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Candidate Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Base Stations (BS), Repeaters and User Equipment (UE) for
IMT-2000 Third-Generation cellular networks;
Part 5: Harmonized EN for IMT-2000,
CDMA Multi-Carrier (cdma2000) (BS and Repeaters)
covering essential requirements
of article 3.2 of the R&TTE Directive**



Reference

REN/ERM-TFES-002-5

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Contents

Intellectual Property Rights	6
Foreword.....	6
Introduction	8
1 Scope	10
2 References	10
3 Definitions, symbols and abbreviations	11
3.1 Definitions	11
3.2 Symbols.....	20
3.3 Abbreviations	23
4 Technical requirements specifications	24
4.1 Environmental profile.....	24
4.2 Conformance requirements	24
4.2.1 Introduction.....	24
4.2.2 Transmitter conducted spurious emissions	25
4.2.2.1 Definition	25
4.2.2.2 Limits	25
4.2.2.3 Conformance.....	25
4.2.3 Maximum output power.....	26
4.2.3.1 Definition	26
4.2.3.1.1 Base stations	26
4.2.3.1.2 Repeaters	26
4.2.3.2 Limits	26
4.2.3.2.1 Base stations operating in Type 1 cdma2000 systems.....	26
4.2.3.2.2 Base stations operating in Type 2 cdma2000 systems.....	26
4.2.3.2.3 Repeaters	27
4.2.3.3 Conformance.....	27
4.2.4 Inter-base station transmitter intermodulation	27
4.2.4.1 Definition	27
4.2.4.1.1 Base stations	27
4.2.4.1.2 Repeaters	27
4.2.4.2 Limits	27
4.2.4.3 Conformance.....	27
4.2.5 Receiver conducted spurious emissions.....	27
4.2.5.1 Definition	27
4.2.5.2 Limits	28
4.2.5.3 Conformance.....	28
4.2.6 Receiver blocking characteristics	28
4.2.6.1 Definition	28
4.2.6.2 Limits	28
4.2.6.2.1 Base stations operating in Type 1 cdma2000 systems.....	28
4.2.6.2.2 Base stations operating in Type 2 cdma2000 systems.....	28
4.2.6.3 Conformance.....	28
4.2.7 Intermodulation spurious response attenuation.....	29
4.2.7.1 Definition	29
4.2.7.1.1 Base stations	29
4.2.7.1.2 Repeaters	29
4.2.7.2 Limits	29
4.2.7.2.1 Base stations operating in Type 1 cdma2000 systems.....	29
4.2.7.2.2 Base stations operating in Type 2 cdma2000 systems.....	29
4.2.7.2.3 Repeaters	29
4.2.7.3 Conformance.....	29
4.2.8 Adjacent channel selectivity	29
4.2.8.1 Definition	29

4.2.8.2	Limits	29
4.2.8.2.1	Base stations operating in Type 1 cdma2000 systems	29
4.2.8.2.2	Base stations operating in Type 2 cdma2000 systems	30
4.2.8.3	Conformance	30
4.2.9	Out of band gain	30
4.2.9.1	Definition	30
4.2.9.2	Limits	30
4.2.9.3	Conformance	30
5	Testing for compliance with technical requirements	30
5.1	Conditions for testing	30
5.1.1	Introduction	30
5.1.2	Standard equipment under test	31
5.1.2.1	Basic equipment	31
5.1.2.2	Ancillary equipment	31
5.2	Interpretation of the measurement results	31
5.3	Essential radio test suites	31
5.3.1	Transmitter conducted spurious emissions	31
5.3.1.1	Test procedure for base stations supporting operation in Type 1 cdma2000 systems	31
5.3.1.2	Test procedure for base stations supporting operation in Type 2 cdma2000 systems	32
5.3.1.3	Test procedure for repeaters	33
5.3.2	Maximum output power	34
5.3.2.1	Test procedure for base stations supporting operation in Type 1 cdma2000 systems	34
5.3.2.2	Test procedure for base stations supporting operation in Type 2 cdma2000 systems	34
5.3.2.3	Test procedure for repeaters	34
5.3.3	Inter-base station transmitter intermodulation	35
5.3.3.1	Test procedure for base stations supporting operation in Type 1 cdma2000 systems	35
5.3.3.2	Test procedure for base stations supporting operation in Type 2 cdma2000 systems 2	35
5.3.3.3	Test procedure for repeaters	36
5.3.4	Receiver conducted spurious emissions	37
5.3.4.1	Test procedure for base stations supporting operation in Type 1 or Type 2 cdma2000 systems	37
5.3.5	Receiver blocking characteristics	37
5.3.5.1	Test procedure for base stations supporting operation in Type 1 cdma2000 systems	37
5.3.5.2	Test procedure for base stations supporting operation in Type 2 cdma2000 systems	38
5.3.6	Intermodulation spurious response attenuation	38
5.3.6.1	Test procedure for base stations supporting operation in Type 1 cdma2000 systems	38
5.3.6.2	Test procedure for base stations supporting operation in Type 2 cdma2000 systems	39
5.3.6.3	Test procedure for repeaters	39
5.3.7	Adjacent channel selectivity	40
5.3.7.1	Test procedure for base stations supporting operation in Type 1 cdma2000 systems	40
5.3.7.2	Test procedure for base stations supporting operation in Type 2 cdma2000 systems	40
5.3.8	Out of band gain	41
Annex A (normative):	EN Requirements table (EN-RT)	42
Annex B (normative):	Base station Configurations	43
B.1	Receiver diversity	43
B.2	Duplexers	43
B.3	Power supply options	43
B.4	Ancillary RF amplifiers	44
B.5	BS using antenna arrays	44
B.5.1	Receiver tests	45
B.5.2	Transmitter tests	45
Annex C (informative):	Environmental profile and standard test conditions	46
C.1	Introduction	46
C.2	CDMA environmental requirements	46
C.2.1	Temperature and power supply voltage	46

C.2.1.1	Definition.....	46
C.2.1.2	Method of measurement	46
C.2.1.3	Minimum standard.....	47
C.2.2	High humidity	47
C.2.2.1	Definition.....	47
C.2.2.2	Method of measurement	47
C.2.2.3	Minimum standard.....	47
C.3	Standard test conditions.....	47
C.3.1	Standard environmental test conditions.....	47
C.3.2	Standard conditions for the primary power supply.....	48
C.3.2.1	General.....	48
C.3.2.2	Standard DC test voltage from accumulator batteries.....	48
C.3.2.3	Standard AC voltage and frequency	48
Annex D (informative):	Bibliography.....	49
Annex E (informative):	The EN title in the official languages	50
History		51

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Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [1] of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

The present document is part 5 of a multi-part deliverable covering the Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks, as identified below:

- Part 1: "Harmonized EN for IMT-2000, introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 2: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 3: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 4: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 5: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (BS and Repeaters) covering essential requirements of article 3.2 of the R&TTE Directive";**
- Part 6: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 7: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 8: "Harmonized EN for IMT-2000, TDMA Single-Carrier (UWC 136) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 9: "Harmonized EN for IMT-2000, TDMA Single-Carrier (UWC 136) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 10: "Harmonized EN for IMT-2000 FDMA/TDMA (DECT) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 11: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (Repeaters) covering essential requirements of article 3.2 of the R&TTE Directive".

Technical specifications relevant to Directive 1999/5/EC [1] are given in annex A.

National transposition dates	
Date of adoption of this EN:	3 October 2003
Date of latest announcement of this EN (doa):	31 January 2004
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 July 2004
Date of withdrawal of any conflicting National Standard (dow):	31 January 2006

Introduction

The present document is part of a set of standards designed to fit in a modular structure to cover all radio and telecommunications terminal equipment under the R&TTE Directive [1]. Each standard is a module in the structure. The modular structure is shown in figure 1.

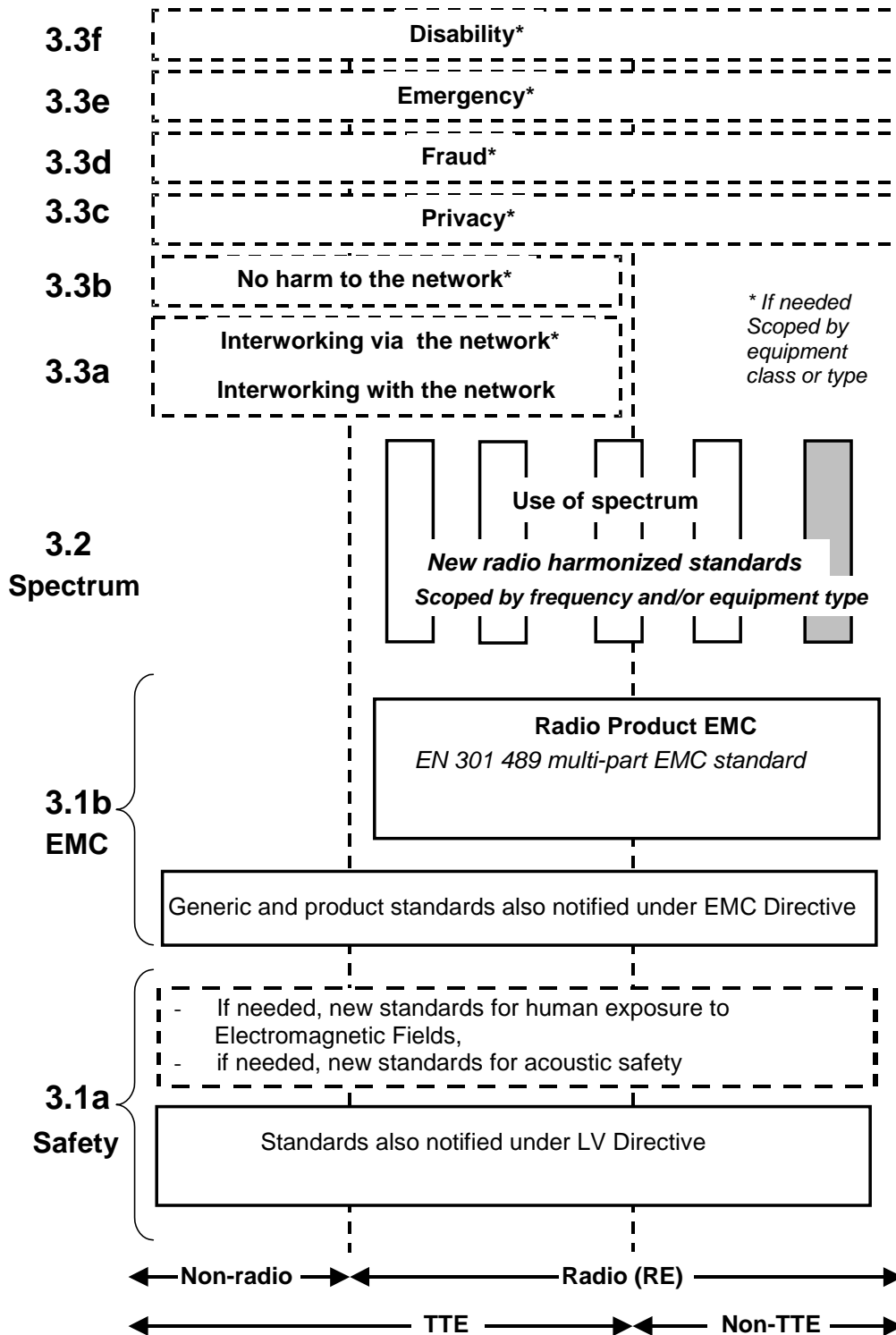


Figure 1: Modular structure for the various standards used under the R&TTE Directive

The left hand edge of the figure 1 shows the different clauses of article 3 of the R&TTE Directive [1].

For article 3.3 various horizontal boxes are shown. Dotted lines indicate that at the time of publication of the present document essential requirements in these areas have to be adopted by the Commission. If such essential requirements are adopted, and as far and as long as they are applicable, they will justify individual standards whose scope is likely to be specified by function or interface type.

The vertical boxes show the standards under article 3.2 for the use of the radio spectrum by radio equipment. The scopes of these standards are specified either by frequency (normally in the case where frequency bands are harmonized) or by radio equipment type.

For article 3.1b, figure 1 shows EN 301 489 [10], the multi-part product EMC standard for radio used under the EMC Directive [2].

For article 3.1a, figure 1 shows the existing safety standards currently used under the LV Directive [3] and new standards covering human exposure to electromagnetic fields. New standards covering acoustic safety may also be required.

The bottom of figure 1 shows the relationship of the standards to radio equipment and telecommunications terminal equipment. A particular equipment may be radio equipment, telecommunications terminal equipment or both. A radio spectrum standard will apply if it is radio equipment. An article 3.3 standard will apply as well only if the relevant essential requirement under the R&TTE Directive [1] is adopted by the Commission and if the equipment in question is covered by the scope of the corresponding standard. Thus, depending on the nature of the equipment, the essential requirements under the R&TTE Directive [1] may be covered in a set of standards.

The modularity principle has been taken because:

- It minimizes the number of standards needed. Because equipment may, in fact, have multiple interfaces and functions it is not practicable to produce a single standard for each possible combination of functions that may occur in an equipment.
- It provides scope for standards to be added:
 - under article 3.2, when new frequency bands are agreed; or
 - under article 3.3, should the Commission take the necessary decisions without requiring alteration of standards that are already published.
- It clarifies, simplifies and promotes the usage of Harmonized Standards as the relevant means of conformity assessment.

The product specifications upon which this present multi-part deliverable is based differ in presentation, and this is reflected in the present document.

1 Scope

The present document applies to the following radio equipment types:

- Base stations and repeaters for IMT-2000 CDMA multi-carrier (cdma2000).

These radio equipment types are capable of operating in all or any part of the frequency bands given in table 1.

Table 1: CDMA multi-carrier base station service frequency bands

Direction of transmission	CDMA multi-carrier base station service frequency bands
Transmit	2 110 MHz to 2 170 MHz
Receive	1 920 MHz to 1 980 MHz

Base stations and repeaters for IMT-2000 CDMA multi-carrier (cdma2000) may support:

- 1) operation in cdma2000 spread spectrum systems as defined in TIA/EIA/IS-2000.2-B [5], referred to herein as operation in Type 1 cdma2000 systems; or
- 2) operation in cdma2000 High Rate Packet Data Systems as defined in TIA/EIA/IS-856-1 [11], referred to herein in Type 2 cdma2000 systems.

