): Interferer signals for intermodulation performance requirement

Operating Band	Type of Signal	Offset	Signal mean power Wide Area BS	Signal mean power Medium Range BS	Signal mean power Local Area BS
I, II, III	Wanted signal	-	-115 dBm	-105 dBm	-101 dBm
	CW signal	10 MHz	-48 dBm	-44 dBm	-38 dBm
	WCDMA signal with one code	20 MHz	-48 dBm	-44 dBm	-38 dBm

Table 7.5A(b): Narrowband intermodulation performance requirement

Operating band	Type of Signal	Offset	Signal mean power Wide Area BS	Signal mean power Medium Range BS	Signal mean power Local Area BS
II, III	Wanted signal	-	-115 dBm	-105 dBm	-101 dBm
	CW signal	3.5 MHz	- 47 dBm	- 43 dBm	-37 dBm
	GMSK modulated*	5.9 MHz	- 47 dBm	- 43 dBm	-37 dBm
* GMSK as defined in TS 45.004 [12].					

~~**Table 7.5A(a): Interferer signals for intermodulation performance requirement**~~

~~Operating Band~~	~~Type of Signal~~	~~Offset~~	~~Signal mean power~~
~~I, II, III~~	~~Wanted signal~~	~~-~~	~~-115 dBm~~
	~~CW signal~~	~~10 MHz~~	~~-48 dBm~~
	~~WCDMA signal with one code~~	~~20 MHz~~	~~-48 dBm~~

~~**Table 7.5A(b): Narrowband intermodulation performance requirement**~~

~~Operating band~~	~~Type of Signal~~	~~Offset~~	~~Signal mean power~~
~~II, III~~	~~Wanted signal~~	~~-~~	~~-115 dBm~~
	~~CW signal~~	~~3.5 MHz~~	~~-47 dBm~~
	~~GMSK modulated*~~	~~5.9 MHz~~	~~-47 dBm~~
~~* GMSK as defined in TS 45.004 [12].~~			

The BER for wanted signal shall not exceed 0,001 for the parameters specified in table 7.5A.

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.

3GPP TSG RAN WG4 (Radio) Meeting #25 **R4-021495**

Secaucus, NJ, USA 11 - 15 November, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.942** **CR** **010** ⌘ **rev** ⌘ Current version: **5.1.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Blocking scenarios for Medium Range BS in FDD mode
Source:	⌘	RAN WG4
Work item code:	⌘	RInImp-BSClass-FDD
Date:	⌘	26/11/2002
Category:	⌘	**B**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Specific blocking scenario descriptions for the REL-6 WI on FDD BS classification for Medium Range BS are not shown in TR 25.942 yet. A scenario with an interfering 5 km Macro network plus an interfered Micro network is an unrealistic scenario. It is proposed to use 1 and 2 km scenarios instead.
Summary of change:	⌘	Description of the reference scenario from which requirements are derived are introduced. 1 and 2 km scenario is added. Also a micro-micro scenario for blocking simulations is added.
Consequences if not approved:	⌘	Outcome of the FDD BS classification WI is not completely reflected in TR 25.942. Simulation scenarios showing the background for requirements could only be found in the WI TR 25.951.

Clauses affected:	⌘	New chapter 5.2.3 and 8.1.3.2

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	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/specs/CR.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.

Therefore, the considered parameters are:

Table 2A

MCL	70 dB
BS antenna gain	11 dBi
MS antenna gain	0 dBi
Log normal shadowing	Standard Deviation of 10 dB
# of snapshot	3 000
Handover threshold	3 dB
Noise figure of BS receiver	5 dB
Thermal noise (NF included)	-103,16 dBm @ 3,84 MHz
Max TX power of MS	21 dBm/24 dBm
Power control dynamic range	65 dB/68 dB
Cell radius	577 m (for both systems)
Inter-site distance	1 000 m (for both systems)
BS offset between two systems (x, y)	Intermediate: (0,25 km, 0,14425 km) -> 0,289 km shift Worst: (0,5 km, 0,2885 km) -> 0,577 km shift
User bit rate	8 kbps and 144 kbps
Activity	100 %
Target Eb/I0	6,1 dB (8 kbps), 3,1 dB (144 kbps)
ACIR	25 - 40 dB

5.2 BTS Receiver Blocking

The simulations are static Monte Carlo using a methodology consistent with that described in the clause on ACIR.

