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Technical Specification

China Wireless Telecommunication Standard (CWTS);
Working Group 1 (WG1);
TD-SCDMA (Node B); Radio Transmission and Reception

CWTS

Contents

1 Scope

This document establishes the minimum RF characteristics of TD-SCDMA for the Node B.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ITU-R Recommendation SM.320-7 “Spurious emissions”

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions apply.

Power Setting-	The value of the control signal, which determines the desired transmitter, output Power. Typically, the power setting would be altered in response to power control commands
Maximum power setting-	The highest value of the Power control setting which can be used.
Maximum output power-	This refers to the measure of power when averaged over the transmit timeslot at the maximum power setting.
Peak power-	The instantaneous power of the RF envelope which is not expected to be exceeded for [99.9%] of the time.
Maximum peak power-	The peak power observed when operating at a given maximum output power.

Average power- The average transmitter output power obtained over any specified time interval, including periods with no transmission. *<Editors: This definition would be relevant when considering realistic deployment scenarios where the power control setting may vary. >*

Maximum average power The average transmitter output power obtained over any specified time interval, including periods with no transmission, when the transmit time slots are at the maximum power setting. *<Editors: The average power at the maximum power setting would also be consistent with defining a long term average power>*

Zero distance- Connected to the antenna connector of the Node B using an interconnection of negligible delay.

3.2 Symbols

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

<symbol> <Explanation>

3.3 Abbreviations

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

ACIR	Adjacent Channel Interference Ratio
ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
BER	Bit Error Rate
Node B	Node B
CW	Continuous wave (unmodulated signal)
DL	Down link (forward link)
EIRP	Effective Isotropic Radiated Power
FDD	Frequency Division Duplexing
FER	subFrame Error Rate
PPM	Parts Per Million
RSSI	Received Signal Strength Indicator
SIR	Signal to Interference ratio

TDD	Time Division Duplexing
TD-SCDMA	Time Division Synchronous SCDMA
TPC	Transmit Power Control
UE	User Equipment
UL	Up link (reverse link)
UTRA	UMTS Terrestrial Radio Access

4 General

4.1 Measurement uncertainty

The requirement given in this specification are absolute.Compliance with the requirement is determined by comparing the measureed value with the specified limit,without making allowance for measurement uncertainty.

4.2 Node B classes

The requirements in this specification apply to Node B intended for general-purpose applications in co-ordinated network operation.

In the future further classes of Node Bs may be defined; the requirements for these may be different than for general-purpose applications.

5 Frequency bands and channel arrangement

5.1 General

The information presented in this section is based on a chiprate of 1.28Mcps.

5.2 Frequency bands

TD-SCDMA is designed to operate in the following bands;unpaired frequncy band around 2GHz band.
Deployment of TDD in paired frequency band is an open item.
Deployment in other frequency bands is not precluded.

5.3 TX–RX frequency separation

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each TDMA subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

5.4 Channel arrangement

5.4.1 Channel spacing

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimize performance in a particular deployment scenario.

5.4.2 Channel raster

The channel raster is 200 kHz, which means that the carrier frequency must be a multiple of 200 kHz.

5.4.3 Channel number

The carrier frequency is designated by the TD-SCDMA absolute radio frequency channel number.

6 Transmitter characteristics

6.1 General

Unless detailed the transmitter characteristic are specified at the antenna connector.

6.2 Base station output power

Out put power, Pout, of the base station is the mean power of one carrier delivered to a load with resistance equal to the nominal load impedance of the transmistter during one slot.

6.2.1 Node B maximum output power

The maximum output power, Pmax, of the Node B is the mean power level per carrier that the manufacturer has declared to be available at the antenna connector.

6.2.1.1 Minimum requirement

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

6.3 Frequency stability

Frequency stability is the ability of the Node B to transmit at the assigned carrier frequency.

6.3.1 Minimum requirement

The modulated carrier frequency of the Node B shall be accurate to within ± 0.05 PPM for RF frequency generation.

6.4 Output power dynamics

Power control is used to limit the interference level. The transmitter uses a quality-based power control on the downlink.