The present document is intended to cover the provisions of Directive 1999/5/EC [1] (R&TTE Directive) article 3.2, which states that "[...] radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of article 3 of the R&TTE Directive [1] will apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site <http://www.newapproach.org/>.

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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [2] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).
- [3] Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).
- [4] ANSI/TIA-97-E (February 2003): "Recommended Minimum Performance Standard for cdma2000 Spread Spectrum Base Stations".

- [5] TIA/EIA/IS-2000.2-B (May 2002): "Physical Layer Standard for cdma2000 Spread Spectrum Systems - Release B".
- [6] ANSI/TIA-98-E (February 2003): "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations".
- [7] ANSI/TIA/EIA-126-D-2001 (May 2001): "Mobile Station Loopback Service Options Standard".
- [8] TIA/EIA/IS-870 (April 2001): "Test Data Service Option (TDSO) for cdma2000 Spread Spectrum Systems".
- [9] TIA/EIA/IS-871 (April 2001): "Markov Service Option (MSO) for cdma2000 Spread Spectrum Systems".
- [10] ETSI EN 301 489 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services".
- [11] TIA/EIA/IS-856-1 (January 2002): "cdma2000 High Rate Packet Data Air Interface Specification - Addendum 1".
- [12] TIA-864 (February 2002): "Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Network Equipment".
- [13] TIA/EIA/IS-890 (July 2001): "Test Application Specification (TAS) for High Rate Packet Data Air Interface".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [1] and the following apply:

1X: mode of operation of a base station or access network using spreading rate 1

1XDO: mode of operation of a base station or access network using spreading rate 1 in data optimized systems

3X: mode of operation of a base station using spreading rate 3

access attempt: sequence of one or more access probe sequences on the access channel or enhanced access channel containing the same message

NOTE: See also access probe, access probe sequence, and enhanced access probe.

access channel: reverse CDMA channel used by mobile stations for communicating to the base station

NOTE: The access channel is used for short signalling message exchanges, such as call originations, responses to pages, and registrations. The access channel is a slotted random access channel.

access channel preamble: preamble of an access probe consisting of a sequence of all-zero frames that is sent at the 4 800 bit/s rate

access network: network equipment providing data connectivity between a packet switched data network (typically the Internet) and the access terminals in Type 2 cdma2000 systems

NOTE: Connectivity is typically provided at the link layer (PPP). As used in the present document it is synonymous with base station except that HRPD access network always use spreading rate 1.

access probe: one access channel transmission consisting of a preamble and a message

NOTE: The transmission is an integer number of frames in length, and transmits one access channel message. See also access probe sequence and access attempt.

access probe sequence: sequence of one or more access probes on the access channel or enhanced access channel

NOTE: The same access channel or enhanced access channel message is transmitted in every access probe of an access attempt. See also access probe, enhanced access probe, and access attempt.

access terminal: device providing data connectivity to a user in Type 2 cdma2000 systems

NOTE: An access terminal may be connected to a computing device such as a laptop personal computer or may be self-contained data device such as a personal digital assistant or may be a mobile station. Also referred to as HRPD access terminal using spreading rate 1 or UE operating in a Type 2 cdma2000 system.

active frame: frame that contains data and, therefore, is enabled in terms of traffic power

additional preamble: preamble sent after the last fractional preamble on the reverse pilot channel, prior to transmitting on the enhanced access channel or on the reverse common control channel

adjacent channel leakage ratio: ratio of the on-channel transmit power to the power measured in one of the adjacent channels

bad frame: frame classified with insufficient frame quality or for radio configuration 19 600 bit/s primary traffic only, with bit errors

NOTE: See also good frame.

band class: set of frequency channels and a numbering scheme for these channels

NOTE: Band classes are defined in ANSI/TIA-97-E [4], clause 3.1, and ANSI/TIA-98-E [6], clause 3.1.

band class 6: set of frequencies

NOTE: Frequencies identified in table 1 of the present document.

base station: fixed station used for communicating with mobile stations

NOTE 1: Base stations for IMT-2000 CDMA multi-carrier (cdma2000) may support, operation in cdma2000 spread spectrum systems as defined in TIA/EIA/IS-2000.2-B [5], referred to herein as operation in Type 1 cdma2000 system, or operation in cdma2000 High Rate Packet Data Systems as defined in TIA/EIA/IS-856-1 [11], referred to herein as operation in Type 2 cdma2000 systems.

NOTE 2: Depending upon the context, the term base station may refer to a cell, a repeater, a sector within a cell, an MSC, and access network or other part of the wireless system. See also MSC.

basic access mode: mode used on the enhanced access channel where a mobile station transmits an enhanced access channel preamble and enhanced access data in a method similar to that used on the access channel

broadcast control channel: code channel in a forward CDMA channel used for transmission of control information from a base station to a mobile station

candidate frequency: frequency for which the base station specifies a search set, when searching on other frequencies while performing mobile-assisted handoffs

CDMA channel: set of channels transmitted from the base station and the mobile stations on a given frequency

CDMA channel number: 11-bit number corresponding to the centre of the CDMA frequency assignment

CDMA frequency assignment: 1,23 MHz segment of spectrum

NOTE: For band class 0, the channel is centred on one of the 30 kHz channels.
For band classes 1, 4, 6, 7, 8, 9, and 10, the channel is centred on one of the 50 kHz channels.
For band classes 2, 3, 11 and 12, the channel is centred on one of the 25 kHz channels.
For band class 5, the channel is centred on one of the 20 kHz or 25 kHz channels.

CDMA preferred set: set of CDMA channel numbers in a CDMA system corresponding to frequency assignments that a mobile station will normally search to acquire a CDMA pilot channel

code channel: subchannel of a forward CDMA channel or reverse CDMA channel. Each subchannel uses an orthogonal Walsh function or quasi-orthogonal function

Code Division Multiple Access (CDMA): technique for spread-spectrum multiple-access digital communications that creates channels through the use of unique code sequences

code symbol: output of an error-correcting encoder. Information bits are input to the encoder and code symbols are output from the encoder

NOTE: See convolutional code and turbo code.

common assignment channel: forward common channel used by the base station to acknowledge a mobile station accessing the enhanced access channel, and in the case of reservation access mode, to transmit the address of a reverse common control channel and associated common power control subchannel

common power control channel: forward common channel which transmits power control bits (i.e. common power control subchannels) to multiple mobile stations

NOTE: The common power control channel is used by mobile stations operating in the power controlled access mode, reservation access mode, or designated access mode.

common power control subchannel: subchannel on the common power control channel used by the base station to control the power of a mobile station when operating in the power controlled access mode on the enhanced access channel or when operating in the reservation access mode or the designated access mode on the reverse common control channel

continuous transmission: mode of operation in which discontinuous transmission is not permitted

convolutional code: type of error-correcting code

NOTE: A code symbol can be considered as the convolution of the input data sequence with the impulse response of a generator function.

cyclic redundancy code: class of linear error detecting codes which generate parity check bits by finding the remainder of a polynomial division

NOTE: See also frame quality indicator.

discontinuous transmission: mode of operation in which a base station or a mobile station switches its transmitter or a particular code channel on and off autonomously

NOTE: For the case of DTx operation on the forward dedicated control channel, the forward power control subchannel is still transmitted.

down-link: signal path where base station or repeater transmits and the mobile receives

NOTE: Also referred to as the forward link.

effective radiated power: product of the power supplied to the antenna and the antenna gain in a direction relative to a half-wave dipole

enhanced access channel: reverse channel used by the mobile for communicating to the base station

NOTE: The enhanced access channel operates in the basic access mode, power controlled access mode, and reservation access mode. It is used for transmission of short messages, such as signalling, MAC messages, response to pages, and call originations. It can also be used to transmit moderate-sized data packets.

enhanced access channel preamble: non-data-bearing portion of the enhanced access probe sent by the mobile station to assist the base station in initial acquisition and channel estimation

enhanced access data: data transmitted while in the basic access mode or power controlled access mode on the enhanced access channel or while in the reservation mode on a reverse common control channel

enhanced access header: frame containing access origination information transmitted immediately after the enhanced access channel preamble while in the power controlled access mode or reservation access mode

enhanced access probe: one enhanced access channel transmission consisting of an enhanced access channel preamble, optionally an enhanced access header, and optionally enhanced access data

enhanced access probe sequence: sequence of one or more enhanced access probes on the enhanced access channel

NOTE: See also enhanced access probe.

environmental profile: range of environmental conditions under which equipment within the scope of EN 301 908-5 is required to comply with the provisions of EN 301 908-5

forward CDMA channel: CDMA channel from a base station or repeater to mobile stations

NOTE: The forward CDMA channel contains one or more code channels that are transmitted on a CDMA frequency assignment using a particular pilot PN offset.

forward common control channel: control channel used for the transmission of digital control information from a base station to one or more mobile stations

forward dedicated control channel: portion of a radio configuration 3 through 9 forward traffic channel used for the transmission of higher-level data, control information, and power control information from a base station to a mobile station

forward fundamental channel: portion of a forward traffic channel which carries a combination of higher-level data and power control information

forward MAC channel: forward channel used for medium access control in Type 2 cdma2000 systems

NOTE: Forward MAC channel consists of the reverse power control channels, the DRCLock channel and the reverse activity channel.

forward pilot channel: unmodulated, direct-sequence spread spectrum signal transmitted continuously by each CDMA base station

NOTE: The pilot channel allows a mobile station to acquire the timing of the forward CDMA channel, provides a phase reference for coherent demodulation, and provides means for signal strength comparisons between base stations for determining when to handoff.

forward power control subchannel: subchannel on the forward fundamental channel or forward dedicated control channel used by the base station to control the power of a mobile station when operating on the reverse traffic channel

forward supplemental channel: portion of a radio configuration 3 through 9 forward traffic channel which operates in conjunction with a forward fundamental channel or a forward dedicated control channel in that forward traffic channel to provide higher data rate services, and on which higher-level data is transmitted

forward supplemental code channel: portion of a radio configuration 1 and 2 forward traffic channel which operates in conjunction with a forward fundamental channel in that forward traffic channel to provide higher data rate services, and on which higher-level data is transmitted

forward test application protocol: test application protocol allowing forward link performance characterizations of Type 2 cdma2000 systems

NOTE: See TIA/EIA/IS-890 [13].

forward traffic channel: one or more code channels used to transport user and signalling traffic from the base station to the mobile station

NOTE: See forward fundamental channel, forward dedicated control channel, forward supplemental channel, and forward supplemental code channel.

frame: basic timing interval in the system

NOTE: For the sync channel, a frame is 26,666... ms long. For the access channel, the paging channel, the broadcast channel, the forward supplemental code channel, and the reverse supplemental code channel, a frame is 20 ms long. For the forward supplemental channel and the reverse supplemental channel, a frame is 20 ms, 40 ms, or 80 ms long. For the enhanced access channel, the forward common control channel, and the reverse common control channel, a frame is 5 ms, 10 ms, or 20 ms long. For the forward fundamental channel, forward dedicated control channel, reverse fundamental channel, and reverse dedicated control channel, a frame is 5 ms or 20 ms long. For the common assignment channel, a frame is 5 ms long.

frame activity: ratio of the number of active frames to the total number of frames during channel operation

Frame Error Rate (FER): Frame Error Rate of forward traffic channel

NOTE: The value of Frame Error Rate may be estimated by using Service Option 2, 9, 32, 54, or 55 (see ANSI/TIA-97-E [4], clause 1.3).

frame quality indicator: CRC check applied to 9,6 and 4,8 kbit/s traffic channel frames of radio configuration 1, to all forward traffic channel frames for radio configurations 2 through 9, to all reverse traffic channel frames for radio configurations 2 through 6, the broadcast channel, common assignment channel, enhanced access channel, and to the reverse common control channel

good frame: frame not classified as a bad frame

NOTE: See also bad frame.

good message: received message is declared a good message if it is received with a correct CRC

handoff: act of transferring communication with a mobile station from one base station to another

hard handoff: handoff characterized by a temporary disconnection of the traffic channel

NOTE: Hard handoffs occur when the mobile station is transferred between disjoint active sets, the CDMA frequency assignment changes, the frame offset changes, or the mobile station is directed from a CDMA traffic channel to an analog voice channel. See also soft handoff.

High Rate Packet Data: CDMA technique optimized for data communications in Type 2 cdma2000 systems

MAC channel: See forward MAC channel.

mean input power: total received calorimetric power measured in a specified bandwidth at the antenna connector, including all internal and external signal and noise sources

mean output power: total transmitted calorimetric power measured in a specified bandwidth at the antenna connector when the transmitter is active

mobile station: station intended to be used while in motion or during halts at unspecified points

NOTE: Mobile stations include portable units (e.g. hand-held personal units) and units installed in vehicles and HRPD access terminals.

mobile station class: mobile station classes define mobile station characteristics, such as slotted operation and transmission power

mobile switching centre: configuration of fixed equipment that provides cellular or PCS service

non-slotted mode: operation mode of the mobile station in which the mobile station continuously monitors the paging channel

orthogonal channel noise simulator: hardware mechanism used to simulate the users on the other orthogonal channels of a forward CDMA channel

orthogonal transmit diversity: forward link transmission method which distributes forward link channel symbols among multiple antennas and spreads the symbols with a unique Walsh or quasi-orthogonal function associated with each antenna

paging channel: code channel in a forward CDMA channel used for transmission of control information and pages from a base station to a mobile station

packet: physical layer protocol data unit

packet activity: ratio of the number of active frames to the total number of frames during channel operation in Type 2 cdma2000 systems

packet error: packet error event occurs when a decoded packet's FCS does not check

pass band: range of frequencies over which a repeater is designed to operate and meet the requirements of operation detailed in the present document

physical layer: part of the communication protocol between the mobile station and the base station that is responsible for the transmission and reception of data

NOTE: The physical layer in the transmitting station is presented a frame and transforms it into an over-the-air waveform. The physical layer in the receiving station transforms the waveform back into a frame.

piece-wise linear FER curve: FER-versus- E_b/N_t curve in which the FER vertical axis is in log scale and the E_b/N_t horizontal axis is in linear scale expressed in dB, obtained by interpolating adjacent test data samples with straight lines

piece-wise linear MER curve: MER-versus- E_b/N_t curve in which the MER vertical axis is in log scale and the E_b/N_t horizontal axis is in linear scale expressed in dB, obtained by interpolating adjacent test data samples with straight lines

pilot channel: unmodulated, direct-sequence spread spectrum signal transmitted by a CDMA base station or mobile station

NOTE: A pilot channel provides a phase reference for coherent demodulation and may provide a means for signal strength comparisons between base stations for determining when to handoff.

pilot PN sequence: pair of modified maximal length PN sequences used to spread the forward CDMA channel and the reverse CDMA channel

NOTE: Different base stations are identified by different pilot PN sequence offsets.