The simulations are constructed using two uncoordinated networks that are on different frequencies. The frequencies are assumed to be separated by 10 MHz to 15 MHz or more so that the BS receiver selectivity will not limit the simulation, and so that the UE spurious and noise performance will dominate over its adjacent channel performance. These are factors that distinguish a blocking situation from an adjacent channel situation in which significant BS receiver degradation can be caused at very low levels due to the poor ACP from the UE.

During each trial of the simulations, uniform drops of the UE are made, power levels are adapted, and data is recorded. A thousand such trials are made. From these results, CDF of the total signal appearing at the receivers' inputs have been constructed and are shown in the graphs inserted in the result clause.

5.2.1 Assumptions for simulation scenario for 1 Km cell radius

The primary assumptions made during the simulations are:

1) both networks are operated with the average number of users (50) that provide a 6 dB noise rise;
2) the two networks have maximal geographic offset (a worst case condition);
3) cell radius is 1 km;
4) maximum UE power is 21 dBm;
5) UE spurious and noise in a 4,1 MHz bandwidth is 46 dB;
6) BS selectivity is 100 dB (to remove its effect);
7) C/I requirement is –21 dB;
8) BS antenna gain is 11 dB;
9) UE antenna gain is 0 dB; and
10) minimum path loss is 70 dB excluding antenna gains.

5.2.2 Assumptions for simulation scenario for 5 Km cell radius

The primary assumptions that are common to all simulations are:

1) the two networks have maximal geographic offset (a worst case condition);
2) cell radius is 5 km;
3) UE spurious and noise in a channel bandwidth is 46 dB;
4) BS selectivity is 100 dB (to remove its effect);
5) BS antenna gain is 11 dB;
6) UE antenna gain is 0 dB;
7) minimum path loss is 70 dB including antenna gains. In addition;
8) for the speech simulations, maximum UE power is 21 dBm and the C/I requirement is –21 dB;
9) for the data simulations, maximum UE power is 33 dBm and the C/I requirement is –11,4 dB.

NOTE: This is different from the basic assumption in the ACIR clause, since its data power level is 21 dBm, just like the speech level.

5.2.3 Assumptions for macro-micro simulation scenario with 1 and 2 Km interfering macro cell radius

The primary assumptions that are common to all simulations are:

1) the topology of the multi-operator Macro-Micro scenario as in clause 5.1.3.2. Finite micro cell layer (Manhattan grid) overlaid by a much larger finite macro network (see Figure 10A).
2) interfering macro cell radius is 1 or 2 km;
3) noise floor at BS receiver is –103 dBm for macro and –93 dBm for micro;
4) log-normal shadow fading standard deviation is 10 dB;
5) BS antenna gain is 11 dB;
6) UE antenna gain is 0 dB;
7) MCL is 70 dB for Macro and 53 dB for Micro (including antenna gains);
8) for the speech simulations, maximum UE power is 21 dBm and the micro cell C/I requirement is –23.5 dB;
9) for the data simulations, maximum UE power is 33 dBm and the micro C/I requirement is –12 dB.

NOTE: This is different from the basic assumption in the ACIR clause, since its data power level is 21 dBm, just like the speech level.

Figure 10A: Macro-Micro network deployment topology (zoomed example for 1km interfering macro cell size)

5.2.4 Assumptions for micro-micro simulation scenario

The layout for a single Micro network is described in chapter 5.1.3.2. Based on this network grid, a second identical Micro network grid was placed in the same area but with maximal geographic offset between the Micro BSs as worst-case condition (see Figure 10B). The number of BS in this scenario is 72 Micro BS (network 1) plus 72 Micro BS (network 2). This approach is consistent with the strategy used in chapter 5.2 (BTS receiver blocking) in case of two Macro networks.

Simulation parameters are as under 5.2.2.

Figure 10B: Micro-Micro layout [units in meter].

6 Methodology for coexistence studies FDD/TDD

6.1 Evaluation of FDD/TDD interference

[Editor's note: a better description of the parameters used to simulate the services is needed. Eb/N0 values for FDD and TDD to be specified in detail like in the FDD/FDD clause.]