6.4.1 Closed loop power control

Closed loop power control is the ability of the Node B transmitter to adjust its output power in response to the UL received signal.

For closed loop correction on the Downlink Channel (with respect to the open loop estimate), the Node B adjust its mean output power level in response to each valid power control bit received from the UE on the Uplink Channel.

6.4.2 Power control steps

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

6.4.2.1 Minimum requirement

DL power control step: [1 - 3 dB]

Tolerance: ± 3 dB

6.4.3 Power control dynamic range

The power control dynamic range is the difference between the maximum and the minimum output power for a specified reference condition

6.4.3.1 Minimum requirement

DL power control dynamic range : [30 dB]

<Definition needs clarification. >

6.4.4 Minimum transmit power

The minimum controlled output power of the Node B 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.

6.4.4.1 Minimum requirement

DL minimum transmit power is set to: Maximum output power – 30dB

6.4.5 Total power dynamic range

The power control dynamic range is differece between the maximum and the minimum transmit output power for a specified reference condition.

6.4.5.1 Minimum Requirement

Down link (DL) total dynamic range 30 dB

<This requirement is redundant, since 6.4.4 defines the same dynamic range by a minimum transmit power.>

6.4.6 Power control cycles per second

The rate of change for the DL transmitter power control step.

6.4.6.1 Minimum requirement

The rate of change for the DL transmitter power control step is a s follows: 0-200Hz.

6. 5 Transmitting OFF power

The transimit OFF power state is when the Node B does not transmit. This parameter is defined as maximum output trasmit power within the channel bandwidth when the transmitter is OFF.

6.5.1 Minimum requirement

The requirement of transmit OFF power shall be better than –33dBm meatured with a filter that has a Root Raised Cosine(RPC) flter responcse with a roll off α=0.22 and a bandwidth equal to the chip rate.

6.6 Output RF spectrum emissions

6.6.1 Occupied bandwidth

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 occupied channel bandwidth is about 1.6 MHz based on a chiprate of 1.28 Mcps.

6.6.2 Out of band emissions

Out of band emissions are unwanted emissions immediately outside the [channel] bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit can be specified in terms of a spectrum emission mask or adjacent channel power ratio for the transmitter.

6.6.2.1 Spectrum emission mask

The emission mask of the Node B is an item for further study.

6.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the transmitted power to the power measured after a receiving filter in the adjacent channels(s). Both the transmitted power and the received power are measured through a matched filter (Root Raised Cosine and roll-off 0.22) with a noise power bandwidth equal to the chiprate (1.28MHz).

6.6.2.2.1 Minimum requirement

Node B channel	ACLR limit
± First adjacent channel	-35 dBc
± Second adjacent channel	-45 dBc

Table 1. Node B ACLR

Note

In order to ensure that switching transients do not degrade the ACLR value the reference measurements conditions are an item for further study.

6.6.2.3 Protection outside a licensee’s frequency block

This requirement is applicable if protection is required outside a licensee’s defined frequency block.

6.6.2.3.1 Minimum requirement

This requirement applies for frequencies outside the licensee’s frequency block, up to an offset of 5MHz from a carrier frequency.

The power of any emission shall be attenuated below the transmit power (P) by at least 43 + 10 log (P)dB.

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz or greater. However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier centre frequency and one above the carrier centre frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

The measurements of emission power shall be mean power.

6.6.3 Spurious emissions

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products but excluding out of band emissions. This is measured at the Node B RF output port.

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

6.6.3.1 Mandatory Requirements

The requirements of either subclause 6.6.3.1.1 or subclause 6.6.3.1.2 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's.

Either requirement applies at frequencies within the specified frequency ranges which are more than 5MHz under the first carrier frequency used or more than 5 MHz above the last carrier frequency used.

6.6.3.1.1 Spurious emissions (Category A)

The following requirements shall be met in cases where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329-7 [1], are applied.