PN chip: one bit in the PN sequence

PN sequence (PseudoNoise sequence): periodic binary sequence

power control bit: bit sent in every 1,25 ms interval on the forward traffic channel, to signal the mobile station to increase or decrease its transmit power

power control group: 1,25 ms interval on the forward traffic channel and the reverse traffic channel

NOTE: See also power control bit.

power controlled access mode: mode used on the enhanced access channel where a mobile station transmits an enhanced Access preamble, an enhanced access header, and enhanced access data in the enhanced access probe using closed loop power control

power up function: method by which the mobile station increases its output power to support location services

preamble: See access channel preamble, enhanced access channel preamble, reverse common control channel preamble, and reverse traffic channel preamble.

primary paging channel: default code channel (code channel 1) assigned for paging on a CDMA channel

PUF probe: one or more consecutive frames on the reverse traffic channel within which the mobile station transmits the PUF pulse

PUF pulse: portion of PUF probe which may be transmitted at elevated output power

PUF target frequency: CDMA frequency to which the base station directs a mobile station for transmitting the PUF probe

quick paging channel: uncoded, spread, and On-Off-Keying (OOK) modulated spread spectrum signal sent by a base station to inform mobile stations operating in the slotted mode during the idle state whether to receive the forward common control channel or the paging channel starting in the next forward common control channel or paging channel frame

radio configuration: set of forward traffic channel and reverse traffic channel transmission formats that are characterized by physical layer parameters such as transmission rates, modulation characteristics, and spreading rate

NOTE: Radio configurations are defined in TIA/EIA/IS-2000.2-B [5], clauses 2.1.3 and 3.1.3.

received signal quality indicator: reverse traffic channel measure of signal quality related to the received E_b/N_0 (see also E_b)

repeater: station used for communicating with mobile stations by receiving a forward CDMA channel from a remote base station and retransmitting the signal with the same PN offset on the same or a different frequency and receiving a reverse CDMA channel and retransmitting the signal on the same or a different frequency for reception at a remote base station

NOTE: A repeater can be a device that receives, amplifies and transmits one or more radiated or conducted CDMA channel(s) both in the down-link direction (from the base station to the mobile area) and in the up-link direction (from the mobile to the base station).

reservation access mode: mode used on the enhanced access channel and reverse common control channel where a mobile station transmits an enhanced access preamble and an enhanced access header in the enhanced access probe

NOTE: The enhanced access data is transmitted on a reverse common control channel using closed loop power control.

reverse CDMA channel: CDMA channel from the mobile station to the base station

NOTE: From the base station's perspective, the reverse CDMA channel is the sum of all mobile station transmissions on a CDMA frequency assignment.

reverse common control channel: portion of a reverse CDMA channel used for the transmission of digital control information from one or more mobile stations to a base station

NOTE: The reverse common control channel can operate in a reservation access mode or designated access mode. It can be power controlled in the reservation access mode or designated access mode, and may support soft handoff in the reservation access mode.

reverse common control channel preamble: non-data bearing portion of the reverse common control channel sent by the mobile station to assist the base station in initial acquisition and channel estimation

reverse dedicated control channel: portion of a radio configuration 3 through 6 reverse traffic channel used for the transmission of higher-level data and control information from a mobile station to a base station

reverse fundamental channel: portion of a reverse traffic channel which carries higher-level data and control information from a mobile station to a base station

reverse pilot channel: unmodulated, direct-sequence spread spectrum signal transmitted continuously by a CDMA mobile station

NOTE: A reverse pilot channel provides a phase reference for coherent demodulation and may provide a means for signal strength measurement.

reverse power control subchannel: subchannel on the reverse pilot channel used by the mobile station to control the power of a base station when operating on the forward traffic channel with radio configurations 3 through 9

reverse supplemental channel: portion of a radio configuration 3 through 6 reverse traffic channel which operates in conjunction with the reverse fundamental channel or the reverse dedicated control channel in that reverse traffic channel to provide higher data rate services, and on which higher-level data is transmitted

reverse supplemental code channel: portion of a radio configuration 1 and 2 reverse traffic channel which operates in conjunction with the reverse fundamental channel in that reverse traffic channel, and (optionally) with other reverse supplemental code channels to provide higher data rate services, and on which higher-level data is transmitted

reverse traffic channel: traffic channel on which data and signalling are transmitted from a mobile station to a base station

NOTE: The reverse traffic channel is composed of up to one reverse dedicated control channel, up to one reverse fundamental channel, zero to two reverse supplemental channels, and zero to seven reverse supplemental code channels.

reverse traffic channel preamble: non-data bearing portion of the reverse pilot channel sent by the mobile station to aid the base station in initial acquisition and channel estimation for the reverse dedicated control channel and reverse fundamental channel

reverse test application protocol: test application protocol allowing reverse link performance characterizations in Type 2 cdma2000 systems

NOTE: See TIA/EIA/IS-890 [13].

RF carrier: direct-sequence spread RF channel

NOTE: For the forward CDMA channel, the number of RF carriers is equal to the spreading rate; for the reverse CDMA channel, there is one RF carrier.

service option 2: loopback service option for radio configuration 1

NOTE: See ANSI/TIA/EIA-126-D [7].

service option 9: loopback service option for radio configuration 2

NOTE: See ANSI/TIA/EIA-126-D [7].

service option 30: mobile station data loopback test mode for Multiplex Option 1 supplemental channel

NOTE: See ANSI/TIA/EIA-126-D [7].

service option 31: mobile station data loopback test mode for Multiplex Option 2 supplemental channel

NOTE: See ANSI/TIA/EIA-126-D [7].

service option 32: test data service option for radio configurations 3 through 6 on the reverse traffic channel and radio configurations 3 through 9 on the forward traffic channel

NOTE: See TIA/EIA/IS-870 [8].

service option 54: Markov service option for radio configurations 1 through 6 on the reverse traffic channel and radio configurations 1 through 9 on the forward traffic channel

NOTE: See TIA/EIA/IS-871 [9].

service option 55: loopback service option for radio configurations 1 through 6 on the reverse traffic channel and radio configurations 1 through 9 on the forward traffic channel

NOTE: See ANSI/TIA/EIA-126-D [7].

servicing frequency: CDMA frequency on which a mobile station is currently communicating with one or more base stations

slot: duration of time specified by 1,6 ms

slotted mode: operation mode of the mobile station in which the mobile station monitors only selected slots on the paging channel

soft handoff: handoff occurring while the mobile station is in the mobile station control on the traffic channel state

NOTE: This handoff is characterized by commencing communications with a new base station on the same CDMA frequency assignment before terminating communications with the old base station. See hard handoff.

space time spreading: forward link transmission method which transmits all forward link channel symbols on multiple antennas and spreads the symbols with complementary Walsh or quasi-orthogonal functions

spreading rate: PN chip rate of the forward CDMA channel or the reverse CDMA channel, defined as a multiple of 1,2288 Mcps

spreading rate 1: spreading rate 1 forward CDMA channel uses a single direct-sequence spread carrier with a chip rate of 1,2288 Mcps, and a spreading rate 1 reverse CDMA channel uses a single direct-sequence spread carrier with a chip rate of 1,2288 Mcps

NOTE: Spreading rate 1 is often referred to as "1X".

spreading rate 3: a spreading rate 3 forward CDMA channel uses three direct-sequence spread carriers each with a chip rate of 1,2288 Mcps and a spreading rate 3 reverse CDMA channel uses a single direct-sequence spread carrier with a chip rate of 3,6864 Mcps

NOTE: Spreading rate 3 is often referred to as "3X". See multiple-carrier forward channel.

symbol: See code symbol and modulation symbol.

sync channel: code channel 32 in the forward CDMA channel, which transports the synchronization message to the mobile station

system time: time reference used by the system

NOTE: System time is synchronous to UTC time (except for leap seconds) and uses the same time origin as Global Positioning System (GPS) time. All base stations use the same system time (within a small error). Mobile stations use the same system time, offset by the propagation delay from the base station to the mobile station. See also Universal Co-ordinated Time.

time reference: reference established by the mobile station that is synchronous with the earliest arriving multipath component used for demodulation

traffic channel: communication path between a mobile station and a base station used for user and signalling traffic

NOTE: The term traffic channel implies a forward traffic channel and reverse traffic channel pair. See also forward traffic channel and reverse traffic channel.

transmit diversity pilot channel: unmodulated, direct-sequence spread spectrum signal transmitted continuously by a CDMA base station to support forward link transmit diversity

NOTE: The pilot channel and the transmit diversity pilot channel provide phase references for coherent demodulation of forward link CDMA channels which employ transmit diversity.

turbo code: type of error-correcting code

NOTE: A code symbol is based on the outputs of the two recursive convolutional codes (constituent codes) of the turbo code.

Type 1 cdma2000 systems: cdma2000 spread spectrum systems

NOTE: See TIA/EIA/IS-2000.2-B [5].

Type 2 cdma2000 systems: cdma2000 High Rate Packet Data systems

NOTE: See TIA/EIA/IS-856-1 [11].

universal coordinated time: internationally agreed-upon time scale maintained by the Bureau International de l'Heure (BIH) used as the time reference by nearly all commonly available time and frequency distribution systems, e.g. WWV, WWVH, LORAN-C, Transit, Omega, and GPS

up-link: signal path where the mobile or repeater transmits and the base station receives

NOTE: Also referred to as the reverse link.

user equipment: mobile station supporting operation in cdma2000 spread spectrum systems

NOTE: See TIA/EIA/IS-2000.2-B [5], referred to herein as operation in Type 1 cdma2000 system; access terminal supporting operation in cdma2000 High Rate Packet Data Systems as defined in TIA/EIA/IS-856-1 [11], referred to herein as operation in Type 2 cdma2000 system; and mobile station supporting operation in Type 1 and Type 2 cdma2000 systems.

valid power control bit: valid power control bit is sent on the forward power control subchannel in the second power control group following the corresponding reverse traffic channel power control group which was not gated off and in which the signal was estimated

NOTE: See TIA/EIA/IS-2000.2-B [5], clause 3.1.3.1.10.

walsh function: one of 2^N time orthogonal binary functions

NOTE: The functions are orthogonal after mapping "0" to 1 and "1" to -1.

3.2 Symbols

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

bit/s bits per second

$\frac{\text{BCCH } E_c}{I_{or}}$ ratio of the average transmit energy-per-PN energy-per-PNchip for the broadcast control channel to the total transmit power spectral density

dBc ratio (in dB) of the sideband power of a signal, measured in a given bandwidth at a given frequency offset from the centre frequency of the same signal, to the total inband power of the signal. For CDMA, the total inband power of the signal is measured in a 1,23 MHz bandwidth around the centre frequency of the CDMA signal for a spreading rate 1 CDMA signal and in 3,69 MHz bandwidth around the centre frequency of the CDMA signal for a spreading rate 3 CDMA signal

dBm measure of power expressed in terms of its ratio (in dB) to 1 mW

dBm/Hz measure of power spectral density. The ratio, dBm/Hz, is the power in 1 Hz of bandwidth, where power is expressed in units of dBm

E_b combined energy per bit at the base station RF input port or the mobile station antenna connector

NOTE: For radio configurations 1 and 2, this is the received energy of the access channel or traffic channel. For the enhanced access channel with radio configurations 3 through 6, this is the combined energy of the enhanced access channel and the reverse pilot channel. For the reverse common control channel with radio configurations 3 through 6, this is the combined energy of the reverse common control channel and the reverse pilot channel. For the reverse traffic channel with radio configurations 3 through 6, this is the combined energy of the reverse traffic channel, the reverse pilot channel, and the reverse power control subchannel. See also E_b/N_0 .

E_b/N_0 ratio in dB of the combined received energy per bit to the total received noise-plus-interference power in the received CDMA bandwidth divided by 1,23 MHz for spreading rate 1 and 3,69 MHz for spreading rate 3 (see also E_b)

E_b/N_t ratio in dB of the combined received energy per bit to the effective noise power spectral density

E_c average energy accumulated over one PN chip period

E_c/I_{or} ratio in dB between the energy accumulated over one PN chip period (E_c) to the total transmit power spectral density

E_c/I_o ratio in dB between the pilot energy accumulated over one PN chip period (E_c) to the total power spectral density (I_o) in the received bandwidth

$\frac{\text{FCACH } E_c}{I_{or}}$ ratio of the average transmit energy-per-PN chip for the forward common assignment channel to the total transmit power spectral density

$\frac{\text{FCCCH } E_c}{I_{or}}$ ratio of the average transmit energy-per-PN chip for the forward common control channel to the total transmit power spectral density

$\frac{\text{FCPCCH } E_c}{I_{or}}$ ratio of the average transmit energy-per-PN chip for the forward common power control channel to the total transmit power spectral density

GHz GigaHertz (10^9 Hertz)

I_o	total received power spectral density, including signal and interference, as measured at the mobile or base station antenna connector
I_{oc}	power spectral density of a band-limited white noise source (simulating interference from other cells) as measured at the mobile station antenna connector. For test cases where multiple channels or cells are specified, this power spectral density does not include power from these multiple channels or cells
I_{or}	total transmit power spectral density of the forward CDMA channel at the base station antenna connector. For transmit diversity test cases, it shall be the total combined transmit power spectral density of the forward CDMA channel from both the main and transmit diversity base station antenna connectors
\hat{I}_{or}	received power spectral density of the forward CDMA channel as measured at the mobile station antenna connector
kHz	kiloHertz (10^3 Hertz)
mbar	millibar (10^{-3} Bar)
MHz	MegaHertz (10^6 Hertz)
Mcps	Megachips per second (10^6 chips per second)
μ s	microsecond (10^{-6} second)
ms	millisecond (10^{-3} second)
ns	nanosecond (10^{-9} second)
N_0	effective inband noise or interference power spectral density
OCNS E_c	average energy-per-PN chip for the OCNS
$\frac{\text{OCNS } E_c}{I_{or}}$	ratio of the average transmit energy-per-PN chip for the OCNS to the total transmit power spectral density
Pa	Pascal
Paging E_c	average energy-per-PN chip for the paging channel
$\frac{\text{Paging } E_c}{I_{or}}$	ratio of the average transmit energy-per-PN chip for the paging channel to the total transmit power spectral density
Pilot E_c	average energy-per-PN chip for the pilot channel
Pilot $\frac{E_c}{I_o}$	ratio of the combined pilot energy per chip, E_c , to the total received power spectral density (noise and signals), I_o , of at most K usable multipath components at the mobile station antenna connector. K is the number of demodulating elements supported by the mobile station
$\frac{\text{Pilot } E_c}{I_{or}}$	ratio of the average transmit energy-per-PN chip for the pilot channel to the total transmit power spectral density

