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*Harmonized European Standard*

**IMTcellular networks;  
Harmonized EN covering the essential requirements  
of article 3.2 of the R&TTE Directive  
Part 4: CDMA Multi-Carrier (cdma2000) User Equipment (UE)**

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Reference

REN/MSG-TFES-007-4

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Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

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## Foreword

This Harmonized European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document has been produced by ETSI in response to mandate M/284 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 Harmonized Standard covering the essential requirements under article 3.2 of Directive 1999/5/EC [i.2] (R&TTE Directive) for Base Stations (BS), Repeaters and User Equipment (UE) for IMT cellular networks, as identified below:

- Part 1: "Introduction and common requirements";
- Part 2: "CDMA Direct Spread (UTRA FDD) User Equipment (UE)";
- Part 3: "CDMA Direct Spread (UTRA FDD) Base Stations (BS)";
- Part 4: "CDMA Multi-Carrier (cdma2000) User Equipment (UE)";**
- Part 5: "CDMA Multi-Carrier (cdma2000) Base Stations (BS)";
- Part 6: "CDMA TDD (UTRA TDD) User Equipment (UE)";
- Part 7: "CDMA TDD (UTRA TDD) Base Stations (BS)";
- 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: "CDMA Direct Spread (UTRA FDD) (Repeaters)";
- 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: "Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)";

- Part 14: "Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)";
- Part 15: "Evolved Universal Terrestrial Radio Access (E-UTRA) (FDD Repeaters)";
- 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";
- Part 18: "E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)";
- Part 19: "OFDMA TDD WMAN (Mobile WiMAX) TDD User Equipment (UE)";
- Part 20: "OFDMA TDD WMAN (Mobile WiMAX) TDD Base Station (BS)";
- Part 21: "OFDMA TDD WMAN (Mobile WiMAX) FDD User Equipment (UE)";
- Part 22: "OFDMA TDD WMAN (Mobile WiMAX) FDD Base Stations (BS)".

<b>Proposed national transposition dates</b>	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

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## 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).

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-E [2], referred to herein as operation in type 1 cdma2000 systems; or
- 2) operation in cdma2000 High Rate Packet Data Systems as defined in 3GPP2 C.S0024-200-C [7] subtypes 0, 1, 2, and 3, 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 specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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 necessary for the application of the present document.

[1] ANSI/TIA-98-F-1 (June 2006): "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations - Addendum".

[2] 3GPP2 C.S0002-E V2.0 (June 2010): "Physical Layer Standard for cdma2000 Spread Spectrum Systems Revision E".

NOTE: Available at: [http://www.3gpp2.org/Public\\_html/specs/C.S0002-E\\_v2.0\\_cdma2000\\_1x\\_PHY.pdf](http://www.3gpp2.org/Public_html/specs/C.S0002-E_v2.0_cdma2000_1x_PHY.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-871-1 (October 2009): "Markov Service Option (MSO) for cdma2000 Spread Spectrum Systems".

[6] 3GPP2 C.S0005-E V2.0 (June 2010): "Upper Layer (Layer 3) Signalling Standard for cdma2000 Spread Spectrum Systems".

NOTE: Available at: [http://www.3gpp2.org/Public\\_html/specs/C.S0005-E\\_v2.0\\_cdma2000\\_1x\\_L3\\_Signaling.pdf](http://www.3gpp2.org/Public_html/specs/C.S0005-E_v2.0_cdma2000_1x_L3_Signaling.pdf).

[7] 3GPP2 C.S0024-200-C V1.0 (April 2010): "Physical Layer for cdma2000 High Rate Packet Data Air Interface Specification".

NOTE: Available at: [http://www.3gpp2.org/Public\\_html/specs/C.S0024-200-C\\_v1.0\\_HRPD\\_PHY.pdf](http://www.3gpp2.org/Public_html/specs/C.S0024-200-C_v1.0_HRPD_PHY.pdf).

[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](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](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".

[12] 3GPP2 C.S0024-100-C V1.0 (April 2010): "Overview for cdma2000 High Rate Packet Data Air Interface Specification".

NOTE: Available at: [http://www.3gpp2.org/Public\\_html/specs/C.S0024-100-C\\_v1.0\\_HRPD\\_Intro.pdf](http://www.3gpp2.org/Public_html/specs/C.S0024-100-C_v1.0_HRPD_Intro.pdf).

