Title: CRs (R'99 and Rel-4 Category A) to TS 25.142

Source TSG RAN WG4

Agenda item: 8.4.3

RAN4 Tdoc	Spec	CR	Title	Cat	Phase	Curr Ver	New Ver
R4-010828	25.142	65	Clarification of AWGN interferer definition	F	Rel99	3.6.0	3.7.0
R4-011082	25.142	66	Clarification of AWGN interferer definition	Α	Rel-4	4.1.0	4.2.0
R4-010831	25.142	67	Measurement uncertainty	F	Rel99	3.6.0	3.7.0
R4-011083	25.142	68	Measurement uncertainty	Α	Rel-4	4.1.0	4.2.0
R4-010946	25.142	69	Receiver spurious emissions for co-located base stations	F	Rel99	3.6.0	3.7.0
R4-011084	25.142	70	Receiver spurious emissions for co-located base stations	Α	Rel-4	4.1.0	4.2.0
R4-011120	25.142	71	CR to TS 25.142 Measurement uncertainty issues	F	Rel99	3.6.0	3.7.0
R4-011121	25.142	72	CR to TS 25.142 Measurement uncertainty issues	Α	Rel-4	4.1.0	4.2.0
R4-011135	25.142	73	Power and ACLR definition corrections	F	Rel99	3.6.0	3.7.0
R4-011085	25.142	74	Power and ACLR definition corrections	Α	Rel-4	4.1.0	4.2.0
R4-011182	25.142	75	Minimum transmit power test condition alignment with PC dynamic range test conditions.	F	Rel99	3.6.0	3.7.0
R4-011283	25.142	76	Minimum transmit power test condition alignment with PC dynamic range test conditions.	A	Rel-4	4.1.0	4.2.0
R4-011280	25.142	77	Correction of frequency range for receiver spurious emissions	F	Rel99	3.6.0	3.7.0
R4-011281	25.142	78	Correction of frequency range for receiver spurious emissions	A	Rel-4	4.1.0	4.2.0
R4-011292	25.142	79	Definition of "classical Doppler spectrum"	F	Rel99	3.6.0	3.7.0
R4-011296	25.142	80	Definition of "classical Doppler spectrum"	A	Rel-4	4.1.0	4.2.0

R4-010828

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

						CR-Form-
CHANGE REQUEST						
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ф (25.14	12 CR 00	ተ		њ Current vers	3.6.0 **
For HELP on ι	isina this	form. see bottom	of this pao	e or look a	t the pop-up text	over the % symbols.
· · ·	9	,				
Proposed change	affects:	₩ (U)SIM	ME/UE	Radio	Access Networ	k X Core Network
Title: ೫	Clarific	cation of AWGN ir	nterferer de	finition		
Source: #	RANM	VGA				
Source. m		VG4				
Work item code: भ					<i>Date:</i>	9 July 2001
Category: #	F				Release: #	Rel99
	Use <u>one</u>	of the following ca	tegories:		Use <u>one</u> of	the following releases:
	F (correction)	-		2	(GSM Phase 2)
	A (corresponds to a co	orrection in a	n earlier rele	ease) R96	(Release 1996)
	В (addition of feature)	tion of featur	ما	R97 R08	(Release 1997) (Release 1998)
	ם מ	editorial modificatio	n)	-	R90 R99	(Release 1990)
	Detailed	explanations of the	above cate	gories can	REL-4	(Release 4)
	be found	l in 3GPP <u>TR 21.90</u>	<u>0</u> .	-	REL-5	(Release 5)
Reason for change	e: ೫ TI	he existing AWG	l interferer	definition is	s incomplete.	
Summary of chan		he flatness across	the minim	um handwi	dth and the neal	k to average ratio of the
ounnary or chang	A	WGN interferer a	re specified		and the peak	to average ratio of the
				•		
Consequences if	ж <mark>А</mark> і	n AWGN signal w	vith insufficio	ent random	iness may be us	ed which will artificially
not approved:	in	nprove test results	S.			
Clauses affected:	Ж <mark>3;</mark>	; 5.18 (new); 7.3.4	1.1; 8.1			
Other specs	ж 📃	Other core spec	ifications	ж		
affected:		Test specificatio	ns			
		O&M Specificati	ons			

How to create CRs using this form:

ж

Other comments:

- 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 <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Definitions, symbols, and abbreviations

For the purposes of the present document, the following definitions, symbols and abbreviations apply:

3GPP	3rd Generation Partnership Project
α	Roll-off factor
AWGN	Additive White Gaussian Noise
dB	decibel
dBm	decibel relative to 1 milliWatt
DPCHo	Mechanism used to simulate an individual intracell interferer in the cell with one code and a
	spreading factor of 16
$\frac{DPCH_o_E_c}{I_{or}}$	Ratio of the average transmit energy per PN chip for the DPCH_{0} to the total transmit power
	spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
EVM	Error Vector Magnitude
F	Frequency (of the assigned channel frequency of the wanted signal)
Fuw	Frequency offset of the unwanted interfering signal from the assigned channel frequency of the wanted signal
IMT-2000	International Mobile Telecommunications 2000
Ioc	Power spectral density of a band limited white noise source (simulating interference form other
	cells) as measured at the BS antenna connector.
Îor	Received power spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
IPR	Intellectual Property Rights
Р	Transmit power
Pout	Output power of the base station; defined as the mean power of one carrier delivered to a load with resistance equal to the nominal load impedance of the transmitter during one slot
Pmax	Maximum output power of the base station; defined as the mean power level per carrier over an
	active timeslot measured at the antenna connector for a specified reference condition
RBER	Residual BER
REFSENS	Reference Sensitivity Level
RMS	Root-Mean Square
PRAT	Rated output power of the base station; defined as the mean power level per carrier over an active
	timeslot that the manufacturer has declared to be available at the antenna connector
RRC	Root-Raised Cosine
T _C	Chip duration
TS	Time Slot

5.18 Definition of Additive White Gaussian Noise (AWGN) Interferer

The minimum bandwidth of the AWGN interferer shall be 1,5 times chip rate of the radio access mode (e.g. 5,76 MHz for a chip rate of 3,84 Mcps). The flatness across this minimum bandwidth shall be within \pm 0,5 dB, and the peak to average ratio at a probability of 0,001% shall exceed 10 dB.

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.

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

7.3.2 Minimum Requirements

The BER shall not exceed 0,001 for the parameters specified in table 7.3.

 Table 7.3: Dynamic Range

Parameter	Level	Unit	
Data rate	12,2	kbit/s	
Wanted signal	<refsens> + 30 dB</refsens>	dBm	
Interfering AWGN signal	-73	dBm/3,84 MHz	

The normative reference for this requirement is TS 25.105 [1] subclause 7.3.

7.3.3 Test purpose

The test purpose is to verify the ability of the BS to receive a prescribed single-code test signal of maximum input power under defined conditions (specified interference, no multipath) 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 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

- (1) Connect the BS tester (UE simulator), generating the wanted signal, and a band-limited white noise source, generating the interfering AWGN signal, to the antenna connector of one BS Rx port.
- (2) Terminate or disable any other BS Rx port not under test.
- (3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12,2 kbps) defined in Annex A.2.1.
- (4) The level of the BS tester output signal measured at the BS antenna connector shall be adjusted as specified in table 7.4.
- (5) The power spectral density of the band-limited white noise source measured at the BS antenna connector shall be adjusted as specified in table 7.4. The characteristics of the white noise source shall comply with the AWGN interferer definition in subclause 5.18. The minimum bandwidth of the white noise source shall be 1,5 times the chip rate (5,76 MHz for a chip rate of 3,84 MHz).

8 Performance requirements

8.1 General

Performance requirements for the BS are specified for the measurement channels defined in Annex A and the propagation conditions in Annex B. The requirements only apply to those measurement channels that are supported by the base station.

The <u>characteristics</u> minimum bandwidth of the white noise source, simulating interference from other cells $(I_{oc})_{2}$ shall <u>comply with the AWGN interferer definition in subclause 5.18</u>. be 1,5 times the chip rate (5,76 MHz for a chip rate of 3,84 MHz).

The requirements only apply to a base station with dual receiver antenna diversity. The required \hat{I}_{or}/I_{oc} shall be applied separately at each antenna port.

R4-011082

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

	CR-Form-v4				
CHANGE REQUEST					
æ	25.142 CR ⁶⁶ [#] ev - [#] Current version: 4.1.0 [#]				
For HFI P on I	using this form, see bottom of this page or look at the pop-up text over the # symbols				
Proposed change	affects: # (U)SIM ME/UE Radio Access Network X Core Network				
Title: #	Clarification of AWGN interferer definition				
Source: #	RAN WG4				
Work item code:₩	Date: # 3 September 2001				
Category: ¥	Release: %Rel-4Use one of the following categories:Use one of the following releases:F (correction)2A (corresponds to a correction in an earlier release)R96B (addition of feature),R97C (functional modification of feature)R98D (editorial modification)R99D tetailed explanations of the above categories canREL-4be found in 3GPP TR 21.900.REL-5				
Reason for change: # The existing AWGN interferer definition is incomplete. Summary of change: # The flatness across the minimum bandwidth and the peak to average ratio of the AWGN interferer are specified.					
Consequences if not approved:	# An AWGN signal with insufficient randomness may be used which will artificially improve test results.				
Clauses affected:	₩ 3; 5.18 (new); 7.3.4.1.1; 7.3.4.1.2; 8.1				
Other specs affected:	% Other core specifications % Test specifications %				

Other comments: # This CR corresponds to R99 Cat F CR in tdoc R4-010828.

O&M Specifications

How to create CRs using this form:

- 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 <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Definitions, symbols, and abbreviations

For the purposes of the present document, the following definitions, symbols and abbreviations apply:

3GPP	3rd Generation Partnership Project
α	Roll-off factor
AWGN	Additive White Gaussian Noise
dB	decibel
dBm	decibel relative to 1 milliWatt
DPCHo	Mechanism used to simulate an individual intracell interferer in the cell with one code and a spreading factor of 16
$\frac{DPCH_o _ E_c}{I_{or}}$	Ratio of the average transmit energy per PN chip for the DPCH _o to the total transmit power
	spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
EVM	Error Vector Magnitude
F	Frequency (of the assigned channel frequency of the wanted signal)
Fuw	Frequency offset of the unwanted interfering signal from the assigned channel frequency of the wanted signal
IMT-2000	International Mobile Telecommunications 2000
Ioc	Power spectral density of a band limited white noise source (simulating interference form other cells) as measured at the BS antenna connector.
Îor	Received power spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
IPR	Intellectual Property Rights
Р	Transmit power
Pout	Output power of the base station; defined as the mean power of one carrier delivered to a load with resistance equal to the nominal load impedance of the transmitter during one slot
Pmax	Maximum output power of the base station; defined as the mean power level per carrier over an active timeslot measured at the antenna connector for a specified reference condition
RBER	Residual BER
REFSENS	Reference Sensitivity Level
RMS	Root-Mean Square
PRAT	Rated output power of the base station; defined as the mean power level per carrier over an active
	timeslot that the manufacturer has declared to be available at the antenna connector
RRC	Root-Raised Cosine
T _C	Chip duration
TS	Time Slot

5.18 Definition of Additive White Gaussian Noise (AWGN) Interferer

The minimum bandwidth of the AWGN interferer shall be 1,5 times chip rate of the radio access mode (e.g. 5,76 MHz for a chip rate of 3,84 Mcps and 1,92 MHz for a chip rate of 1,28 Mcps). The flatness across this minimum bandwidth shall be within \pm 0,5 dB, and the peak to average ratio at a probability of 0,001% shall exceed 10 dB.

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.

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

7.3.2 Minimum Requirements

7.3.2.1 3,84 Mcps TDD option

The BER shall not exceed 0,001 for the parameters specified in table 7.3.

Table 7.3: Dynamic Range

Parameter	Level	Unit	
Data rate	12,2	kbit/s	
Wanted signal	<refsens> + 30 dB</refsens>	dBm	
Interfering AWGN signal	-73	dBm/3,84 MHz	

7.3.2.2 1,28 Mcps TDD option

The BER shall not exceed 0,001 for the parameters specified in table 7.3A.

Table 7.3A: Dynamic Range for 1,28 Mcps TDD

Parameter	Level	Unit	
Data rate	12,2	kbit/s	
Wanted signal	<refsens> + 30 dB</refsens>	dBm	
Interfering AWGN signal	-76	dBm/1,28 MHz	

The normative reference for this requirement is TS 25.105 [1] subclause 7.3.

7.3.3 Test purpose

The test purpose is to verify the ability of the BS to receive a prescribed single-code test signal of maximum input power under defined conditions (specified interference, no multipath) with a BER not exceeding a specified limit.

7.3.4 Method of test

7.3.4.1 Initial conditions

7.3.4.1.1 3,84 Mcps TDD option

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

- (1) Connect the BS tester (UE simulator), generating the wanted signal, and a band-limited white noise source, generating the interfering AWGN signal, to the antenna connector of one BS Rx port.
- (2) Terminate or disable any other BS Rx port not under test.

- (3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12,2 kbps) defined in Annex A.2.1.
- (4) The level of the BS tester output signal measured at the BS antenna connector shall be adjusted as specified in table 7.4.
- (5) The power spectral density of the band-limited white noise source measured at the BS antenna connector shall be adjusted as specified in table 7.4. The <u>characteristics of the white noise source shall compy with the AWGN</u> <u>interferer definition in subclause 5.18. minimum bandwidth of the white noise source shall be 1,5 times the chip rate (5,76 MHz for a chip rate of 3,84 MHz).</u>

7.3.4.1.2 1,28 Mcps TDD option

- (1) Connect the BS tester (UE simulator), generating the wanted signal, and a band-limited white noise source, generating the interfering AWGN signal, to the antenna connector of one BS Rx port.
- (2) Terminate or disable any other BS Rx port not under test.
- (3) Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex A.2.1.
- (4) The level of the BS tester output signal measured at the BS antenna connector shall be adjusted as specified in table 7.3A.
- (5) The power spectral density of the band-limited white noise source measured at the BS antenna connector shall be adjusted as specified in table 7.3A. The <u>characteristics of the white noise source shall compy with the AWGN</u> <u>interferer definition in subclause 5.18. minimum bandwidth of the white noise source shall be 1,5 times the chip</u> rate (2,4 MHz for a chip rate of 1,28 MHz).

8 Performance requirements

8.1 General

Performance requirements for the BS are specified for the measurement channels defined in Annex A and the propagation conditions in Annex B. The requirements only apply to those measurement channels that are supported by the base station.

The <u>characteristics</u>minimum bandwidth of the white noise source, simulating interference from other cells $(I_{oc})_{a}$ shall <u>comply with the AWGN interferer definition in subclause 5.18 be 1,5 times the chip rate</u>.

The requirements only apply to a base station with dual receiver antenna diversity. The required \hat{I}_{or}/I_{oc} shall be applied separately at each antenna port.

R4-010831

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

	CR-Form-v4				
CHANGE REQUEST					
¥	25.142 CR ⁶⁷ # ev _ # Current version: 3.6.0 #				
For <u>HELP</u> on u	sing this form, see bottom of this page or look at the pop-up text over the # symbols.				
Proposed change	affects: % (U)SIM ME/UE Radio Access Network X Core Network				
Title: ೫	Measurement uncertainty				
Source: ೫	RAN WG4				
Work item code: ℜ	Date: 米 9 July 2001				
Category: ⊮	FRelease: %Rel99Use one of the following categories:Use one of the following releases:2(GSM Phase 2)A (corresponds to a correction in an earlier release)R96(Release 1996)B (addition of feature),R97(Release 1997)C (functional modification of feature)R98(Release 1998)D (editorial modification)R99(Release 1999)Detailed explanations of the above categories canREL-4(Release 4)be found in 3GPP TR 21.900.REL-5(Release 5)				
Reason for change	Reason for change: # Alignment with recent changes in TS 25.141 based on additional work on measurement uncertainty at TEM Meeting #04.				
Summary of chang	e: # Various updates				
Consequences if not approved:	# Incorrect setting of test limits for conformance testing.				
Clauses affected:	¥ 5.10.2; 5.10.3				
Other specs affected:	% Other core specifications % Test specifications Ø&M Specifications				

How to create CRs using this form:

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Other comments:

- 1) Fill out the above form. The symbols above marked **#** contain pop-up help information about the field that they are closest to.
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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.

5.10.2 Measurement of transmitter

Subclause	Maximum Test System Uncertainty	Derivation of Test System	
		Uncertainty Measurement	
		range	
		(see NOTE)	
6.2 Maximum Output Power	± 0,7 dB		
6.3 Frequency stability	± 12 Hz	<u>± 500 Hz</u>	
6.4.2 Power control steps	single step: ± 0,1 dB	Result is difference between two	
		absolute Code Domain Power	
	ten steps: ± 0.3 dB	measurements on the power	
C.4.2. Device control durancia		controlled DPCH.	
6.4.3 Power control dynamic	± 0,3 dB		
6 4 4 Minimum transmit power	+ 0.7 dB		
6.4.5 Primary CCPCH power	± 0.8 dB		
6.5.1 Transmit OFF power	± 2,0 dB		
6.5.2 Transmit ON/OFF time mask	Tx power limit = -79 dBm: ± 2,0 dB		
	Tx power limit = -33 dBm: ± 0,7 dB		
6.6.1 Occupied Bandwidth	± 100 kHz	Accuray = $\pm 3 \times RBW$.	
		Assume 30 kHz bandwidth.±1,0	
		MHz	
6.6.2.1 Spectrum emission mask	± 1,5 dB		
6.6.2.2 Adjacent Channel	minimum requirement:	Signal power = PRAT	
Leakage power Ratio (ACLR)			
	TO MHZ OUSEL: ± 0.8 dB		
	requirement in case of operation in proximity to		
	TDD BS or FDD BS operating on an adjacent		
	frequency:		
	5 MHz offset: ± 4 dB		
	10 MHz offset: ±4 dB		
	requirement in case of co-siting with TDD BS or		
	FDD BS operating on an adjacent frequency:		
	D MHZ OIISEL. TBD		
	Note: Impact of measurement period (averaging)		
	and intermod effects in the measurement		
	receiver not yet fully studied.		
6.6.3 Spurious emissions	\pm 2,0 dB for BS and coexistence bands for		
	results		
	> -60 dBm		
	\pm 3,0 dB for results < -60 dBm		
	Outside above range:		
	$f < 2.2 \text{ GHz}^2$ + 1.5 dB		
	2.2 GHz < f < 4 GHz; + 2.0 dB		
	$f > 4 \text{ GHz}:$ $\pm 4.0 \text{ dB}$		
6.7 Transmit intermodulation	The value below applies to the setting of the	The uncertainty of the interferer	
	interference signal level only and is unrelated to	has double the effect on the	
	the measurement uncertainty of the tests	result due to the frequency	
	(6.6.2.1, 6.6.2.2 and 6.6.3) which have to be	ottset.Not applicable	
	carried out in the presence of the interference		
	Signal.		
	Hose to ded formale for theoreanny of the fatte.		
	± 1 dB		
6.8.1 Modulation accuracy	± 2,5 % (for single code)	<u>± 5,0 %</u>	
		Signal power = PRAT to (PRAT	
		-30 dB)	

Table_5.3: Maximum Test System Uncertainty for transmitter tests

6.8.2 Peak code doma	ain error ± 1 dB	Signal power = PRAT
NOTE: The Test Sys	stem uncertainty applies for measu	rement results in a range equal to the DUT Test Requirement
(not the Mini	mum Requirement) extended by th	e range specified