Power Control E_c

average energy-per-PN chip for the power control subchannel. For the case when the power control sub-channel is assumed to be transmitted at the same power level that is used for the 9 600 bit/s or 14 400 bit/s data rate, the following equations apply:

for radio configuration 1, it is equal to $\frac{v}{11+v} \times$ (total forward traffic channel energy-per-PN chip),

where v equals 1 for 9 600 bit/s, v equals 2 for 4 800 bit/s, v equals 4 for 2 400 bit/s, and v equals

8 for 1 200 bit/s traffic data rate. For radio configuration 2, it is equal to $\frac{v}{23+v}$ (total forward

traffic channel energy-per-PN chip), where v equals 1 for 14 400 bit/s, v equals 2 for 7 200 bit/s,

v equals 4 for 3 600 bit/s, and v equals 8 for 1 800 bit/s traffic data rate. For radio configurations 3,

4, 6, and 7, it is equal to $\frac{v}{11+v}$ (total forward traffic channel energy-per-PN chip), where v equals

1 for 9 600 bit/s, v equals 2 for 4 800 bit/s, v equals 4 for 2 700 bit/s, and v equals 8 for 1 500 bit/s

traffic data rate. For radio configurations 5, 8, and 9, it is equal to $\frac{v}{11+v}$ (total forward traffic channel energy-per-PN chip), where v equals 1 for 14 400 bit/s, v equals 2 for 7 200 bit/s, v equals 4 for 3 600 bit/s, and v equals 8 for 1 800 bit/s traffic data rate. The total forward traffic channel is comprised of traffic data and a power control sub-channel

Power Control E_c I_{Or}

ratio of the average transmit energy-per-PN chip for the power control subchannel to the total transmit power spectral density

Quick Paging E_c I_{Or}

ratio of the average transmit energy-per-PN chip for the quick paging channel to the total transmit power spectral density

Supplemental E_c average energy-per-PN chip for one forward supplemental code channel

Supplemental $\frac{E_c}{I_{Or}}$

ratio of the average transmit energy-per-PN chip for one forward supplemental to the total transmit power spectral density

Sync E_c average energy-per-PN chip for the sync channel

$\frac{\text{Sync } E_c}{I_{Or}}$

ratio of the average transmit energy-per-PN chip for the sync channel to the total transmit power spectral density

Traffic E_c	average energy-per-PN chip for the forward fundamental channel. For the case when the power control sub-channel is assumed to be transmitted at the same power level that is used for the 9 600 bit/s or 14 400 bit/s data rate, the following equations apply: For radio configuration 1, it is equal to $\frac{11}{11+v}$ (total forward fundamental channel energy-per-PN chip), where v equals 1 for 9 600 bit/s, v equals 2 for 4 800 bit/s, v equals 4 for 2 400 bit/s, and v equals 8 for 1 200 bit/s traffic data rate. For radio configuration 2, it is equal to $\frac{23}{23+v}$ (total forward fundamental channel energy-per-PN chip), where v equals 1 for 14 400 bit/s, v equals 2 for 7 200 bit/s, v equals 4 for 3 600 bit/s, and v equals 8 for 1 800 bit/s traffic data rate. The total forward fundamental channel is comprised of traffic data and a power control sub-channel. For radio configurations 3, 4, 6, and 7, it is equal to $\frac{11}{11+v}$ (total forward traffic channel energy-per-PN chip), where v equals 1 for 9 600 bit/s, v equals 2 for 4 800 bit/s, v equals 4 for 2 700 bit/s, and v equals 8 for 1 500 bit/s traffic data rate. For radio configurations 5, 8, and 9, it is equal to $\frac{11}{11+v}$ (total forward traffic channel energy-per-PN chip), where v equals 1 for 14 400 bit/s, v equals 2 for 7 200 bit/s, v equals 4 for 3 600 bit/s, and v equals 8 for 1 800 bit/s traffic data rate. The total forward traffic channel is comprised of traffic data and a power control sub-channel.
$\frac{\text{Traffic } E_c}{I_{\text{or}}}$ ppm	ratio of the average transmit energy-per-PN chip for the forward traffic channel to the total transmit power spectral density parts per million

3.3 Abbreviations

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

BS	Base Station
CDMA	Code Division Multiple Access
CRC	Cyclic Redundancy Code
DC	Direct Current
DTx	Discontinuous Transmission
EMC	ElectroMagnetic Compatibility
FER	Frame Error Rate
FTAP	Forward Test Application Protocol
HRPD	High Rate Packet Data
LV	Low Voltage
MAC	Medium Access Control
MER	Message Error Rate, $MER = 1 - \frac{\text{Number of good messages received}}{\text{Number of messages transmitted}}$
MSC	Mobile Switching Centre
OCNS	Orthogonal Channel Noise Simulator
OOK	On-Off-Keying
PCS	Personal Communication System
PER	Packet Error Rate, $PER = 1 - \frac{\text{Number of good packets received}}{\text{Number of packets transmitted}}$
PN	PseudoNoise
PUF	Power Up Function
R&TTE	Radio and Telecommunications Terminal Equipment
RTAP	Reverse Test Application Protocol
Rx	Receiver
Tx	Transmitter
UE	User Equipment
UTC	Universal Temps Coordoné (See Universal Coordinated Time)
UTRA	Universal Terrestrial Radio Access

4 Technical requirements specifications

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

For guidance on how a supplier can declare the environmental profile see annex C of the present document.

4.2 Conformance requirements

4.2.1 Introduction

To meet the essential requirement under article 3.2 of the R&TTE Directive [1] for IMT-2000 Base Stations (BS) seven essential parameters in addition to those in part 1 have been identified. Table 2 provides a cross-reference between these seven essential parameters and the corresponding eight technical requirements for equipment within the scope of the present document.

To fulfil an essential parameter the compliance with all the corresponding technical requirements in table 2 must be verified.

Table 2: Cross references

Essential parameter	Corresponding technical requirements (see note 1)	Corresponding technical requirements (see note 2)
Spectrum emissions mask	4.2.2 Transmitter conducted spurious emissions	4.2.2 Transmitter conducted spurious emissions
Conducted spurious emissions from the transmitter antenna connector	4.2.2 Transmitter conducted spurious emissions	4.2.2 Transmitter conducted spurious emissions
Accuracy of maximum output power	4.2.3 Maximum output power	4.2.3 Maximum output power
Intermodulation attenuation of the transmitter	4.2.4 Inter-base station transmitter intermodulation	4.2.4 Inter-base station transmitter intermodulation
Conducted spurious emissions from the receiver antenna connector	4.2.5 Receiver conducted spurious emissions	
Impact of interference on receiver performance	4.2.6 Receiver blocking characteristics	
	4.2.7 Intermodulation spurious response attenuation	4.2.7 Intermodulation spurious response attenuation
Receiver adjacent channel selectivity	4.2.8 Adjacent channel selectivity	4.2.9 Out of band gain
NOTE 1: These technical requirements are all applicable for base station operation in Type 1 cdma2000 spread spectrum systems as defined in TIA/EIA/IS-2000.2-B [5], and for base station (access network) operation in Type 2 cdma2000 High Rate Packet Data Systems as defined in TIA/EIA/IS-856-1 [11].		
NOTE 2: These technical requirements are all applicable for repeater operation in Type 1 cdma2000 spread spectrum systems as defined in TIA/EIA/IS-2000.2-B [5], and for repeater operation in Type 2 cdma2000 High Rate Packet Data Systems as defined in TIA/EIA/IS-856-1 [11].		

NOTE: Base stations operating in Type 2 cdma2000 High Rate Packet Data Systems as defined in TIA/EIA/IS-856-1 [11], are also termed access networks in the present document. Access networks defined herein always use spreading rate 1 and are data optimized (1XDO).

4.2.2 Transmitter conducted spurious emissions

4.2.2.1 Definition

Conducted spurious emissions are emissions at frequencies that are outside the assigned CDMA Channel or HRPD channel, measured at the base station or repeater RF output port.

When operating in Type 2 cdma2000 systems, base station HRPD Channel conducted spurious emissions are measured for two test conditions:

- Case 1: continuous data mode (no idle slots).
- Case 2: idle mode (all idle slots, except the control channel).

NOTE 1: Inhibiting control channel transmissions is optional for case 2.

NOTE 2: If the repeater is capable of multi-carrier operation, the manufacturer shall declare the input power configurations required to achieve the maximum output power per carrier to support multi carrier operation within the repeater power output rating.

4.2.2.2 Limits

The spurious emissions shall be less than the limits specified in table 3 and table 4. The spurious emissions limits in table 3 and table 4 shall be met when transmitting on a single or all RF carriers supported by the base station and configured in accordance with the manufacturer's specification as indicated by the entries in the column "Active Carriers".

Table 3: Transmitter spurious emission limits

For $ \Delta f $ within the range	Active carriers	Emission limit
885 kHz to 1,25 MHz	Single	-45 dBc/30 kHz
1,25 MHz to 1,45 MHz	All	-13 dBm/30 kHz
1,45 MHz to 2,25 MHz	All	$-[13 + 17 \times (\Delta f - 1,45 \text{ MHz})]$ dBm/30 kHz
2,25 MHz to 4,00 MHz	All	-13 dBm/1 MHz
> 4,00 MHz	All	-36 dBm/1 kHz; 9 kHz < f < 150 kHz -36 dBm/10 kHz; 150 kHz < f < 30 MHz -36 dBm/100 kHz; 30 MHz < f < 1 GHz -30 dBm/1 MHz; 1 GHz < f < 12,75 GHz
NOTE: All frequencies in the measurement bandwidth shall satisfy the restrictions on $ \Delta f $ where Δf = centre frequency - closer measurement edge frequency (f). The emissions requirements shall apply for all values of Δf regardless of whether the measurement frequency falls inside or outside of the band or block edge. For multiple-carrier testing, Δf is defined for positive Δf as the centre frequency of the highest carrier - closer measurement edge frequency (f) and for negative Δf as the centre frequency of the lowest carrier - closer measurement edge frequency (f).		

Table 4: Additional transmitter spurious emission limits

Measurement frequency	Active carriers	Emission limit	For protection of
921 MHz to 960 MHz	All	-57 dBm/100 kHz	GSM 900 MS receive frequency range
1 805 MHz to 1 880 MHz	All	-47 dBm/100 kHz	DCS 1800 MS receive frequency range
1 900 MHz to 1 920 MHz 2 010 MHz to 2 025 MHz	All	-52 dBm/1 MHz	IMT-2000 CDMA TDD
1 920 MHz to 1 980 MHz	Single	-86dBm/1 MHz	IMT-2000 CDMA multi-carrier and IMT-2000 CDMA direct spread BS receive frequency range

4.2.2.3 Conformance

Conformance tests described in clause 5.3.1 shall be carried out.

4.2.3 Maximum output power

4.2.3.1 Definition

4.2.3.1.1 Base stations

Maximum output power is the mean power delivered to a load with resistance equal to the nominal load impedance of the transmitter.

Within each slot for base stations operating in Type 2 cdma2000 systems, the Pilot, MAC and Traffic or Traffic control channels shall be time-division multiplexed. All time-division multiplexed channels shall be transmitted at equal power. For base stations operating in Type 2 cdma2000 systems, this test measures the time response of the mean output power for non-idle slots and the mean power at the RF output port.

4.2.3.1.2 Repeaters

Maximum output power is the limitation of output power by a repeater under the abnormal condition of a high input signal to the specified level.

NOTE: If the repeater is capable of multi carrier operation, the manufacturer shall declare the input power configurations required to achieve the maximum output power per carrier to support multi carrier operation within the repeater output power rating.

4.2.3.2 Limits

4.2.3.2.1 Base stations operating in Type 1 cdma2000 systems

The maximum output power shall remain within +2 dB and -4 dB of the manufacturer's rated power for the equipment.

4.2.3.2.2 Base stations operating in Type 2 cdma2000 systems

Given an ensemble of non-idle half slots, the time response of the ensemble average shall be within the limits shown in figure 2.

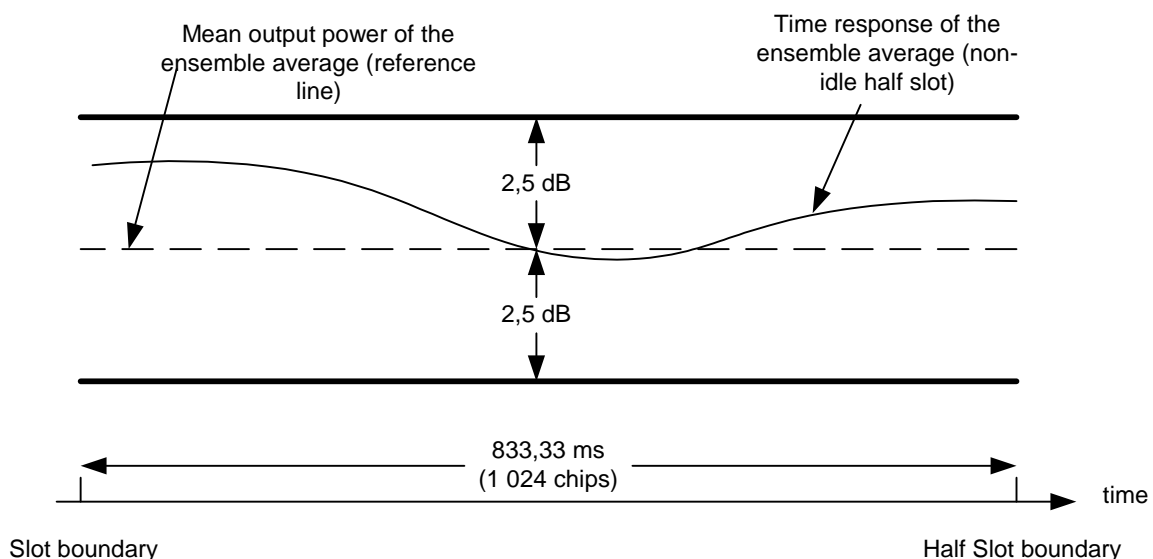


Figure 2: Transmission envelope mask (average non-idle half slot)

The mean power shall remain +2 dB and -4 dB of the manufacturer's rated power for the equipment.

