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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

This document is a Technical Report on Release 5 work item “TDD Base Station Classification”.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] 3GPP TS 25.105

[2] 3GPP TS 25.123

[3] 3GPP TS 25.142

[4] 3GPP TR 25.942

3 Definitions, symbols and abbreviations

3.1 Definitions

void

3.2 Symbols

void

3.3 Abbreviations

void

4 General

Current TSG RAN WG4 specifications have been done according to the requirements for the macrocell base stations (NodeBs). For the UTRA evolution requirement specifications for other types of base stations are needed as well to take into account different use scenarios and radio environments. In this technical report, base station classification is described and requirements for each base station class are derived.

5 System scenarios

This section describes the system scenarios for UTRA operation that are considered when defining base station classes. It also includes typical radio parameters that are used to derive requirements.

5.1 Indoor Environment

5.1.1 Path Loss Model

The indoor path loss model expressed in dB is in the following form, which is derived from the COST 231 indoor model:

$$L = 37 + 20\ Log_{10}(R) + \Sigma\ k_{wi}\ L_{wi} + 18.3\ n^{((n+2)/(n+1)-0.46)}$$

where:

R = transmitter-receiver separation given in metres

k_{wi} = number of penetrated walls of type i

L_{wi} = loss of wall type i

n = number of penetrated floors

Two types of internal walls are considered. Light internal walls with a loss factor of 3.4 dB and regular internal walls with a loss factor of 6.9 dB.

If internal walls are not modelled individually, the indoor path loss model is represented by the following formula:

$$L = 37 + 30\ Log_{10}(R) + 18.3\ n^{((n+2)/(n+1)-0.46)}$$

where:

R = transmitter-receiver separation given in metres;

n = number of penetrated floors

Slow fading deviation in pico environment is assumed to be 6 dB.

5.2 Mixed Indoor – Outdoor Environment

5.2.1 Propagation Model

Distance attenuation inside a building is a pico cell model as defined in Chapter 5.1.1. In outdoors UMTS30.03 model is used.

Attenuation from outdoors to indoors is sketched in Figure 5.1 below. In the figure star denotes receiving object and circle transmitting object. Receivers are projected to virtual positions. Attenuation is calculated using micro propagation model between transmitter and each virtual position. Indoor attenuation is calculated between virtual transmitters and the receiver. Finally, lowest pathloss is selected for further calculations. Only one floor is considered.

The total pathloss between outdoor transmitter and indoor receiver is calculated as

$$L = L_{micro} + L_{OW} + \Sigma\ k_{wi}\ L_{wi} + a * R\ ,$$

where:

L_{micro} = Micro cell pathloss according UMTS30.03 Outdoor to Indoor and Pedestrian Test Environment pathloss model

L_{OW} = outdoor wall penetration loss [dB]

R = is the virtual transmitter-receiver separation given in metres;

k_{wi}= number of penetrated walls of type i;

L_{wi}= loss of wall type i;

a = 0.8 attenuation [dB/m]

<Editor Note: a reference to the source 0f the formula is required>

Slow fading deviation in mixed pico-micro environment shall be 6 dB

Propagation from indoors to outdoors would be symmetrical with above models.

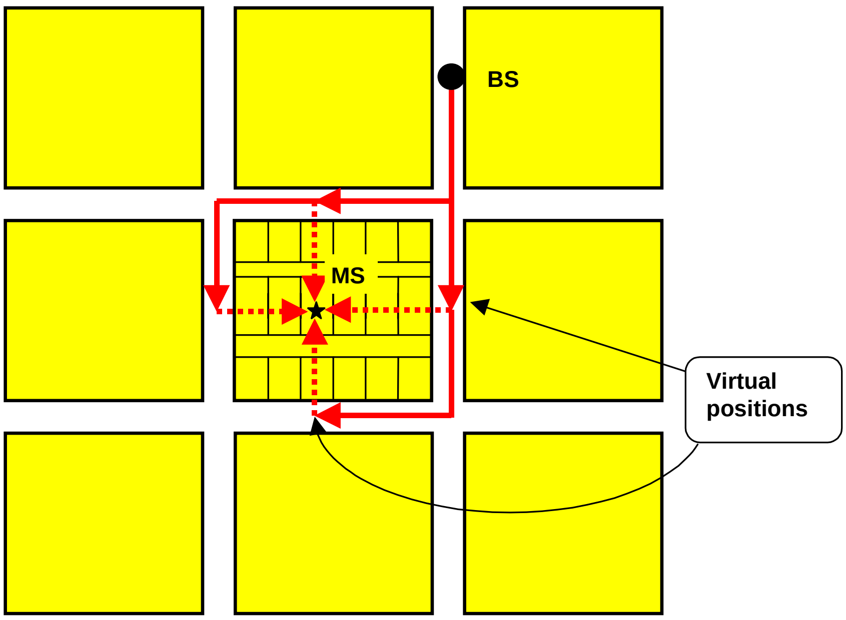

Figure 5.1: Simulation scenario and propagation model.