8.1.3.2 Simulation Results for 5 Km cell radius

Figure 24 shows the overall CDF of the input signals to the receivers using speech only, and figure 25 shows an expanded view of the occurrences having probability greater than .998. A sharp discontinuity can be seen at the -49 dBm input level in the expanded view. This occurs because in large cells there are a few occurrences of users operating at their maximum transmitted power level of 21 dBm while they are also close enough to another network's cell to produce a minimum coupling loss condition. Therefore, for this large of a cell, the received signal power level corresponding to 99,99 % of the occurrences is very close to the level dictated by MCL and is about -49 dBm (= 21 dBm – 70 dB).

The condition just described is for speech only systems with a maximum transmitted power level of 21 dBm. It is probably reasonable to assume that mixed speech and data systems would produce approximately the same result if the maximum power level for a data terminal were also 21 dBm. This is the case given in [12]. However, 33 dBm data terminals may exist, so it would be desirable to consider this higher power case also.

Figures 26 and 27 show the CDF of the input signals to the receivers in mixed speech and data systems. These indicate that 99,99 % of occurrences of the input signals to the receivers are about –40 dBm or less. Of course, with this large of a cell, the absolute maximum signal is dictated by MCL also and is only a few dB higher (33 dBm – 70 dB = -37 dBm).

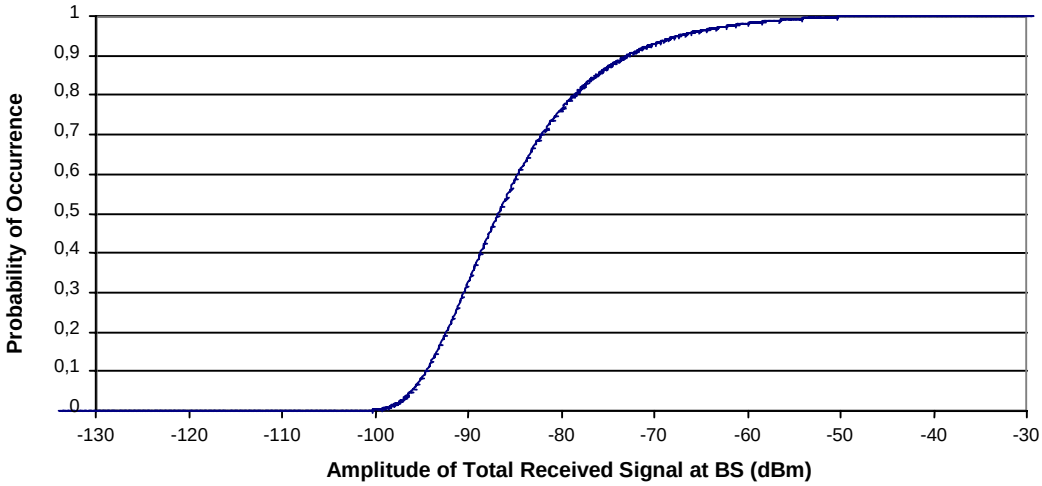

Figure 24: CDF of Total Signal for Speech Only System with 5 km Cells and Worst Case Geographic Offset

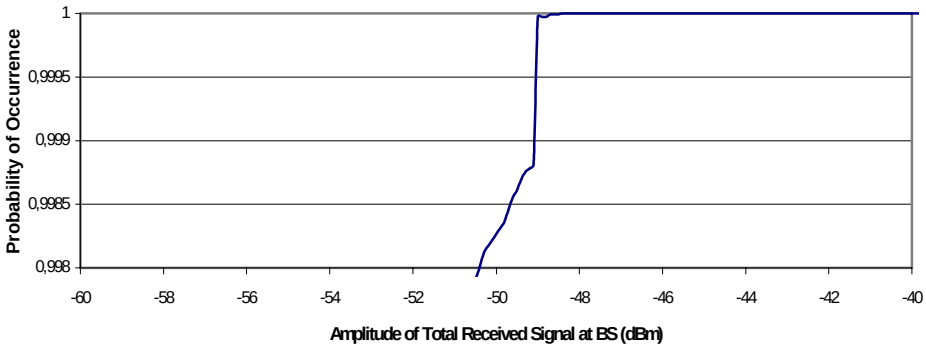

Figure 25: CDF of Total Signal for Speech Only System with 5 km Cells and Worst Case Geographic Offset