[13] 3GPP2 C.S0024-300-C V1.0 (April 2010): "Medium Access Layer for cdma2000 High Rate Packet Data Air Interface Specification".

NOTE: Available at: [http://www.3gpp2.org/Public\\_html/specs/C.S0024-300-C\\_v1.0\\_HRPD\\_MAC.pdf](http://www.3gpp2.org/Public_html/specs/C.S0024-300-C_v1.0_HRPD_MAC.pdf).

- [14] 3GPP2 C.S0024-400-C V1.0 (April 2010): "Connection and Security Layers for cdma2000 High Rate Packet Data Air Interface Specification".

NOTE: Available at: [http://www.3gpp2.org/Public\\_html/specs/C.S0024-400-C\\_v1.0\\_HRPD\\_ConnectionSecurity.pdf](http://www.3gpp2.org/Public_html/specs/C.S0024-400-C_v1.0_HRPD_ConnectionSecurity.pdf).

- [15] 3GPP2 C.S0024-500-C V1.0 (April 2010): "Application, Stream and Session Layers for cdma2000 High Rate Packet Data Air Interface Specification".

NOTE: Available at: [http://www.3gpp2.org/Public\\_html/specs/C.S0024-500-C\\_v1.0\\_HRPD\\_ApplicationStreamSession.pdf](http://www.3gpp2.org/Public_html/specs/C.S0024-500-C_v1.0_HRPD_ApplicationStreamSession.pdf).

## 2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [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".

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## 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-E [2], referred to herein as operation in type 1 cdma2000 system, or operation in cdma2000 high rate packet data systems as defined in 3GPP2 C.S0024-200-C [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 classes 6, 8, 9 and 13, the channel is centred on one of the 50 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 12 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 12 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).

**frame quality indicator:** CRC check applied to 9,6 Kbit/s and 4,8 Kbit/s traffic channel frames of radio configuration 1, to all forward traffic channel frames for radio configurations 2 through 12, to all reverse traffic channel frames for radio configurations 2 through 8, 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 1: 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.

NOTE 2: See also soft handoff.

**high rate packet data:** CDMA technique optimized for data communications in type 2 cdma2000 system

**line impedance stabilization network:** network inserted in the supply mains lead of apparatus to be tested that provides, in a given frequency range, a specified load impedance for the measurement of disturbance voltages and that may isolate the apparatus from the supply mains in that frequency range

**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), 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

**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:** for multiple transmissions, a packet is declared in error if it has insufficient frame quality after the last re-transmission defined for that test

**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

**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

**protocol data unit:** encapsulated data communicated between peer layers on the mobile station and the Base Station

**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 3GPP2 C.S0002-E [2], 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  $E_b$ )

**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 8 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 12

**reverse supplemental channel:** portion of a radio configuration 3 through 8 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 test application protocol:** test application protocol allowing reverse link performance characterizations in type 2 cdma2000 systems

**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

**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 TIA-870 [4].

**service option 9:** loopback service option for radio configuration 2

NOTE: See TIA-870 [4].

**service option 30:** mobile station data loopback test mode for multiplex option 1 supplemental channel

NOTE: See TIA-870 [4].

**service option 31:** mobile station data loopback test mode for multiplex option 2 supplemental channel

NOTE: See TIA-870 [4].

**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-870 [4].

**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 [5].

**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 TIA-870 [4].

**servicing frequency:** CDMA frequency on which a mobile station is currently communicating with one or more Base Stations

**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:** often referred to as "1X"

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

NOTE 2: A spreading rate 1 reverse CDMA channel uses a single direct-sequence spread carrier with a chip rate of 1,2288 Mcps.

**spreading rate 3:** often referred to as "3X"

NOTE 1: A spreading rate 3 forward CDMA channel uses three direct-sequence spread carriers (see multiple-carrier forward channel) each with a chip rate of 1,2288 Mcps.

NOTE 2: A spreading rate 3 reverse CDMA channel uses a single direct-sequence spread carrier with a chip rate of 3,6864 Mcps.