Parameters related to propagation models are summarised in Table 5.1.

Table 5.1: Parameters related to mixed indoor - outdoor propagation model

Parameter	Value
Inside wall loss	6.9dB
Outside wall loss	10 dB
Slow fading deviation in indoors	6dB
Slow fading deviation in outdoors	6dB
Building size	110 x 110 meters
Street size	110 x 15 meters
Room size	22 x 25 meters
Number of rooms	5 rooms in 4 rows
Corridor size	110 x 5 meters
Number of corridors	2
Size of entrance point	5 meters
Number of base stations	4 .. 6
BS coordinates	tba

5.3 Minimum coupling loss (MCL)

Minimum Coupling Loss (MCL) is defined as the minimum distance loss including antenna gain measured between antenna connectors.

5.3.1 MCL for Local Area scenario

The minimum coupling loss between UEs is independent of the scenario, therefore the same minimum coupling loss is assumed for all environments.

Local area BSs are usually mounted under the ceiling, on wall or some other exposed position. In 0 chapter 4.1.1.2 a minimal separation of 2 metres between UE and indoor BS is assumed. Free space path loss is defined in 0 as:

$$\text{Path loss [dB]} = 38.25 + 20 \log10(d\ [m])$$

Taking into account 0 dBi antenna gain for Local area BS and UE and a body loss of 1 dB at the terminal, a MCL of 45.27 dB is obtained. The additional 2 dB cable loss at the BS as proposed in TR 25.942 is not considered.

The assumed MCL values are summarised in Table 5.2.

Table 5.2: Minimum Coupling Losses

	MCL
MS ↔ MS	40 dB
Local area BS ↔ MS	45 dB
Local area BS ↔ Local area BS	45 dB

5.4 Propagation conditions for local area base stations

The demodulation of DCH in multipath fading conditions in TS 25.105 considers three different test environments:

Case 1: Typical indoor environment delay spread, low terminal speed

Case 2: Large delay spread (12 us), low terminal speed

Case 3: Typical vehicular environment delay spread, high terminal speed (120 km/h)

The local area BS is intended for small cells as can be usually found in indoor environments or outdoor hot spot areas. The large delay spread in Case 2 and the high terminal speed in Case 3 are not typical for these scenarios. Therefore, requirements defined for Case 2 and Case 3 shall not be applied to the local area BS. The Case 1 propagation condition shall apply for both the local area and wide area BS.

6 Base station classes

This section describes how the base station classes are defined.

6.1 Base station class criteria

Different sets of requirements are derived from calculations based on Minimum Coupling Loss between BS and UE. Each set of requirements corresponds to a base station class used as criteria for classification. Two classes are defined: Wide Area BS class and Local Area BS class.

Wide Area BS class assumes relatively high MCL, as is typically found in outdoor macro and outdoor micro environments, where the BS antennas are located off masts, roof tops or high above street level. Existing requirements are used, as they are in 0, for the Wide Area BS class. Requirements have been derived assuming 53dB and 70dB MCL for micro and macro scenarios, respectively.

Local Area BS class assumes relatively low MCL, as is typically found indoors (offices, subway stations etc) where antennas are located on the ceilings or walls or possibly built-in in the BS on the wall. Low-CL can also be found outdoors on hot spot areas like market place, high street or railway station. New requirements, as defined in this TR, are set for the Local Area BS class. Requirements have been derived assuming 40dB MCL.

7 Changes with respect to Release 99

7.1 Changes in 25.105

This section describes the considered changes to requirements on BS minimum RF characteristics, with respect to Release 1999 requirements in TS25.105.

7.1.1 New text for base station classes

The requirements in this specification apply to both Wide Area Base Stations and Local Area Base Stations, unless otherwise stated.

Wide Area Base Stations are characterised by requirements based on BS to UE coupling losses equal to or higher than 53dB.

Local Area Base Stations are characterised by requirements based on BS to UE coupling losses less than 53dB.

7.1.2 Frequency stability

7.1.2.1 New requirement

In the present system the mobile has to be designed to work with a Doppler shift caused by speeds up to 250 km/h at 2100 MHz. This corresponds to a frequency offset of:

[Doppler shift, Hz] = [UE velocity, m/s] * [Carrier frequency, Hz] / [speed of light, m/s]

= (250 * 1000/3600) * 2.1 * 10^9 / (3 *10^8) Hz

≈ 486 Hz

At present, the BS requirement is 0.05 ppm, corresponding to 105 Hz at 2100 MHz.

In this case, the mobile must be able to successfully decode signals with offset of

[present UE decode offset, Hz] = [frequency error, Hz] + [max. Doppler shift, Hz]

= 486 Hz + 105 Hz

= 591 Hz

The frequency error requirement for local area BS class is proposed to be relaxed to 0.1ppm.

[frequency error, ppm] = 0.1 ppm

This corresponds to a maximum UE speed of 155km/h.