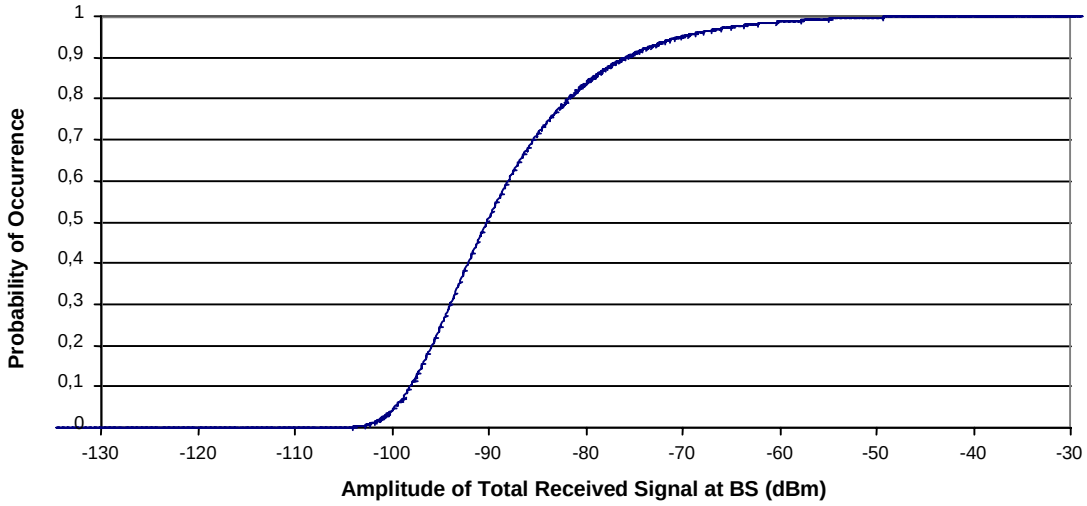

Figure 26: CDF of Total Signal for Mixed Speech and Data System with 5 km Cells and Worst Case Geographic Offset

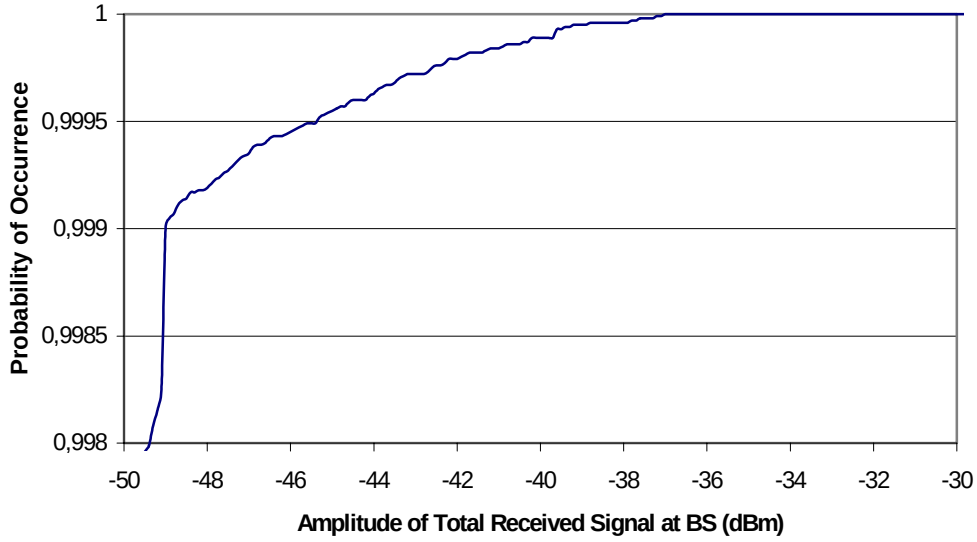

Figure 27: CDF of Total Signal for Mixed Speech and Data System with 5 km Cells and Worst Case Geographic Offset

Recent proposals from other companies have indicated that it may be desirable to allow more than the 3 dB degradation in sensitivity that is typically used in the measurement of a blocking spec. This is probably reasonable since:

1) the interfering UE's spurious and noise are going to dominate the noise in the victim cell in a real system; and

2) the measurement equipment is approaching the limit of its capability in the performance of this test.

The first comment is evident by observing that the interfering UE's noise two channels from its assigned frequency is probably typically in the range of -90 dBm (= -40 dBm - 50 dB), which is greatly larger than the typical noise floor of the receiver at -103 dBm. The second comment is evident by observing that the typical noise floor of most high quality signal generators is 65 dBc to 70 dBc with a W-CDMA signal. This results in test equipment generated noise of -105 to -110 dBm, which can produce a significant error in the blocking measurement.