5.10.3 Measurement of receiver

	Subclause	Maximum Test System Uncertainty	Derivation of Test System
		(see NOTE 1)	Uncertainty Measurement
			range
			(see NOTE 2)
7.2	Reference sensitivity level	± 0,7 dB	Not applicable
7.3	Dynamic range	± 1,2 dB	Formula =
			SQRT(signal level error ² and
		Formula =	AWGN level error ²)Not
		SQRT(signal level error ² and AWGN level error ²)	applicable
7.4	Adjacent Channel Selectivity	± 1,1 dB	Formula = SQRT
(ACS)			(wanted_level_error ² +
		Formula = SQRT (wanted_level_error ² +	interferer_level_error ²) + ACLR
		interferer_level_error ²) + ACLR effect	effect
		,	
		The ACLR effect is calculated by:	The ACLR effect is calculated by:
		(Formula to follow)	(Formula to follow)Not applicable
7.5	Blocking characteristics	Formula =	Not applicable Formula =
_	3	SQRT (wanted level error ² +	SQRT (wanted level error ² +
		interferer level error ²) + ACLR effect +	interferer level error ²) + ACLR
		Broadband noise	effect + Broadband noise
		Maximum Test System Accuracy with Frequency	(Frequency offset < 15 MHz:
		offset of interfering signal < 15MHz:	assuming ACLR of interfering
		± 1.4dB	signal = 68 dB, measurement
		(assuming ACLR of interfering signal = 68 dB.	uncertainty of wanted signal =
		measurement uncertainty of wanted signal = 0.7	0.7 dB)
		dB)	<u></u>
			(Frequency offset > 15 MHz
		Frequency offset of interfering signal > 15 MHz [·]	assuming –130 dBc broadband
		f < 2.2 GHz + 1.1 dB	noise from interfering signal)
		2.2 GHz < f < 1 GHz + 1.8 dB	noise nom interioring signary
		f \ / GHz: + 3.2 dB	Harmonics and spurs of the
		2 = 0.2 dB	interfering signal need to be
		interfering signal)	carefully considered. Perhaps
			need to avoid harmonics of the
		Harmonics and sours of the interfering signal	interferer that fall on top of the
		need to be carefully considered.	receive channel.
		For the -15 dBm CW interfering signal filtering	For the –15 dBm CW interfering
		of the interfering signal (at least 25 dB) is	signal, filtering of the interfering
		necessary to elimininate problems with	signal (at least 25 dB) is
		broadband noise falling into the bandwidth of the	necessary to elimininate
		wanted signal.	problems with broadband noise
			falling into the bandwidth of the
			wanted signal.
7.6	Intermodulation	+ 1.3 dB	Not applicable
charac	cteristics		$((2*CW evel error)^2 +$
onarac		(assuming:	$(mod level error)^2 +$
		CW level error: 0.5 dB	(wanted signal level error) ²)
		mo level error: 0.5 dB	
		wanted signal level error: 0.7 dB)	(assuming:
			CW level error: 0.5 dB
		Formula:	mod level error: 0.5 dB
		Test-system-uncertainty=	wanted signal level error: 0.7
			dB)
		2 2	
		Y	
1			1

Table_5.4: Maximum Test System Uncertainty for receiver tests

I	7.7 Spurious emissions	\pm 3,0 dB for BS receive band (-78 dBm)	
		Outside above range: $f \le 2, 2 \text{ GHz}$: $\pm 2, 0 \text{ dB}$ (-57 dBm) $2, 2 \text{ GHz} < f \le 4 \text{ GHz}$: $\pm 2, 0 \text{ dB}$ (-47 dBm) $f > 4 \text{ GHz}$: $\pm 4, 0 \text{ dB}$ (-47 dBm) (see Note 2) $\pm 4, 0 \text{ dB}$	
·	NOTE 1: Unless otherwise noted, o	nly the Test System stimulus error is considered h	ere. The effect of errors in the
	BER/FER measurements	due to finite test duration is not considered.	
	NOTE 2: The Test System uncertai	nty applies for measurement results in a range equ	al to the DUT Test Requirement
	(not the Minimum Require	ment) extended by the range specified.	
	NOTE 23: The Test System uncertai	nty figures for Spurious emissions apply to the me	asurement of the DUT and not to
	any stimulus signals.		

R4-011083

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

	CR-Form-v4							
	CHANGE REQUEST							
¥	25.142 CR ⁶⁸ # ev - # Current version: 4.1.0 #							
For <u>HELP</u> on u	For HELP on using this form, see bottom of this page or look at the pop-up text over the # symbols.							
Proposed change	affects: # (U)SIM ME/UE Radio Access Network X Core Network							
Title: ೫	Measurement uncertainty							
Source: #	RAN WG4							
Work item code: ₩	Date: # 3 September 2001							
Category: ⊮	ARelease: %Rel-4Use one of the following categories:Use one of the following releases:F (correction)2A (corresponds to a correction in an earlier release)R96B (addition of feature),R97C (functional modification of feature)R98D (editorial modification)R99D tetailed explanations of the above categories canREL-4be found in 3GPP TR 21.900.REL-5							
Reason for change	Alignment with recent changes in TS 25.141 based on additional work on measurement uncertainty at TEM Meeting #04.							
Summary of chang	ye: ដ Various updates							
Consequences if not approved:	# Incorrect setting of test limits for conformance testing.							
Clauses affected:	¥ 5.10.2; 5.10.3							
Other specs affected:	% Other core specifications % Test specifications 0&M Specifications							

How to create CRs using this form:

Other comments:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

This CR corresponds to a Rel99 Cat F CR in R4-010831.

- 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 <u>ftp://ftp.3gpp.org/specs/</u> 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.

5.10.2 Measurement of transmitter

Subclause	Maximum Test System Uncertainty	Derivation of Test System		
		Uncertainty Measurement		
		(see NOTE)		
6.2 Maximum Output Power	± 0,7 dB			
6.3 Frequency stability	± 12 Hz	<u>± 500 Hz</u>		
6.4.2 Power control steps	single step: ± 0,1 dB	Result is difference between two		
	ton stong, i 0.2 dB	absolute Code Domain Power		
		controlled DPCH.		
6.4.3 Power control dynamic range	± 0,3 dB			
6.4.4 Minimum transmit power	± 0,7 dB			
6.4.5 Primary CCPCH power	± 0,8 dB			
6.5.1 Transmit OFF power	± 2,0 dB			
6.5.2 Transmit ON/OFF time mask	Tx power limit = -79 dBm: ± 2,0 dB			
	Tx power limit = -33 dBm: ± 0,7 dB			
6.6.1 Occupied Bandwidth	± 100 kHz	Accuray = $\pm 3 \times RBW$.		
		Assume 30 kHz bandwidth.± 1,0		
6.6.2.1 Spectrum emission mask	+ 1 5 dB			
6 6 2 2 Adjacent Channel	\pm 1,5 dB	Signal power = PRAT		
Leakage power Ratio (ACLR)	5 MHz offset: + 0.8 dB			
	10 MHz offset: $\pm 0.8 \text{ dB}$			
	requirement in case of operation in proximity to			
	TDD BS or FDD BS operating on an adjacent			
	frequency:			
	5 MHz offset: ± 4 dB			
	10 MHz offset: $\pm 4 \text{ dB}$			
	requirement in case of co-siting with TDD BS or			
	EDD BS operating on an adjacent frequency:			
	5 MHz offset: TBD			
	10 MHz offset: TBD			
	Note: Impact of measurement period (averaging)			
	and intermod effects in the measurement			
663 Sourious emissions	+ 2.0 dP for PS and appyintence hands for			
0.0.3 Opunous emissions				
	> -60 dBm			
	\pm 3.0 dB for results < -60 dBm			
	Outside above range:			
	$f \le 2,2 \text{ GHz}$: ± 1,5 dB			
	2,2 GHz < $f \le 4$ GHz: ± 2,0 dB f > 4 GHz: + 4 0 dB			
6.7 Transmit intermodulation	The value below applies to the setting of the	The uncertainty of the interferer		
	interference signal level only and is unrelated to	has double the effect on the		
	the measurement uncertainty of the tests	result due to the frequency		
	(6.6.2.1, 6.6.2.2 and 6.6.3) which have to be	offset.Not applicable		
	carried out in the presence of the interference			
	Signal.			
	ineed to add formula for uncertainty of the fatto.			
	± 1 dB			
6.8.1 Modulation accuracy	±2,5 % (for single code)	± 5,0 %		
		Signal power = PRAT to (PRAT		
		- 30 UB)		

Table_5.3: Maximum Test System Uncertainty for transmitter tests

6.8.2 Peak code domain error	±1 dB	Signal power = PRAT
OTE: The Test System uncertain	inty applies for measurement results in a range og	ual to the DLIT Test Requirement
tore. The rest bystern uncerta	inty applies for measurement results in a range eq	
(not the Minimum Require	extended by the range specified	

5.10.3 Measurement of receiver

	Subclause	Maximum Test System Uncertainty	Derivation of Test System		
		(see NOTE 1)	Uncertainty Measurement		
			range		
			(see NOTE 2)		
7.2	Reference sensitivity level	± 0,7 dB	Not applicable		
7.3	Dynamic range	± 1,2 dB	Formula =		
			SQRT(signal level error ² and		
		Formula =	AWGN level error ²)Not		
		SQRT(signal level error ² and AWGN level error ²)	applicable		
7.4	Adjacent Channel Selectivity	± 1,1 dB	Formula = SQRT		
(ACS)	,	· ·	(wanted level error ² +		
,		Formula = SQRT (wanted level error ² +	interferer level error ²) + ACLR		
		interferer level error ²) + ACLR effect	effect		
		The ACLR effect is calculated by:	The ACLR effect is calculated by:		
		(Formula to follow)	(Formula to follow)Not applicable		
7.5	Blocking characteristics	Formula =	Not applicable Formula =		
		SQRT (wanted level error ² +	SQRT (wanted level error ² +		
		$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	interferer level error ²) + ACLR		
		Broadband noise	effect + Broadband noise		
		Maximum Test System Accuracy with Frequency	(Frequency offset < 15 MHz:		
		offset of interfering signal < 15MHz:	assuming ACLR of interfering		
		+ 1.4dB	signal = 68 dB, measurement		
		(assuming ACLR of interfering signal = 68 dB.	uncertainty of wanted signal =		
		measurement uncertainty of wanted signal = 0.7	0.7 dB)		
		dB)			
			(Frequency offset > 15 MHz		
		Frequency offset of interfering signal > 15 MHz	assuming -130 dBc broadband		
		f < 2.2 GHz + 1.1 dB	noise from interfering signal)		
		2.2 GHz < f < 1 GHz + 1.8 dB	noise nem interioring signary		
		f \ / GHz: + 3.2 dB	Harmonics and spurs of the		
		2 = 0.2 dB	interfering signal need to be		
		interfering signal)	carefully considered. Perhaps		
			need to avoid harmonics of the		
		Harmonics and sours of the interfering signal	interferer that fall on top of the		
		need to be carefully considered.	receive channel		
		For the -15 dBm CW interfering signal filtering	For the –15 dBm CW interfering		
		of the interfering signal (at least 25 dB) is	signal, filtering of the interfering		
		necessary to elimininate problems with	signal (at least 25 dB) is		
		broadband noise falling into the bandwidth of the	necessary to elimininate		
		wanted signal.	problems with broadband noise		
			falling into the bandwidth of the		
			wanted signal.		
7.6	Intermodulation	± 1.3 dB	Not applicable Formula = SQRT		
charac	cteristics	· ·	((2*CW level error) ² +		
		(assuming:	$(mod level error)^2 +$		
		CW level error: 0,5 dB	(wanted signal level error) ²)		
		mo level error: 0.5 dB	<u></u>		
		wanted signal level error: 0.7 dB)	(assuming:		
			CW level error: 0.5 dB		
		Formula:	mod level error: 0.5 dB		
		Test-system-uncertainty=	wanted signal level error: 0.7		
			dB)		
		<u>√</u> 2 2			

Table_5.4: Maximum Test System Uncertainty for receiver tests

ī	7.7 Spurious emissions	\pm 3,0 dB for BS receive band (-78 dBm)	
	(See NOTE 3)		
		Outside above range:	
		$f \le 2,2 \text{ GHz}$: $\pm 2,0 \text{ dB} (-57 \text{ dBm})$	
		2,2 GHz < f ≤ 4 GHz: ± 2,0 dB (-47 dBm)	
		f > 4 GHz : ± 4,0 dB (-47 dBm)	
		(see Note 2)	
	NOTE 1: Unless otherwise noted, o	only the Test System stimulus error is considered h	ere. The effect of errors in the
	BER/FER measurements	due to finite test duration is not considered.	
	NOTE 2: The Test System uncertain	nty applies for measurement results in a range equ	al to the DUT Test Requirement
	(not the Minimum Require	ment) extended by the range specified.	
	NOTE 23: The Test System uncertain	nty figures for Spurious emissions apply to the mea	asurement of the DUT and not to
	any stimulus signals.		

R4-010946

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

			CHA	NGE R	EQ	UES	ST			CR-Form-v3
¥	<mark>25.</mark> ′	<mark>142</mark> (CR <mark>69</mark>	ж	rev	- 9	f C	Current vers	^{sion:} 3.6.0) ^ж
For HELP on using this form, see bottom of this page or look at the pop-up text over the # symbols.										
Proposed change	affects	s: #	(U)SIM	ME/UE		Radio	Acce	ess Networl	k X Core N	Network
Title: ೫	Rece	eiver sp	ourious emis	<mark>sion for co</mark>	-locate	ed bas	e sta	ations		
Source: #	RAN	WG4								
Work item code: ೫								<i>Date:</i>	2001-07-03	;
Category: #	F						I	Release: ೫	Rel99	
	Use <u>o</u> F A E C D Detaile be fou	ne of the (esser (corre (Addit (Funct (Edito ed expla nd in 30	e following cat ntial correction sponds to a co ion of feature) tional modification rial modification anations of the GPP TR 21.90	tegories:) prrection in (, ation of featu on) e above cate 0.	an ean ure) egories	lier rele can	ease)	Use <u>one</u> of 2 R96 R97 R98 R99 REL-4 REL-5	the following re (GSM Phase 2 (Release 1996 (Release 1997 (Release 1998 (Release 4) (Release 5)	eleases: 2) 3) 7) 3) 9)
Reason for change	e: #	In case	e of separate	RX and T	X ante	enna p	ort th	ne receiver	is currently al	lowed to
		have n station	nore spuriou: s.	s emission	than	the tra	insmi	itter in case	of co-located	base
Summary of chang	ge: #	Adding TX ant require	<mark>, requiremen</mark> enna port. T ements for co	ts for rece he require b-located b	iver sp ments ase st	are in ations	s emi i line i.	ission in cas with the cu	se of separate rrent transmit	e RX and ter
Consequences if not approved:	Ħ	Reduc spurio	ed performa us emission.	nce of the	co-loc	ated b	ase	station caus	sed by receive	er
Clauses affected:	ж	7.7.2								
Other specs Affected:	¥ <mark>)</mark>	X Oth Tes O&N	er core speci t specificatio M Specificatio	ifications ns ons	ж	3GP	P TS	25.105		
Other comments:	ж									
How to create CRs using this form:										

- 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 <u>ftp://www.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

7.7 Spurious emissions

7.7.1 Definition and applicability

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the BS antenna connector. The requirements apply to all BS with separate Rx and Tx antenna connectors. For BS equipped with only a single antenna connector for both transmitter and receiver, the requirements of subclause 6.6.3 shall apply to this port, and this test need not be performed.

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

7.7.2 Minimum Requirements

The power of any spurious emission shall not exceed the values given in table 7.12.

Band	Maximum level	Measurement Bandwidth	Note
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1,9 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,900 – 1,980 GHz	-78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,980 – 2,010 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,010 – 2,025 GHz	,010 – 2,025 GHz -78 dBm 3,84 MHz		With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,025 GHz – 12,75 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS

Table 7.12: Receiver spurious emission requirements

In addition to the requirements in table 7.12, the co-existence requirements for co-located base stations in subclauses 6.6.3.2.2.2, 6.6.3.2.3.2 and 6.6.3.2.4.2 may also be applied.

The normative reference for this requirement is TS 25.105 [1] subclause 7.7.1.

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

ж	25.142 CR 70 [#] rev _ [#] Current version	^{n:} 4.1.0 [#]						
For <u>HELP</u> on us	For HELP on using this form, see bottom of this page or look at the pop-up text over the # symbols.							
Proposed change a	Proposed change affects: # (U)SIM ME/UE Radio Access Network X Core Network							
Title: ೫	Receiver spurious emission for co-located base stations							
Source: ೫	RAN WG4							
Work item code: #	Date: ೫ 2	2001-08-16						
Category: ೫	A Release: # F	Rel-4						
	Use one of the following categories:Use one of theF (essential correction)2A (corresponds to a correction in an earlier release)R96B (Addition of feature),R97C (Functional modification of feature)R98D (Editorial modification)R99Detailed explanations of the above categories canREL-4be found in 3GPP TR 21.900.REL-5	e following releases: SM Phase 2) Pelease 1996) Pelease 1997) Pelease 1998) Pelease 1999) Pelease 4) Pelease 5)						
Reason for change:	: X In case of separate RX and TX antenna port the receiver is of have more spurious emission than the transmitter in case of stations.	currently allowed to co-located base						
Summary of change	Adding requirements for receiver spurious emission in case TX antenna port. The requirements are in line with the curren requirements for co-located base stations.	of separate RX and nt transmitter						
Consequences if not approved:	Reduced performance of the co-located base station caused spurious emission.	d by receiver						
Clauses affected:	¥ 7.7.2							
Other specs Affected:	# X Other core specifications # 3GPP TS 25.105 Test specifications 0&M Specifications							
Other comments:	¥							

How to create CRs using this form:

- 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 <u>ftp://www.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

7.7 Spurious emissions

7.7.1 Definition and applicability

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the BS antenna connector. The requirements apply to all BS with separate Rx and Tx antenna connectors. For BS equipped with only a single antenna connector for both transmitter and receiver, the requirements of subclause 6.6.3 shall apply to this port, and this test need not be performed.

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

7.7.2 Minimum Requirements

The power of any spurious emission shall not exceed the values given in table 7.12.

Band	Maximum level	Measurement Bandwidth	Note
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1,9 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,900 – 1,980 GHz	-78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,980 – 2,010 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,010 – 2,025 GHz	10 – 2,025 GHz -78 dBm 3,84 MHz		With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,025 GHz – 12,75 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS

Table 7.12: Receiver spurious emission requirements

In addition to the requirements in table 7.12, the co-existence requirements for co-located base stations in subclauses 6.6.3.2.2.2, 6.6.3.2.3.2 and 6.6.3.2.4.2 may also be applied.