[max. new Doppler shift] = [present UE decode offset] - [frequency error, Hz]

= 591 Hz – 210 Hz

= 301 Hz

[UE velocity, km/h] = [speed of light, km/h] * [Doppler shift, Hz] / [Carrier frequency, Hz]

= (3 *10^8 * 301 * 3600) / (2.1 * 10^9 * 1000)

= 155 km/h

7.1.2.2 New text for frequency stability

The modulated carrier frequency is observed over a period of one power control group (timeslot). The frequency error shall be within the accuracy range given in Table 7.1.

Table 7.1: Frequency error minimum requirement

BS class	accuracy
wide area BS	±0.05 ppm
local area BS	±0.1 ppm

7.1.3 Transmit On/Off Time Mask

The time mask transmit ON/OFF defines the ramping time allowed for the BS between transmit OFF power and transmit ON power.

7.1.3.1 Minimum Requirement

This requirement is independent of the BS class. For the local area BS the same requirement as specified in chapter 6.5.2.1 of TS 25.105 for the wide area BS shall apply.

7.1.4 Spectrum emission mask

The same requirement as for the wide area BS shall apply to the local area BS.

7.1.5 Adjacent Channel Leakage power Ratio (ACLR)

7.1.5.1 Justification

Two different ACLR requirements for the local area BS are defined in a similar way as for the wide area BS to consider different deployment scenarios. A minimum requirement, which is based on MS-BS interference and BS-BS interference in case of unsynchronised TDD operation on adjacent carriers with a sufficient de-coupling, and another ACLR requirement based on BS-BS interference for co-siting of unsynchronised TDD operation.

7.1.5.1.1 Minimum Requirement

The minimum requirement is based on MS to BS interference (synchronised operation). Because MS to BS interference is dominated by the performance of the terminal, the same minimum requirement as for the wide area BS is proposed for the local area BS.

The minimum requirement can also be used for unsynchronised operation, if base stations have a certain distance. The de-coupling between base stations is calculated as follows: for local area BS to local area BS, the indoor office path loss model according to UMTS 30.03 is used, while in case of wide area to local area and vice versa, the path loss model for outdoor to indoor according to UMTS 30.30 is utilised.

In Table 7.2 the required path-loss between base stations is calculated as well as the required distances for free space propagation and for indoor propagation as well as for outdoor to indoor propagation. The value for the required distance in the indoor environment is calculated using a continuous attenuation model according to UMTS 30.03. The required distance for outdoor to indoor environment are also depicted in UMTS 30.03. The chosen formula considers a typical urban and suburban environment.

Table 7.2

	Unit	Local area BS to local area BS	Local area BS to wide area BS	Wide area BS to local area BS
Maximum transmit power	dBm	26	26	39
TX antenna gain	dBi	0	0	11
RX antenna gain	dBi	0	11	0
ACLR	dBc	45	45	45
Allowed interference	dBm	-79	-106	-79
Required path loss	dB	**60**	**98**	**84**
Required distance free space	m	11.93	984.42	189.23
Required distance indoor	m	5.84	-	
Indoor-outdoor model	m	-	56.2	25.1

From the table above, it can be observed that already with the minimum requirement a distance below 12 m in the worst case of a line of sight between local area base stations is sufficient to achieve the required de-coupling. Due to this fact there is no need to define a separate proximity requirement for the local area BS. Only an additional co-siting requirement is considered for the local area BS.

7.1.5.1.2 Requirement in case of co-siting with TDD BS or FDD BS operating on an adjacent frequency

The co-siting requirement defines an ACLR requirement, which is based on the worst case BS-BS interference of co-located base stations. Only the co-siting of base stations belonging to one class is considered. In Table 7.3 the maximum interference level for co-sited local area base stations is calculated which corresponds to the same absolute ACLR value.

Table 7.3

	Unit	Local area BS to local area BS
BS-BS MCL	dB	45
Allowed interference	dBm	-79
max. interference level	dBm	**-34**

For the co-location of local area BSs a maximum interference level of -34 dBm is required.

If base stations of different classes are co-sited, it is assumed that the MCL between the base stations has to be increased. In Table 7.4 the required MCL for co-siting of local and wide area base stations is calculated.

Table 7.4

	Unit	Local area BS to wide area BS	Wide area BS to local area BS
ACLR	dBm	-34	-80
Allowed interference	dBm	-106	-79
BS-BS MCL	dB	**72**	**<0**

If wide area and local area base stations are co-located the de-coupling has to be increased to 72 dB to protect the receiver of the wide area BS.

7.1.5.2 New text for ACLR

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the transmitted power to the power measured in an adjacent channel. Both the transmitted and the adjacent channel power are measured through a matched filter (Root Raised Cosine and roll-off 0.22) with a noise power bandwidth equal to the chip rate. The requirements shall apply for all configurations of BS (single carrier or multi-carrier), and for all operating modes foreseen by the manufacturer's specification.

7.1.5.2.1 Minimum Requirement

The ACLR shall be higher than the value specified in Table 7.5.