6.6.3.1.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

*Table 2****: Node B Mandatory spurious emissions limits, Category A***

Band	Minimum requirement	Measurement Bandwidth	Note
9kHz – 150kHz	-13 dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150kHz – 30MHz		10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30MHz – 1GHz		100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1GHz – 12.75 GHz		1 MHz	Upper frequency as in ITU SM.329-7, s2.6

P = Mean power (W) where P < 500W

6.6.3.1.2 Spurious emissions (Category B)

The following requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-7 [1], are applied.

6.6.3.1.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 3: Node B Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	-36dBm	1 kHz	Bandwidth as in ITU SM.329-7, s4.1
150kHz – 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30MHz – 1GHz	-36 dBm	100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1GHz – 12.75 GHz	-30 dBm	1 MHz	Upper frequency as in ITU SM.329-7, s2.6

6.6.3.2 Co-existence with GSM 900

6.6.3.2.1 Operation in the same geographic area

This requirement may be applied for the protection of GSM 900 MS in geographic areas in which both GSM 900 and TD-SCDMA are deployed.

For different scenarios, the manufacturer may declare a different requirement.

6.6.3.2.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

*Table 4**: Node B Spurious emissions limits for Node B in geographic coverage area of GSM 900***

Band	Maximum Level	Measurement Bandwidth	Note
921 – 960MHz	-47 dBm	100 kHz	

6.6.3.2.2 Co-located base stations

This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and TD-SCDMA Node B are co-located.

For different scenarios, the manufacturer may declare a different requirement.

6.6.3.2.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

*Table 5**: Node B Spurious emissions limits for protection of the Node B receiver***

Band	Maximum Level	Measurement Bandwidth	Note

921 – 960MHz	–[98]dBm	100 kHz	

6.6.3.3 Co-existence with DCS 1800

6.6.3.3.1 Operation in the same geographic area

This requirement may be applied for the protection of DCS 1800 MS in geographic areas in which both DCS 1800 and TD-SCDMA are deployed.

For different scenarios, the manufacturer may declare a different requirement.

6.6.3.3.1.1 Minimum Requirement

The power of any spurious emission shall not exceed:

*Table 6**: Node B Spurious emissions limits for Node B in geographic coverage area of DCS 1800***

Band	Maximum Level	Measurement Bandwidth	Note
1805 – 1880MHz	-57 dBm	100 kHz	

6.6.3.3.2 Co-located basestations

This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and TD-SCDMA Node B are co-located.

For different scenarios, the manufacturer may declare a different requirement.

6.6.3.3.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

*Table 7**: Node B Spurious emissions limits for Node B co-located with DCS 1800 BTS***

Band	Maximum Level	Measurement Bandwidth	Note
1710 – 1785 MHz	-[98]dBm	100 kHz	

6.7 Transmitting intermodulation

The transmitting intermodulation attenuation performance is a measure of the capability of the Node B transmitter to inhibit the generation of signals in its non-linear elements caused by presence of the wanted signal and a unwanted interfering CW signal reaching the transmitter via the antenna.

The transmit intermodulation level is the power of the intermodulation products when a CDMA modulated interference signal is injected into the antenna connector at a level of 30 dB lower than that of the subject signal. The frequency of the interference signal shall be ±1.6 MHz, ±5 MHz and ±10 MHz offset from the subject signal.

6.7.1. Minimum requirement

The Transmit intermodulation level shall not exceed the out of band or the spurious emission requirements of section 6.6.2 and 6.6.3

6.8 Transmit modulation

6.8.1 Transmit pulse shape filter

The transmit pulse-shaping filter is a root-raised cosine (RRC) with roll-off α =0.22 in the frequency domain. The impulse response of the chip impulse filter $RC_0(t)$ is

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

Where the roll-off factor α =0.22 and the chip duration: $T_C = \frac{1}{chiprate} = 0.78125ms$

6.8.2 Modulation Accuracy

The modulation accuracy is a measure of the difference between the measured waveform and the theoretical modulated waveform (the error vector). It is the square root of the ratio of the mean error vector power to the mean reference signal power expressed as %. The measurement interval is one timeslot.