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R4-011120

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

									CR-Form-v4
		(CHANG	GE RE	QUE	ST			
æ	25.	<mark>.142</mark> CR	71	Ħ	ev _	жC	urrent vers	sion: 3.6.0	ж
For <u>HELP</u> on	using t	his form, see	bottom of	this page	e or look	at the p	oop-up text	tover the # sy	mbols.
Proposed change	e affect	ts:	SIM	ME/UE	Rad	io Acce	ess Networl	k X Core No	etwork
Title:	₭ <mark>CR</mark>	to TS 25.142	2 Measurer	ment unc	ertainty i	ssues			
Source:	f RA	N WG4							
Work item code:	f						Date: ೫	3 Septembe	r 2001
Category: # F Release: # Rel99 Use one of the following categories: Use one of the following release. F (correction) 2 (GSM Phase 2) A (corresponds to a correction in an earlier release) R96 (Release 1996) B (addition of feature), R97 (Release 1997) C (functional modification of feature) R98 (Release 1998) D (editorial modification) R99 (Release 1999) Detailed explanations of the above categories can REL-4 (Release 4) be found in 3GPP TR 21.900. REL-5 (Release 5)					eases:				
Reason for chang	уе: Ж	Measureme	ent uncertai	inty aspe	cts are s	<mark>till not f</mark>	ully specifi	ed.	
Summary of change:		Various upo work of TEI 010944	dates in An M ad hoc, in	nex E wi n alignmo	th respected the respected to the test of test	ct to me an endo	asurement orsed CR to	t ranges etc. ba TS 25.141 in	ased on R4-
Consequences if not approved:	ж	Possible mi outside the	sinterpreta range over	tion of co r which e	onforman quipmen	i <mark>ce test</mark> t accura	results if m acy applies	neasurements s	are
Clauses affected:	ж	Annex G							
Other specs affected:	ж	Other co Test spe O&M Sp	re specifica cifications ecifications	ations	ж				

Other comments: # Corresponding REL-4 Cat A CR in R4-011121

How to create CRs using this form:

- 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 <u>ftp://ftp.3gpp.org/specs/</u> 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.

Annex E (informative): Acceptable uncertainty of Test Equipment

This informative annex specifies the critical parameters of the components of an overall Test System (e.g. Signal generators, Signal Analysers etc.) which are necessary when assembling a Test System which complies with subclause 5.10 Acceptable Uncertainty of Test System. These Test Equipment parameters are fundamental to the accuracy of the overall Test System and are unlikely to be improved upon through System Calibration.

Test		Equipment accuracy	Range (see NOTE) over which equipment accuracy applies
6.2	Maximum output power	Not critical	Not critical
6.3	Frequency stability	± 10 Hz + timebase = 12 Hz	Measurements in the range ± 500 Hz.
			(This is to allow for UE range that at
			0,1 PPM is larger than BTS.)
6.4.2	Power control steps	single step: ± 0,1 dB	Pmax to Pmax - 30 dB
		ten steps: ± 0,3 dB	
6.4.3	Power control dynamic range	± 0,3 dB	Pmax to Pmax - 30 dB
6.4.4	Minimum transmit power	Not critical	Pmax to Pmax - 30 dBNot critical
6.4.5	Primary CCPCH power	Not critical	Not critical
6.5.1	Transmit OFF power	Not critical	Not critical
6.5.2	Transmit ON/OFF time mask	Not critical	Not critical
6.6.1	Occupied bandwidth	± 100 kHz	± 1 MHz of the minimum requirement
6.6.2.	1 Spectrum emission mask	Not critical	Not critical
6.6.2.2	2 ACLR	minimum requirement: ± 0,8 dB	Measurements in the range ±3 dB of
			the minimum requirement at signa
		requirement in case of operation in	power = Pmax
		proximity: ± 4,0 dB	
		requirement in case of co-siting: TBD	
6.6.3	Spurious emissions	Not critical	Not critical
6.7	Transmit intermodulation	Not critical	Not critical
0.0.4	(interferer requirements)		
6.8.1	Modulation accuracy	± 2,5 %	
		(for single code)	PRATIO (PRAT = 30 GB)
			Specified accuracy applies to
			measurement results between
			\pm 7,5% and 17,5% <u>at signal power =</u>
600	Dook oode demain errer	L 1 dD	Manauramenta in the range 25 dD to
0.0.2	reak code domain enor		30 dB at signal power - Pmax
NOTE	The Test Equipment upget	l	a range equal to the DUT Test
HOIL	Requirement (not the Minim	um Requirement) extended by the range	

Table E.1: Ec	quipment accurac	y for transmitter	measurements
---------------	------------------	-------------------	--------------

Table E.2: Equipment accuracy	for receiver measurements
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	Subclause	Equipment accuracy	Range <u>over which equipment</u> accuracy applies
7.2	Reference sensitivity level	Not critical	Not critical
7.3	Dynamic range	Not critical	Not critical
7.4	Adjacent channel selectivity	Not critical	Not critical
7.5	Blocking characteristics	Not critical	Not critical
7.6	Intermodulation characteristics	Not critical	Not critical
7.7	Spurious Emissions	Not critical	Not critical

	Subclause	Equipment accuracy	Range <u>over which equipment</u> <u>accuracy applies</u>
8.2	Demodulation in static propagation conditions	Not critical	Not critical
8.3	Demodulation of DCH in multipath fading conditions	Not critical	Not critical

 Table E.3: Equipment accuracy for performance measurements

R4-011121

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

	CR-F	orm-v4
	CHANGE REQUEST	
¥	25.142 CR 72 * ev - * Current version: 4.1.0 *	
For <u>HELP</u> on u	sing this form, see bottom of this page or look at the pop-up text over the st symbol	s.
Proposed change	ffects: 第 (U)SIM ME/UE Radio Access Network X Core Networ	rk
Title: ೫	CR to TS 25.142 Measurement uncertainty issues	
Source: #	RAN WG4	
Work item code: ₩	Date: # 3 September 200)1
Category: ₩	A Release: % Rel-4 Use one of the following categories: Use one of the following releases F (correction) 2 (GSM Phase 2) A (corresponds to a correction in an earlier release) R96 (Release 1996) B (addition of feature), R97 (Release 1997) C (functional modification of feature) R98 (Release 1998) D (editorial modification) R99 (Release 1999) Detailed explanations of the above categories can be found in 3GPP TR 21.900. REL-4 (Release 5)	S:
Reason for change	: X Measurement uncertainty aspects are still not fully specified.	
Summary of chang	e: # Various updates in Annex E with respect to measurement ranges etc. based work of TEM ad hoc, in alignment with an endorsed CR to TS 25.141	on
Consequences if not approved:	Constitution of conformance test results if measurements are outside the range over which equipment accuracy applies	
Clauses affected:	X Annex G	
Other specs affected:	# Other core specifications # Test specifications 0&M Specifications	

Other comments:

How to create CRs using this form: Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

Corresponds to a R99 Cat F CR in R4-011120

- 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 <u>ftp://ftp.3gpp.org/specs/</u> 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.

Annex E (informative): Acceptable uncertainty of Test Equipment

This informative annex specifies the critical parameters of the components of an overall Test System (e.g. Signal generators, Signal Analysers etc.) which are necessary when assembling a Test System which complies with subclause 5.10 Acceptable Uncertainty of Test System. These Test Equipment parameters are fundamental to the accuracy of the overall Test System and are unlikely to be improved upon through System Calibration.

Test	Equipment accuracy	Range (see NOTE) over which equipment accuracy applies
6.2 Maximum output power	Not critical	Not critical
6.3 Frequency stability	± 10 Hz + timebase = 12 Hz	Measurements in the range ± 500 Hz. (This is to allow for UE range that at 0,1 PPM is larger than BTS.)
6.4.2 Power control steps	single step: ± 0,1 dB ten steps: ± 0,3 dB	Pmax to Pmax - 30 dB
6.4.3 Power control dynamic range	± 0,3 dB	Pmax to Pmax - 30 dB
6.4.4 Minimum transmit power	Not critical	Pmax to Pmax - 30 dBNot critical
6.4.5 Primary CCPCH power	Not critical	Not critical
6.5.1 Transmit OFF power	Not critical	Not critical
6.5.2 Transmit ON/OFF time mask	Not critical	Not critical
6.6.1 Occupied bandwidth	± 100 kHz	± 1 MHz of the minimum requirement
6.6.2.1 Spectrum emission mask	Not critical	Not critical
6.6.2.2 ACLR	minimum requirement: ± 0,8 dB requirement in case of operation in proximity: ± 4,0 dB	Measurements in the range ±3 dB of the minimum requirement at signal power = Pmax
6.6.3 Spurious emissions	Not critical	Not critical
6.7 Transmit intermodulation (interferer requirements)	Not critical	Not critical
6.8.1 Modulation accuracy	± 2,5 % (for single code)	Signal power = PRAT to (PRAT - 30 dB) Specified accuracy applies to measurement results between ± 7,5% and 17,5% at signal power = Pmax to Pmax - 30 dB
6.8.2 Peak code domain error	±1 dB	Measurements in the range -25 dB to - 30 dB at signal power = Pmax
NOTE: The Test Equipment uncert: Requirement (not the Minim	definition of the second	30 dB at signal power = Pmax a range equal to the DUT Test specified.

Table E.1:	Equipment accurac	y for transmitter	measurements
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Table E.2: Equipment accuracy	for receiver measurements
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	Subclause	Equipment accuracy	Range <u>over which equipment</u> accuracy applies
7.2	Reference sensitivity level	Not critical	Not critical
7.3	Dynamic range	Not critical	Not critical
7.4	Adjacent channel selectivity	Not critical	Not critical
7.5	Blocking characteristics	Not critical	Not critical
7.6	Intermodulation characteristics	Not critical	Not critical
7.7	Spurious Emissions	Not critical	Not critical

	Subclause	Equipment accuracy	Range <u>over which equipment</u> accuracy applies
8.2	Demodulation in static propagation conditions	Not critical	Not critical
8.3	Demodulation of DCH in multipath fading conditions	Not critical	Not critical

 Table E.3: Equipment accuracy for performance measurements

R4-011135

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

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		6.4.3.4.2; 6.4.4;, 6.4.4.1; 6.4.4.2; 6.4.4.5; 6.4.5.3; 6.5.1.1; 6.6.1.4.2; 6.6.2.2.1 6.6.2.2.2.3; 6.6.2.2.4.2; Annex C; Annex D; Annex E						
Other specs affected:	ж	Other core specifications # Test specifications O&M Specifications						
Other comments:	ж							

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. 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 <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.
3 Definitions, symbols, and abbreviations

3.1 Definitions

Average power: The thermal power as measured through a root raised cosine filter with roll-off $\alpha = 0,22$ and a bandwidth equal to the chip rate of the radio access mode. The period of measurement shall be a transmit timeslot excluding the guard period, unless otherwise stated.

Maximum output power, Pmax: The maximum output power of the base station per carrier measured at the antenna connector (i.e. the actual broadband power as would be measured assuming no measurement error) for a specified reference condition. The period of measurement shall be a transmit timeslot excluding the guard period.

Rated output power, PRAT: The output power that the manufacturer has declared to be available.

3.2 Symbols

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

α Roll-off factor

3.3 Abbreviations

For the purposes of the present document, the following definitions, symbols and abbreviations apply:

3GPP	3rd Generation Partnership Project
α	Koll off factor
dB ID	
aBm	decidel relative to 1 milli watt
DPCH0	spreading factor of 16
$\frac{DPCH_o_E_c}{I_{or}}$	Ratio of the average transmit energy per PN chip for the $DPCH_0$ to the total transmit power
	spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
EVM	Error Vector Magnitude
F	Frequency (of the assigned channel frequency of the wanted signal)
Fuw	Frequency offset of the unwanted interfering signal from the assigned channel frequency of the wanted signal
IMT-2000	International Mobile Telecommunications 2000
Ioc	Power spectral density of a band limited white noise source (simulating interference form other cells) as measured at the BS antenna connector.
Îor	Received power spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
IPR	Intellectual Property Rights
Р	Transmit Output power
Pout	Output power of the base station; defined as the mean power of one carrier delivered to a load with resistance equal to the nominal load impedance of the transmitter during one slot
Pmax	Maximum output power of the base station: defined as the mean power level per carrier over an
	active timeslot measured at the antenna connector for a specified reference condition
RBER	Residual BER
REFSENS	Reference Sensitivity Level
RMS	Root-Mean Square
PRAT	Rated output power of the base station: defined as the mean power level per carrier over an active
	timeslot that the manufacturer has declared to be available at the antenna connector
RRC	Root-Raised Cosine
T _C	Chip duration
TS	Time Slot

5.2 Output power

The manufacturer shall declare the rated output power, PRAT, of the base station<u>which is PRAT is</u> defined <u>in</u> <u>subclause 3.1.</u> as the mean power level per carrier over an active timeslot available at the antenna connector; see subclause 6.2.

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5.10.2 Measurement of transmitter

range range 6.2 Maximum Qutput Pgower ± 0,7 dB 6.3 Frequency stability ± 1 Hz 6.4.2 Power control steps single step: ± 0,1 dB 6.4.3 Prever control dynamic range ± 0,3 dB 6.4.4 Minimum Qutputranernit power ± 0,7 dB 6.4.5 Primary CCPCH power ± 0,7 dB 6.5.1 Transmit OFF power ± 2,0 dB 6.5.2 Transmit OFF power ± 2,0 dB 6.6.1 Occupied Bandwidth ± 100 kHz 5.2 dBm: ± 0,7 dB 6.6.2.7 Agacent Channel Leakage minimum requirement: Signal power = 6.6.2.7 Adjacent Channel Leakage minimum requirement in case of operating on an adjacent frequency: S MHz offset: ± 0,8 dB 10 MHz offset: ± 4 dB 10 MHz offset: ± 4 dB PRAT 10 MHz offset: ± 4 dB 10 MHz offset: ± 4 dB Note: 10 Note: Impact of measurement period (averaging) and intermod effects in the measurement receiver not yet full y studied.		Subclause	Maximum Test System Uncertainty	Measurement
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6.2 Maxmum Goupt Hower ± 0,7 dB 6.3 Frequency stability ± 12 Hz ± 500 Hz 6.4.2 Power control steps single step: ± 0,1 dB 6.4.3 Prequency stability ± 12 Hz ± 500 Hz 6.4.4 Minimum outputransemi power ± 0,7 dB				(see NOTE)
6.3 Frequency stability ± 12 H2 ± 500 Hz 6.4.2 Power control steps single step: ± 0.1 dB ± 500 Hz 6.4.3 Minum outputrament: power ± 0.7 dB $= -200$ dB $= -200$ dB 6.4.4 Minum outputrament: power ± 0.7 dB $= -200$ dB $= -200$ dB 6.5.1 Transmit OVFCPt power ± 2.0 dB $= -730$ dBm; ± 2.0 dB $= -730$ dBm; ± 2.0 dB 6.5.2 Transmit OVFCPt imme mask Try power limit = -730 dBm; ± 2.0 dB $= +1.0$ MHz 6.6.1 Occupied Bandwidth ± 10.0 KHz $= +1.0$ MHz $= +2.0$ dB 6.6.2.2 Adgacent Channel Leakage finimum requirement: Signal power = Signal power = power Ratio (ACLR) MHz offset: ± 0.8 dB $= -700$ dBm; dS operating on an adjacent frequency: S MHz offset: TBD 10 MHz offset: TBD $= 0.00000000000000000000000000000000000$	6.2	Maximum Ooutput Ppower	± 0,7 dB	
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Note: Impact of measurement period (averaging) and intermod effects in the measurement receiver not yet fully studied. 6.6.3 Spurious emissions ± 2,0 dB for BS and coexistence bands for results > -60 dBm ± 3,0 dB for results < -60 dBm			10 MHz offset: TBD	
Note: Impact of measurement period (averaging) and intermod effects in the measurement receiver not yet fully studied. 6.6.3 Spurious emissions ± 2,0 dB for BS and coexistence bands for results > -60 dBm ± 3,0 dB for results < -60 dBm				
6.6.3 Spurious emissions ± 2,0 dB for BS and coexistence bands for results > -60 dBm ± 3,0 dB for results < -60 dBm			Note: Impact of measurement period (averaging) and	
6.6.3 Spurious emissions ± 2,0 dB for BS and coexistence bands for results > -60 dBm ± 3,0 dB for results < -60 dBm			fully studied	
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\pm 3,0 dB for results < -60 dBm	0.0.5	opunous emissions	60 dBm	
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Requirement (not the Minimum Requirement) extended by the range specified.	NOTF	: The Test System uncertainty	applies for measurement results in a range equal to the	DUT Test
	Requirement (not the Minimum Requirement) extended by the range specified.			

Table_5.3: Maximum Test System Uncertainty for transmitter tests

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5.11.1 Transmitter

Subclause	Test Tolerance (see NOTE)	
6.2 Maximum Ooutput Ppower	0,7 dB	
6.3 Frequency stability	12 Hz	
6.4.2 Power control steps	single step: 0,1 dB	
	ten steps: 0,3 dB	
6.4.3 Power control dynamic range	0,3 dB	
6.4.4 Minimum transmitoutput power	0,7 dB	
6.4.5 Primary CCPCH power	0,8 dB	
6.5.1 Transmit OFF power	2,0 dB	
6.5.2 Transmit ON/OFF time mask	Tx power limit = -79 dBm: 2,0 dB	
	Tx power limit = -33 dBm: 0,7 dB	
6.6.1 Occupied Bandwidth	0 kHz	
6.6.2.1 Spectrum emission mask	1,5 dB	
6.6.2.2 Adjacent Channel Leakage pow	er minimum requirement: 0,8 dB	
Ratio (ACLR)		
	operation in proximity: 4 dB	
6.6.2 Sourious omissions		
6.6.3 Spurious emissions	U 0B	
6.7 Transmit Intermodulation	testing of transmit intermodulation consists of 3 parts:	
	testing of ACL P. and 6.6.2.2	
	testing of spurious omissions, soo 6.6.2	
	For each of these parts, the respective Test Tolerances as	
	specified in this table shall apply	
	speenied in this table shall apply.	
	Test Tolerance for setting of the interferer power level: 0 dB	
6.8.1 Modulation accuracy	0 %	
6.8.2 Peak code domain error	1 dB	
NOTE: Unless otherwise stated, the Test Tolerances are applied to the DUT Minimum Requirement.		
See Annex D.		

Table 5.6: Test Tolerance for transmitter tests

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Peak code domain error

5.15 Overview of the conformance test requirements

Tables 5.9, 5.10 and 5.11 give an overview of the conformance test requirements for the transmitter, the receiver and system performance, respectively.

Parameter	Subclause	Note
Maximum output power	6.2	manufacturer's declaration required
Frequency stability	6.3	manufacturer's declaration required
Output power dynamics	6.4	
Inner loop power control	6.4.1	
Power control steps	6.4.2	
Power control dynamic range	6.4.3	
Minimum transmitoutput power	6.4.4	
Primary CCPCH power	6.4.5.	
Transmit OFF power	6.5.1	
Transmit ON/OFF time mask	6.5.2	
Output RF spectrum emissions	6.6	
Occupied bandwidth	6.6.1	
Out-of-band emission	6.6.2	
Spectrum emission mask	6.6.2.1	manufacturer's declaration required
Adjacent Channel Leakage power Ratio (ACLR)	6.6.2.2	manufacturer's declaration required
Spurious emissions	6.6.3	
Mandatory requirements	6.6.3.2.1	manufacturer's declaration required
Co-existence with GSM 900	6.6.3.2.2	manufacturer's declaration required
Co-existence with DCS 1800	6.6.3.2.3	manufacturer's declaration required
Co-existence with UTRA FDD	6.6.3.2.4	manufacturer's declaration required
Transmit intermodulation	6.7	
Transmit modulation	6.8	
Modulation accuracy	6.8.1	

6.8.2

Table 5.9: Overview of the conformance tests requirements for the transmitter

6.2 Maximum output power

6.2.1 Definition and applicability

Output power, Pout, of the base station is the power of one carrier delivered to a load with resistance equal to the nominal load impedance, when averaged (in the sense of thermal power) over the useful part of the burst (time slot).

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

Maximum output power, Pmax, of the base station is the mean power level per carrier over an active timeslot measured at the antenna connector for a specified reference condition.

mMaximum output power (Pmax) and rated output power (PRAT) are defined in subclause 3.1.

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

6.2.2 Minimum Requirements

In normal conditions, the base station maximum output power shall remain within +2 dB and -2 dB of the manufacturer's rated output power.