Table 7.5: BS ACLR

BS adjacent channel offset	ACLR limit
± 5 MHz	45 dB
± 10 MHz	55 dB

7.1.5.2.2 Requirement in case of co-siting with TDD local area BS or FDD local area BS operating on an adjacent frequency

In case the equipment is co-sited to another TDD BS or FDD BS operating on the first or second adjacent frequency, the requirement is specified in terms of the adjacent channel power level of the BS measured in the adjacent channel. The adjacent channel power shall not exceed the limit in Table 7.6.

Table 7.6: BS ACLR in case of co-siting

BS class	BS adjacent channel offset	Maximum Level	Measurement Bandwidth
Wide area BS	± 5 MHz	-80 dBm	3.84 MHz
Wide area BS	± 10 MHz	-80 dBm	3.84 MHz
Local area BS	± 5 MHz	-34 dBm	3.84 MHz
Local area BS	± 10 MHz	-34 dBm	3.84 MHz

NOTE: The requirement is based on a minimum coupling loss of 30 dB between wide area base stations and a minimum coupling loss of 45 dB between local area base stations. For the co-siting of unsynchronised base stations of different classes operating on adjacent frequencies a minimum coupling loss of 72 dB between wide area and local area base stations is assumed.

7.1.6 New text for reference sensitivity level

The reference sensitivity is the minimum receiver input power measured at the antenna connector at which the FER/BER does not exceed the specific value indicated in section 7.2.1.

7.1.6.1 Minimum Requirement

For the measurement channel specified in Annex A, the reference sensitivity level and performance of the BS shall be as specified in Table 7.7.

Table 7.7: BS reference sensitivity levels

BS class	Data rate	BS reference sensitivity level (dBm)	FER/BER
Wide area BS	12.2 kbps	-109 dBm	BER shall not exceed 0.001
Local area BS	12.2 kbps	-95 dBm	BER shall not exceed 0.001

7.1.7 New text for adjacent channel selectivity (ACS)

Adjacent channel selectivity (ACS) is a measure of the receiver ability to receive a wanted signal at its 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).

7.1.7.1 Minimum Requirement

The BER shall not exceed 0.001 for the parameters specified in Table 7.8.

Table 7.8: Adjacent channel selectivity

Parameter		Level	Unit
Data rate		12.2	kbps
Wanted signal		Reference sensitivity level + 6dB	dBm
Interfering signal	Wide area BS	-52	dBm
	Local area BS	-38	dBm
Fuw (Modulated)		5	MHz

7.1.8 Blocking and Intermodulation Characteristics

7.1.8.1 Justification

7.1.8.1.1 Simulation Description

To derive values for the level of the interfering signal at a minimum offset frequency of 10 MHz for the local area BS, multi operator simulations were performed with a snapshot based monte-carlo simulator, using at least 10000 trials. The indoor environment is applied while the number of penetrated floors is set to zero and a path loss model according to UMTS30.03, using continuous attenuation. In the simulations a 8kbps service is considered. The receiver noise of the base station is set to -89 dBm, for the terminal it is set to -99dBm. Further basic simulation assumptions are depicted in Table 7.9. In order to have an homogenous coverage with base stations a placement of the BS of the two operators was chosen as shown in Figure 7.1.

Table 7.9: Simulation parameters

Reference sensitivity level	-95 dBm
considered service	8 kbps
number of users (victim and interferer system)	57MS/4TS
max. BS Tx power	26 dBm
min CIR BS	-8.1 dBm
ACS BS	53 dB
BS power control range	30 dB
BS receiver noise	-89 dBm
max. MS Tx power	21 dBm
min. CIR MS	-5.6 dBm
ACLR2 of UE	43 dB
MS power control range	65 dB
MS receiver noise	-99 dBm
Spreading factor	16
Indoor path loss model	continuous attenuation (UMTS 30.03)
Fading standard deviation	12 dB

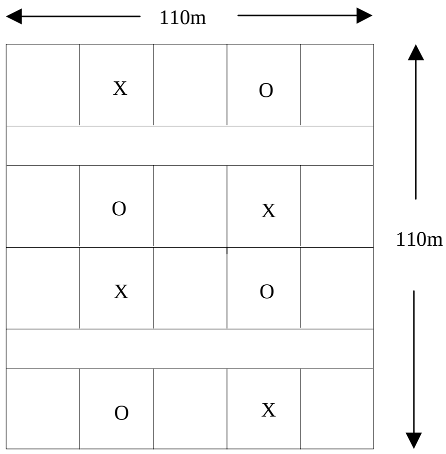

Figure 7.1: Placement of the base stations in the multi operator scenario (X is operator 1, O is operator 2)

The aim in the simulations is to obtain the adjacent channel interference I_{adj} at a chosen base station of operator 1 caused by the terminals of operator 2 to verify the interference level given in Tdoc R4–010268. For the simulations, the scenario is filled with the maximum number of users for a 2 % blocking probability according to the Erlang B formula. During each trial of the simulation random drops of the UEs are made and the power levels are adapted for each link. One base station of operator one is determined to be the victim station. At this station the adjacent channel interference I_{adj} caused by the uplink of operator 2 is recorded.