6.8.2.1 Minimum Requirement

The Modulation accuracy shall not be worse than 12.5 %.

6.8.3 Peak Code Domain Error

The code domain error is computed by projecting the error vector power onto the code domain at the maximum spreading factor. The error power for each code is defined as the ratio to the mean power of the reference waveform expressed in dB. And the Peak Code Domain Error is defined as the maximum value for Code Domain Error. The measurement interval is one timeslot.

6.8.3.1 Minimum Requirement

The peak code domain error shall not exceed -28 dB.

7 Receiver characteristics

7.1 General

Unless detailed the receiver characteristic are specified at each antenna connector of the Node B.

7.2 Reference sensitivity level

The reference sensitivity is the minimum receiver input power measured at the antenna connector at which the FER/BER does not exceed the specific value indicated in section 7.2.1. The signal power is equally applied to each antenna connector for diversity.

7.2.1 Minimum Requirement

For the different services with corresponding data rates, the reference sensitivity level of the NODE B shall be specified in Table 8 below.

*Table 8**: NODE B reference sensitivity levels***

Data rate	NODE B reference sensitivity level (dBm)	FER/BER
12.2 kbps	-110 dBm	BER shall not exceed 0.001

7.2.2 Maximum frequency deviation for receiver performance

The need for such a requirement is for further study.

7.3 Dynamic range

The receiver dynamic range is the input power range at each Node B antenna connector over which the [FER/BER] does not exceed a specific rate.

The static [FER/BER] reference performance as specified in clause 7.2.1 should be met over a receiver input range of [30] dB above the specified reference sensitivity level for [channel type ffs].

<The effect of applying mast head LNAs to the dynamic range specification is FFS.>

7.4 Adjacent Channel Selectivity (ACS)

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

7.4.1 Minimum Requirement

The BER shall not exceed 0.001 for the parameters specified in Table 9.

*Table 9**: Adjacent channel selectivity***

Parameter	Level	Unit
Data rate	12.2	kbps
Wanted signal	[ ]	dBm
Interfering signal	[ ]	dBm
Fuw (Modulated)	1 6	MHz

7.5 Blocking characteristics

The blocking characteristics is a measure of the receiver ability to receive a wanted signal at is assigned channel frequency in the presence of an unwanted interfering on frequencies other than those of the spurious response or the adjacent channels. The blocking performance shall apply at all frequencies as specified in the table below.

The static reference performance as specified in clause 7.2.1 should be met with a wanted and an interfering signal coupled to NODE B antenna input using the following parameters.

*Table 10**: Blocking requirements***

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1900 – 1920 MHz, 2010 – 2025 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	CDMA signal with one code
1880 – 1900 MHz, 1990 – 2010 MHz, 2025 – 2045 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	CDMA signal with one code
1920 – 1980 MHz	-40 dBm	<REFSENS> + 6 dB	3.2 MHz	CDMA signal with one code
<1880, 1980 – 1990 MHz, > 2045 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

7.6 Intermodulation characteristics

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

The static reference performance as specified in clause 7.2.1 should be met when the following signals are coupled to Node B antenna input;

- A wanted signal at the assigned channel frequency, 6 dB above the static reference level.

- Two interfering signals with the following parameters.

Table 11: ***Intermodulation requirement***

Interfering Signal Level	Offset	Type of Interfering Signal
- 48 dBm	3.2 MHz	CW signal
- 48 dBm	6.4 MHz	CDMA signal with one code

7.7 Spurious emissions

The Spurious Emissions Power is the power of emissions generated or amplified in a receiver that appear at the Node B antenna connector.

7.7.1 Minimum requirements

The spurious emission shall be:

1. Less than [-73dBm/1.28MHz] at the Node B antenna connector, for frequencies within the Node B receives band.
2. Less than [-57dBm/100kHz] at the Node B antenna connector, for frequencies band from 9kHz to 1GHz.
3. Less than [-47dBm/100kHz] at the Node B antenna connector, for frequencies band from 1GHz to 12.75GHz.

8 Performance requirement

8.1 General

Performance requirements are specified for a number of test environments and multipath channel classes.