In extreme conditions, the base station maximum output power shall remain within +2,5 dB and -2,5 dB of the manufacturer's rated output power.

In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the ranges defined for the Normal test environment in subclause 5.9.1.

The normative reference for this requirement is TS 25.105 [1] subclause 6.2.1.1.

6.2.3 Test purpose

The test purpose is to verify the accuracy of the maximum output power across the frequency range and under normal and extreme conditions for all transmitters in the BS.

6.2.4 Method of test

6.2.4.1 Initial conditions

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

In addition, on one UARFCN only, the test shall be performed under extreme power supply as defined in subclause 5.9.4.

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

(1) The transmitter under test and all other transmitters of the base station (if any) are switched on.

- (2) The power of the transmitters not under test (if any) are controlled down.
- (3) Connect the power measuring equipment to the BS antenna connector.

(4) Set the parameters of the transmitted signal according to table 6.1.

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

Table 6.1: Parameters of the transmitted signal for maximum output power test

6.2.4.2 Procedure

- (1) Measure thermal power <u>of the BS output signal</u> over the 2464 active chips of an even time slot <u>TS i</u> (this excludes the guard periods), and with a measurement bandwidth of at least 5 MHz.
- (2) Run step (1) for RF channels Low / Mid / High.

6.2.5 Test Requirements

In normal conditions, the measured output power, derived according to subclause 6.2.4.2, shall remain within +2,7 dB and -2,7 dB of the manufacturer's rated output power.

In extreme conditions, the measured output power, derived according to subclause 6.2.4.2, shall remain within +3,2 dB and -3,2 dB of the manufacturer's rated output power.

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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.4.3 Power control dynamic range

6.4.3.1 Definition and applicability

The power control dynamic range is the difference between the maximum and the minimum transmit output power-<u>of</u> one code channel for a specified reference condition.

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

6.4.3.2 Minimum Requirements

The DL power control dynamic range shall be greater than or equal to 30 dB.

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.3.1.

6.4.3.3 Test purpose

The test purpose is to verify the ability of the BS to control the power of a single code signal over the specified dynamic range.

6.4.3.4 Method of test

6.4.3.4.1 Initial conditions

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability:

- to analyze the output signal of the BS under test with respect to code domain power, by applying the global in-channel Tx test method described in Annex C;
- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.6: Parameters of the BS transmitted signal for power control dynamic range test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
Number of DPCH in each active TS	1
Data content of DPCH	real life (sufficient irregular)

6.4.3.4.2 Procedure

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

(2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Increase Tx power". This sequence shall be sufficiently long so that the transmit-output power of the active DPCH is controlled to reach its maximum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).

- (3) Measure the power of the active DPCH over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).
- (5) Measure the power of the active DPCH over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (6) Determine the power control dynamic range by calculating the difference between the maximum transmit output power measured in step (3) and the minimum transmit output power measured in step (5).
- (7) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (6).

6.4.3.5 Test Requirements

The power control dynamic range derived according to subclause 6.4.3.4.2 shall be greater than or equal to 29,7 dB

NOTE: If the above Test Requirement differs from the Minimum Requirement, then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in subclause 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.4.4 Minimum <u>output</u>transmit power

6.4.4.1 Definition and applicability

The minimum controlled output power of the BS is when the power control setting is set to a minimum value. This is when the power control indicates a minimum transmit output power is required.

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

6.4.4.2 Minimum Requirements

The DL minimum transmitoutput power shall be lessower than or equal to:

Maximum output power - 30 dB.

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.4.1.

6.4.4.3 Test purpose

The test purpose is to verify the ability of the BS to reduce its output power to a specified value.

6.4.4.4 Method of test

6.4.4.4.1 Initial conditions

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

- (1) Connect the BS tester to the antenna connector of the BS under test.
- (2) Set the parameters of the BS transmitted signal according to table 6.7.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability:

- to analyze the output signal of the BS under test with respect to thermal power;

- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.7: Parameters of the BS transmitted signal for minimum output transmit power test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

6.4.4.2 Procedure

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

- (2) Set the BS tester to produce a sequence of TPC commands related to all active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of all active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).
- (3) Measure the power of the BS output signal over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) and (3).

6.4.4.5 Test Requirements

For all measurements, the minimum transmitoutput power derived in step (4) of subclause 6.4.4.4.2 shall be at least 29,3 dB below the maximum output power as declared by the manufacturer; see 6.2.

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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.4.5 Primary CCPCH power

6.4.5.1 Definition and applicability

Primary CCPCH power is the transmission power of the Primary Common Control Physical Channel averaged over the transmit timeslot. Primary CCPCH power is signaled on the BCH.

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

6.4.5.2 Minimum Requirements

The error between the BCH-broadcast value of the Primary CCPCH power and the Primary CCPCH power averaged over the timeslot shall not exceed the values in table 6.8. The error is a function of the total power averaged over the timeslot, Pout, and the manufacturer's rated output power, PRAT.

Total power in slot, dB	PCCPCH power tolerance
PRAT - 3 < Pout \leq PRAT + 2	+/- 2,5 dB
PRAT - 6 < P ≤ PRAT - 3	+/- 3,5 dB
PRAT - 13 < P ≤ PRAT - 6	+/- 5 dB

Table 6.8: Errors between Primary CCPCH power and the broadcast value

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.5.

6.4.5.3 Test purpose

The power of the Primary CCPCH received by the UE, together with the information on the Primary CCPCH nominal transmit power signaled on the BCH, are used by the UE for path loss estimation and adjustment of its own <u>output</u> transmit power. Therefore, deviations of the Primary CCPCH power from its nominal value are transposed by the UE into deviations from the wanted <u>output transmit</u> power of the UE.

The test purpose is to verify that the Primary CCPCH power remains within its specified tolerances under normal and extreme conditions.

6.5 Transmit ON/OFF power

6.5.1 Transmit OFF power

6.5.1.1 Definition and applicability

The transmit OFF power is the maximum residual output power within the channel bandwidth when the BS does not transmit.defined as the average power measured over one chip when the transmitter is off. The transmit OFF power state is when the BS does not transmit.

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

6.6 Output RF spectrum emissions

6.6.1 Occupied bandwidth

6.6.1.1 Definition and applicability

Occupied bandwidth is a measure of the bandwidth containing 99% of the total integrated power for transmitted spectrum and is centered on the assigned channel frequency.

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

6.6.1.2 Minimum Requirements

The occupied bandwidth shall be less than 5 MHz based on a chip rate of 3,84 Mcps.

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.1.

6.6.1.3 Test purpose

The occupied bandwidth, defined in the Radio Regulations of the International Telecommunication Union ITU, is a useful concept for specifying the spectral properties of a given emission in the simplest possible manner; see also Recommendation ITU-R SM.328-9 [7]. The test purpose is to verify that the emission of the BS does not occupy an excessive bandwidth for the service to be provided and is, therefore, not likely to create interference to other users of the spectrum beyond undue limits.

6.6.1.4 Method of test

6.6.1.4.1 Initial conditions

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

- (1) Connect the measuring equipment to the antenna connector of the BS under test.
- (2) Set the parameters of the BS transmitted signal according to table 6.12.

Table 6.12: Parameters of the BS transmitted signal for occupied bandwidth testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	Real life
	(sufficient irregular)

6.6.1.4.2 Procedure

(1) Measure the power of the transmitted signal with a measurement filter of bandwidth 30 kHz. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). The centre frequency of the filter shall be stepped in contiguous 30 kHz steps from a minimum frequency, which shall be (7,5 - 0,015) MHz below the assigned channel frequency of the transmitted signal, up to a maximum frequency, which shall be (7,5 - 0,015) MHz above the assigned channel frequency of the transmitted signal. The time duration of each step shall be sufficiently long to capture one active time slot. The measured power shall be recorded for each step.

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- (2) Determine the total transmittedoutput-power by accumulating the recorded power measurement results of all steps.
- (3) Sum up the recorded power measurement results, starting from the step at the minimum frequency defined in (1) up to the step at a lower limit frequency by which this sum is equal to or greater than 0.5 % of the total <u>output</u> power determined in (2). This limit frequency is recorded as "Lower Frequency".
- (4) Sum up the recorded power measurement results, starting from the step at the maximum frequency defined in (1) down to the step at an upper limit frequency by which this sum is equal to or greater than 0.5 % of the total <u>output</u> power determined in (2). This limit frequency is recorded as "Upper Frequency".
- (5) Calculate the occupied bandwidth as the difference between the "Upper Frequency" obtained in (3) and the "Lower Frequency" obtained in (4).

6.6.1.5 Test Requirements

The occupied bandwidth calculated in step (5) of subclause 6.6.1.4.2 shall be less than 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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.6.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the <u>transmitted_average</u> power <u>centered on the assigned</u> <u>channel frequency</u> to the <u>average</u> power <u>centered on measured in an adjacent channel frequency</u>. In <u>Bboth cases</u>, the <u>transmitted and the adjacent channel</u> power <u>isare</u> measured <u>withthrough a matched a filter that has a(R</u>Foot <u>R</u>Faised <u>Ceosine (RRC) filter response withand</u> roll-off $\alpha = 0,22$) with a noise power <u>and a</u> 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.

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

6.6.2.2.2 Minimum Requirements

6.6.2.2.2.1 Minimum requirement

The ACLR shall be equal to or greater than the limits given in table 6.22.

Table 6.22: BS ACLR limits

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

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.2.2.1.

6.6.2.2.2.2 Requirement in case of operation in proximity to TDD BS or FDD BS operating on an adjacent frequency

In case the equipment is operated in proximity to another TDD BS or FDD BS on an adjacent frequency, the ACLR shall be equal to or greater than the value specified in table 6.23.

Table 6.23: BS ACLR limits in case of operation in proximity

BS adjacent channel offset	ACLR limit
± 5 MHz	70 dB
± 10 MHz	70 dB

The requirement is based on the assumption that the coupling loss between the base stations is at least 84dB.

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.2.2.2.

- NOTE: The necessary dynamic range to very the conformance requirements specified in table 6.23 is at the limits of the capability of state-of-art measuring equipment.
- 6.6.2.2.2.3 Requirement in case of co-siting with TDD BS or FDD BS operating on an adjacent frequency

In case the equipment is co-sited to another TDD BS or FDD BS operating on an adjacent frequency, the ACLR is specified in terms of the absolute transmit_average power level of the BS measured in the adjacent channel. The maximum power level shall not exceed the limit in table 6.24.

BS adjacent channel offset	Maximum Level	Measurement Bandwidth
± 5 MHz	-80 dBm	3.84 MHz
± 10 MHz	-80 dBm	3.84 MHz

Table 6.24: BS ACLR limits in case of co-siting

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.2.2.3.

NOTE: The necessary dynamic range of the measuring equipment to verify the conformance requirements specified in table 6.24 is dependent on the BS output power. If the BS output power is larger than -10 dBm, the necessary dynamic range is beyond the capability of state-of-the-art measuring equipment; direct verification of the conformance requirements is not feasible. Alternatively, indirect measurement methods need to be defined.

6.6.2.2.3 Test purpose

The test purpose is to verify the ability of the BS to limit the interference produced by the transmitted signal to other UTRA receivers operating at the first or second adjacent RF channel.

6.6.2.2.4 Method of test

6.6.2.2.4.1 Initial conditions

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.25.

Table 6.25: Parameters of the BS transmitted signal for ACLR testing

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	Real life
	(sufficient irregular)

6.6.2.2.4.2 Procedure

- (1) Measure transmitted output the average power centered on the assigned channel frequency over the 2464 active chips of the even time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points. (The global in channel Tx test described in Annex C may be applied.)
- (2) Average over TBD time slots.
- (3) Measure interference the average power at the first lower adjacent RF channel (center frequency 5 MHz below the assigned channel frequency of the transmitted signal) over the useful part of the burst within the even time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken with adherence to the sampling theorem.
- (4) Average over TBD time slots.
- (5) Calculate the ACLR by the ratio

ACLR =<u>output transmitted</u><u>average</u> power acc. to (2) / <u>average</u><u>interference</u> power acc. to (4)

(6) Repeat steps (3), (4) and (5) for the second lower adjacent RF channel (center frequency 10 MHz below the assigned channel frequency of the transmitted signal) and also for the first and second upper adjacent RF channel (center frequency 5 MHz and 10 MHz above the assigned channel frequency of the transmitted signal, respectively).

6.6.2.2.5 Test Requirements

The ACLR calculated in step (5) of subclause 6.6.2.2.4.2 shall be equal or greater than the limits given in table 6.26 or table 6.272, respectively. In case the equipment is co-sited to another TDD BS or FDD BS operating on an adjacent frequency, the interference power at the first and second adjacent channel measured according to steps (3) and (4) of subclause 6.6.2.2.4.2 shall not exceed the maximum level specified in table 6.28

Table 6.26: BS ACLR Test Requirements

BS adjacent channel offset	ACLR limit
± 5 MHz	44,2 dB
± 10 MHz	54,2 dB

Table 6.27: BS ACLR Test Requirements in case of operation in proximity

BS adjacent channel offset	ACLR limit
± 5 MHz	66 dB
± 10 MHz	66 dB

Table 6.28: BS ACLR Test Requirements in case of co-sitting

BS adjacent channel offset	Maximum Level	Measurement Bandwidth
± 5 MHz	-[80 dBm - TT]	3.84 MHz
± 10 MHz	-[80 dBm - TT]	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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

C.3 Applications

This process may be applied in the measurements defined in the following subclauses:

- 6.3 Frequency Stability
- 6.4 Output Power Dynamics
- 6.4.2 Power control steps
- 6.4.3 Power control dynamic range
- 6.4.4 Minimum transmit-output power
- 6.4.5 Primary CCPCH power
- 6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)
- 6.8 Transmit Modulation
- 6.8.1 Modulation accuracy

6.8.2 Peak Code Domain Error

Annex D (informative): Derivation of Test Requirements

The Test Requirements in this specification have been calculated by relaxing the Minimum Requirements of the core specification using the Test Tolerances defined in subclause 5.11. When the Test Tolerance is zero, the Test Requirement will be the same as the Minimum Requirement. When the Test Tolerance is non-zero, the Test Requirements will differ from the Minimum Requirements, and the formula used for this relaxation is given in tables D.1 to D.3

Note that a formula for applying Test Tolerances is provided for all tests, even those with a test tolerance of zero. This is necessary in the case that the Test System uncertainty is greater than that allowed in subclause 5.10. In this event, the excess error shall be subtracted from the defined test tolerance in order to generate the correct tightened Test Requirements as defined in subclause 5.12.

For example, a Test System having 0,9 dB accuracy for test 6.2 Maximum output power (which is 0,2 dB above the limit specified in subclause 5.10.2) would subtract 0,2 dB from the Test Tolerance of 0,7 dB defined in subclause 5.11.1. This new test tolerance of 0,5 dB would then be applied to the Minimum Requirement using the formula defined in Table D.1 to give a new range of $\pm 2,5$ dB of the manufacturer's rated output power.

For the case where an excess error of 0.2 dB exists, when applied to a test with a test tolerance of zero, the test tolerance used in the formula would be -0.2 dB.

	Test	Minimum Requirement in TS 25.105	Test Tolerance	Test Requirement in TS 25.142
		(numbering of tables in the	(TT)	
		25.142)		
6.2	Maximum output power	In normal conditions within +2 dB and -2 dB of the manufacturer's rated output power	0,7 dB	Formula: Upper limit + TT Lower limit – TT
		In extreme conditions within +2,5 dB and –2,5 dB of the manufacturer's rated output power		In normal conditions … within +2,7 dB and –2,7 dB of the manufacturer's rated output power
				In extreme conditions… within +3,2 dB and –3,2 dB of the manufacturer's rated output power
6.3	Frequency stability	Frequency stability = $\pm 0,05$ ppm	12 Hz	Formula: ± (frequency stability +TT)
				± (0,05 ppm + 12 Hz)
6.4.2	Power control steps	single step: step size tolerance specified in table 6.3	single step: 0,1 dB	Formula: single step: ± (step size tolerance + TT)
		ten steps: minimum and maximum average rate of change in mean power specified in table 6.3	ten steps: 0,3 dB	ten steps: maximum average rate + TT minimum average rate – TT
				0,1 dB and 0,3 dB, respectively, applied as above to table 6.3
6.4.3 range	Power control dynamic	range ≥ 30 dB	0,3 dB	Formula: Range – TT
611	Minimum transmitoutout	PRAT - 30 dB	0 7 dB	range ≥ 29,7 dB Formula :
power	Minimum tranomit<u>ou</u>tput		0,7 00	PRAT – 30 dB +TT
				PRAT – 29,3 dB
6.4.5	Primary CCPCH power	in table 6.8	0,8 dB	Formula: ± (power tolerance + TT)
				0,8 dB applied as above to table 6.8
6.5.1	Transmit OFF power	Tx OFF power limit < -79 dBm	2,0 dB	Formula: < Tx OFF power limit + TT
0.5.0		T		< - 77 dBm
6.5.2 mask	Transmit ON/OFF time	dBm, resp.	< -33 dBm: 0,7 dB	Formula: < Tx power limit + TT
			< -79 dBm: 2,0 dB	< -32,3 dBm or < - 77 dBm
6.6.1	Occupied bandwidth	occupied bandwidth limit = 5 MHz	0 kHz	Formula: Occupied bandwidth limit + TT
				Occupied bandwidth limit = 5 MHz

Table D.1: Derivation of Test Requirements (Transmitter tests)

6624	Spectrum emission mosk	Maximum layel defined in tables		Formula, Maximum laval, TT
		6.13 to 6.16	1,5 0B	Formula: Maximum level + 11
				Add 1,5 dB to Maximum level
				entries in tables 6.13 to 6.16
6.6.2.2	Adjacent Channel Leakage	minimum requirement:	min. req. :	Formula: ACLR limit – TT
power	Ratio (ACLR)	ACLR limit = 45 dB at 5 MHz ACLR limit = 55 dB at 10 MHz	0,8 dB	
			an anation	min. requirement:
		provimity to TDD BS or EDD BS	operation	ACLR limit = $44,2$ dB at 5 MHz ACLR limit = 54.2 dB at 10 MHz
		operating on an adjacent	4 dB	
		frequency:		operation in proximity:
		ACLR limit = 70 dB at 5 MHz		ACLR limit = 66 dB at 5 MHz
		ACLR limit = 70 dB at 10 MHz		ACLR limit = 66 dB at 10 MHz
		requirement in case of co-siting	co-siting:	co-siting:
		with TDD BS or FDD BS operating	TBD	твр
		on an adjacent frequency		
		ACLR limit = -80 dBm at 5 MHz		
6.6.3	Spurious emissions	maximum level defined in tables	0 dB	Formula: Maximum limit + TT
		6.29 to 6.37		
				add 0 dD to an extension locale in
				tables 6 29 to 6 37
6.7	Transmit intermodulation	Wanted signal level – interferer	0 dB	Formula: Ratio + TT
	(interferer requirements)	level = 30 dB		
This to	lerance applies to the			Wanted signal level – interferer
stimul	us and not the			eve = 30 + 0 dB
measu	rements defined in 6.6.2.1,			
6.6.2.2	2 and 6.6.3.			
6.8.1	Modulation accuracy	EVM limit = 12,5 %	0 %	Formula: EVM limit + 11
				EVM limit = 12,5 %
6.8.2	Peak code domain error	PCDE limit = - 28 dB	1 dB	Formula: PCDE limit + TT
				PCDE limit = - 27 dB

Annex E (informative): Acceptable uncertainty of Test Equipment

This informative annex specifies the critical parameters of the components of an overall Test System (e.g. Signal generators, Signal Analysers etc.) which are necessary when assembling a Test System which complies with subclause 5.10 Acceptable Uncertainty of Test System. These Test Equipment parameters are fundamental to the accuracy of the overall Test System and are unlikely to be improved upon through System Calibration.