In the next section the simulation results received with the given assumptions are introduced.

7.1.8.1.2 Simulation Results

With the simulation parameters given in Table 7.9 we obtain an outage below 1 percent and a noise raise of 13.9 dB after 10000 trials. Also note that all results are derived for a capacity loss of 0. Figure 7.2 shows the CDF of the adjacent channel interference measured at the victim base station receiver caused by the strongest and the second strongest interferer. In Figure 7.2 it can be seen that the difference of the interference levels caused by the strongest interferer I_{adj1} and the second strongest interferer I_{adj2} is approximately 10 dB. For this reason the influence on the victim station is dominated by I_{adj1}.

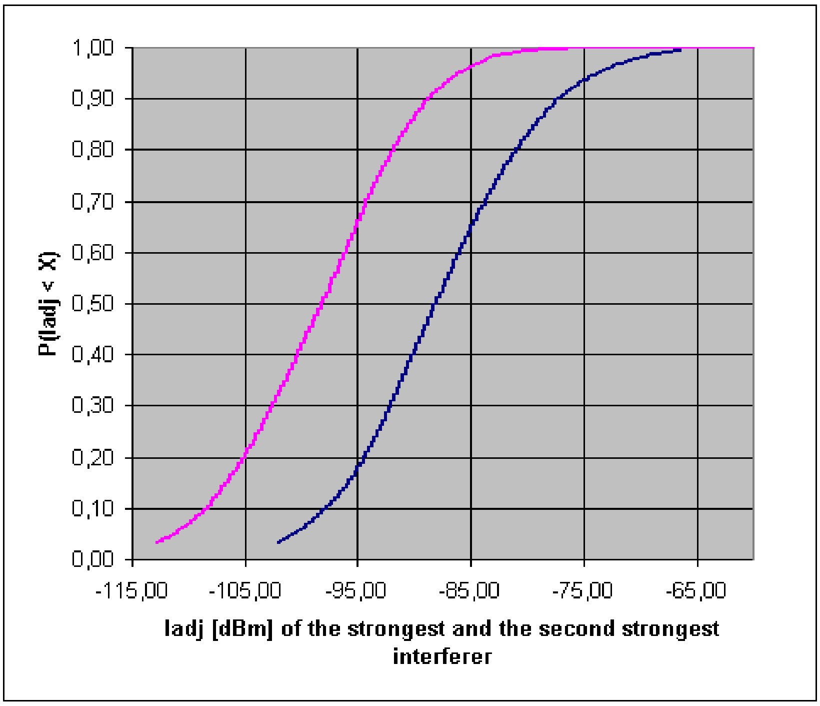

Figure 7.2: CDFs of the adjacent interference I_{adj} originating from the strongest interferer and the second strongest interferer at the victim BS. Parameter: P_{noise} = -89 dBm.

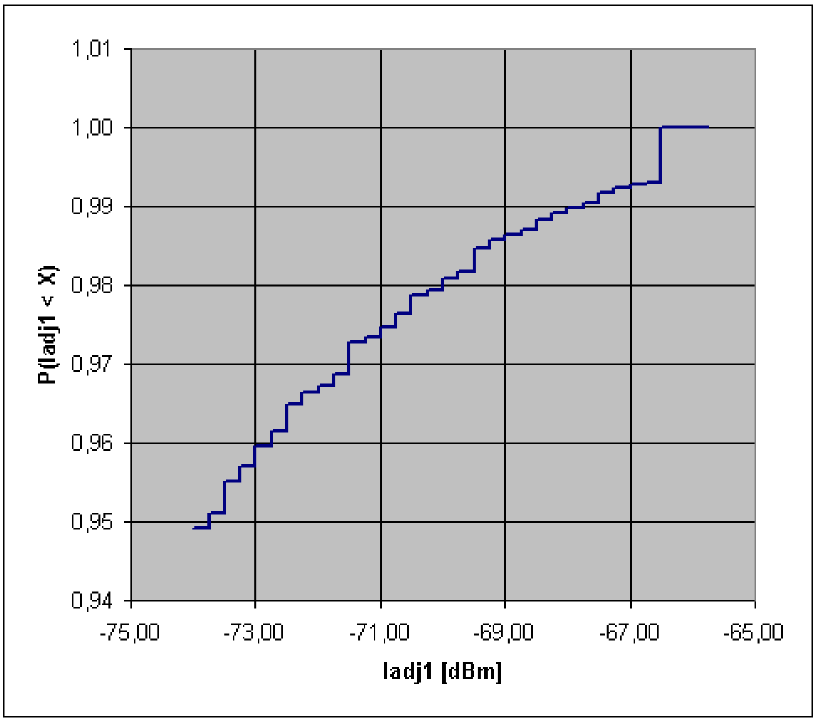

Figure 7.3: CDF of I_{adj1} originating from the strongest interferer at the victim BS. Parameter: P_{noise} = -89 dBm (zoomed in).