4.2.3.2.3 Repeaters

The power output of the repeater shall not exceed its maximum rated output power by more than 2 dB, three seconds or more after the 10 dB increase of the input signal occurred, as specified in the conformance tests described in clause 5.3.2.

NOTE: The repeater may comply with this requirement by adding attenuation; gain control, or shutting down the transmitter.

4.2.3.3 Conformance

Conformance tests described in clause 5.3.2 shall be carried out.

4.2.4 Inter-base station transmitter intermodulation

4.2.4.1 Definition

4.2.4.1.1 Base stations

Inter-base station transmitter intermodulation (inter-base station and inter-sector are synonymous) occurs when an external signal source is introduced to the antenna connector of the base station. This test verifies that transmitter conducted spurious emissions are still met with the presence of the interfering source.

For base stations operating in Type 2 cdma2000 systems, inter-sector transmitter intermodulation is measured for all combinations of idle and non-idle slots in one sector and the other under three test conditions:

- **Case 1** measures the spurious emissions level having both sectors transmitting idle slots.
- **Case 2** measures the spurious emissions level having the sector under test transmitting non-idle slots and the other sector transmitting idle slots.
- **Case 3** measures the spurious emissions level having the sector under test transmitting idle slots and the other sector transmitting non-idle slots.
- **Case 4** measures the spurious emissions level having both sectors transmitting non-idle slots.

4.2.4.1.2 Repeaters

Inter-base station transmitter intermodulation is a measure of the ability of the repeater to inhibit the generation of intermodulation product signals created by the presence of an interfering signal reaching the repeater through an output port.

4.2.4.2 Limits

The base station and repeater shall meet the limits for transmitter conducted spurious emission requirements in clause 4.2.2.2 of the present document.

4.2.4.3 Conformance

Conformance tests described in clause 5.3.3 shall be carried out.

4.2.5 Receiver conducted spurious emissions

4.2.5.1 Definition

Conducted spurious emissions are spurious emissions generated or amplified in the base station equipment and appearing at the receiver RF input ports.

This requirement only applies if the base station is equipped with a separate RF input port.

4.2.5.2 Limits

The conducted spurious emissions shall be:

- 1) Less than -80 dBm, measured in a 30 kHz resolution bandwidth at the base station RF input ports, for frequencies within the base station receiver band (see table 1).
- 2) Less than -60 dBm, measured in a 30 kHz resolution bandwidth at the base station RF input ports, for frequencies within the base station transmit band (see table 1).
- 3) Less than -57 dBm, measured in a 100 kHz resolution bandwidth at the base station RF input ports, for frequencies from 30 MHz to 1 GHz.
- 4) Less than -47 dBm, measured in a 1 MHz resolution bandwidth at the base station RF input ports, for all other frequencies in the range from 1 GHz to 12,75 GHz with the exception of frequencies used by the BS between 4 MHz below the first carrier frequency and 4 MHz above the last carrier frequency when the BS is operating in spreading rate 1 mode, and 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency when the BS is operating in spreading rate 3 mode.

NOTE: HRPD access networks, BS operating in Type 2 cdma2000 systems, always use spreading rate 1.

4.2.5.3 Conformance

Conformance tests described in clause 5.3.4 shall be carried out.

4.2.6 Receiver blocking characteristics

4.2.6.1 Definition

Receiver blocking is a measure of the ability to receive a CDMA signal or an HRPD signal on the assigned channel frequency in the presence of a single tone that is offset from the centre frequency of the assigned channel on frequencies other than those of the adjacent channels.

4.2.6.2 Limits

4.2.6.2.1 Base stations operating in Type 1 cdma2000 systems

The output power of the mobile station simulator shall increase by no more than 3dB from the measurement in step 8 of clause 5.3.5.1.

4.2.6.2.2 Base stations operating in Type 2 cdma2000 systems

As steps 7 and 9 are performed in clause 5.3.5.2, the increase in access terminal output power (relative to step 5) shall be less than 3 dB.

4.2.6.3 Conformance

Conformance tests described in clause 5.3.5 shall be carried out.

4.2.7 Intermodulation spurious response attenuation

4.2.7.1 Definition

4.2.7.1.1 Base stations

The intermodulation spurious response attenuation is a measure of a receiver's ability to receive a CDMA signal or an HRPD signal on its assigned channel frequency in the presence of two interfering CW tones. These tones are separated from the assigned channel frequency and are separated from each other such that the third order mixing of the two interfering CW tones can occur in the non-linear elements of the receiver, producing an interfering signal in the band of the desired CDMA signal.

For the case of multiple adjacent carrier receivers, the test places the CW tones outside the bandwidth of the receiver, which is approximately $n \times 1,25$ MHz, where n is the number of adjacent carriers.

4.2.7.1.2 Repeaters

The intermodulation spurious response attenuation is a measure of a repeater ability to rebroadcast a signal in the presence of two interfering out of band CW signals at an input of the repeater.

4.2.7.2 Limits

4.2.7.2.1 Base stations operating in Type 1 cdma2000 systems

The output power of the mobile station simulator shall increase by no more than 3 dB and the FER shall be less than 1,5 % with 95 % confidence (see ANSI/TIA-97-E [4], clause 6.8).

4.2.7.2.2 Base stations operating in Type 2 cdma2000 systems

The output power of the access terminal simulator shall increase by no more than 3 dB and the PER measured in steps 5 and 8 shall be less than 1,5 % with 95 % confidence (see TIA-864 [12], clause 11.8).

4.2.7.2.3 Repeaters

The output power increase in the centre of the pass band due to application of the two CW signals shall be no more than 11,2 dB when measured with a resolution bandwidth of 1 MHz.

4.2.7.3 Conformance

Conformance tests described in clause 5.3.6 shall be carried out.

4.2.8 Adjacent channel selectivity

4.2.8.1 Definition

Adjacent channel selectivity is a measure of the ability to receive a CDMA signal or an HRPD signal on the assigned channel frequency in the presence of another interfering CDMA signal that is offset from the centre frequency of the assigned channel by $\pm 2,5$ MHz for spreading rate 1 or ± 5 MHz for spreading rate 3.

4.2.8.2 Limits

4.2.8.2.1 Base stations operating in Type 1 cdma2000 systems

The output power of the mobile station simulator shall increase by no more than 3 dB and the FER shall be less than 1,5 % with 95 % confidence (see ANSI/TIA-97-E [4], clause 6.8).

4.2.8.2.2 Base stations operating in Type 2 cdma2000 systems

The output power of the access terminal simulator shall increase by no more than 3 dB and the PER measured in steps 5 and 7 shall be less than 1,5 % with 95 % confidence (see TIA-864 [12], clause 11.8).

4.2.8.3 Conformance

Conformance tests described in clause 5.3.7 shall be carried out.

4.2.9 Out of band gain

4.2.9.1 Definition

Out of band gain refers to the gain of the repeater immediately outside the pass band.

4.2.9.2 Limits

The lowest carrier frequency supported in the carrier pass band shall be termed f_1 . The highest carrier frequency supported in the carrier pass band shall be termed f_2 .

For repeaters with measured pass band gain of 40 dB or greater, the gain of the repeater measured at $f_2 + 1,25$ MHz and $f_1 - 1,25$ MHz shall be at least 40 dB below the in-band signal gain (ratio of repeater in-band output power to repeater in-band input power) as measured in a 30 kHz bandwidth. For repeaters with measured pass band gain of less than 40 dB, the gain of the repeater does not need to be below 0 dB at $f_2 + 1,25$ MHz and $f_1 - 1,25$ MHz within the pass band of the repeater. The gain of the repeater at frequencies greater than $f_2 + 1,25$ MHz and less than $f_1 - 1,25$ MHz shall be monotonically decreasing. The repeater gain shall be within ± 2 dB of the average repeater gain within the pass band.

NOTE 1: The gain of the repeater shall be equal to or less than the manufacture declared minimum coupling loss between the repeater and the donor base station at frequencies that are $f_2 + 1,25$ MHz and $f_1 - 1,25$ MHz outside the repeater pass band.

NOTE 2: If the repeater has more than one pass band, the pass bands not presently under test are excluded from the limit.

4.2.9.3 Conformance

Conformance tests described in clause 5.3.8 shall be carried out.

5 Testing for compliance with technical requirements

5.1 Conditions for testing

5.1.1 Introduction

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile.

Where technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions (within the boundary limits of the declared operational environmental profile) to give confidence of compliance for the affected technical requirements.

Normally it should be sufficient for all tests to be conducted using standard test conditions except where otherwise stated (see ANSI/TIA-97-E [4] or TIA-864 [12]). For a definition of standard test conditions and for guidance on the use of other test conditions to be used in order to show compliance reference can be made to annex C.

5.1.2 Standard equipment under test

5.1.2.1 Basic equipment

The equipment under test shall be assembled and any necessary adjustments shall be made in accordance with the manufacturer's instructions for the mode of operation required. When alternative modes are available, the equipment shall be assembled and adjusted in accordance with the relevant instructions. A complete series of measurements shall be made for each mode of operation.

5.1.2.2 Ancillary equipment

The base station equipment may include ancillary equipment during tests if the ancillary equipment is normally used in the operation of the equipment under test. This would include power supplies, cabinets, antenna couplers, and receiver multi-couplers.

5.2 Interpretation of the measurement results

The interpretation of the results recorded in a test report for the measurements described in the present document shall be as follows:

- the measured value related to the corresponding limit will be used to decide whether an equipment meets the requirements of the present document;
- the value of the measurement uncertainty or the accuracy of each piece of test equipment used for the measurement of each parameter shall be included in the test report; only test equipment meeting the performance requirements for standard test equipment as defined in ANSI/TIA-97-E [4], clause 6.4 or TIA-864 [12], clause 11.4, shall be used;
- the test set-up of each test shall be equivalent to the test set-up descriptions in ANSI/TIA-97-E [4], clause 6.5 or TIA-864 [12], clause 11.5;
- the recorded value of the measurement uncertainty or the recorded value of the accuracy of each piece of test equipment shall be equal to or better than the figures in ANSI/TIA-97-E [4], clause 6.4 or TIA-864 [12], clause 11.4.

5.3 Essential radio test suites

5.3.1 Transmitter conducted spurious emissions

5.3.1.1 Test procedure for base stations supporting operation in Type 1 cdma2000 systems

- 1) Connect a spectrum analyser (or other suitable test equipment) to each base station RF output port, using an attenuator or directional coupler if necessary.
- 2) Configure the base station to operate in band class 6 and perform steps 3 through 11.
- 3) Configure the base station to transmit a single carrier and perform steps 4 through 6.
- 4) Set the base station to transmit a signal modulated with a combination of Pilot, Sync, Paging, and traffic channels as stated in ANSI/TIA-97-E [4], clause 6.5.2. Total power at the RF output port shall be the maximum power as specified by the manufacturer.
- 5) Measure the power level at the carrier frequency.
- 6) Measure the spurious emission levels.
- 7) If the base station supports two carriers through a single RF output port with a carrier-to-carrier spacing of 1,25 MHz, configure the base station to transmit two adjacent carriers and perform steps 10 and 11.

- 8) If the base station supports two carriers through a single RF output port with a carrier-to-carrier spacing of greater than 1,25 MHz, configure the base station to transmit two non-adjacent carriers and perform steps 10 and 11.
- 9) If the base station supports three or more carriers through a single RF output port, configure the base station to transmit all carriers with the smallest carrier-to-carrier spacing specified by the manufacturer and perform steps 10 and 11.
- 10) Set the base station to transmit multiple signals modulated with a combination of Pilot, Sync, Paging, and traffic channels as stated in ANSI/TIA-97-E [4], clause 6.5.2. Total power at the RF output port shall be the maximum power as specified by the manufacturer for the multiple-carrier configuration under test.
- 11) Measure the spurious emission levels.

The results obtained shall be compared to the limits in clause 4.2.2.2 in order to prove compliance.

5.3.1.2 Test procedure for base stations supporting operation in Type 2 cdma2000 systems

Refer to TIA-864 [12], figure 11.5.1-1 for a functional block diagram of the test setup.

- 1) Connect the sector under test and an access terminal simulator as shown in TIA-864 [12], figure 11.5.1-1. The AWGN generators are not applicable in this test.
- 2) Connect a spectrum analyser (or other suitable test equipment) to the sector RF output port, using an attenuator or directional coupler if necessary.
- 3) Configure the sector to operate in band class 6 and perform steps 4) through 13).

Case 1 (Continuous Data Mode):

- 4) Configure the sector to transmit continuous non-idle slots: Set up a test application session. Open a connection and configure the test application FTAP so that the forward traffic channel data rate 2 457,6 kbit/s. Configure the MAC Channel with 14 active MAC indices, i.e. the RA Channel and 13 RPC Channels.
- 5) The carrier power shall be adjusted to the maximum level as specified by the manufacturer.
- 6) Measure the average carrier power. Record the value for use in case 2.
- 7) Measure the spurious emission levels using appropriate resolution bandwidths consistent with the limits given in the tables 3 and 4 in clause 4.2.2.2. Averaging of up to 25 sweeps may be used.

Case 2 (Idle Mode):

- 8) Configure the sector to transmit a continuous stream of idle slots, except for the control channel, which may either be transmitted or inhibited. Configure 14 active MAC indices on the MAC Channel, i.e. the RA Channel and 13 RPC Channels. Set idle-mode gain to the minimum value specified by the manufacturer.
- 9) Set up the measurement equipment so that the following time windows are measured: The active measurement shall be during a window that starts and stops between 5 and 15 μ s before and after the MAC and pilot channel transmissions.
- 10) Measure the average carrier power of gated transmission during these MAC-Pilot-MAC windows.
- 11) Measure the average spurious emissions levels during these MAC-Pilot-MAC windows using appropriate resolution bandwidth at the offset frequencies specified in tables 3 and 4 in clause 4.2.2.2.
- 12) For limits specified in dBc: compare the measurements in step 11) with the carrier power measurements in step 10).

- 13) For limits specified in dBm: If the gated power measured in step 10) is lower than the carrier power measured in step 6) by more than 1 dB, add a correction factor equal to the difference of the carrier power levels, to the gated power measurements in steps 10) and 11).

NOTE: Case 2 measurements may be made using a spectrum analyser with time gated and RMS detection capabilities, by RF/IF triggering on alternate half-slots with delay to the next half-slot.