Test		Equipment accuracy	Range (see NOTE)
6.2 Maximum outpu	ut power	Not critical	Not critical
6.3 Frequency stab	ility	± 10 Hz + timebase = 12 Hz	± 500 Hz. (This is to allow for UE range that at 0,1 PPM is larger than BTS.)
6.4.2 Power control s	teps	single step: $\pm 0,1 \text{ dB}$ ten steps: $\pm 0,3 \text{ dB}$	
6.4.3 Power control d	lynamic range	± 0,3 dB	
6.4.4 Minimum transr	mitoutput power	Not critical	Not critical
6.4.5 Primary CCPCH	I power	Not critical	Not critical
6.5.1 Transmit OFF p	ower	Not critical	Not critical
6.5.2 Transmit ON/O	FF time mask	Not critical	Not critical
6.6.1 Occupied band	width	± 100 kHz	± 1 MHz
6.6.2.1 Spectrum er	mission mask	Not critical	Not critical
6.6.2.2 ACLR		requirement in case of operation in proximity: ± 4,0 dB requirement in case of co-siting: TBD	
6.6.3 Spurious emiss	ions	Not critical	Not critical
6.7 Transmit interm (interferer requi	odulation rements)	Not critical	Not critical
6.8.1 Modulation acc	uracy	± 2,5 % (for single code)	Signal power = PRAT to (PRAT – 30 dB) Specified accuracy applies to measurement results between ± 7,5% and 17,5%
6.8.2 Peak code dom	ain error	±1 dB	
NOTE: The Test Ec Requirement	uipment uncertant (not the Minim	inty applies for measurement results in a unit of the range of the ran	a range equal to the DUT Test

Table E.1: Equipment accuracy for transmitter measurements

3GPP TSG RAN WG4 Meeting #19

R4-011085

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

													С	R-Form-v4
	CHANGE REQUEST													
¥	25	<mark>.142</mark>	CR	74		ж .е∖	′ -	ж	Curre	nt vers	sion:	4.1	.0	ж
For <u>HELP</u> on u	ising t	this for	rm, see	e bottom	of this	page o	or look	at the	e pop-	up text	t over	the ¥	sym	bols.
Proposed change	Proposed change affects: # (U)SIM ME/UE Radio Access Network X Core Network													
Title: ೫	Pov	wer an	d ACL	.R definit	<mark>ion cor</mark>	rection	S							
Source: #	RA	<mark>N WG</mark>	4											
Work item code: अ									D	ate: ೫	3 S	eptem	ber 2	2001
Category: # A Release: # Rel-4 Use one of the following categories: Use one of the following releases: F (correction) 2 (GSM Phase 2) A (corresponds to a correction in an earlier release) R96 (Release 1996) B (addition of feature), R97 (Release 1997) C (functional modification of feature) R98 (Release 1998) D (editorial modification) R99 (Release 1999) Detailed explanations of the above categories can REL-4 (Release 4) be found in 3GPP TR 21.900. REL-5 (Release 5) Reason for change: # Corrections of power related entities; in alignment with a corresponding CR to the relevant core specification TS 25.105. Summary of change: # Clarification of the definitions for average power, output power, maximum outp power and rated output power.						R to output with the								
new definition. Renaming of the minimum transmit power into minimum output power. Correction of ACLR definition. Correction of Power Control dynamic range definition.					ır.									
Consequences if not approved:	ж	Poss non-	sible m consis	<mark>isunders</mark> tent conf	tanding forman	g of se ce mea	veral p asurer	oower nents	and A	CLR c	lefiniti	ons m	ay re	sult in
Clauses affected:	ж	3.1(r 6.4.2 6.4.4 C Ar	new); 3 2.4.2.1 1.5; 6.4 nex D	8.2 (new) , 6.4.3.1, I.5.3; 6.5 ; Annex	; 3.3(no 6.4.3.4 .1.1; 6. E	ew); 5. 4.2.1, 6 6.1.4.2	2; 5.1 6.4.4; 2.1; 6.	0.2; 5 6.4.4. 6.2.2.	.11.1;	5.15; 6 .2; 6.4 2.2.2.3	6.2.1; 1.4.4.1 3.1; 6.1	6.2.4.2 .1, 6.4 6.2.2.4	2.1; I.4.4.: I.2.1;	2.1, Annex

Other comments: # This CR corresponds to R99 Cat F CR in tdoc R4-011135.

Other core specifications

Test specifications O&M Specifications

How to create CRs using this form:

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Other specs

affected:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

ж

- 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 <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Definitions, symbols, and abbreviations

3.1 Definitions

Average power: The thermal power as measured through a root raised cosine filter with roll-off $\alpha = 0.22$ and a bandwidth equal to the chip rate of the radio access mode. The period of measurement shall be a transmit timeslot excluding the guard period, unless otherwise stated.

Maximum output power, Pmax: The maximum output power of the base station per carrier measured at the antenna connector (i.e. the actual broadband power as would be measured assuming no measurement error) for a specified reference condition. The period of measurement shall be a transmit timeslot excluding the guard period.

Rated output power, PRAT: The output power that the manufacturer has declared to be available.

3.2 Symbols

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

<u>α</u> Roll-off factor

3.3 Abbreviations

For the purposes of the present document, the following definitions, symbols and abbreviations apply:

3GPP	3rd Generation Partnership Project
0.	- Roll off factor
dB	decibel
dBm	decibel relative to 1 milliWatt
DPCHo	Mechanism used to simulate an individual intracell interferer in the cell with one code and a spreading factor of 16
$\frac{DPCH_o_E_c}{I_{or}}$	Ratio of the average transmit energy per PN chip for the $DPCH_0$ to the total transmit power
	spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
EVM	Error Vector Magnitude
F	Frequency (of the assigned channel frequency of the wanted signal)
Fuw	Frequency offset of the unwanted interfering signal from the assigned channel frequency of the wanted signal
IMT-2000	International Mobile Telecommunications 2000
Ioc	Power spectral density of a band limited white noise source (simulating interference form other cells) as measured at the BS antenna connector.
Îor	Received power spectral density of all users in the cell in one timeslot as measured at the BS antenna connector
IPR	Intellectual Property Rights
Р	Transmit Output power
Pout	Output power of the base station; defined as the mean power of one carrier delivered to a load with resistance equal to the pominal load impedance of the transmitter during one slot
Pmax	Maximum output power of the base station; defined as the mean power level per carrier over an optimality timeslet measured at the enterna comparison of a specified reference condition
DDED	Desidual DED
KDEK DEESENS	Residual DER Deference Sensitivity Level
DMC	Deet Meen Square
	Root-Mean Square
PKAI	timeslot that the manufacturer has declared to be available at the antenna connector
RRC	Root-Raised Cosine
T _C	Chip duration
TS	Time Slot

5.2 Output power

The manufacturer shall declare the rated output power, PRAT, of the base station. <u>whichPRAT</u> is defined <u>in subclause</u> <u>3.1.</u> as the mean power level per carrier over an active timeslot available at the antenna connector; see subclause 6.2.

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5.10.2 Measurement of transmitter

Table_5.3: Maximum Test System Uncertainty for transmitter tests

	Subclause	Maximum Test System Uncertainty	Measurement				
			range (see NOTE)				
6.2	Maximum Qoutput Ppower	± 0.7 dB					
6.3	Frequency stability	± 12 Hz	± 500 Hz				
6.4.2	Power control steps	single step: ±0,1 dB					
	D	ten steps: ± 0,3 dB					
6.4.3	Power control dynamic range	± 0,3 dB					
6.4.4	Ninimum <u>outputtransmit</u> power						
0.4.0		± 0,0 0B					
652	Transmit ON/OFF time mask	Tx power limit = -79 dBm : $+ 2.0 \text{ dB}$					
0.0.2		Tx power limit = -33 dBm: ± 0.7 dB					
6.6.1	Occupied Bandwidth	± 100 kHz	± 1,0 MHz				
6.6.2.	1 Spectrum emission mask	± 1.5 dB					
6.6.2.2	2 Adjacent Channel Leakage	minimum requirement:	Signal power =				
power	Ratio (ACLR)	5 MHz offset: ± 0,8 dB	PRAT				
		10 MHz offset: ± 0,8 dB					
		requirement in case of operation in proximity to TDD BS					
		or FDD BS operating on an adjacent frequency:					
		D MHZ OIISEL: $\pm 4 \text{ dB}$					
		requirement in case of co-siting with TDD BS or FDD					
		BS operating on an adjacent frequency:					
		5 MHz offset: TBD					
		10 MHz offset: TBD					
		Note: Impost of monopulation and indications and					
		intermed effects in the measurement period (averaging) and					
		fully studied					
6.6.3	Spurious emissions	± 2,0 dB for BS and coexistence bands for results					
	•	> -60 dBm					
		\pm 3,0 dB for results < -60 dBm					
		Outside above range:					
		$f \le 2,2 \text{ GHz}$: $\pm 1,5 \text{ dB}$					
		$2,2 \text{ GHZ} < f \le 4 \text{ GHZ}; \pm 2,0 \text{ dB}$					
67	Transmit intermodulation	$1 > 4$ GHZ. $\pm 4,0$ dD	Not applicable				
0.7		interference signal level only and is unrelated to the	Not applicable				
		measurement uncertainty of -the tests (6.6.2.1, 6.6.2.2					
		and 6.6.3) which have to be carried out in the presence					
		of the interference signal.					
		Need to add formula for uncertainty of the ratio.					
		1 dD					
681	Modulation accuracy	+2.5% (for single code)	+ 5 0 9/				
0.0.1	modulation accuracy		± 3,0 /0				
			Signal power =				
			PRAT to (PRAT				
			–30 dB)				
6.8.2	Peak code domain error	± 1 dB	Signal power =				
			PRAT				
NOTE	: The Test System uncertainty	applies for measurement results in a range equal to the l	DUT Test				
	Requirement (not the Minimum Requirement) extended by the range specified.						

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5.11.1 Transmitter

Subclause	Test Tolerance (see NOTE)
6.2 Maximum Output Ppower	0,7 dB
6.3 Frequency stability	12 Hz
6.4.2 Power control steps	single step: 0,1 dB
	ten steps: 0,3 dB
6.4.3 Power control dynamic range	0,3 dB
6.4.4 Minimum transmitoutput power	0,7 dB
6.4.5 Primary CCPCH power	0,8 dB
6.5.1 Transmit OFF power	2,0 dB
6.5.2 Transmit ON/OFF time mask	Tx power limit = -79 dBm: 2,0 dB Tx power limit = -33 dBm: 0,7 dB
6.6.1 Occupied Bandwidth	0 kHz
6.6.2.1 Spectrum emission mask	1,5 dB
6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)	minimum requirement: 0,8 dB
	co-siting: TBD
6.6.3 Spurious emissions	0 dB
6.7 Transmit intermodulation	 Testing of transmit intermodulation consists of 3 parts: testing of spectrum emission mask, see 6.6.2.1 testing of ACLR, see 6.6.2.2 testing of spurious emissions, see 6.6.3 For each of these parts, the respective Test Tolerances as specified in this table shall apply. Test Tolerance for setting of the interferer power level: 0 dB
6.8.1 Modulation accuracy	0 %
6.8.2 Peak code domain error	1 dB
NOTE: Unless otherwise stated, the Test See Annex D.	Tolerances are applied to the DUT Minimum Requirement.

Table 5.6: Test Tolerance for transmitter tests

5.15 Overview of the conformance test requirements

Tables 5.9, 5.10 and 5.11 give an overview of the conformance test requirements for the transmitter, the receiver and system performance, respectively.

Parameter	Subclause	Note
Maximum output power	6.2	manufacturer's declaration required
Frequency stability	6.3	manufacturer's declaration required
Output power dynamics	6.4	
Inner loop power control	6.4.1	
Power control steps	6.4.2	
Power control dynamic range	6.4.3	
Minimum transmit<u>output</u> power	6.4.4	
Primary CCPCH power	6.4.5.	
Transmit OFF power	6.5.1	
Transmit ON/OFF time mask	6.5.2	
Output RF spectrum emissions	6.6	
Occupied bandwidth	6.6.1	
Out-of-band emission	6.6.2	
Spectrum emission mask	6.6.2.1	manufacturer's declaration required
Adjacent Channel Leakage power Ratio (ACLR)	6.6.2.2	manufacturer's declaration required
Spurious emissions	6.6.3	
Mandatory requirements	6.6.3.2.1	manufacturer's declaration required
Co-existence with GSM 900	6.6.3.2.2	manufacturer's declaration required
Co-existence with DCS 1800	6.6.3.2.3	manufacturer's declaration required
Co-existence with UTRA FDD	6.6.3.2.4	manufacturer's declaration required
Transmit intermodulation	6.7	
Transmit modulation	6.8	
Modulation accuracy	6.8.1	
Peak code domain error	6.8.2	

Table 5.9: Overview of the conformance tests requirements for the transmitter

6.2 Maximum output power

6.2.1 Definition and applicability

Output power, Pout, of the base station is the power of one carrier delivered to a load with resistance equal to the nominal load impedance, when averaged (in the sense of thermal power) over the useful part of the burst (time slot).

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

Maximum output power, Pmax, of the base station is the mean power level per carrier over an active timeslot measured at the antenna connector for a specified reference condition.

Mmaximum output power (Pmax) and rated output power (PRAT) are defined in subclause 3.1.

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

6.2.2 Minimum Requirements

In normal conditions, the base station maximum output power shall remain within +2 dB and -2 dB of the manufacturer's rated output power.

In extreme conditions, the base station maximum output power shall remain within +2,5 dB and -2,5 dB of the manufacturer's rated output power.

In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the ranges defined for the Normal test environment in subclause 5.9.1.

The normative reference for this requirement is TS 25.105 [1] subclause 6.2.1.1.

6.2.3 Test purpose

The test purpose is to verify the accuracy of the maximum output power across the frequency range and under normal and extreme conditions for all transmitters in the BS.

6.2.4 Method of test

6.2.4.1 Initial conditions

6.2.4.1.1 3,84 Mcps TDD option

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

In addition, on one UARFCN only, the test shall be performed under extreme power supply as defined in subclause 5.9.4.

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

- (1) The transmitter under test and all other transmitters of the base station (if any) are switched on.
- (2) The power of the transmitters not under test (if any) are controlled down.
- (3) Connect the power measuring equipment to the BS antenna connector.
- (4) Set the parameters of the transmitted signal according to table 6.1.

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

Table 6.1: Parameters of the transmitted signal for maximum output power test

6.2.4.1.2 1,28 Mcps TDD option

(1) The transmitter under test and all other transmitters of the base station (if any) are switched on.

- (2) The power of the transmitters not under test (if any) are controlled down.
- (3) Connect the power measuring equipment to the BS antenna connector.
- (4) Set the parameters of the transmitted signal according to table 6.1A.

Table 6.1A: Parameters of the transmitted signal for maximum output power test for 1,28 Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6:
	transmit, if i is 0,4,5,6;
	receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

6.2.4.2 Procedure

6.2.4.2.1 3,84 Mcps TDD option

- (1) Measure thermal power of the BS output signal over the 2464 active chips of an even time slot <u>TS i</u> (this excludes the guard periods), and with a measurement bandwidth of at least 5 MHz.
 - (2) Run step (1) for RF channels Low / Mid / High.

6.2.4.2.2 1,28 Mcps TDD option

- (1) Measure thermal power over the 848 active chips of an even time slot (this excludes the guard periods), and with a measurement bandwidth of at least 1,6 MHz.
- (2) Run step (1) for RF channels Low / Mid / High.

6.2.5 Test Requirements

NOTE: If the Test Requirement below 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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

In normal conditions, the measured output power, derived according to subclause 6.2.4.2, shall remain within +2,7 dB and -2,7 dB of the manufacturer's rated output power.

In extreme conditions, the measured output power, derived according to subclause 6.2.4.2, shall remain within +3,2 dB and -3,2 dB of the manufacturer's rated output power.

6.4.2 Power control steps

6.4.2.1 Definition and applicability

The power control step is the step change in the DL transmitter output power in response to a TPC message from the UE.

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

6.4.2.2 Minimum Requirements

The power control step sizes in the DL shall be 1 dB, 2 dB and 3 dB.

The tolerance of the transmitter output power and the greatest average rate of change in mean power due to the power control step shall be within the range shown in Table 6.3.

Step size	Tolerance	Range of average ra mean power pe	te of change in r 10 steps
		Minimum	maximum
1dB	± 0,5 dB	± 8 dB	± 12 dB
2dB	± 0,75 dB	± 16 dB	\pm 24 dB
3dB	± 1 dB	± 24 dB	± 36 dB

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.2.1.

6.4.2.3 Test purpose

The DL power control is applied to adjust the BS output power to a value that is sufficiently high to generate a SIR at the UE receiver equal to the target SIR, while limiting the intercell interference.

The test purpose is to verify the ability of the BS to interpret received TPC commands in a correct way and to adjust its output power according to these commands with the specified accuracy.

6.4.2.4 Method of test

- 6.4.2.4.1 Initial conditions
- 6.4.2.4.1.1 3,84 Mcps TDD option
- Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

- (1) Connect the BS tester to the antenna connector of the BS under test.
- (2) Disable closed loop power control in the BS under test.
- (3) Set the initial parameters of the BS transmitted signal according to table 6.4.
- (4) Operate the BS in such a mode that it is able to interpret received TPC commands.
- (5) Start BS transmission.

NOTE: The BS tester used for this test must have the ability:

- to analyze the output signal of the BS under test with respect to code domain power, by applying the global inchannel Tx test method described in Annex C;
- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.4: Initial parameters of the BS transmitted signal for power control steps test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
Number of DPCH in each active TS	1
DPCH power	Minimum
Data content of DPCH	real life
	(sufficient irregular)

6.4.2.4.1.2 1,28 Mcps TDD option

- (1) Connect the BS tester to the antenna connector of the BS under test.
- (2) Disable closed loop power control in the BS under test.
- (3) Set the initial parameters of the BS transmitted signal according to table 6.4A.
- (4) Operate the BS in such a mode that it is able to interpret received TPC commands.
- (5) Start BS transmission.

NOTE: The BS tester used for this test must have the ability

- to analyze the output signal of the BS under test with respect to code domain power, by applying the global inchannel Tx test method described in Annex C;
- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.4A: Initial parameters of the BS transmitted signal for power control steps test for 1,28 Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 6:
	transmit, if i is 0, 4,5,6;
	receive, if i is 1,2,3.
Number of DPCH in each active TS	1
DPCH power	Minimun
Data content of DPCH	real life
	(sufficient irregular)

6.4.2.4.2 Procedure

6.4.2.4.2.1 3,84 Mcps TDD option

- (1) Configure the BS transmitter to enable power control steps of size 1 dB.
- (2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH. This sequence shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS) and shall consist of a series of TPC commands with content "Increase Tx power", followed by a series of TPC commands with content "Decrease Tx power". Each of these series should be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum and its minimum, respectively.
- (3) Measure the power of the active DPCH over the 2464 active chips of each even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Based on the measurement made in step (3), calculate the power control step sizes and the average rate of change per 10 steps.

(5) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (4).

6.4.2.4.2.2 1,28 Mcps TDD option

- (1) Configure the BS transmitter to enable power control steps of size 1 dB.
- (2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH. This sequence shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS) and shall consist of a series of TPC commands with content "Increase Tx power", followed by a series of TPC commands with content "Decrease Tx power". Each of these series should be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum and its minimum, respectively.
- (3) Measure the power of the active DPCH over the 848 active chips of each even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Based on the measurement made in step (3), calculate the power control step sizes and the average rate of change per 10 steps.
- (5) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (4).