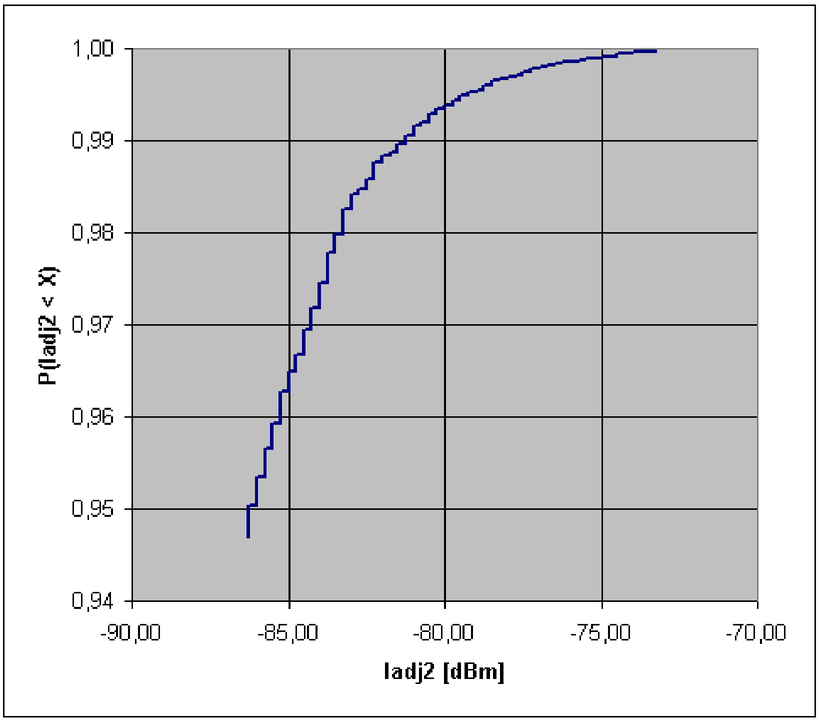

Figure 7.4: CDF of I_{adj2} originating from the second strongest interferer at the victim BS. Parameter: P_{noise} = -89 dBm (zoomed in).

Figure 7.3 shows a zoomed in extract of the CDF of the strongest interferer depicted in Figure 7.2 for probabilities between 94 and 100 percent. At -66.5 dBm a sharp discontinuity can be seen.

This can be explained by the fact that in a small scenario the strongest interferer will be located only a few times close to the victim station while transmitting with high power levels.

Figure 7.4 shows the zoomed in extract of the CDF of the interference level I_{adj2} caused by second strongest interferer.

7.1.8.1.3 Local Area BS Receiver Blocking

With an ACLR2 of the terminal equal to 43 dB and a maximum level of interference of -30 dBm which was proposed in Tdoc R4-010268 an adjacent channel interference of -73 dBm is allowed. The probability of levels below -73 dBm is greater than 95.5 percent which corresponds to a deviation of 2σ of the normal distribution. Therefore an interference level of -30dBm is considered to be sufficient for the receiver blocking.

7.1.8.1.4 Local Area BS Receiver Blocking

For the derivation of the intermodulation characteristic of the wide area base station the second strongest interferer is considered and a level of the interfering signals 8 dB below the blocking requirement are considered to be sufficient.

For the local area base station the same assumptions are taken into account. This leads to an interference level of -38 dBm. With an ACLR2 of the UE of 43 dB a level of -81 dBm is obtained. With the results depicted in Figure 7.4 the occurrence of a signal level below -81 dBm for the second strongest interferer is higher than 99 percent. With these facts a value of -38 dBm is considered to be sufficient.

7.1.8.2 New text for 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 shall apply at all frequencies as specified in the tables below, using a 1MHz step size.

The static reference performance as specified in clause 7.1.5.1 in TS25.105 should be met with a wanted and an interfering signal coupled to BS antenna input using the following parameters.

Table 7.10(a): Blocking requirements for operating bands defined in 5.2(a)

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	-30 dBm	<REFSENS> + 6 dB	10 MHz	WCDMA signal with one code
1880 – 1900 MHz, 1990 – 2010 MHz, 2025 – 2045 MHz	-30 dBm	<REFSENS> + 6 dB	10 MHz	WCDMA signal with one code
1920 – 1980 MHz	-30 dBm	<REFSENS> + 6 dB	10 MHz	WCDMA signal with one code
1 – 1880 MHz, 1980 – 1990 MHz, 2045 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 7.10(b): Blocking requirements for operating bands defined in 5.2(b)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1850 – 1990 MHz	-30 dBm	<REFSENS> + 6 dB	10 MHz	WCDMA signal with one code
1830 – 1850 MHz, 1990 – 2010 MHz	-30 dBm	<REFSENS> + 6 dB	10 MHz	WCDMA signal with one code
1 – 1830 MHz, 2010 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 7.10(c): Blocking requirements for operating bands defined in 5.2(c)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1910 – 1930 MHz	-30 dBm	<REFSENS> + 6 dB	10 MHz	WCDMA signal with one code
1890 – 1910 MHz, 1930 – 1950 MHz	-30 dBm	<REFSENS> + 6 dB	10 MHz	WCDMA signal with one code
1 – 1890 MHz, 1950 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

7.1.8.3 New text for 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 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.

