

ETSI EN 301 908-4 V4.2.1 (2010-03)

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 4: Harmonized EN for IMT-2000,
CDMA Multi-Carrier (cdma2000) and Evolved CDMA
Multi-Carrier Ultra Mobile Broadband (UMB) (UE)
covering the essential requirements
of article 3.2 of the R&TTE Directive**

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Foreword

This 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 [i.1] (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 [i.2] 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").

Technical specifications relevant to Directive 1999/5/EC [i.2] are given in annex A.

The present document is part 4 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 the essential requirements of article 3.2 of the R&TTE Directive";
- Part 2: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 3: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 4: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";**
- Part 5: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 6: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 7: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (BS) covering the 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 and E-UTRA FDD) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 12: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 13: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 14: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 15: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (FDD Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 16: "Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 17: "Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive".

National transposition dates	
Date of adoption of this EN:	19 February 2010
Date of latest announcement of this EN (doa):	31 May 2010
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 2010
Date of withdrawal of any conflicting National Standard (dow):	30 November 2011

Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.2]. The modular structure is shown in EG 201 399 [i.3].

1 Scope

The present document applies to the following radio equipment type:

- User Equipment (also denoted as Mobile stations or Access Terminals) for IMT-2000 CDMA multi-carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB).

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

Table 1-1: CDMA multi-carrier mobile stations operating bands

Band Class (BC)	Direction of transmission	CDMA multi-carrier mobile stations operating bands
6	Transmit	1 920 MHz to 1 980 MHz
	Receive	2 110 MHz to 2 170 MHz
8	Transmit	1 710 MHz to 1 785 MHz
	Receive	1 805 MHz to 1 880 MHz
9	Transmit	880 MHz to 915 MHz
	Receive	925 MHz to 960 MHz
13	Transmit	2 500 MHz to 2 570 MHz
	Receive	2 620 MHz to 2 690 MHz

The present document covers requirements for IMT-2000 CDMA multi-carrier (cdma2000) User Equipments and Evolved CDMA Multi-Carrier (UMB) User Equipment.

User Equipment for IMT-2000 CDMA multi-carrier (cdma2000) may support:

- 1) operation in cdma2000 Spread Spectrum Systems as defined in 3GPP2 C.S0002-D [2], referred to herein as operation in type 1 cdma2000 systems; or
- 2) operation in cdma2000 High Rate Packet Data Systems as defined in TIA-856 [7], referred to herein as operation in type 2 cdma2000 systems; or
- 3) operation in both, type 1 and type 2 cdma2000 systems.

The present document is intended to cover the provisions of Directive 1999/5/EC [i.2] (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 [i.2] may 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

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.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

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

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ANSI/TIA-98-F-1 (June 2006): "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations - Addendum".
- [2] 3GPP2 C.S0002-D V2.0 (September 2005): "Physical Layer Standard for cdma2000 Spread Spectrum Systems Revision D".

NOTE: Available at: http://www.3gpp2.org/Public_html/Specs/C.S0002-D_v2.0_051006.pdf.

- [3] ANSI/TIA-97-F-1 (June 2006): "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations - Addendum 1".
- [4] TIA-870-A (March 2005): "Test Data Service Option (TDSO) for cdma2000 Spread Spectrum Systems - Revision A".
- [5] TIA/EIA/IS-871 (April 2001): "Markov Service Option (MSO) for cdma2000 Spread Spectrum Systems".
- [6] TIA-2000.5-D (March 2004): "Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems".
- [7] TIA-856-B-1 (October 2007): "cdma2000 High Rate Packet Data Air Interface Specification - Addendum 1".
- [8] 3GPP2 C.S0033-B V1.0 (May 2008): "Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal".

NOTE: Available at: http://www.3gpp2.org/Public_html/specs/C.S0033-B_v1.0_080519.pdf.

- [9] 3GPP2 C.S0029-B V1.0 (March 2008): "Test Application Specification (TAS) for High Rate Packet Data Air Interface".

NOTE: Available at: http://www.3gpp2.org/Public_html/specs/C.S0029-B_v1.0_080409.pdf.

- [10] ETSI EN 301 908-1 (V4.1.2): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering the essential requirements of article 3.2 of the R&TTE Directive".
- [11] ETSI EN 301 908-16 (V4.1.2): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 16: Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] 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.
- [i.2] 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).
- [i.3] ETSI EG 201 399 (V2.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

1X: mode of operation of a mobile station or access terminal using spreading rate 1

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

3X: mode of operation of a mobile 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 uses 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.

ACK channel: channel used by the access terminal in type 2 cdma2000 systems to inform the access network whether a data packet transmitted on the forward traffic channel has been received successfully or not

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 (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-98 [1], clause 3.1, and ANSI/TIA-97 [3], clause 3.1.

Base Station (BS): fixed station used for communicating with mobile stations

NOTE 1: For the purpose of tests in clause 5 of the present document the term Base Station may also apply to a Base Station simulator having the capabilities defined in ANSI/TIA-98 [1], clause 6.4.3.

NOTE 2: Base stations for IMT-2000 CDMA multi-Carrier (cdma2000) may support, operation in cdma2000 spread spectrum systems as defined in 3GPP2 C.S0002-D [2], referred to herein as operation in type 1 cdma2000 system, or operation in cdma2000 high rate packet data systems as defined in TIA-856 [7], referred to herein as operation in type 2 cdma2000 systems.

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 and 9, the channel is centred on one of the 50 kHz channels. For band classes 2, 3 and 10, 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

chip rate: rate of "chips" (modulated symbols after spreading) per second

code channel: subchannel of a forward CDMA channel or reverse CDMA channel

NOTE: 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

NOTE: Information bits are input to the encoder and code symbols are output from the encoder (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 (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.

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, 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 (see also enhanced access probe)

environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

equivalent isotropically radiated power: product of the power supplied to the antenna and the antenna gain in a direction relative to an isotropic antenna

forward CDMA channel: CDMA channel from a Base Station 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 channels 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 Directive 98/34/EC [i.1].

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 26,667 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: number of frames in error on the forward traffic channel divided by the total number of frames

NOTE: The value of frame error rate may be estimated by using service option 2, 9, 32, 54, or 55 (see ANSI/TIA-98 [1], clause 1.3).