6.4.2.5 Test Requirements

NOTE: If the Test Requirements below differ 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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.4.2.5.1 3,84 Mcps TDD option

For all measurements, the tolerance of the power control step sizes and the average rate of change per 10 steps shall be within the limits given in Table 6.5.

Step size	Single step tolerance	Range of averag in mean powe	e rate of change er per 10 steps
		Minimum	maximum
1dB	± 0,6 dB	± 7,7 dB	± 12,3 dB
2dB	\pm 0,85 dB	± 15,7 dB	± 24,3 dB
3dB	± 1,1 dB	± 23,7 dB	± 36,3 dB

|--|

In case, the power control step size is set to 3 dB, the number of power control steps feasible within the power control dynamic range of the BS under test may be less than 10. In this case, the evaluation of the average rate of change in mean power shall be based on the number of power control steps actually feasible, and the permitted range of average rate of change shall be reduced compared to the values given in table 6.51 in proportion to the ratio (number of power control steps actually feasible /10).

EXAMPLE: If the number of power control steps actually feasible is 9, the minimum and maximum value of the range of average rate of change in mean power are given by ±21,3 dB and ±32,7 dB, respectively.

6.4.2.5.2 1,28 Mcps TDD option

For all measurements, the tolerance of the power control step sizes and the average rate of change per 10 steps shall be within the limits given in Table 6.3.

In case, the power control step size is set to 3 dB, the number of power control steps feasible within the power control dynamic range of the BS under test may be less than 10. In this case, the evaluation of the average rate of change in

mean power shall be based on the number of power control steps actually feasible, and the permitted range of average rate of change shall be reduced compared to the values given in table 6.4A in proportion to the ratio (number of power control steps actually feasible /10).

EXAMPLE: If the number of power control steps actually feasible is 9, the minimum and maximum value of the range of average rate of change in mean power are given by 21,6 dB and 32,4 dB, respectively.

6.4.3 Power control dynamic range

6.4.3.1 Definition and applicability

The power control dynamic range is the difference between the maximum and the minimum transmit output power <u>of</u> <u>one code channel</u> for a specified reference condition.

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

6.4.3.2 Minimum Requirements

The DL power control dynamic range shall be greater than or equal to 30 dB.

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.3.1.

6.4.3.3 Test purpose

The test purpose is to verify the ability of the BS to control the power of a single code signal over the specified dynamic range.

6.4.3.4 Method of test

6.4.3.4.1 Initial conditions

6.4.3.4.1.1 3,84 Mcps TDD option

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.6.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability:

- to analyze the output signal of the BS under test with respect to code domain power, by applying the global inchannel Tx test method described in Annex C;

- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.6: Parameters of the BS transmitted signal for power control dynamic range test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
Number of DPCH in each active TS	1
Data content of DPCH	real life
	(sufficient irregular)

6.4.3.4.1.2 1,28 Mcps TDD option

- (1) Connect the BS tester to the antenna connector of the BS under test.
- (2) Set the parameters of the BS transmitted signal according to table 6.6A.
- (3) Operate the BS in such a mode that it is able to interpret received TPC commands
- (4) Start BS transmission.
- NOTE: The BS tester used for this test must have the ability
- to analyze the output signal of the BS under test with respect to code domain power, by applying the global inchannel Tx test method described in Annex C;
- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.6A: Parameters of the BS transmitted signal for power control dynamic range test for 1,28 Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 6:
	transmit, if i is 0, 4,5,6;
	receive, if i is 1,2,3.
Number of DPCH in each active TS	1
Data content of DPCH	real life
	(sufficient irregular)

6.4.3.4.2 Procedure

6.4.3.4.2.1 3,84 Mcps TDD option

- (1) Configure the BS transmitter to enable power control steps of size 1 dB.
- (2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Increase Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).
- (3) Measure the power of the active DPCH over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).
- (5) Measure the power of the active DPCH over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (6) Determine the power control dynamic range by calculating the difference between the maximum transmit output power measured in step (3) and the minimum transmit output power measured in step (5).
- (7) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (6).

6.4.3.4.2.2 1,28 Mcps TDD option

(1) Configure the BS transmitter to enable power control steps of size 1 dB.
- (2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Increase Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum, and shall be transmitted to the BS within the receive time slots TS i of the BS.
- (3) Measure the power of the active DPCH over the 848 active chips of an receive time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the receive time slots TS i of the BS.
- (5) Measure the power of the active DPCH over the 848 active chips of a receive time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (6) Determine the power control dynamic range by calculating the difference between the maximum transmit output power measured in step (3) and the minimum transmit output power measured in step (5).
- (7) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (6).

6.4.3.5 Test Requirements

NOTE: If the Test Requirement below 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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

The power control dynamic range derived according to subclause 6.4.3.4.2 shall be greater than or equal to 29,7 dB

6.4.4 Minimum output transmit power

6.4.4.1 Definition and applicability

The minimum controlled output power of the BS is when the power control setting is set to a minimum value. This is when the power control indicates a minimum transmit output power is required.

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

6.4.4.2 Minimum Requirements

The DL minimum transmitoutput power shall be lessower than or equal to:

Maximum output power - 30 dB.

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.4.1.

6.4.4.3 Test purpose

The test purpose is to verify the ability of the BS to reduce its output power to a specified value.

6.4.4.4 Method of test

6.4.4.4.1 Initial conditions

6.4.4.4.1.1 3,84 Mcps TDD option

Test environment: normal; see subclause 5.9.1.

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RF channels to be tested: B, M and T; see subclause 5.3.

- (1) Connect the BS tester to the antenna connector of the BS under test.
- (2) Set the parameters of the BS transmitted signal according to table 6.7.
- (3) Operate the BS in such a mode that it is able to interpret received TPC commands
- (4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability:

- to analyze the output signal of the BS under test with respect to thermal power;
- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.7: Parameters of the BS transmitted signal for minimum transmit-power test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

6.4.4.4.1.2 1,28 Mcps TDD option

(1) Connect the BS tester to the antenna connector of the BS under test.

- (2) Set the parameters of the BS transmitted signal according to table 6.7A.
- (3) Operate the BS in such a mode that it is able to interpret received TPC commands
- (4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability

- to analyze the output signal of the BS under test with respect to thermal power;
- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.7A: Parameters of the BS transmitted signal for minimum transmit power test for 1,28 Mcps TDD

Parameter	Value/description	
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6:	
	transmit, if i is 0,4,5,6;	
	receive, if i is 1,2,3.	
BS output power setting	PRAT	
Number of DPCH in each active TS	8	
Power of each DPCH	1/8 of Base Station output power	
Data content of DPCH	real life	
	(sufficient irregular)	

6.4.4.2 Procedure

6.4.4.4.2.1 3,84 Mcps TDD option

- (1) Configure the BS transmitter to enable power control steps of size 1 dB.
- (2) Set the BS tester to produce a sequence of TPC commands related to all active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit-output power of all active DPCH is

controlled to reach its minimum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).

- (3) Measure the power of the BS output signal over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) and (3).

6.4.4.4.2.2 1,28 Mcps TDD option

- (1) Configure the BS transmitter to enable power control steps of size 1 dB.
- (2) Set the BS tester to produce a sequence of TPC commands related to all active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of all active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the receive time slots TS i of the BS.
- (3) Measure the power of the BS output signal over the 848 active chips of a receive time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) and (3).

6.4.4.5 Test Requirements

NOTE: If the Test Requirement below 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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

For all measurements, the minimum transmitoutput power derived in step (4) of subclause 6.4.4.4.2 shall be at least 29,3 dB below the maximum output power as declared by the manufacturer; see 6.2.

6.4.5 Primary CCPCH power

6.4.5.1 Definition and applicability

Primary CCPCH power is the transmission power of the Primary Common Control Physical Channel averaged over the transmit timeslot. Primary CCPCH power is signaled on the BCH.

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

6.4.5.2 Minimum Requirements

The error between the BCH-broadcast value of the Primary CCPCH power and the Primary CCPCH power averaged over the timeslot shall not exceed the values in table 6.8. The error is a function of the total power averaged over the timeslot, Pout, and the manufacturer's rated output power, PRAT.

Table 6.8: Errors between Primary CCPCH power and the broadcast value

Total power in slot, dB	PCCPCH power tolerance
PRAT - 3 < Pout \leq PRAT + 2	+/- 2,5 dB
PRAT - 6 < P ≤ PRAT - 3	+/- 3,5 dB
PRAT - 13 < P ≤ PRAT - 6	+/- 5 dB

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.5.

6.4.5.3 Test purpose

The power of the Primary CCPCH received by the UE, together with the information on the Primary CCPCH nominal transmit power signaled on the BCH, are used by the UE for path loss estimation and adjustment of its own transmitoutput-power. Therefore, deviations of the Primary CCPCH power from its nominal value are transposed by the UE into deviations from the wanted transmitoutput-power of the UE.

The test purpose is to verify that the Primary CCPCH power remains within its specified tolerances under normal and extreme conditions.

6.5 Transmit ON/OFF power

6.5.1 Transmit OFF power

6.5.1.1 Definition and applicability

The transmit OFF power is the maximum residual output power within the channel bandwidth when the BS does not transmit.defined as the average power measured over one chip when the transmitter is off. The transmit OFF power state is when the BS does not transmit.

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

6.6 Output RF spectrum emissions

6.6.1 Occupied bandwidth

6.6.1.1 Definition and applicability

Occupied bandwidth is a measure of the bandwidth containing 99% of the total integrated power for transmitted spectrum and is centered on the assigned channel frequency.

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

6.6.1.2 Minimum Requirements

6.6.1.2.1 3,84 Mcps TDD option

The occupied bandwidth shall be less than 5 MHz based on a chip rate of 3,84 Mcps.

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.1.

6.6.1.2.2 1,28 Mcps TDD option

The occupied bandwidth shall be less than 1.6 MHz based on a chip rate of 1,28 Mcps.

The reference for this requirement is TS 25.105 [1] subclause 6.6.1.

6.6.1.3 Test purpose

The occupied bandwidth, defined in the Radio Regulations of the International Telecommunication Union ITU, is a useful concept for specifying the spectral properties of a given emission in the simplest possible manner; see also Recommendation ITU-R SM.328-9 [7]. The test purpose is to verify that the emission of the BS does not occupy an excessive bandwidth for the service to be provided and is, therefore, not likely to create interference to other users of the spectrum beyond undue limits.

6.6.1.4 Method of test

6.6.1.4.1 Initial conditions

6.6.1.4.1.1 3,84 Mcps TDD option

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.12.

Table 6.12: Parameters of the BS transmitted signal for occupied bandwidth testing

Parameter	Value/description	
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:	
	transmit, if i is even;	
	receive, if i is odd.	
BS output power setting	PRAT	
Number of DPCH in each active TS	9	
Power of each DPCH	1/9 of Base Station output power	
Data content of DPCH	Real life	
	(sufficient irregular)	

6.6.1.4.1.2 1,28 Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.12A.

Table 6.12A: Parameters of the BS transmitted signal for occupied bandwidth testing for 1,28 Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6:
	transmit, if i is 0,4,5,6;
	receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

6.6.1.4.2 Procedure

6.6.1.4.2.1 3,84 Mcps TDD option

- (1) Measure the power of the transmitted signal with a measurement filter of bandwidth 30 kHz. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). The centre frequency of the filter shall be stepped in contiguous 30 kHz steps from a minimum frequency, which shall be (7,5 0,015) MHz below the assigned channel frequency of the transmitted signal, up to a maximum frequency, which shall be (7,5 0,015) MHz above the assigned channel frequency of the transmitted signal. The time duration of each step shall be sufficiently long to capture one active time slot. The measured power shall be recorded for each step.
- (2) Determine the total-<u>transmittedoutput</u>-power by accumulating the recorded power measurement results of all steps.
- (3) Sum up the recorded power measurement results, starting from the step at the minimum frequency defined in (1) up to the step at a lower limit frequency by which this sum is equal to or greater than 0.5 % of the total <u>output</u> power determined in (2). This limit frequency is recorded as "Lower Frequency".
- (4) Sum up the recorded power measurement results, starting from the step at the maximum frequency defined in (1) down to the step at an upper limit frequency by which this sum is equal to or greater than 0.5 % of the total <u>output</u>-power determined in (2). This limit frequency is recorded as "Upper Frequency".
- (5) Calculate the occupied bandwidth as the difference between the "Upper Frequency" obtained in (3) and the "Lower Frequency" obtained in (4).

6.6.1.4.2.2 1,28 Mcps TDD option

- (1) Measure the power of the transmitted signal with a measurement filter of bandwidth 30 kHz. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyser filter). The centre frequency of the filter shall be stepped in contiguous 30 kHz steps from a minimum frequency, which shall be (2,4 0,015) MHz below the assigned channel frequency of the transmitted signal, up to a maximum frequency, which shall be (2,4 0,015) MHz below the assigned channel frequency of the transmitted signal. The time duration of each step shall be sufficiently long to capture one active time slot. The measured power shall be recorded for each step.
- (2) Determine the total transmitted power by accumulating the recorded power measurement results of all steps.
- (3) Sum up the recorded power measurement results, starting from the step at the minimum frequency defined in (1) up to the step at a lower limit frequency by which this sum is equal to or greater than 0,5 % of the total power determined in (2). This limit frequency is recorded as "Lower Frequency".

- (4) Sum up the recorded power measurement results, starting from the step at the maximum frequency defined in (1) down to the step at an upper limit frequency by which this sum is equal to or greater than 0,5 % of the total power determined in (2). This limit frequency is recorded as "Upper Frequency".
- (5) Calculate the occupied bandwidth as the difference between the "Upper Frequency" obtained in (3) and the "Lower Frequency" obtained in (4).

6.6.1.5 Test Requirements

NOTE: If the Test Requirement below differ from the Minimum Requirements, then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in subclause 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.6.1.5.1 3,84 Mcps TDD option

The occupied bandwidth calculated in step (5) of subclause 6.6.1.4.2.1 shall be less than 5 MHz.

6.6.1.5.2 1,28 Mcps TDD option

The occupied bandwidth calculated in step (5) of subclause 6.6.1.4.2.2 shall be less than 1,6 MHz.

Release 4

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

6.6.2.2.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the <u>transmitted average</u> power <u>centered on the assigned</u> <u>channel frequency</u> to the <u>average</u> power <u>centered on measured in</u> an adjacent channel <u>frequency</u>. <u>In Bboth cases</u>, the <u>transmitted and the adjacent channel</u> power <u>isare</u> measured <u>with a through a matched</u> filter <u>that has a (rR</u>oot rRaised eCosine (RRC) filter response with and roll-off $\alpha = 0,22$) with a noise power and a 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.

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

- 6.6.2.2.2 Minimum Requirements
- 6.6.2.2.2.1 Minimum requirement
- 6.6.2.2.2.1.1 3,84 Mcps TDD option

The ACLR shall be equal to or greater than the limits given in table 6.22.

Table 6.22: BS ACLR limits

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

6.6.2.2.2.1.2 1,28 Mcps TDD option

The ACLR shall be equal to or greater than the limits given in Table 6.22A.

Table 6.22A: BS ACLR limits for 1,28 Mcps TDD

BS adjacent channel offset	ACLR limit
± 1.6 MHz	40 dB
± 3.2 MHz	50 dB

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.2.2.1.

6.6.2.2.2.2 Requirement in case of operation in proximity to TDD BS or FDD BS operating on an adjacent frequency

6.6.2.2.2.2.1 3,84 Mcps TDD option

In case the equipment is operated in proximity to another TDD BS or FDD BS on an adjacent frequency, the ACLR shall be equal to or greater than the value specified in table 6.23.

Table 6.23: BS ACLR limits in case of operation in proximity

BS adjacent channel offset	ACLR limit
± 5 MHz	70 dB
± 10 MHz	70 dB

The requirement is based on the assumption that the coupling loss between the base stations is at least 84dB.

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.2.2.2.

NOTE: The necessary dynamic range to very the conformance requirements specified in table 6.23 is at the limits of the capability of state-of-art measuring equipment.

6.6.2.2.2.2.2 1,28 Mcps TDD option

In case the equipment is operated in proximity to another TDD BS or FDD BS and both BSs operating on an adjacent frequency band, the requirement is specified in terms of power level of the transmitting BS. This requirement is valid for co-existence with non-frame and non-switching point synchronised systems operating on the closest used carrier. The interference power level shall not exceed the limit in Table 6.23A.

Table 6.23A:	BS ACLR in case of o	peration in proximit	y for 1,28 Mcps TDD
--------------	----------------------	----------------------	---------------------

Center Frequency for Measurement	Maximum Level of the interference power (in case of multiple antennas the interference powers shall be summed at all antenna connectors)	Measurement Bandwidth
Closest used carrier of the victim receiver: Either FDD carrier Or 3.84 Mcps TDD carrier Or 1.28 Mcps TDD carrier	-36 dBm	chip rate of the victim receiver: In case of FDD: 3.84 MHz In case of 3.84 Mcps TDD: 3.84 MHz In case of 1.28 Mcps TDD: 1.28 MHz

The closest used carrier with respect to the regarded carrier of one system is defined by

a minimum difference in centre frequency between the regarded carrier and the carriers used in the other system and the chip rate of the other system.

If the actual allowed interference level $P_{int, allowed, actual}$ at the victim receiver is higher than -106dBm, this requirement may be relaxed by the amount $P_{int, allowed, actual} - (-106dBm)$.

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

6.6.2.2.2.3.1 3,84 Mcps TDD option

In case the equipment is co-sited to another TDD BS or FDD BS operating on an adjacent frequency, the ACLR is specified in terms of the absolute <u>transmitoutput</u>-power level of the BS measured in the adjacent channel. The maximum power level shall not exceed the limit in table 6.24.

BS adjacent channel offset	Maximum Level	Measurement Bandwidth
± 5 MHz	-80 dBm	3.84 MHz
± 10 MHz	-80 dBm	3.84 MHz

The normative reference for this requirement is TS 25.105 [1] subclause 6.6.2.2.3.

NOTE: The necessary dynamic range of the measuring equipment to verify the conformance requirements specified in table 6.24 is dependent on the BS output power. If the BS output power is larger than -10 dBm, the necessary dynamic range is beyond the capability of state-of-the-art measuring equipment; direct verification of the conformance requirements is not feasible. Alternatively, indirect measurement methods need to be defined.

6.6.2.2.2.3.2 1,28 Mcps TDD option

In case the equipment is co-sited to another TDD BS or FDD BS and both BSs operating on an adjacent frequency band, the requirement is specified in terms of power level of the transmitting BS. This requirement is valid for co-

existence with a non-frame and non-switching point synchronised systems operating on closest used carrier. The interference power level shall not exceed the limit in Table 6.24A.

Center Frequency for Measurement	Maximum Level of the interference power (in case of multiple antennas the interference powers shall be summed at all antenna connectors)	Measurement Bandwidth
Closest used carrier of the victim receiver: Either FDD carrier Or 3.84 Mcps TDD carrier Or 1.28 Mcps TDD carrier	-76 dBm	chip rate of the victim receiver: In case of FDD: 3.84 MHz In case of 3.84 Mcps TDD: 3.84 MHz In case of 1.28 Mcps TDD: 1.28 MHz

The closest used carrier with respect to the regarded carrier of one system is defined by:

a minimum difference in centre frequency between the regarded carrier and the carriers used in the other system and the chip rate of the other system.

If the actual MCL_{actual} is higher than 30dB, this requirement may be relaxed by the amount MCL_{actual} – 30dB.