The static reference performance as specified in clause 7.1.5.1 in TS 25.105 should be met when the following signals are coupled to BS antenna input.

- A wanted signal at the assigned channel frequency, 6 dB above the static reference level.
- Two interfering signals with the following parameters.

Table 7.11: Intermodulation requirement

Interfering Signal Level	Offset	Type of Interfering Signal
- -38 dBm	10 MHz	CW signal
- -38 dBm	20 MHz	WCDMA signal with one code

7.1.9 New text for demodulation in static propagation conditions

7.1.9.1 Demodulation of DCH

The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

7.1.9.1.1 Minimum requirement

This performance requirement is independent of the BS class. For the parameters specified in Table 7.12 for the local area BS the same performance requirement as specified in chapter 8.2.1.1 of TS 25.105 for the wide area BS shall apply.

Table 7.12: Parameters in static propagation conditions

Parameters		Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$			6	4	0	0
$\frac{DPCH_o\_E_c}{I_{or}}$		dB	-9	-9.5	0	0
I_{oc}	Wide area BS	dBm/3.84 MHz	-89			
	Local area BS	dBm/3.84 MHz	-74			
Information Data Rate		Kbps	12.2	64	144	384

7.1.10 New text for demodulation of DCH in multipath fading conditions

7.1.10.1 Multipath fading Case 1

The performance requirement of DCH in multipath fading Case 1 is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

7.1.10.1.1 Minimum requirement

The performance requirement is independent of the BS class. For the parameters specified in Table 7.13 for the local area BS the same performance requirement as specified in chapter 8.3.1.1 of TS 25.105 for the wide area BS shall apply.

Table 7.13: Parameters in multipath Case 1 channel

Parameters		Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$			6	4	0	0
$\frac{DPCH_o\_E_c}{I_{or}}$		dB	-9	-9.5	0	0
I_{oc}	Wide area BS	dBm/3.84 MHz	-89			
	Local area BS	dBm/3.84 MHz	-74			
Information Data Rate		kbps	12.2	64	144	384

7.1.10.2 Multipath fading Case 2

The performance requirement of DCH in multipath fading Case 2 is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

This requirement shall not be applied to Local Area BS.

7.1.10.3 Multipath fading Case 3

The performance requirement of DCH in multipath fading Case 3 is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

This requirement shall not be applied to Local Area BS.

7.1.11 New text for receiver 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.

7.1.11.1 Minimum requirement

The BER shall not exceed 0.001 for the parameters specified in Table 7.14.

Table 7.14: Dynamic Range

Parameter		Level	Unit
Data rate		12.2	kbps
Wanted signal		<REFSENS> + 30 dB	dBm
Interfering AWGN signal	Wide Area BS	-73	dBm/3.84 MHz
	Local Area BS	-59	dBm/3.84 MHz

7.2 Changes in 25.123

This section describes the considered changes to requirements on UTRAN measurements, with respect to Release 1999 requirements in TS25.123.

7.2.1 New text for performance for UTRAN measurements in uplink (RX)

7.2.1.1 RSCP

The measurement period shall be [100] ms.

7.2.1.1.1 Absolute accuracy requirements

Table 7.15: RSCP absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions	BS class
		Normal conditions	**Extreme conditions**	Io [dBm]	
RSCP	dB	± 6	± 9	-105..-74	Wide area BS
RSCP	dB	± 6	± 9	-91..-60	Local area BS

7.2.1.1.2 Relative accuracy requirements

Table 7.16: RSCP relative accuracy

Parameter	Unit	Accuracy [dB]	Conditions	BS class
			Io [dBm]	
RSCP	dB	± 3 for intra-frequency	-105..-74	Wide area BS
RSCP	dB	± 3 for intra-frequency	-91..-60	Local area BS

7.2.1.1.3 Range/mapping

The reporting range for *RSCP* is from -120 ...-66 dBm.

In Table 7.17 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 7.17

Reported value	Measured quantity value	Unit
RSCP_LEV _00	RSCP <–120,0	dBm
RSCP_LEV _01	-120,0 ≤ RSCP < –119,5	dBm
RSCP_LEV _02	-119,5 ≤ RSCP < –119,0	dBm
…	…	…
RSCP_LEV _107	-67,0 ≤ RSCP < -66,5	dBm
RSCP_LEV _108	-66,5 ≤ RSCP < -66,0	dBm
RSCP_LEV _109	-66,0 ≤ RSCP	dBm

7.2.1.2 Timeslot ISCP

The measurement period shall be [100] ms.

7.2.1.2.1 Absolute accuracy requirements

Table 7.18: Timeslot ISCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions	BS class
		Normal conditions	Extreme conditions	Io [dBm]	
Timeslot ISCP	dB	± 6	± 9	-105..-74	Wide area BS
Timeslot ISCP	dB	± 6	± 9	-91..-60	Local area BS

7.2.1.2.2 Range/mapping

The reporting range for *Timeslot ISCP* is from -120...-66 dBm.