8.2 Dynamic reference sensitivity performance

The minimum required dynamic reference sensitivity performance is specified according to the traffic rate and the propagation conditions.

8.2.1 Performance in AWGN Channel

The performance requirement in AWGN channel is determined by the Eb/I0 required for BER=10^{-3}, 10^{-6}. The BER is calculated for each of the possible data services.

8.2.1.1 Single link performance

The required Eb/I0 is described in Table 12.

.

Data services (BER)	Data rates (kbps)	Required E_b/I_0
Speech (10^{-3})	8	T.B.D.
Long Constrained Delay data bearer services (10^{-6})	64 2048	T.B.D. T.B.D.
Unconstrained Delay Data bearer services (10^{-6})	64 2048	T.B.D. T.B.D.

Table 12 E_b/I_0 required for BER=10^{-3}, 10^{-6}

8.2.1.2 Multi link performance

The required Eb/I0 is described in Table 13.

Data services (BER)	Number of active links	Data rates (kbps)	Required E_b/I_0
Speech (10^{-3})	N	8	T.B.D.

Table 13 E_b/I_0 required for BER=10^{-3}, 10^{-6}

8.2.2 Performance in Multipath Fading Channels

The performance requirement of reverse link with/without TPC in multipath fading channels is determined by the E_b/I_0 required for BER=10^{-3}, 10^{-6}. The BER is calculated for each of the possible data services.

8.2.2.1 Single link performance

8.2.2.1.1 Performance without TPC

The required E_b/I_0 is described in Table 14.

Data services (BER)	Indoor (A), 3km/h		Pedestrian (A), 3km/h		Vehicular (A), 120km/h	
	Data rates	Required E_b/I_0	Data rates	Required E_b/I_0	Data rates	Required E_b/I_0
Speech (10^{-3})	8kbps	T.B.D.	8kbps	T.B.D.	8kbps	T.B.D.
Long Constrained Delay data bearer services (10^{-6})	64kbps 2048kbps	T.B.D. T.B.D.	64kbps 384kbps	T.B.D. T.B.D.	64kbps 144kbps 384kbps	T.B.D. T.B.D. T.B.D.
Unconstrained Delay Data bearer services (10^{-6})	64kbps 2048kbps	T.B.D. T.B.D.	64kbps 384kbps	T.B.D. T.B.D.	64kbps 144kbps 384kbps	T.B.D. T.B.D. T.B.D.

Table 14. E_b/I_0 required for BER=10^{-3}, 10^{-6}

8.2.2.1.2 Performance with TPC

The required Eb/I0 is described in Table 15 .

Data services (BER)	Indoor (A), 3km/h		Pedestrian (A), 3km/h		Vehicular (A), 120km/h	
	Data rates	Required E_b/I_0	Data rates	Required E_b/I_0	Data rates	Required E_b/I_0
Speech (10^{-3})	8kbps	T.B.D.	8kbps	T.B.D.	8kbps	T.B.D.
Long Constrained Delay data bearer services (10^{-6})	64kbps 2048kbps	T.B.D. T.B.D.	64kbps 384kbps	T.B.D. T.B.D.	64kbps 144kbps 384kbps	T.B.D. T.B.D. T.B.D.
Unconstrained Delay Data bearer services (10^{-6})	64kbps 2048kbps	T.B.D. T.B.D.	64kbps 384kbps	T.B.D. T.B.D.	64kbps 144kbps 384kbps	T.B.D. T.B.D. T.B.D.

Table 15 E_b/I_0 required for BER=10^{-3}, 10^{-6}

8.2.2.2 Multi-link performance

The required Eb/I0 is described in Table 16.

Data services (BER)	Number of active links	Data rates (kbps)	Required E_b/I_0
Speech (10^{-3})	N	8	T.B.D.

Long Constrained Delay data bearer services (10^{-6})			
Unconstrained Delay Data bearer services (10^{-6})Speech (10^{-3})	N	8	T.B.D.