If the actual allowed interference level $P_{int, allowed, actual}$ at the victim receiver is higher than -106dBm, this requirement may be relaxed by the amount $P_{int, allowed, actual} - (-106dBm)$.

6.6.2.2.3 Test purpose

The test purpose is to verify the ability of the BS to limit the interference produced by the transmitted signal to other UTRA receivers operating at the first or second adjacent RF channel.

6.6.2.2.4 Method of test

- 6.6.2.2.4.1 Initial conditions
- 6.6.2.2.4.1.1 3,84 Mcps TDD option

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.25.

Table 6.25: Parameters of the BS transmitted signal for ACLR testing

Parameter	Value/description		
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:		
	transmit, if i is even;		
	receive, if i is odd.		
BS output power setting	PRAT		
Number of DPCH in each active TS	9		
Power of each DPCH	1/9 of Base Station output power		
Data content of DPCH	Real life		
	(sufficient irregular)		

6.6.2.2.4.1.2 1,28 Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.25A.

Table 6.25A: Parameters of the BS transmitted signal for ACLR testing for 1,28 Mcps TDD

Parameter	Value/description	
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6:	
	transmit, if i is 0,4,5,6;	
	receive, if i is 1,2,3.	
BS output power setting	PRAT	
Number of DPCH in each active TS	8	
Power of each DPCH	1/8 of Base Station output power	
Data content of DPCH	real life	
	(sufficient irregular)	

6.6.2.2.4.2 Procedure

6.6.2.2.4.2.1 3,84 Mcps TDD option

- (1) Measure transmitted<u>output</u> the average power centered on the assigned channel frequency over the 2464 active chips of the even time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points. (The global in channel Tx test described in Annex C may be applied.)
- (2) Average over TBD time slots.
- (3) Measure interference the average power at the first lower adjacent RF channel (center frequency 5 MHz below the assigned channel frequency of the transmitted signal) over the useful part of the burst within the even time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken with adherence to the sampling theorem.
- (4) Average over TBD time slots.
- (5) Calculate the ACLR by the ratio
 - ACLR =transmitted <u>output</u> average power acc. to (2) / <u>average</u> interference power acc. to (4).
- (6) Repeat steps (3), (4) and (5) for the second lower adjacent RF channel (center frequency 10 MHz below the assigned channel frequency of the transmitted signal) and also for the first and second upper adjacent RF channel (center frequency 5 MHz and 10 MHz above the assigned channel frequency of the transmitted signal, respectively).

6.6.2.2.4.2.2 1,28 Mcps TDD option

- (1) Measure transmitted power over the 848 active chips of the transmit time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points. (The global in-channel Tx test described in Annex C may be applied.)
- (2) Average over TBD time slots.
- (3) Measure interference power at the first lower adjacent RF channel (center frequency 1,6 MHz below the assigned channel frequency of the transmitted signal) over the useful part of the burst within the transmit time slots TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken with adherence to the sampling theorem.
- (4) Average over TBD time slots.
- (5) Calculate the ACLR by the ratio:

ACLR = transmitted power acc. to (2) / interference power acc. to (4).

(6) Repeat steps (3), (4) and (5) for the second lower adjacent RF channel (center frequency 3,2 MHz below the assigned channel frequency of the transmitted signal) and also for the first and second upper adjacent RF channel (center frequency 1,6 MHz and 3,2 MHz above the assigned channel frequency of the transmitted signal, respectively).

6.6.2.2.5 Test Requirements

NOTE: If the Test Requirements below differ from the Minimum Requirements, then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in subclause 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.6.2.2.5.1 3,84 Mcps TDD option

The ACLR calculated in step (5) of subclause 6.6.2.2.4.2.1 shall be equal or greater than the limits given in table 6.26 or table 6.272, respectively. In case the equipment is co-sited to another TDD BS or FDD BS operating on an adjacent frequency, the interference power at the first and second adjacent channel measured according to steps (3) and (4) of subclause 6.6.2.2.4.2.1 shall not exceed the maximum level specified in table 6.28

Table 6.26: BS ACLR Test Requirements

BS adjacent channel offset	ACLR limit
± 5 MHz	44,2 dB
± 10 MHz	54,2 dB

Table 6.27: BS ACLR Test Requirements in case of operation in proximity

BS adjacent channel offset	ACLR limit
± 5 MHz	66 dB
± 10 MHz	66 dB

Table 6.28: BS ACLR Test Requirements in case of co-sitting

BS adjacent channel offset	Maximum Level	Measurement Bandwidth
± 5 MHz	-[80 dBm - TT]	3.84 MHz
± 10 MHz	-[80 dBm - TT]	3.84 MHz

6.6.2.2.5.2 1,28 Mcps TDD option

The ACLR calculated in step (5) of subclause 6.6.2.2.4.2.2 shall be equal or greater than the limits given in table 6.26A. In case the equipment is in proximity or co-sited to another TDD BS or FDD BS operating on an adjacent frequency, the interference power at the adjacent channel measured according to steps (3) and (4) of subclause 6.6.2.2.4.2.2 shall not exceed the maximum level specified in table 6.27A or 6.28A respectively.

Table 6.26A: BS ACLR Test Requirements (1,28 Mcps option)

BS adjacent channel offset	ACLR limit
± 1.6 MHz	39.2 dB
± 3.2 MHz	49 dB

Table 6.27A: BS ACLR Test Requirements in case of operation in proximity (1,28 Mcps option)

Center Frequency for Measurement	Maximum Level (sum of emitted interference power of all node B antennas at the antenna connector)	Measurement Bandwidth
Closest used frequency of victim receiver	[-36 dBm-TT]	chip rate of victim receiver

Table 6.28A: BS ACLR Test Requirements in case of co-siting (1,28 Mcps option)

Center Frequency for Measurement	Maximum Level (sum of emitted interference power of all node B antennas at the antenna connector)	Measurement Bandwidth
Closest used frequency of victim receiver	[-76 dBm-TT]	Chip rate of victim receiver

C.3 Applications

This process may be applied in the measurements defined in the following subclauses:

6.3	Frequency Stability
6.4	Output Power Dynamics
6.4.2	Power control steps
6.4.3	Power control dynamic range
6.4.4	Minimum transmit output power
6.4.5	Primary CCPCH power
6.6.2.2	Adjacent Channel Leakage power Ratio (ACLR)
6.8	Transmit Modulation
6.8.1	Modulation accuracy
6.8.2	Peak Code Domain Error

Annex D (informative): Derivation of Test Requirements

The Test Requirements in this specification have been calculated by relaxing the Minimum Requirements of the core specification using the Test Tolerances defined in subclause 5.11. When the Test Tolerance is zero, the Test Requirement will be the same as the Minimum Requirement. When the Test Tolerance is non-zero, the Test Requirements will differ from the Minimum Requirements, and the formula used for this relaxation is given in tables D.1 to D.3

Note that a formula for applying Test Tolerances is provided for all tests, even those with a test tolerance of zero. This is necessary in the case that the Test System uncertainty is greater than that allowed in subclause 5.10. In this event, the excess error shall be subtracted from the defined test tolerance in order to generate the correct tightened Test Requirements as defined in subclause 5.12.

For example, a Test System having 0,9 dB accuracy for test 6.2 Maximum output power (which is 0,2 dB above the limit specified in subclause 5.10.2) would subtract 0,2 dB from the Test Tolerance of 0,7 dB defined in subclause 5.11.1. This new test tolerance of 0,5 dB would then be applied to the Minimum Requirement using the formula defined in Table D.1 to give a new range of $\pm 2,5$ dB of the manufacturer's rated output power.

For the case where an excess error of 0.2 dB exists, when applied to a test with a test tolerance of zero, the test tolerance used in the formula would be -0.2 dB.

	Test	Minimum Requirement in TS 25 105	Test Tolerance	Test Requirement in TS 25.142
		(numbering of tables in the	(TT)	
		column below refers to TS 25.142)	(,	
6.2	Maximum output power	In normal conditions	0,7 dB	Formula: Upper limit + TT
		within +2 dB and –2 dB of the		Lower limit – TT
		manufacturer's rated output power		
		In extreme conditions		In normal conditions
		within +2,5 dB and -2,5 dB of the		within +2,7 dB and –2,7 dB of the
		manufacturer's rated output power		manufacturer's rated output power
				In extreme conditions
				within +3,2 dB and –3,2 dB of the
6.2	Fragueney stability		12 Ц-7	manufacturer's rated output power
0.3	Frequency stability	Frequency stability = \pm 0,05 ppm		+ (frequency stability +TT)
				± (0.05 ppm + 12 Hz)
6.4.2	Power control steps	single step: step size tolerance	single	Formula:
	-	specified in table 6.3	step:	single step:
			0,1 dB	\pm (step size tolerance + TT)
		ten steps: minimum and maximum	ten steps:	ten steps:
		average rate of change in mean	0,3 dB	maximum average rate + TT
		power specified in table 6.3		minimum average rate – TT
				0,1 dB and 0,3 dB, respectively,
6.4.3	Power control dynamic	range > 30 dB	0.3 dB	Formula: Range – TT
range	· · · · · · · · · · · · · · · · · · ·		-,	
				range > 29.7 dB
6.4.4	Minimum transmitoutput	PRAT – 30 dB	0.7 dB	Formula :
power			-, -	PRAT – 30 dB +TT
				PRAT – 29,3 dB
6.4.5	Primary CCPCH power	PCCPCH power tolerance defined	0,8 dB	Formula:
		in table 6.8		\pm (power tolerance + TT)
				0,8 dB applied as above to table
651	Transmit OFF power	Tx OFF power limit < 79 dBm	2.0 dB	6.8 Formula:
0.0.1	Indianit Of 1 power		2,0 00	< Tx OFF power limit + TT
				< - 77 dBm
6.5.2	Transmit ON/OFF time	Tx power limit < -33 dBm or –79	< -33 dBm:	Formula:
mask		dBm, resp.	0,7 dB	< Tx power limit + TT
			< -79 dBm:	
			2,0 dB	< -32,3 dBm
				or < - 77 dBm
6.6.1	Occupied bandwidth	occupied bandwidth limit = 5 MHz	0 kHz	Formula:
				Occupied bandwidth limit + TT
				Occupied bandwidth limit = 5 MHz

Table D.1: Derivation of Test Requirements (Transmitter tests)

6.6.2.1 Spectrum emission mask		Maximum level defined in tables 6.13 to 6.16	1,5 dB	Formula: Maximum level + TT
				Add 1,5 dB to Maximum level entries in tables 6.13 to 6.16
6.6.2.2 power	Adjacent Channel Leakage Ratio (ACLR)	minimum requirement: ACLR limit = 45 dB at 5 MHz ACLR limit = 55 dB at 10 MHz	min. req. : 0,8 dB	Formula: ACLR limit – TT
		requirement in case of operation in proximity to TDD BS or FDD BS operating on an adjacent frequency: ACLR limit = 70 dB at 5 MHz ACLR limit = 70 dB at 10 MHz	operation in proxim.: 4 dB	min. requirement: ACLR limit = 44,2 dB at 5 MHz ACLR limit = 54,2 dB at 10 MHz operation in proximity: ACLR limit = 66 dB at 5 MHz ACLR limit = 66 dB at 10 MHz
		requirement in case of co-siting with TDD BS or FDD BS operating on an adjacent frequency ACLR limit = - 80 dBm at 5 MHz ACLR limit = - 80 dBm at 10 MHz	co-siting: TBD	co-siting: TBD
6.6.3	Spurious emissions	maximum level defined in tables 6.29 to 6.37	0 dB	Formula: Maximum limit + TT
				add 0 dB to maximum levels in tables 6.29 to 6.37
6.7	Transmit intermodulation (interferer requirements)	Wanted signal level – interferer level = 30 dB	0 dB	Formula: Ratio + TT
This to stimulu measu 6.6.2.2	lerance applies to the us and not the rements defined in 6.6.2.1, and 6.6.3.			Wanted signal level – interferer level = 30 + 0 dB
6.8.1	Modulation accuracy	EVM limit = 12,5 %	0 %	Formula: EVM limit + TT
				EVM limit = 12,5 %
6.8.2	Peak code domain error	PCDE limit = - 28 dB	1 dB	Formula: PCDE limit + TT
				PCDE limit = - 27 dB

Annex E (informative): Acceptable uncertainty of Test Equipment

This informative annex specifies the critical parameters of the components of an overall Test System (e.g. Signal generators, Signal Analysers etc.) which are necessary when assembling a Test System which complies with subclause 5.10 Acceptable Uncertainty of Test System. These Test Equipment parameters are fundamental to the accuracy of the overall Test System and are unlikely to be improved upon through System Calibration.

	Test	Equipment accuracy	Range (see NOTE)
6.2	Maximum output power	Not critical	Not critical
6.3	Frequency stability	± 10 Hz + timebase = 12 Hz	± 500 Hz. (This is to allow for UE range that at 0,1 PPM is larger than BTS.)
6.4.2	Power control steps	single step: $\pm 0,1 \text{ dB}$ ten steps: $\pm 0,3 \text{ dB}$	
6.4.3	Power control dynamic range	± 0,3 dB	
6.4.4	Minimum transmitoutput power	Not critical	Not critical
6.4.5	Primary CCPCH power	Not critical	Not critical
6.5.1	Transmit OFF power	Not critical	Not critical
6.5.2	Transmit ON/OFF time mask	Not critical	Not critical
6.6.1	Occupied bandwidth	± 100 kHz	±1 MHz
6.6.2.	1 Spectrum emission mask	Not critical	Not critical
6.6.2.	2 ACLK	requirement in case of operation in proximity: ± 4,0 dB requirement in case of co-siting: TBD	
6.6.3	Spurious emissions	Not critical	Not critical
6.7	Transmit intermodulation (interferer requirements)	Not critical	Not critical
6.8.1	Modulation accuracy	± 2,5 % (for single code)	Signal power = PRAT to (PRAT – 30 dB) Specified accuracy applies to measurement results between ± 7,5% and 17,5%
6.8.2	Peak code domain error	±1 dB	,
NOTE	: The Test Equipment uncerta Requirement (not the Minimu	inty applies for measurement results in um Requirement) extended by the range	a range equal to the DUT Test

Table E.1: Equipment accuracy for transmitter measurements

3GPP TSG RAN WG4 Meeting #19

R4-011182

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

CHANGE REQUEST							
¥	25.142 CR 75 # ev - # Current version: 3.6.0 #						
For <u>HELP</u> on us	ing this form, see bottom of this page or look at the pop-up text over the $#$ symbols.						
Proposed change a	ffects: 第 (U)SIM ME/UE Radio Access Network X Core Network						
Title: ೫	Minimum transmit power test condition alignment with PC dynamic range test conditions.						
Source: ж	RAN WG4						
Work item code: ₩	Date: 米 3 – 9 – 01						
Category: ₩	FRelease: %Rel99Use one of the following categories:Use one of the following releases:F (correction)2A (corresponds to a correction in an earlier release)R96B (addition of feature),R97C (functional modification of feature)R98D (editorial modification)R99Detailed explanations of the above categories canREL-4be found in 3GPP TR 21.900.REL-5						
Reason for change:	Minimum transmit power test conditions should be in agreement with the PC dynamic range test conditions to maximize testing efficiency.						
Summary of change	Align Minimum transmit power test conditions to be the same as PC dynamic range test conditions with 1 active DPCH in each active TS.						
Consequences if not approved:	# The current requirement requires unnecessary testing complexity.						
Clauses affected:	€ 6.4.4.4						
Other specs affected:	# Other core specifications # Test specifications O&M Specifications						
Other comments:	X						

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. 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 <u>ftp://ftp.3gpp.org/specs/</u> 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.

- (6)Determine the power control dynamic range by calculating the difference between the maximum transmit output power measured in step (3) and the minimum transmit output power measured in step (5).
- (7) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) to (6).

6.4.3.5 Test Requirements

The power control dynamic range derived according to subclause 6.4.3.4.2 shall be greater than or equal to 29,7 dB

NOTE: If the above Test Requirement differs from the Minimum Requirement, then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in subclause 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.4.4 Minimum transmit power

6.4.4.1 Definition and applicability

The minimum controlled output power of the BS is when the power control setting is set to a minimum value. This is when the power control indicates a minimum transmit output power is required.

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

6.4.4.2 Minimum Requirements

The DL minimum transmit power shall be lower than or equal to:

Maximum output power - 30 dB.

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.4.1.

6.4.4.3 Test purpose

The test purpose is to verify the ability of the BS to reduce its output power to a specified value.

6.4.4.4 Method of test

6.4.4.4.1 Initial conditions

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.7.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability:

- to analyze the output signal of the BS under test with respect to thermal power;

- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Parameter	Value/description			
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:			
	transmit, if i is even;			
	receive, if i is odd.			
Number of DPCH in each active TS	<u>91</u>			
Power of each DPCH	1/9 of Base Station output power			
Data content of DPCH	real life			
	(sufficient irregular)			

Table 6.7: Parameters of the BS transmitted signal for minimum transmit power test

6.4.4.2 Procedure

(1) Configure the BS transmitter to enable power control steps of size 1 dB.

- (2) Set the BS tester to produce a sequence of TPC commands related to <u>all-the</u> active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of all active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the odd time slots TS i (receive time slots of the BS).
- (3) Measure the power of the BS output signal over the 2464 active chips of an even time slot TS i (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.
- (4) Configure the BS transmitter to enable power control steps of 2 dB and of 3 dB, respectively, and repeat steps (2) and (3).

6.4.4.5 Test Requirements

For all measurements, the minimum transmit power derived in step (4) of subclause 6.4.4.4.2 shall be at least 29,3 dB below the maximum output power as declared by the manufacturer; see 6.2.

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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

6.4.5 Primary CCPCH power

6.4.5.1 Definition and applicability

Primary CCPCH power is the transmission power of the Primary Common Control Physical Channel averaged over the transmit timeslot. Primary CCPCH power is signaled on the BCH.

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

6.4.5.2 Minimum Requirements

The error between the BCH-broadcast value of the Primary CCPCH power and the Primary CCPCH power averaged over the timeslot shall not exceed the values in table 6.8. The error is a function of the total power averaged over the timeslot, Pout, and the manufacturer's rated output power, PRAT.

Table 6.8: Errors between Prima	ry CCPCH power and the broad	dcast value
---------------------------------	------------------------------	-------------

Total power in slot, dB	PCCPCH power tolerance
$PRAT - 3 < Pout \le PRAT + 2$	+/- 2,5 dB
PRAT - 6 < P ≤ PRAT - 3	+/- 3,5 dB
PRAT - 13 < P ≤ PRAT - 6	+/- 5 dB

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.5.

3GPP TSG RAN WG4 Meeting #19

R4-011283

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

CHANGE REQUEST							
ж	25.142 CR 76 [#] ev - [#] Current version: 4.1 .	.0 ^ж					
For <u>HELP</u> on us	ising this form, see bottom of this page or look at the pop-up text over the $#$	symbols.					
Proposed change a	affects: 第 (U)SIM ME/UE Radio Access Network Ⅹ Core	Network					
Title: ដ	Minimum transmit power test condition alignment with PC dynamic range conditions.	test					
Source: ೫	RAN WG4						
Work item code: ℜ	Date:	1					
Category: ₩	A Release: % Rel-4 Use one of the following categories: Use one of the following 2 F (correction) 2 (GSM Phase A (corresponds to a correction in an earlier release) R96 (Release 19 B (addition of feature), R97 (Release 19 C (functional modification of feature) R98 (Release 19 D (editorial modification) R99 (Release 19 D tetailed explanations of the above categories can REL-4 (Release 4) be found in 3GPP TR 21.900. REL-5 (Release 5)	releases: e 2) 196) 197) 198) 199)					
Reason for change	A Minimum transmit power test conditions should be in agreement with dynamic range test conditions to maximize testing efficiency.	the PC					
Summary of chang	ge: # Align Minimum transmit power test conditions to be the same as PC or range test conditions with 1 active DPCH in each active TS.	dynamic					
Consequences if not approved:	# The current requirement requires unnecessary testing complexity.						
Clauses affected:	₩ <mark>6.4.4.4</mark>						
Other specs affected:	# Other core specifications # Test specifications 0&M Specifications						
Other comments:	ж						

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

6.4.4 Minimum transmit power

6.4.4.1 Definition and applicability

The minimum controlled output power of the BS is when the power control setting is set to a minimum value. This is when the power control indicates a minimum transmit output power is required.