In Table 7.19 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 7.19

Reported value	Measured quantity value	Unit
UTRAN_TS_ISCP_LEV_00	Timeslot_ISCP < –120,0	dBm
UTRAN_TS_ISCP_LEV_01	-120,0 ≤ Timeslot_ISCP < –119,5	dBm
UTRAN_TS_ISCP_LEV_02	-119,5 ≤ Timeslot_ISCP < –119,0	dBm
…	…	…
UTRAN_TS_ISCP_LEV_107	-67,0 ≤ Timeslot_ISCP < -66,5	dBm
UTRAN_TS_ISCP_LEV_108	-66,5 ≤ Timeslot_ISCP < -66,0	dBm
UTRAN_TS_ISCP_LEV_109	-66,0 ≤ Timeslot_ISCP	dBm

7.2.1.3 Received total wide band power

The measurement period shall be [100] ms.

7.2.1.3.1 Absolute accuracy requirements

Table 7.20: RECEIVED TOTAL WIDE BAND POWER Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]	Conditions	BS class
			Io [dBm]	
RECEIVED TOTAL WIDE BAND POWER	dB	± 4	-105..-74	Wide area BS
RECEIVED TOTAL WIDE BAND POWER	dB	± 4	-91..-60	Local area BS

7.2.1.3.2 Range/mapping

The reporting range for *RECEIVED TOTAL WIDE BAND POWER* is from -112 ... -50 dBm.

In Table 7.21 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 7.21

Reported value	Measured quantity value	Unit
RECEIVED TOTAL WIDE BAND POWER_LEV _000	RECEIVED TOTAL WIDE BAND POWER < –112,0	dBm
RECEIVED TOTAL WIDE BAND POWER_LEV _001	-112,0 ≤ RECEIVED TOTAL WIDE BAND POWER < –111,9	dBm
RECEIVED TOTAL WIDE BAND POWER_LEV _002	-111,9 ≤ RECEIVED TOTAL WIDE BAND POWER < –111,8	dBm
…	…	…
RECEIVED TOTAL WIDE BAND POWER_LEV _619	-50,2 ≤ RECEIVED TOTAL WIDE BAND POWER < -50,1	dBm
RECEIVED TOTAL WIDE BAND POWER_LEV _620	-50,1 ≤ RECEIVED TOTAL WIDE BAND POWER < -50,0	dBm
RECEIVED TOTAL WIDE BAND POWER_LEV _621	-50,0 ≤ RECEIVED TOTAL WIDE BAND POWER	dBm

7.2.2 New text for test cases for measurement performance for UTRAN

7.2.2.1 UTRAN RX measurements

If not otherwise stated, the test parameters in Table 7.22 for the wide area BS and Table 7.23 for the local area BS should be applied for UTRAN RX measurements requirements in this clause.

Table 7.22: Intra frequency test parameters for UTRAN RX measurements for wide area BS

Parameter	Unit	Cell 1
UTRA RF Channel number		Channel 1
Timeslot		[ ]
DPCH Ec/Ior	dB	[ ]
Îor/Ioc	dB	[ ]
Ioc	dBm/ 3,84 MHz	-89
Range: Io	dBm	-105..-74
Propagation condition	-	AWGN

Table 7.23: Intra frequency test parameters for UTRAN RX Measurements for local area BS

Parameter	Unit	Cell 1
UTRA RF Channel number		Channel 1
Timeslot		[ ]
DPCH Ec/Ior	dB	[ ]
Îor/Ioc	dB	[ ]
Ioc	dBm/ 3,84 MHz	-74
Range: Io	dBm	-91..-60
Propagation condition	-	AWGN

7.3 Changes in 25.142

This section describes the considered changes to base station conformance testing, with respect to Release 1999 requirements in TS25.142.

8 Impacts to other WGs

8.1 WG1

8.2 WG2

8.3 WG3

9 Backward compatibility

Annex A: Change history

Table A.1: Document History

Date	Version	Comment
14 Sept 2000	0.0.1	Document created
24 Nov 2000	1.0.0	Update based on TSG RAN WG4 meeting #14 approved input documents R4-000860, R4-000880, R4-000882, R4-000883, R4-000884
30 Jan 2001	1.0.1	Update based on TSG RAN WG4 meeting #15 approved input documents R4-010080, R4-010081, R4-010084, R4-010152
05 March 2001	1.1.0	Update based on TSG RAN WG4 meeting #16 approved input documents R4-010067, R4-010068, R4-010069, R4-010070, R4-010071
01 June 2001	2.0.0	Updated based on TSG RAN WG4 meeting #17 approved input documents R4-010597, R4-010625, R4-010652, R4-010653
27 June 2001	5.0.0	Approval at RAN#12, report under change control

History

Document history		
V5.0.0	June 2001	Publication