Table 16. E_b/I_0 required for BER=10^{-3}, 10^{-6}

8.3 NODE B synchronisation performance

8.3.1 Minimum Requirement

The timing error of NODE Bs synchronised to each other shall be less than [5µs].

Annex A (normative): Transmitting power levels versus time

When the transmitter in an Node B is enable or disable, the transmitting power level will go up or down respectively within a period of 20us. The specification for transmitting power level versus time is shown in Figure A-1 below.

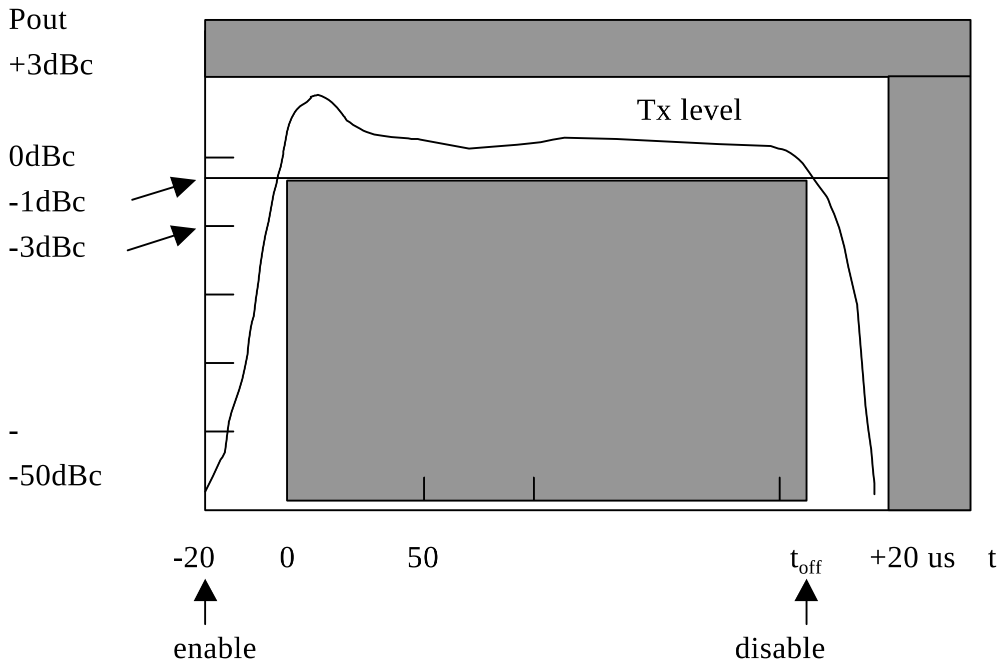

Figure A-1 The transmitting power level versus time, 0dBc means the nominal Tx power level

Annex B (normative): Propagation conditions

B.1 Test environments

The Node B is measured when UE in different environments i.e., static, indoor, outdoor to indoor and pedestrian, and vehicular environments. Each of these environments is modelled by typical channel models that are defined in this section.

The Node B shall be able to receive different channels transmitted from UE for it. These channels may have different bit rates and different BER/FER requirements. Table B 1 describes shortly test environments.

Test Services	**Static**	**Indoor Office 3 km/h**	**Outdoor to Indoor and Pedestrian 3 km/h**	**Vehicular 120 km/h**
	Information Data Rate, Performance metric	Information Data Rate, Performance metric	Information Data Rate, Performance metric	Information Data Rate, Performance metric
Paging Message				
FACH Message				
Speech	8kbps BER<10^{-3}	8kbps BER<10^{-3}	8kbps BER<10^{-3}	8kbps BER<10^{-3}
Circuit Switched Data	64, 384, 2048 kbps, BER < 10^{-6}	64, 384 kbps BER < 10^{-6}	64, 384 kbps BER < 10^{-6}	64, 144 kbps BER < 10^{-6}
Packet Switched Data	64, 384, 2048 kbps, BER < 10^{-6}	64, 384 kbps BER < 10^{-6}	64, 384 kbps BER < 10^{-6}	64, 144 kbps BER < 10^{-6}

Table B 1 Test environments for UE performance specifications

B.2 Channel models

The channel model for the non fading performance measurement is an Additive White Gaussian Noise (AWGN) environment. No fading and multipaths exist for this channel model.