The results obtained shall be compared to the limits in clause 4.2.2.2 in order to prove compliance.

5.3.1.3 Test procedure for repeaters

The test procedures described in this clause apply to both forward and reverse paths. The tests are to be conducted sequentially.

- 1) Connect a spectrum analyser (or other suitable test equipment) to a repeater RF output port, using an attenuator or directional coupler if necessary.
- 2) For each forward CDMA Channel pass band that the repeater supports, configure the repeater to operate in that pass band and perform steps 3 through 13. The tests are to be conducted sequentially.
- 3) Set the repeater at its maximum rated gain.
- 4) Configure the repeater, where necessary, to transmit a single carrier and perform steps 5 through 8.
- 5) Input a CDMA waveform as defined in ANSI/TIA-97-E [4], clause 6.5.2, in the case where the forward path is tested, or ANSI/TIA-98-E [6], table 4.5.1.2, in the case where the reverse path is tested.
- 6) Set the input amplitude of the signal such that the output signal is at the declared maximum power rated by the manufacturer.
- 7) Measure the power level at the carrier frequency.
- 8) Measure the spurious emission levels.
- 9) Increase the power level of the input signal by 10 dB and repeat steps 7 and 8.
- 10) If the repeater supports two or more carriers, input CDMA signals on all supported carriers as defined in ANSI/TIA-97-E [4], clause 6.5.2, in the case where the forward path is tested, or ANSI/TIA-98-E [6], table 4.5.1.2, in the case where the reverse path is tested.
- 11) Set the input amplitude of the signals such that the output signals are at the declared maximum power rated by the manufacturer taking into consideration the ratings for multiple carrier operation and perform steps 12 and 13.
- 12) Measure the spurious emission levels.
- 13) Increase the power level of the input signals by 10 dB and measure the spurious emission levels.

The results obtained shall be compared to the limits in clause 4.2.2.2 in order to prove compliance.

5.3.2 Maximum output power

5.3.2.1 Test procedure for base stations supporting operation in Type 1 cdma2000 systems

Test environment: normal and extreme (for guidance see annex C).

- 1) Connect the power measuring equipment to the base station RF output port.
- 2) Configure the base station to operate in band class 6 and perform steps 3 and 4.
- 3) Set the base station to transmit a signal modulated with a combination of Pilot, Sync, Paging, and traffic channels as stated in ANSI/TIA-97-E [4], clause 6.5.2.
- 4) Measure the mean power at the RF output port.

The results obtained shall be compared to the limits in clause 4.2.3.2.1 in order to prove compliance.

5.3.2.2 Test procedure for base stations supporting operation in Type 2 cdma2000 systems

Refer to TIA-864 [12], figure 11.5.1-1 for a functional block diagram of the test setup.

- 1) Configure both the sector under test and an access terminal simulator as shown in TIA-864 [12], figure 11.5.1-1.
- 2) Connect the power measuring equipment to the sector RF output port.
- 3) For band class 6, configure the sector to operate in that band class and perform steps 4 and 5.
- 4) Set up a test application session. Open a connection and configure the test application FTAP so that the forward traffic channel data rate corresponds to 2 457,6 kbit/s. Configure the MAC channel with 14 MAC indices, i.e. the RA channel and 13 RPC channels.
- 5) Measure the time response and the mean power of the sector output power averaged over at least 100 non-idle half slots. The power is measured at the sector's RF output port.

The results obtained shall be compared to the limits in clause 4.2.3.2.2 in order to prove compliance.

5.3.2.3 Test procedure for repeaters

- 1) Connect the power measuring equipment to the repeater RF output port for forward CDMA Channels.
- 2) For each forward CDMA Channel pass band that the repeater supports, configure the repeater to operate in that pass band and perform steps 3 through 5. The tests are to be conducted sequentially.
- 3) Set the repeater at its maximum gain setting and apply an input CW signal within the pass band of the repeater at a level which results in the maximum rated output power.
- 4) Increase the input signal level by 10 dB and measure the output power of the repeater 3 seconds after increasing the input signal level.
- 5) Measure the power level at the RF output port for forward CDMA Channels.

The results obtained shall be compared to the limits in clause 4.2.3.2.3 in order to prove compliance.

5.3.3 Inter-base station transmitter intermodulation

5.3.3.1 Test procedure for base stations supporting operation in Type 1 cdma2000 systems

- 1) Connect a spectrum analyser (or other suitable test equipment) and the external base station to the base station RF output port, using attenuators or directional couplers if necessary as shown in ANSI/TIA-97-E [4], figure 6.5.1-9.
- 2) Configure the base station to operate in band class 6 and perform steps 3 through 6.
- 3) Set the base station under test to transmit a signal modulated with a combination of Pilot, Sync, Paging, and traffic channels as stated in ANSI/TIA-97-E [4], clause 6.5.2. Total power at the RF output port shall be the maximum power as specified by the manufacturer.
- 4) Set the second base station to transmit a signal modulated with a combination of Pilot, Sync, Paging, and traffic channels as stated in ANSI/TIA-97-E [4], clause 6.5.2 with a total power that is 30 dB less than the power of the other base station with an offset of 1,25 MHz between the centre of the CDMA centre frequencies for spreading rate 1 or 3,75 MHz between the centre of the CDMA centre frequencies for spreading rate 3.
- 5) Measure the power level at the carrier frequency.
- 6) Measure the spurious emission level at the image of the base station transmitter and the interference source. The image is centred at a frequency of 2 times the centre frequency of the base station under test minus the centre frequency of the second base station. The bandwidth of the image is the same as the bandwidth of the radio configuration in effect.

The results obtained shall be compared to the limits in clause 4.2.4.2 in order to prove compliance.

5.3.3.2 Test procedure for base stations supporting operation in Type 2 cdma2000 systems 2

Refer to TIA-864 [12], figure 11.5.1-8 for a functional block diagram of the test setup.

- 1) Connect the two sectors under test and two access terminal simulators as shown in TIA-864 [12], figure 11.5.1-8. Configure the setup so that sector 2 total power is 30 dB less than the power of sector 1 with offsets of +1,25 MHz and -1,25 MHz between the centre of the CDMA centre frequencies.
- 2) Connect a spectrum analyser (or other suitable test equipment) to the sector 1 RF output port, using an attenuator or directional coupler if necessary.
- 3) Configure the sectors to operate in band class 6 and perform steps 4) through 19).

Case 1:

- 4) Set sector 1 to transmit Pilot, MAC and control channels (no connection is needed to allow having more idle slots).
- 5) Set sector 2 to transmit Pilot, MAC and control channels (no connection is needed to allow having more idle slots).
- 6) Measure the mean power level at the carrier frequency.
- 7) Measure the spurious emission levels in the range specified in clause 4.2.2.2 of the present document.

Case 2:

- 8) Open a connection between sector 1 and access terminal simulator 1. Set access terminal simulator 1 to request non-null data rates for the duration of the test.
- 9) Set sector 2 to transmit Pilot, MAC and control channels (no connection is needed to allow having more idle slots).
- 10) Measure the mean power level at the carrier frequency.
- 11) Measure the spurious emission levels in the range specified in clause 4.2.2.2 of the present document.

Case 3:

- 12) Set sector 1 to transmit Pilot, MAC and control channels (no connection is needed to allow having more idle slots).
- 13) Open a connection between sector 2 and access terminal simulator 2. Set access terminal simulator 2 to request non-null data rates for the duration of the test.
- 14) Measure the mean power level at the carrier frequency.
- 15) Measure the spurious emission levels in the range specified in clause 4.2.2.2 of the present document.

Case 4:

- 16) Open a connection between sector 1 and access terminal simulator 1. Set access terminal simulator 1 to request non-null data rates for the duration of the test.
- 17) Open a connection between sector 2 and access terminal simulator 2. Set access terminal simulator 2 to request non-null data rates for the duration of the test.
- 18) Measure the mean power level at the carrier frequency.
- 19) Measure the spurious emission levels in the range specified in clause 4.2.2.2 of the present document. The results obtained shall be compared to the limits in clause 4.2.4.2 in order to prove compliance.

5.3.3.3 Test procedure for repeaters

- 1) Set the repeater to its maximum gain setting.
- 2) For each forward CDMA Channel pass band that the repeater supports, configure the repeater to operate in that pass band and perform steps 3 through 5. The tests are to be conducted sequentially.
- 3) Input a forward CDMA Channel as defined in ANSI/TIA-97-E [4], clause 6.5.2, to the repeater input port (desired signal) at the level that produces the manufacturer declared maximum output power.
- 4) Input a forward CDMA Channel as defined in ANSI/TIA-97-E [4], clause 6.5.2, to the repeater output port (interference signal) at a level producing a signal power corresponding to 30 dB below the manufacturer declared maximum output power at the repeater output port with a frequency offset from the signal in step 3 of $\pm 1,25$ MHz, $\pm 2,5$ MHz, and $\pm 3,75$ MHz.
- 5) Measure the emission at the specified frequencies with specified measurement bandwidth and note that the measured value does not exceed the specified value. Measurements in the band of the interfering signal shall be excluded. The measurements can be limited to the frequencies of all third and fifth order intermodulation products.

The results obtained shall be compared to the limits in clause 4.2.4.2 in order to prove compliance.

5.3.4 Receiver conducted spurious emissions

5.3.4.1 Test procedure for base stations supporting operation in Type 1 or Type 2 cdma2000 systems

- 1) Connect a spectrum analyser (or other suitable test equipment) to a receiver RF input port.
- 2) Configure the base station to operate in band class 6 and perform steps 3 through 5.
- 3) Disable all transmitter RF outputs.
- 4) Perform step 5 for all receiver input ports.
- 5) Sweep the spectrum analyser over a frequency range from 30 MHz to 12,75 GHz and measure the spurious emission level.

The results obtained shall be compared to the limits in clause 4.2.5.2 in order to prove compliance.

5.3.5 Receiver blocking characteristics

5.3.5.1 Test procedure for base stations supporting operation in Type 1 cdma2000 systems

- 1) Configure the base station under test and a mobile station simulator as shown in ANSI/TIA-97-E [4], figure 6.5.1-3.
- 2) Configure the base station to operate in band class 6 and perform steps 3 through 13.
- 3) Adjust the equipment to ensure path losses of at least 100 dB. All power control mechanisms shall be enabled and set at nominal values.
- 4) If the base station supports demodulation of radio configuration 1 or 2, set up a call using fundamental channel test mode 1 (see ANSI/TIA-97-E [4], clause 1.3) and perform steps 7 through 13.
- 5) If the base station supports demodulation of radio configuration 3 or 4, set up a call using fundamental channel test mode 3 or dedicated control channel test mode 3 (see ANSI/TIA-97-E [4], clause 1.3) and perform steps 7 through 13.
- 6) If the base station supports demodulation of radio configuration 5 or 6, set up a call using fundamental channel test mode 7 or dedicated control channel test mode 7 (see ANSI/TIA-97-E [4], clause 1.3) and perform steps 7 through 13.
- 7) Transmit random data to the mobile station simulator at full data rate.
- 8) Measure the mobile station simulator output power.
- 9) Adjust the CW generator power to be 75 dB above the mobile station simulator output power at the RF input ports as measured in step 8.
- 10) If the base station is operating with spreading rate 1 step the CW Tone frequency from 1 900 MHz to 2 000 MHz at 1 MHz intervals but skip frequencies closer than 2,5 MHz to the carrier frequency and measure the mobile station simulator output power at the base station receiver.
- 11) If the base station is operating with spreading rate 3 step the CW Tone frequency from 1 900 MHz to 2 000 MHz at 1 MHz intervals but skip frequencies closer than 10 MHz to the carrier frequency measure the mobile station simulator output power at the base station receiver.
- 12) Adjust the CW generator power to be 100 dB above the mobile station simulator output power at the RF input ports as measured in step 8.
- 13) Step the CW Tone frequency from 1 MHz to 1 899 MHz and 2 001 MHz to 12 750 MHz in 1 MHz steps and measure the mobile station simulator output power at the base station receiver.

The results obtained shall be compared to the limits in clause 4.2.6.2.1 in order to prove compliance.

5.3.5.2 Test procedure for base stations supporting operation in Type 2 cdma2000 systems

Refer to TIA-864 [12], figure 11.5.1-3 for a functional block diagram of the test setup.

- 1) Configure the sector under test and an access terminal simulator as shown in TIA-864 [12], figure 11.5.1-3.
- 2) Configure the sector to operate in band class 6 and perform steps 3) through 10).
- 3) Adjust the equipment to ensure path losses of at least 100 dB. All power control mechanisms shall be enabled and set at nominal values.
- 4) Set up a test application session. Open a connection and configure the test application RTAP so that the reverse data channel data rate corresponds to 9,6 kbit/s.
- 5) Measure the access terminal simulator output power at the RF input ports of the sector.
- 6) Adjust the CW generator power to be 75 dB above the access terminal simulator output power at the RF input ports as measured in step 5).
- 7) Step the CW tone frequency from 1 900 to 2 000 MHz at 1 MHz intervals but skip frequencies closer than 5 MHz to the carrier frequency and perform step 10).
- 8) Adjust the CW generator power to be 100 dB above the access terminal simulator output power at the RF input ports as measured in step 5).
- 9) Step the CW tone frequency from 1 to 1 899 MHz and from 2 001 to 12 750 MHz in 1 MHz steps and perform step 10).
- 10) Measure the access terminal simulator output power at each frequency step of the CW tone.

The results obtained shall be compared to the limits in clause 4.2.6.2.2.

5.3.6 Intermodulation spurious response attenuation

5.3.6.1 Test procedure for base stations supporting operation in Type 1 cdma2000 systems

Refer to ANSI/TIA-97-E [4], figure 6.5.1-4 for a functional block diagram of the test setup.

- 1) Configure the base station under test and a mobile station simulator as shown in ANSI/TIA-97-E [4], figure 6.5.1-4.
- 2) Configure the base station to operate in band class 6 and perform steps 3 through 11.
- 3) Adjust the equipment to ensure path losses of at least 100 dB. All power control mechanisms shall be enabled and set at nominal values.
- 4) If the base station supports demodulation of radio configuration 1, 2, 3, or 4, set up a call using fundamental channel test mode 1 or 3 or dedicated control channel test mode 3 (see ANSI/TIA-97-E [4], clause 1.3) and perform steps 6 through 11.
- 5) If the base station supports demodulation of radio configuration 5 or 6, set up a call using fundamental channel test mode 7 or dedicated control channel test mode 7 (see ANSI/TIA-97-E [4], clause 1.3) and perform steps 6 through 11.
- 6) Transmit random data to the mobile station simulator at full data rate.
- 7) Measure the mobile station simulator output power.