In view of these concerns, it is probably reasonable to allow more than a 3 dB increase in the specified sensitivity level under the blocking condition. Other proposals recommend up to a 13 dB sensitivity degradation in the blocking spec and a 6 dB degradation in similar specs (like receiver spurious and IM). Motorola would consider 6 dB preferable.

In conclusion, the in-band blocking specification for UTRA should be -40 dBm (assuming that 33 dBm terminals will exist), and the interfering (blocking) test signal should be an HPSK carrier. A 6 dB degradation in sensitivity under the blocking condition should be allowed.

8.1.3.3 Simulation Results for macro-micro simulation scenario with 1 and 2 Km interfering macro cell radius

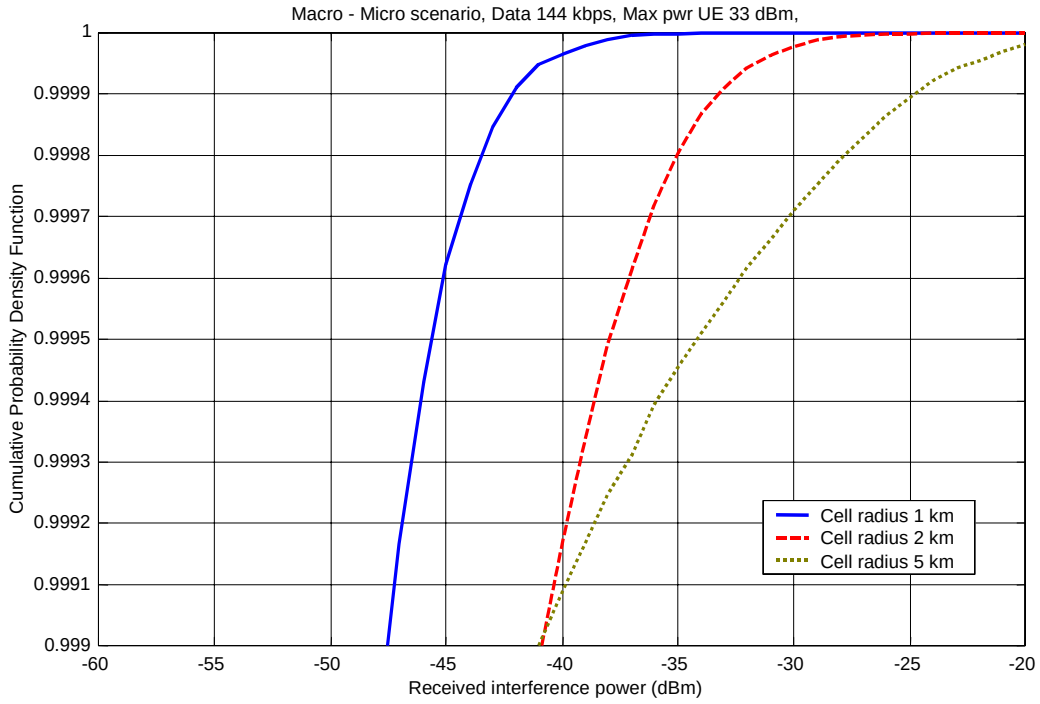

Figure 27A: Zoom: Macro – Micro Blocking data in one plot UE 33 dBm 1,2 and 5km (5 km case for additional information only).

Figure 27A shows a typical scenario for pure data UEs (33dBm) in a Macro cell network with cell radii of 1, 2 or 5 km (5 km case for additional information only).

According to , Sect 8.4.2.2 the target blocking probability for a macro-macro scenario was assumed to be 1e-4 for the victim BS. Considering that a micro BS will typically deploy only 1 carrier and also that additional coverage may be available from an overlaid macro network (ie single operator HCS scenario), the event of blocking a micro BS may be considered as less severe then the blocking of a multi-carrier macro BS. Hence, a slightly higher blocking probability of 2e-4 is assumed for the micro BS to reflect this difference and to avoid overly conservative blocking criteria.

It can be seen from Figure 27A that the Blocking performance requirement for a general purpose BS of –40dBm interfering Signal mean power, as it is specified in TS 25.104 (Rel.99, Rel. 4 and Rel. 5), is not sufficient for a FDD Medium Range (Micro) base station (BS).

It has been shown in Figure 27A (which represents the worst case) that for a high power UE (33dBm, data 144kbps) only in 0.02% of the cases the received power is larger or equal to –35dBm and it is recommended to use this value as new blocking requirement.