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

6.4.4.2 Minimum Requirements

The DL minimum transmit power shall be lower than or equal to:

Maximum output power - 30 dB.

The normative reference for this requirement is TS 25.105 [1] subclause 6.4.4.1.

6.4.4.3 Test purpose

The test purpose is to verify the ability of the BS to reduce its output power to a specified value.

6.4.4.4 Method of test

6.4.4.4.1	Initial	conditions
-----------	---------	------------

6.4.4.4.1.1 3,84 Mcps TDD option

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: B, M and T; see subclause 5.3.

(1) Connect the BS tester to the antenna connector of the BS under test.

(2) Set the parameters of the BS transmitted signal according to table 6.7.

(3) Operate the BS in such a mode that it is able to interpret received TPC commands

(4) Start BS transmission.

NOTE: The BS tester used for this test must have the ability:

- to analyze the output signal of the BS under test with respect to thermal power;

- to simulate an UE with respect to the generation of TPC commands embedded in a valid UE signal.

Table 6.7: Parameters of the BS transmitted signal for minimum transmit power test

Parameter	Value/description		
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:		
	transmit, if i is even;		
	receive, if i is odd.		
Number of DPCH in each active TS	<u>91</u>		
Power of each DPCH	1/9 of Base Station output power		
Data content of DPCH	real life		
	(sufficient irregular)		

3GPP TSG RAN WG4 Meeting #19

R4-011280

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

											CR-Form-v4
CHANGE REQUEST											
ж	25.	<mark>142</mark>	CR 77	ж	ev	-	Ħ	Current ve	ersion:	3.6.0) ^ж
For <u>HELP</u> on u	For HELP on using this form, see bottom of this page or look at the pop-up text over the # symbols.										
Proposed change affects: # (U)SIM ME/UE Radio Access Network X Core Network											
Title: #	Cor	rection	of frequency	y range for I	receiv	er spu	uriou	s emissior	าร		
Source: ೫	RAI	<mark>N WG4</mark>	1								
Work item code: %	B							Date:	ж <mark>3</mark>	Septemb	er 2001
Category: # F Release: # Rel99 Use one of the following categories: Use one of the following releases: F (correction) 2 (GSM Phase 2) A (corresponds to a correction in an earlier release) R96 (Release 1996) B (addition of feature), R97 (Release 1997) C (functional modification of feature) R98 (Release 1998) D (editorial modification) R99 (Release 1999) Detailed explanations of the above categories can REL-4 (Release 4) be found in 3GPP TR 21.900. REL-5 (Release 5)						eleases: 2) 6) 7) 8) 9)					
Reason for change	e: #	The c incon	current freque sistent with t	ency range he value pro	for rec opose	ceiver ed in I	spur TU-R	ious emis M.[UNW/	sion re ANT-M	quireme S].	nts is
Summary of chang	ge: ೫	The starting frequency for receiver spurious emission requirements is changed from 9 kHz to 30 MHz as proposed in ITU-R M.[UNWANT-MS].									
Consequences if not approved:	ж	There cause follow	e will be an ir e further inco v the ITU-R re	nconsistencies Insistencies ecommenda	y with with f ation.	ITU-F future	R rec regio	ommenda onal or nat	tion M. ional r	[UNWAI	NT]. It will is that will
Clauses affected:	ж										
Other specs Affected:	ж	Otl Te: O8	her core spe st specificati &M Specifica	cifications ons tions	ж						
Other comments:	ж	Corre	esponding RF	EL-4 Cat A (CR in	R4-01	1128	1			

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7.7 Spurious emissions

7.7.1 Definition and applicability

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the BS antenna connector. The requirements apply to all BS with separate Rx and Tx antenna connectors. For BS equipped with only a single antenna connector for both transmitter and receiver, the requirements of subclause 6.6.3 shall apply to this port, and this test need not be performed.

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

7.7.2 Minimum Requirements

The power of any spurious emission shall not exceed the values given in table 7.12.

Band	Maximum level	Measurement Bandwidth	Note
<u>30 MHz</u> 9 kHz – 1 GHz -57 dBm		100 kHz	
1 GHz – 1,9 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,900 – 1,980 GHz	-78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,980 – 2,010 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,010 – 2,025 GHz	-78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,025 GHz – 12,75 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS

Table 7.12: Receiver spurious emission requirements

The normative reference for this requirement is TS 25.105 [1] subclause 7.7.1.

7.7.3 Test purpose

The test purpose is to verify the ability of the BS to limit the interference caused by receiver spurious emissions to other systems.

7.7.4 Method of test

7.7.4.1 Initial conditions

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: M; see subclause 5.3.

(1) Connect the measuring equipment to the antenna connector of one BS Rx port.

- (2) Terminate or disable any other BS Rx port not under test.
- (3) Set the BS receiver to operational mode.

- (4) Set the BS to transmit a signal with parameters according to table 7.13.
- (5) Terminate the Tx port(s).

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

7.7.4.2 Procedure

1

- (1) Measure the power of the spurious emissions by applying the measuring equipment with the settings as specified in table 7.14. The characteristics of the measurement filter with the bandwidth 3,84 MHz shall be RRC with roll-off $\alpha = 0,22$. The characteristics of the measurement filters with bandwidths 100 kHz and 1 MHz shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filters shall be stepped in contiguous steps over the frequency bands as specified in table 7.14. The time duration of each step shall be sufficiently long to capture one even (transmit) time slot.
- (2) If the BS is equipped with more than one Rx port, interchange the connections of the BS Rx ports and repeat the measurement according to (1).

Stepped frequency range	Measurement bandwidth	Step width	Note	Detection mode
<u>30 MHz</u> 9 kHz – 1 GHz	100 kHz	100 kHz		true RMS
1 GHz – 1,900 GHz	1 MHz	1 MHz	With the exception of frequencies	
1,900 GHz – 1,980 GHz	3,84 MHz	200 kHz	between 12,5 MHz below the first	
1,980 GHz – 2,010 GHz	1 MHz	1 MHz	carrier frequency and 12,5 MHz	
2,010 GHz – 2,025 GHz	3,84 MHz	200 kHz	above the last carrier frequency	
2,025 GHz – 12,75 GHz	1 MHz	1 MHz	used by the BS	

Table 7.14: Measurement equipment settings

7.7.5 Test Requirements

The spurious emissions measured according to subclause 7.7.4.2 shall not exceed the limits specified in subclause 7.7.2.

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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

3GPP TSG RAN WG4 Meeting #19

R4-011281

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

	CR-Form-v		
CHANGE REQUEST			
¥	25.142 CR 78 * ev - * Current version: 4.1.0 *		
For <u>HELP</u> on u	using this form, see bottom of this page or look at the pop-up text over the $#$ symbols.		
Proposed change	affects: # (U)SIM ME/UE Radio Access Network X Core Network		
Title: %	Correction of frequency range for receiver spurious emissions		
Source: अ	RAN WG4		
Work item code: %	Date: # 4 September 2001		
Category: ₩	ARelease: %Rel-4Use one of the following categories:Use one of the following releases:F (correction)2A (corresponds to a correction in an earlier release)R96B (addition of feature),R97C (functional modification of feature)R98D (editorial modification)R99D tetailed explanations of the above categories canREL-4be found in 3GPP TR 21.900.REL-5		
Reason for change	e: # The current frequency range for receiver spurious emission requirements is inconsistent with the value proposed in ITU-R M.[UNWANT-MS].		
Summary of chang	ge: # The starting frequency for receiver spurious emission requirements is changed from 9 kHz to 30 MHz as proposed in ITU-R M.[UNWANT-MS].		
Consequences if not approved:	# There will be an inconsistency with ITU-R recommendation M.[UNWANT]. It will cause further inconsistencies with future regional or national regulations that will follow the ITU-R recommendation.		
Clauses affected:	x		
Other specs affected:	% Other core specifications % Test specifications O&M Specifications		
Other comments:	Corresponds to a R99 Cat F CR in R4-011280		

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- 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 <u>ftp://ftp.3gpp.org/specs/</u> 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.

7.7 Spurious emissions

7.7.1 Definition and applicability

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the BS antenna connector. The requirements apply to all BS with separate Rx and Tx antenna connectors. For BS equipped with only a single antenna connector for both transmitter and receiver, the requirements of subclause 6.6.3 shall apply to this port, and this test need not be performed.

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

7.7.2 Minimum Requirements

7.7.2.1 3,84 Mcps TDD option

The power of any spurious emission shall not exceed the values given in table 7.12.

Band	Maximum level	Measurement Bandwidth	Note
<u>30 MHz9 kHz – 1 GHz</u>	-57 dBm	100 kHz	
1 GHz – 1,9 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,900 – 1,980 GHz	-78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
1,980 – 2,010 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,010 – 2,025 GHz	-78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2,025 GHz – 12,75 GHz	-47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS

Table 7.12: Receiver spurious emission requirements

7.7.2.2 1,28 Mcps TDD option

The power of any spurious emission shall not exceed the values given in table 7.12A.

Band	Maximum level	Measurement Bandwidth	Note
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1.9 GHz and 1.98 GHz – 2.01 GHz	-47 dBm	1 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the BS.
1.9 GHz – 1.98 GHz and 2.01 GHz – 2.025 GHz	-83 dBm	1.28 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the BS.
2.025 GHz – 12.75 GHz	-47 dBm	1 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the BS.

 Table 7.12A: Receiver spurious emission requirements for 1,28 Mcps TDD

The normative reference for this requirement is TS 25.105 [1] subclause 7.7.1.

7.7.3 Test purpose

The test purpose is to verify the ability of the BS to limit the interference caused by receiver spurious emissions to other systems.

7.7.4 Method of test

7.7.4.1 Initial conditions

7.7.4.1.1 3,84 Mcps TDD option

Test environment: normal; see subclause 5.9.1.

RF channels to be tested: M; see subclause 5.3.

(1) Connect the measuring equipment to the antenna connector of one BS Rx port.

(2) Terminate or disable any other BS Rx port not under test.

(3) Set the BS receiver to operational mode.

(4) Set the BS to transmit a signal with parameters according to table 7.13.

(5) Terminate the Tx port(s).

Table 7.13: Parameters of the transmitted signal for Rx spurious emissions test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 14:
	transmit, if i is even;
	receive, if i is odd.
BS output power setting	PRAT
Number of DPCH in each active TS	9
Power of each DPCH	1/9 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

7.7.4.1.2 1,28 Mcps TDD option

(1) Connect the measuring equipment to the antenna connector of one BS Rx port.

- (2) Terminate or disable any other BS Rx port not under test.
- (3) Set the BS receiver to operational mode.
- (4) Set the BS to transmit a signal with parameters according to table 7.13A.
- (5) Terminate the Tx port(s).

Table 7.13A: Parameters of the transmitted signal for Rx spurious emissions test for 1,28 Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2,, 6:
	transmit, if i is 0,4,5,6;
	receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life
	(sufficient irregular)

7.7.4.2 Procedure

7.7.4.2.1 3,84 Mcps TDD option

- (1) Measure the power of the spurious emissions by applying the measuring equipment with the settings as specified in table 7.14. The characteristics of the measurement filter with the bandwidth 3,84 MHz shall be RRC with roll-off $\alpha = 0,22$. The characteristics of the measurement filters with bandwidths 100 kHz and 1 MHz shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filters shall be stepped in contiguous steps over the frequency bands as specified in table 7.14. The time duration of each step shall be sufficiently long to capture one even (transmit) time slot.
- (2) If the BS is equipped with more than one Rx port, interchange the connections of the BS Rx ports and repeat the measurement according to (1).

Stepped frequency range	Measurement	Step width	Note	Detection mode
	bandwidth			
<u>30 MHz9 kHz – 1 GHz</u>	100 kHz	100 kHz		true RMS
1 GHz – 1,900 GHz	1 MHz	1 MHz	With the exception of frequencies	
1,900 GHz – 1,980 GHz	3,84 MHz	200 kHz	between 12,5 MHz below the first	
1,980 GHz – 2,010 GHz	1 MHz	1 MHz	carrier frequency and 12,5 MHz	
2,010 GHz – 2,025 GHz	3,84 MHz	200 kHz	above the last carrier frequency	
2,025 GHz – 12,75 GHz	1 MHz	1 MHz	used by the BS	

Table 7.14: Measurement equipment settings

7.7.4.2.2 1,28 Mcps TDD option

- (1) Measure the power of the spurious emissions by applying the measuring equipment with the settings as specified in table 7.14A. The characteristics of the measurement filter with the bandwidth 1,28 MHz shall be RRC with roll-off $\alpha = 0,22$. The characteristics of the measurement filters with bandwidths 100 kHz and 1 MHz shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filters shall be stepped in contiguous steps over the frequency bands as specified in table 7.14A. The time duration of each step shall be sufficiently long to capture one even (transmit) time slot.
- (2) If the BS is equipped with more than one Rx port, interchange the connections of the BS Rx ports and repeat the measurement according to (1).
| Stepped frequency range | Measurement | Step width | Note | Detection mode |
|-------------------------|-------------|------------|-----------------------------------|----------------|
| | bandwidth | | | |
| 9 kHz – 1 GHz | 100 kHz | 100 kHz | | true RMS |
| 1 GHz – 1,900 GHz | 1 MHz | 1 MHz | With the exception of frequencies | |
| 1,900 GHz – 1,980 GHz | 1,28 MHz | 200 kHz | between 4 MHz below the first | |
| 1,980 GHz – 2,010 GHz | 1 MHz | 1 MHz | carrier frequency and 4 MHz | |
| 2,010 GHz – 2,025 GHz | 1,28 MHz | 200 kHz | above the last carrier frequency | |
| 2,025 GHz – 12,75 GHz | 1 MHz | 1 MHz | used by the BS | |

Table 7.14A: Measurement equipment settings

7.7.5 Test Requirements

NOTE: If the Test Requirement below 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 5.11 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex D.

The spurious emissions measured according to subclause 7.7.4.2 shall not exceed the limits specified in subclause 7.7.2.

3GPP TSG RAN WG4 Meeting #19

R4-011292

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

		CR-Form-v4				
CHANGE REQUEST						
ж	25.142 CR 79 [#]	ev _ [#] Current version: 3.6.0 [#]				
For <u>HELP</u> on us	ing this form, see bottom of this page	or look at the pop-up text over the # symbols.				
Proposed change a	ffects: ೫ (U)SIM ME/UE	Radio Access Network X Core Network				
Title: ೫	Definition of "classical Doppler spec	trum" in TS 25.142				
Source: ೫	RAN WG4					
Work item code:₩		Date: ೫ 04 September 2001				
Category: ⊮	 F Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories be found in 3GPP <u>TR 21.900</u>. 	Release: % Rel99Use one of the following releases:2(GSM Phase 2)earlier release)R96R97(Release 1996)R97(Release 1997))R98R99(Release 1998)R99(Release 1999)pories canREL-4REL-5(Release 5)				
Reason for change:	# Clarification of how the "classic	al Doppler spectrum" is defined				
Summary of change	A formula of the classical Dopp as taken by GSM specs	ler spectrum with Rayleigh fading is introduced,				
Consequences if not approved:	* There is not a unique definition	of "classical Doppler spectrum"				
Clauses affected:	ж <mark>В.2</mark>					
Other specs affected:	 X Other core specifications X Test specifications O&M Specifications 					
Other comments:	¥					

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- 1) Fill out the above form. The symbols above marked # contain pop-up help information about the field that they are closest to.
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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.

B.2 Multi-path fading propagation conditions

Table B1 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum, defined as: 0.5

$$S(f) \propto 1/(1 - (f/f_D)^2)^{6}$$

(CLASS) <u>-f_d, f_d.</u>

<u>–for f ∈</u>

Table B.1: Propagation Conditions for Multi path Fading Environments

Case 1, speed 3km/h		Case 2, speed 3 km/h		Case 3, 120 km/h	
Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]
0	0	0	0	0	0
976	-10	976	0	260	-3
		12000	0	521	-6
				781	-9

3GPP TSG RAN WG4 Meeting #19

R4-011296

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

					CR-Form-v4
	(CHANGE R	EQUEST		
ж	25.142 CR	80 [#]	ev _ ¥	Current versi	^{on:} 4.1.0 [#]
For <u>HELP</u> on us	sing this form, see	e bottom of this pa	ge or look at the	e pop-up text o	over the # symbols.
Proposed change a	ffects:	SIM ME/UE	Radio Ac	cess Network	X Core Network
Title: ೫	Definition of "cla	assical Doppler spe	ectrum" in TS 2	5.142	
Source: ೫	RAN WG4				
Work item code:₩				<i>Date:</i>	04 September 2001
Category: ⊮	A Use <u>one</u> of the follo F (correction) A (correspon B (addition of C (functional D (editorial m Detailed explanation be found in 3GPP	owing categories: ds to a correction in o f feature), modification of featu odification) ons of the above cate <u>TR 21.900</u> .	an earlier release re) egories can	Release: % Use <u>one</u> of t 2 (e) R96 R97 R98 R99 REL-4 REL-5	Rel-4 he following releases: (GSM Phase 2) (Release 1996) (Release 1997) (Release 1998) (Release 1999) (Release 4) (Release 5)
Reason for change.	: # Clarification	n of how the "class	ical Doppler sp	ectrum" is def	ined
Summary of change	e: # A formula o as taken by	of the classical Dop GSM specs	opler spectrum	with Rayleigh	fading is introduced,
Consequences if not approved:	# There is no	ot a unique definition	on of "classical I	Doppler spect	rum"
Clauses affected:	<mark>ቼ B.2</mark>				
Other specs affected:	# X X Test spe O&M Sp	pre specifications ecifications pecifications	\$ <mark>25.104,</mark> 25.141	25.105	
Other comments:	¥				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. 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 <u>ftp://ftp.3gpp.org/specs/</u> 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.

B.2 Multi-path fading propagation conditions

Table B1 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum_{τ}, defined as:

(CLASS)

 $S(f) \propto 1/(1 - (f/f_D)^2)^{0.5}$

<u>for $f \in -f_d, f_d$.</u>

B.2.1 3,84 Mcps TDD option

Table B.1: Propagation Conditions for Multi path Fading Environments

Case 1, speed 3km/h		Case 2, speed 3 km/h		Case 3, 120 km/h	
Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]
0	0	0	0	0	0
976	-10	976	0	260	-3
		12000	0	521	-6
				781	-9

B.2.2 1,28 Mcps TDD option

Table B2.2 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum-, defined as:

(CLASS) $S(f) \propto 1/(1 - (f/f_D)^2)^{0.5}$ for $f \in -f_{d_1} f_{d_2}$.

Table B2: Propagation Conditions for Multi path Fading Environments for 1,28 Mcps TDD

Case 1, speed 3km/h		Case 2, sp	eed 3km/h	Case 3, speed 120km/h	
Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]
0	0	0	0	0	0
2928	-10	2928	0	781	-3
		12000	0	1563	-6
				2344	-9