- 8) For each block of n adjacent (1,23 MHz or 1,25 MHz spacing) carriers (including $n = 1$), define the lowest frequency, f_1 , as the lowest CDMA frequency assignment and the highest frequency, f_2 , as the highest CDMA frequency assignment and perform steps 9 through 11.
- 9) Perform steps 10 and 11 with the CW generators adjusted to $(f_2 + 1,25 \text{ MHz})$ and $(f_2 + 2,05 \text{ MHz} + i \times 1,25 \text{ MHz})$, and $(f_1 - 1,25 \text{ MHz})$ and $(f_1 - 2,05 \text{ MHz} - i \times 1,25 \text{ MHz})$ from the CDMA frequency assignment, where $i = 0, 1, \dots, n-1$.
- 10) Adjust the CW generator powers to be 70 dB above the mobile station simulator output power at the RF input ports as measured in step 7.
- 11) Measure the mobile station simulator output power and the FER of the base station receiver.

The results obtained shall be compared to the limits in clause 4.2.7.2.1 in order to prove compliance.

5.3.6.2 Test procedure for base stations supporting operation in Type 2 cdma2000 systems

Refer to TIA-864 [12], figure 11.5.1-4 for a functional block diagram of the test setup.

- 1) Configure the sector under test and an access terminal simulator as shown in TIA-864 [12], figure 11.5.1-4.
- 2) Configure the sector to operate in band class 6 and perform steps 3) through 8).
- 3) Adjust the equipment to ensure path losses of at least 100 dB. All power control mechanisms shall be enabled and set at nominal values.
- 4) Set up a test application session. Open a connection and configure the test application RTAP so that the reverse data channel data rate corresponds to 9,6 kbit/s.
- 5) Measure the access terminal simulator output power at the RF input ports of the sector, and the packet error rate at the access network.
- 6) With the sector operating in band class 6 perform steps 7 and 8 with the CW generators adjusted to offsets of +1,25 MHz and +2,05 MHz, and -1,25 MHz and -2,05 MHz from the CDMA frequency assignment.
- 7) Adjust the CW generator powers to be 70 dB for band class 6 above the access terminal simulator output power at the RF input ports as measured in step 5).
- 8) Measure the access terminal simulator output power and the packet error rate at the access network. The results obtained shall be compared to the limits in clause 4.2.7.2.2 in order to prove compliance.

5.3.6.3 Test procedure for repeaters

- 1) Configure the repeater under test and a mobile station simulator as shown in ANSI/TIA-97-E [4], figure 6.5.1-4, substituting the mobile station simulator with a base station signal, configured to transmit a signal modulated with a combination of Pilot, Sync, Paging, and Traffic Channels as stated in ANSI/TIA-97-E [4], clause 6.5.2.
- 2) For each Reverse CDMA Channel pass band that the repeater supports, configure the repeater to operate in that pass band and perform steps 3 and 4. The tests are to be conducted sequentially.
- 3) Adjust the repeater to its maximum gain setting and apply two CW tones at a level of -40 dBm at frequencies outside the pass band of the repeater such that the lowest order intermodulation products are located in the centre of the pass band.
- 4) Measure the increase in output power at the centre of the pass band, using a 1 MHz resolution bandwidth, relative to the output power before the CW signals were applied.

The results obtained shall be compared to the limits in clause 4.2.7.2.3 in order to prove compliance.

5.3.7 Adjacent channel selectivity

5.3.7.1 Test procedure for base stations supporting operation in Type 1 cdma2000 systems

Refer to ANSI/TIA-97-E [4], figure 6.5.1-8 for a functional block diagram of the test setup.

- 1) Configure the base station under test and a mobile station simulator as shown in ANSI/TIA-97-E [4], figure 6.5.1-8.
- 2) Configure the base station to operate in band class 6 and perform steps 3 through 11.
- 3) Adjust the equipment to ensure path losses of at least 100 dB. All power control mechanisms shall be enabled and set at nominal values.
- 4) If the base station supports demodulation of radio configuration 1 or 2, set up a call using fundamental channel test mode 1 (see ANSI/TIA-97-E [4], clause 1.3) and perform steps 7 through 11.
- 5) If the base station supports demodulation of radio configuration 3 or 4, set up a call using fundamental channel test mode 3 or dedicated control channel test mode 3 (see ANSI/TIA-97-E [4], clause 1.3) and perform steps 7 through 11.
- 6) If the base station supports demodulation of radio configuration 5 or 6, set up a call using fundamental channel test mode 7 or dedicated control channel test mode 7 (see ANSI/TIA-97-E [4], clause 1.3) and perform steps 7 through 11.
- 7) Transmit random data to the assigned mobile station simulator at full data rate.
- 8) Measure the assigned mobile station simulator output power.
- 9) If the base station is operating with spreading rate 1, perform step 11 with the interfering mobile station simulator adjusted to offsets of +2,5 MHz and -2,5 MHz from the CDMA frequency assignment with an output power at the RF input ports of -53 dBm. The interfering mobile station simulator shall be one mobile station transmitting a full rate RC 3 signal.
- 10) If the base station is operating with spreading rate 3, perform step 11 with the interfering mobile station simulator adjusted to offsets of +5 MHz and -5 MHz from the CDMA frequency assignment with an output power at the RF input ports of -49 dBm. The interfering mobile station simulator shall be one mobile station transmitting a full rate RC 5 signal.
- 11) Measure the assigned mobile station simulator output power and FER of the base station receiver.

The results obtained shall be compared to the limits in clause 4.2.8.2.1 in order to prove compliance.

5.3.7.2 Test procedure for base stations supporting operation in Type 2 cdma2000 systems

Refer to TIA-864 [12], figure 11.5.1-9 for a functional block diagram of the test setup.

- 1) Configure the sector under test and the two access terminal simulators as shown in TIA-864 [12], figure 11.5.1-9
- 2) Configure the sector to operate in band class 6 and perform steps 3) through 7).
- 3) Adjust the equipment to ensure path losses of at least 100 dB. All power control mechanisms shall be enabled and set at nominal values.
- 4) Set up a test application session. Open a connection between the sector under test and access terminal simulator 1, and configure the test application RTAP so that the reverse data channel data rate corresponds to 153,6 kbit/s.
- 5) Measure the access terminal simulator 1 output power referenced to the sector RF input ports, and the packet error rate at the access network.

- 6) Adjust access terminal simulator 2 to offsets of +2,5 MHz and -2,5 MHz from the CDMA frequency assignment of access terminal simulator 1 and with an output power of -53 dBm referenced to the sector RF input ports.
- 7) Measure the access terminal simulator output power referenced to the sector RF input ports, and the packet error rate at the access network.

The results obtained shall be compared to the limits in clause 4.2.8.2.2 in order to prove compliance.

5.3.8 Out of band gain

This test applies to both the forward and reverse link of the repeater

Refer to ANSI/TIA-97-E [4], figure 6.5.1-10 for a functional block diagram of the test setup.

- 1) Set the repeater at its maximum gain setting.
- 2) For each CDMA Channel pass band that the repeater supports, configure the repeater to operate in that pass band and perform steps 3 through 9. The tests are to be conducted sequentially.
- 3) Measure the average gain of the repeater pass band.
- 4) Input a CW tone at the repeater input port approximately 5 dB below the level that would cause the maximum rated output from the repeater at the centre of its pass band.
- 5) Measure the gain at the centre frequency of the repeater pass band.
- 6) Set the CW frequency to 1,25 MHz below the lowest carrier frequency supported in the carrier pass band, f1, and input the CW tone at the repeater input port at the same level as in step 4.
- 7) Measure the repeater gain at frequency f1 at the output port of the repeater.
- 8) Set the CW frequency to 1,25 MHz above the highest carrier frequency supported in the carrier pass band, f2, and input a CW tone at the repeater input port at the same level as in step 4.
- 9) Measure the repeater gain at frequency f2 at the output port of the repeater.
- 10) Repeat this test for the reverse signal path.

The results obtained shall be compared to the limits in clause 4.2.9.3 in order to prove compliance.

Annex A (normative): EN Requirements table (EN-RT)

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the EN-RT proforma in this annex so that it can be used for its intended purposes and may further publish the completed EN-RT.

This EN Requirements table (EN-RT) serves a number of purposes, as follows:

- It provides a tabular summary of the requirements for this part.
- It shows the status of each EN-R, whether it is essential to implement in all circumstances (Mandatory), or whether the requirement is dependent on the supplier having chosen to support a particular optional service or functionality (Optional). In particular it enables the EN-Rs associated with a particular optional service or functionality to be grouped and identified.
- When completed in respect of a particular equipment it provides a means to undertake the static assessment of conformity with this part of the EN.

Table A.1: EN Requirements table (EN-RT)

EN Reference		EN 301 908-5				Comment
No.	Reference	EN-R (see note)	Status			
1	4.2.2	Transmitter conducted spurious emissions	M			
2	4.2.3	Maximum output power	M			
3	4.2.4	Inter-base station transmitter intermodulation	M			
4	4.2.5	Receiver conducted spurious emissions	M			
5	4.2.6	Receiver blocking characteristics	M			
6	4.2.7	Intermodulation spurious response attenuation	M			
7	4.2.8	Adjacent channel selectivity	M			
8	4.2.9	Out of band gain	M			
NOTE: These EN-Rs are justified under article 3.2 of the R&TTE Directive. EN-R 1-7 are mandatory for base station operation in Type 1 or Type 2 cdma2000 systems. EN-R 1, 2, 3, 6 and 8 are mandatory for all repeater operation in Type 1 or Type 2 cdma2000 systems.						

Key to columns:

- No** Table entry number;
- Reference** Clause reference number of conformance requirement within the present document;
- EN-R** Title of conformance requirement within the present document;
- Status** Status of the entry as follows:
- M Mandatory, shall be implemented under all circumstances;
 - O Optional, may be provided, but if provided shall be implemented in accordance with the requirements;
 - O.n this status is used for mutually exclusive or selectable options among a set. The integer "n" shall refer to a unique group of options within the EN-RT. A footnote to the EN-RT shall explicitly state what the requirement is for each numbered group. For example, "It is mandatory to support at least one of these options", or, "It is mandatory to support exactly one of these options".
- Comments** To be completed as required.

Annex B (normative): Base station Configurations

B.1 Receiver diversity

For the tests in clause 5 of the present document, the specified test signals shall be applied to one receiver antenna connector, with the remaining receivers are disabled or their antenna connectors being terminated with 50 Ω .

B.2 Duplexers

The requirements of the present document shall be met with a duplexer fitted, if a duplexer is supplied as part of the BS. If the duplexer is supplied as an option by the manufacturer, sufficient tests should be repeated with and without the duplexer fitted to verify that the BS meets the requirements of the present document in both cases.

The following tests should be performed with the duplexer fitted, and without it fitted if this is an option:

- 1) clause 5.3.2 maximum output power, for the highest static power step only, if this is measured at the antenna connector;
- 2) clause 5.3.1, output RF spectrum emissions; outside the BS transmit band;
- 3) clause 5.3.3, inter-base station transmitter intermodulation; for the testing of conformance, the carrier frequencies should be selected to minimize intermodulation products from the transmitters falling in receive channels. The remaining tests may be performed with or without the duplexer fitted.

NOTE 1: When performing receiver tests with a duplexer fitted, it is important to ensure that the output from the transmitters does not affect the test apparatus. This can be achieved using a combination of attenuators, isolators and filters.

NOTE 2: When duplexers are used, intermodulation products will be generated, not only in the duplexer but also in the antenna system. The intermodulation products generated in the antenna system are not controlled by the specifications, and may degrade during operation (e.g. due to moisture ingress). Therefore, to ensure continued satisfactory operation of a BS, an operator will normally select CDMA channel numbers to minimize intermodulation products falling on receive channels. For testing of complete conformance, an operator may specify the CDMA channel numbers to be used.

B.3 Power supply options

If the BS is supplied with a number of different power supply configurations, it may not be necessary to test RF parameters for each of the power supply options, provided that it can be demonstrated that the range of conditions over which the equipment is tested is at least as great as the range of conditions due to any of the power supply configurations.

This applies particularly if a BS contains a DC rail which can be supplied either externally or from an internal mains power supply. In this case, the conditions of extreme power supply for the mains power supply options can be tested by testing only the external DC supply option. The range of DC input voltages for the test should be sufficient to verify the performance with any of the power supplies, over its range of operating conditions within the BS, including variation of mains input voltage, temperature and output current.

B.4 Ancillary RF amplifiers

The requirements of the present document shall be met with the ancillary RF amplifier fitted. At tests according to clause 5 for Tx and Rx respectively, the ancillary amplifier is connected to the BS by a connecting network (including any cable(s), attenuator(s), etc.) with applicable loss to make sure the appropriate operating conditions of the ancillary amplifier and the BS. The applicable connecting network loss range is declared by the manufacturer. Other characteristics and the temperature dependence of the attenuation of the connecting network are neglected. The actual attenuation value of the connecting network is chosen for each test as one of the applicable extreme values. The lowest value is used unless otherwise stated.

Sufficient tests should be repeated with the ancillary amplifier fitted and, if it is optional, without the ancillary RF amplifier to verify that the BS meets the requirements of the present document in both cases.

When testing, the following tests should be repeated with the optional ancillary amplifier fitted according to table B.1, where x denotes that the test is applicable:

Table B.1: Table of tests applicable to Ancillary RF Amplifiers.

	Clause	Tx amplifier only	Rx amplifier only	Tx/Rx amplifiers combined (see note)
Receiver Tests	5.3.4		X	
	5.3.5		X	X
	5.3.6		X	X
Transmitter Tests	5.3.1	X		X
	5.3.2	X		X
	5.3.3	X		X
NOTE: Combining can be by duplex filters or any other network. The amplifiers can either be in Rx or Tx branch or in both. Either one of these amplifiers could be a passive network.				

In test according to clause 5.3.2, the highest applicable attenuation value is applied.

B.5 BS using antenna arrays

A BS may be configured with a multiple antenna port connection for some or all of its transceivers or with an antenna array related to one cell (not one array per transceiver). This clause applies to a BS which meets at least one of the following conditions:

- the transmitter output signals from one or more transceiver appear at more than one antenna port; or
- there is more than one receiver antenna port for a transceiver or per cell and an input signal is required at more than one port for the correct operation of the receiver thus the outputs from the transmitters as well as the inputs to the receivers are directly connected to several antennas (known as "aircombining"); or

NOTE: diversity reception does not meet this requirement

- transmitters and receivers are connected via duplexers to more than one antenna.