ITU channel models[1] are used for the performance measurements in multipath fading channels. The channel models for indoor, indoor to outdoor and pedestrian, and for vehicular environments are depicted in Table B 2 and Table B 3 for 2 kinds of channel.

1 These channel models are the same that were used in simulations and evaluations of the system presented in ITU-R M.1225 1998"

Indoor		Indoor to Outdoor and Pedestrian		Vehicular	
Relative Delay [ns]	**Average Power [dB]**	**Relative Delay [ns]**	**Average Power [dB]**	**Relative Delay [ns]**	**Average Power [dB]**
0	0.0	0	0.0	0	0.0
50	-3.0	110	-9.7	310	-1.0
110	-10.0	190	-19.2	710	-9.0
170	-18.0	410	-22.8	1090	-10.0
290	-26.0			1730	-15.0
310	-32.0			2510	-20.0

Table B 2 Channel models for Channel A

Indoor		Indoor to Outdoor and Pedestrian		Vehicular	
Relative Delay [ns]	**Average Power [dB]**	**Relative Delay [ns]**	**Average Power [dB]**	**Relative Delay [ns]**	**Average Power [dB]**
0	0.0	0	0.0	0	-2.5
100	-3.6	200	-0.9	300	-0.0
200	-7.2	800	-4.9	8900	-12.8
300	-10.8	1200	-8.0	12900	-10.0
500	-18.0	2300	-7.8	17100	-25.2
700	-25.2	3700	-23.9	20000	-16.0

Table B 3 Channel models for Channel B

Annex C (normative): Environmental conditions

C.1 General

This normative annex specifies the environmental requirements of the Node B. Within these limits the requirements of these specifications shall be fulfilled.

C.2 Environmental requirements for the Node B

The requirements in this clause apply to all types of Node B

C.2.1 Temperature

The UE shall fulfil all the requirements in the full temperature range of:

[+15]°C – [+35]° C for normal conditions (with relative humidity of 25 % to 75 %);

[0]°C – [+40]°C for indoor units extreme conditions (see IEC publications 68-2-1 and 68-2-2)

[-20]°C – [+55]°C for other units extreme conditions (see IEC publications 68-2-1 and 68-2-2).

Outside this temperature range, the Node B, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the Node B exceed the transmitted levels as defined in S4.01A (?) for extreme operation.

C.2.2 Voltage

The Node B shall fulfil all the requirements in the full voltage range, i.e. the voltage range between the extreme voltages.

The manufacturer shall declare the lower and higher extreme voltages and the approximate shutdown voltage. For the equipment that can be operated from one or more of the power sources listed below, the lower extreme voltage shall not be higher, and the higher extreme voltage shall not be lower than that specified below.

Power source	**Lower extreme voltage**	**Higher extreme voltage**	**Normal conditions voltage**
AC mains	0.9 * nominal	1.1 * nominal	nominal
Regulated lead acid battery	0.9 * nominal	1.3 * nominal	1.1 * nominal

Outside this voltage range the Node B if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the Node B exceed the transmitted levels as defined in S4.01A for extreme operation.

C.2.3 Vibration

The Node B shall fulfil all the requirements when vibrated at the following frequency/amplitudes:

Frequency	**ASD (Acceleration Spectral Density) random vibration**
5 Hz to 20 Hz	0.96 m^2/s^3
20 Hz to 500 Hz	0.96 m^2/s^3 at 20 Hz, thereafter -3 dB/Octave

History

Document history		
Version	Date	Description
V0.1.0	1999-05	Document created based on the 3GPP S25.105 V2.0.0 and the discussion between Siemens and CATT.
V1.0.0	1999-08-06	Based on the discussion of CWTS#2 meeting in CUPT
V2.0.0	1999-9-15	Based on the discussion of CWTS WG1 meeting in Beijing
V2.1.0	1999-10-2	Chiprate changed to 1.28Mcps

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