If a BS is used, in normal operation, in conjunction with an antenna system which contains filters or active elements which are necessary to meet the UTRA requirements, the conformance tests may be performed on a system comprising the BS together with these elements, supplied separately for the purposes of testing. In this case, it must be demonstrated that the performance of the configuration under test is representative of the system in normal operation, and the conformance assessment is only applicable when the BS is used with the antenna system.

For conformance testing of such a BS, the following procedure may be used.

B.5.1 Receiver tests

For each test, the test signals applied to the receiver antenna connectors shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) specified in the test.

An example of a suitable test configuration is shown in figure B.1.

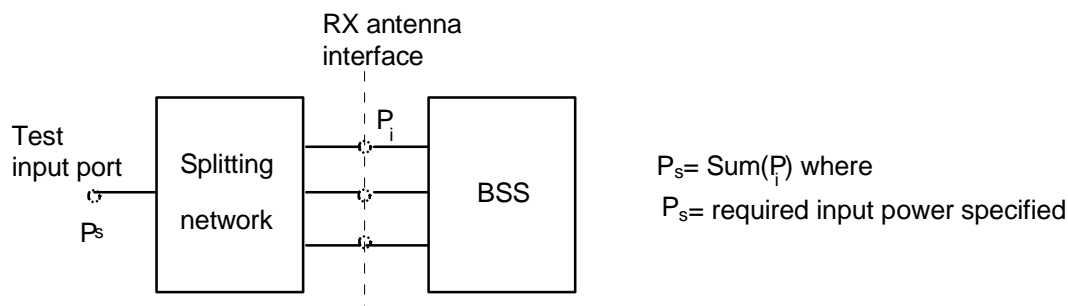


Figure B.1: Receiver test set-up

For spurious emissions from the receiver antenna connector, the test may be performed separately for each receiver antenna connector.

B.5.2 Transmitter tests

For each test, the test signals applied to the transmitter antenna connectors (P_i) shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) (P_s) specified in the test. This may be assessed by separately measuring the signals emitted by each antenna connector and summing the results, or by combining the signals and performing a single measurement. The characteristics (e.g. amplitude and phase) of the combining network should be such that the power of the combined signal is maximized.

An example of a suitable test configuration is shown in figure B.2.

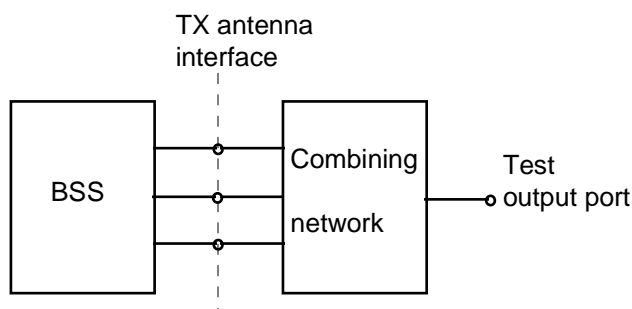


Figure B.2: Transmitter test set-up

For inter-base station transmitter intermodulation, the test may be performed separately for each transmitter antenna connector.

Annex C (informative): Environmental profile and standard test conditions

C.1 Introduction

The following clause contains a copy of the description of environmental requirements as specified in ANSI/TIA-97-E [4], clause 5, and TIA-864 [12], clause 10 and a definition of standard test conditions ANSI/TIA-97-E [4], clause 6, and TIA-864 [12], clause 11. This should provide some guidance on how the environmental profile can be declared for the purpose of the present document.

C.2 CDMA environmental requirements

C.2.1 Temperature and power supply voltage

C.2.1.1 Definition

The temperature and voltage ranges denote the ranges of ambient temperature and power supply input voltages over which the base station will operate and meet the requirements of the present document. The ambient temperature is the average temperature of the air surrounding the base station equipment. The power supply voltage is the voltage applied at the input terminals of the base station equipment. The manufacturer is to specify the temperature range and the power supply voltage over which the equipment is to operate.

C.2.1.2 Method of measurement

The base station equipment shall be installed in its normal configuration (i.e. in its normal cabinet or rack mounting arrangement with all normally supplied covers installed) and placed in a temperature chamber. Optionally, the equipment containing the frequency determining element(s) may be placed in the temperature chamber if the frequency stability is to be maintained over a different temperature from that specified for the rest of the base-station equipment.

The temperature chamber shall be stabilized at the manufacturer's highest specified operating temperature and then shall be operated in accordance with the standard duty cycle test conditions specified in ANSI/TIA-97-E [4], clause 6, and over the power supply input voltage range specified by the manufacturer. With the base station equipment operating, the temperature is to be maintained at the specified test temperature without forced circulation of air from the temperature chamber being directly applied to the base station equipment.

During the entire duty cycle, the transmitter frequency accuracy, timing reference, output power, and waveform quality shall be measured as specified in ANSI/TIA-97-E [4], clause 4.

Turn the base station equipment off, stabilize the equipment in the chamber at room temperature, and repeat the above measurements after a 15 min standby warm up period.

Turn the base station equipment off, stabilize the equipment in the chamber at the coldest operating temperature specified by the manufacturer, and repeat the above measurements above after a 15 min standby warm up period.

For transmitter frequency stability measurements, the above procedure shall be repeated every 10°C over the operating temperature range specified by the manufacturer. The equipment shall be allowed to stabilize at each step before a frequency measurement is made.

C.2.1.3 Minimum standard

Over the ambient temperature and power supply ranges specified by the manufacturer, the operation of the base station equipment shall conform to the limits shown in table C.1.

Table C.1: Environmental test limits

Parameter	Limit (see note 1)	Reference in ANSI/TIA-97-E [4]	Limit (see note 2)	Reference in TIA-864 [12]
Frequency Tolerance	±0,05 ppm	4.1.2	±0,05 ppm	3.1.2.1.2
Time Reference	±10 µs	4.2.1.1	±10 µs	3.1.2.2.1.1
Pilot Waveform Quality	$\rho > 0,912$	4.2.2	$\rho > 0,977$	3.1.2.2.2
RF Power Output Variation	+2 dB, -4 dB	4.3.1	±1.5 dB	3.1.2.3.1
NOTE 1: These limits are all applicable for base station operation in Type 1 cdma2000 spread spectrum systems as defined in TIA/EIA/IS-2000.2-B [5], and repeaters.				
NOTE 2: These limits are applicable to base station (access network) operation in Type 2 cdma2000 High Rate Packet Data Systems as defined in TIA/EIA/IS-856-1 [11].				

C.2.2 High humidity

C.2.2.1 Definition

The term "high humidity" denotes the relative humidity at which the base station will operate with no more than a specified amount of degradation in performance.

C.2.2.2 Method of measurement

The base station equipment, after having been adjusted for normal operation under standard test conditions, shall be placed, inoperative (i.e. switched off), in a humidity chamber with the humidity maintained at 0,024 gm H₂O/g Dry Air at 50°C (40 % relative humidity) for a period of not less than eight hours. While in the chamber and at the end of this period, the base station shall be switched on and its transmitting equipment shall be tested for frequency accuracy, timing reference, output power, and waveform quality. No readjustment of the base station equipment shall be allowed during this test.

C.2.2.3 Minimum standard

Under the above humidity conditions, the operation of the base station equipment shall conform to the limits specified in table C.1.

C.3 Standard test conditions

C.3.1 Standard environmental test conditions

Measurements under standard atmospheric conditions should be carried out under any combination of the following conditions:

- Temperature: +15°C to +35°C;
- Relative humidity: 45 % to 75 %;
- Air pressure: 86 000 Pa to 106 000 Pa (860 mbar to 1 060 mbar).

If desired, the results of the measurements can be corrected by calculation to the standard reference temperature of 25°C and the standard reference air pressure of 101 300 Pa (1 013 mbar).

C.3.2 Standard conditions for the primary power supply

C.3.2.1 General

The standard test voltages shall be those specified by the manufacturer as minimum, normal, and maximum operating values. The voltage shall not deviate from the stated values by more than $\pm 2\%$ during a series of measurements carried out as part of one test on the same equipment.

C.3.2.2 Standard DC test voltage from accumulator batteries

The standard (or nominal) DC test voltage battery specified by the manufacturer shall be equal to the standard test voltage of the type of accumulator to be used multiplied by the number of cells minus an average DC power cable loss value that the manufacturer determines as being typical (or applicable) for a given installation. Since accumulator batteries may or may not be under charge and, in fact, may be in a state of discharge when the equipment is being operated, the manufacturer shall also test the equipment at anticipated voltage extremes above and below the standard voltage. The test voltages shall not deviate from the stated values by more than $\pm 2\%$ (nominal float voltage) during a series of measurements carried out as part of one test on the same equipment.

C.3.2.3 Standard AC voltage and frequency

For equipment that operates from the AC mains, the standard AC test voltage shall be equal to the nominal voltage specified by the manufacturer. If the equipment is provided with different input taps, the one designated "nominal" shall be used. The standard test frequency and the test voltage shall not deviate from their nominal values by more than $\pm 2\%$.

The equipment shall operate without degradation with input voltage variations of up to $\pm 10\%$ and shall maintain its specified transmitter frequency stability for input voltage variations of up to $\pm 15\%$. The frequency range over which the equipment is to operate shall be specified by the manufacturer.

Annex D (informative): Bibliography

- ETSI TR 100 028 (V1.3.1): "Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- CEPT/ERC/REC 74-01E (Siófok 1998, Nice 1999, Sesimbra 2002): "Spurious emissions".

Annex E (informative): The EN title in the official languages

Language	EN title
Danish	Elektromagnetisk kompatibilitet og radiospektrumanliggender (ERM); Basisstationer (BS), Repeaters og brugerudstyr (UE) for IMT-2000 CDMA tredje generations cellulær radionet; Part 5: Harmoniseret EN for IMT-2000, CDMA multibærebølge (CDMA2000) (BS og Repeaters), der dækker de væsentlige krav i R&TTE Direktivets artikel 3.2
Dutch	Elektromagnetische compatibiliteit en radiospectrum-zaken (ERM); Basisstations (BS), Repeaters en gebruikersapparatuur (UE) voor IMT-2000 derde generatie mobiele netwerken; Deel 5: Geharmoniseerde EN voor IMT-2000, CDMA Multi-Carrier (cdma2000) (BS en Repeaters), welke invulling geeft aan de wezenlijke vereisten, neergelegd in artikel 3.2 van de R&TTE-richtlijn
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 5: Harmonized standard for IMT-2000, CDMA Multi-Carrier (cdma2000) (BS and Repeaters) covering essential requirements of article 3.2 of the R&TTE Directive
Finnish	Sähkömagneettinen yhteensopivuus ja radiospektriasiat (ERM); IMT-2000 kolmannen sukupolven solukkovertokojen tukiasemat (BS), toistimet ja matkaviestinlaitteet (UE); Osa 5: R&TTE direktiivin artiklan 3.2 olennaiset vaatimukset toteuttava yhdenmukaistettu EN IMT-2000 CDMA monikantoaaltoekniikkaa (cdma2000) käytäville tukiasemille (BS) ja toistimille
French	Compatibilité électromagnétique et Radioélectrique (ERM); Stations de Base (BS), Répéteurs et Equipement Utilisateur (UE) pour les réseaux cellulaires de troisième génération IMT-2000; Partie 5: Norme harmonisée pour l'IMT-2000, CDMA Multi-porteuse (CDMA 2000) (BS et Répéteurs) couvrant les exigences essentielles de l'article 3.2 de la Directive R&TTE
German	Elektromagnetische Verträglichkeit und Funkpektrumanlagen (ERM); Feststationen (BS), Repeater und Mobilstationen (UE) für zellulare Mobilfunknetze der dritten Generation IMT-2000; Teil 5: CDMA Mehrfachträger (cdma2000) (BS und Repeater), Harmonisierte Europäische Norm (EN) für IMT-2000 mit wesentlichen Anforderungen nach R&TTE Richtlinie Artikel 3.2
Greek	Ηλεκτρομαγνητική συμβατότητα και Θέματα Ηλεκτρομαγνητικού Φάσματος (ERM); Σταθμοί Βάσης (BS), αναμεταδότες και Μηχανήματα Χρηστών (UE) για κυψελωτά δίκτυα Τρίτης Γενιάς IMT-2000; Μέρος 5: Εξαρμονισμένη τυποποίηση για IMT-2000, CDMA Multi-Carrier (cdma2000) (BS και αναμεταδότες) Που καλύπτει τα αναγκαία προαπαιτούμενα του Αρθρου 3.2 της Ντιρεκτιβας R&TTE
Italian	Compatibilità elettromagnetica e problematiche di Spettro Radio (ERM); Stazioni Base (BS), Ripetitori e Terminali (UE) per le reti cellulari di terza generazione IMT-2000; Parte 5: Norma armonizzata per IMT-2000, CDMA Multi-Portante (cdma2000) (BS e Ripetitori) relativa ai requisiti essenziali dell'articolo 3.2 della Direttiva R&TTE
Portuguese	Assuntos de Espectro Radioelétrico e Compatibilidade Electromagnética (ERM); Estações de Base (BS), Repetidores e equipamento de utilizador (UE) para a terceira geração de redes celulares IMT-2000; Parte 5: EN Harmonizada para o IMT-2000, Portadoras múltiplas CDMA (cdma2000) (BS e Repetidores), cobrindo os requisitos essenciais no âmbito do artigo 3.º, n.º 2 da Directiva R & TTE
Spanish	Compatibilidad electromagnética y espectro radio (ERM); estaciones base (BS), Repetidores y equipos de usuario (UE) de redes móviles de tercera generación IMT-2000; EN armonizada que cubre los requisitos mínimos del artículo 3.2 de la directiva de R&TTE (1999/5/EC); parte 5: CDMA multi portadora (cdma2000) (BS y Repetidores)
Swedish	Elektromagnetisk kompatibilitet och radiospektrumfrågor (ERM); Basstationer (BS), Repeatrar och Mobilstationer (UE) för tredje generationens mobilnät IMT-2000; Del 5: Harmoniserad EN för IMT-2000, CDMA med multipla bärvågor (cdma2000) (BS och Repeater) omfattande väsentliga krav enligt artikel 3.2 i R&TTE-direktivet

History

Document history		
V1.1.1	January 2002	Publication
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