**subtype 3 physical layer protocol:** physical layer operation mode for cdma2000 high rate packet data systems employed for multicarrier traffic channel MAC protocols along with the Enhanced Access Channel MAC protocol, and the Enhanced Control Channel MAC protocol

NOTE 1: The Physical Layer Protocol provides the channel structure, frequency, power output, modulation, and encoding specifications for the forward and reverse links.

NOTE 2: See 3GPP2 C.S0024-200-C [7].

**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 coordinated 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 3GPP2 C.S0002-E [2].

**type 2 cdma2000 systems:** cdma2000 high rate packet data systems

NOTE: See 3GPP2 C.S0024-200-C [7].

**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

**user equipment:** mobile station supporting operation in cdma2000 spread spectrum systems as defined in 3GPP2 C.S0002-E [2], referred to herein as operation in type 1 cdma2000 system; access terminal supporting operation in cdma2000 high rate packet data systems as defined in 3GPP2 C.S0024-200-C [7], referred to herein as operation in type 2 cdma2000 system; mobile station that supports 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 3GPP2 C.S0002-E [2], 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:

$\Delta f$  separation between the carrier centre frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency

$\frac{\text{BCCH } E_c}{I_{or}}$  ratio of the average transmit energy-per-PN chip 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 one milliwatt

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

dBW measure of power expressed in terms of its ratio (in dB) to one watt

$E_b$  the 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 reverse enhanced access channel with radio configurations 3 through 8, this is the combined energy of the reverse enhanced access channel and the reverse pilot channel. For the reverse common control channel with radio configurations 3 through 8, 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 8, 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
$\frac{FCACH E_c}{I_{or}}$	ratio of the average transmit energy-per-PN chip for the forward common assignment Channel to the total transmit power spectral density
$\frac{FCCCH E_c}{I_{or}}$	ratio of the average transmit energy-per-PN chip for the forward common control channel to the total transmit power spectral density
$\frac{FCPCCH E_c}{I_{or}}$	ratio of the average transmit energy-per-PN chip for the forward common power control Channel to the total transmit power spectral density
FPC_PRI_CHAN <sub>s</sub>	Power Control Subchannel indicator set by the Base Station to indicate whether the mobile station is to perform the primary inner loop estimation on the received Forward Fundamental Channel or the Forward Dedicated Control Channel
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
$\hat{I}_{or}$	the 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)
$N_{FTCMPRestartTx}$	protocol numeric constant that is the number of consecutive slots of non-null rate DRCs to re-enable the reverse traffic channel transmitter once it is disabled due to DRC supervision failure and equals 12 as defined in 3GPP2 C.S0029-B [9], clause 8.4.8
$\mu s$	microsecond ( $10^{-6}$ second)
ms	millisecond ( $10^{-3}$ second)
ns	nanosecond ( $10^{-9}$ second)
N0	effective inband noise or interference power spectral density
OCNS $E_c$	average energy-per-PN chip for the OCNS
$\frac{OCNS E_c}{I_{or}}$	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
NOTE:	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 $\frac{v}{23+v} \times$ (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 $\frac{v}{11+v} \times$ (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 2 700 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 $\frac{v}{11+v} \times$ (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.
$\frac{\text{Power Control } E_c}{I_{or}}$	ratio of the average transmit energy-per-PN chip for the power control subchannel to the total transmit power spectral density
$\frac{\text{Quick Paging } E_c}{I_{or}}$	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

$\frac{\text{Sync } E_c}{I_{\text{or}}}$	ratio of the average transmit energy-per-PN chip for the sync channel to the total transmit power spectral density
$T_{\text{FTCMDRCSupervision}}$	protocol numeric constant equal to 240 ms as defined in 3GPP2 C.S0029-B [9] at clause 8.4.8
$T_{\text{FTCMPRestartTx}}$	protocol numeric constant equal to 12 control channel cycles as defined in 3GPP2 C.S0029-B [9] at clause 8.4.8
$T_{\text{CCMPSupervision}}$	protocol numeric constant equal to 12 control channel cycles as defined in 3GPP2 C.S0029-B [9] at clause 8.2.8
Traffic $E_c$	average energy-per-PN chip for the forward fundamental channel

NOTE: 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  $\frac{11}{11+v} \times$  (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  $\frac{23}{23+v} \times$  (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  $\frac{11}{11+v} \times$  (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 2 700 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  $\frac{11}{11+v} \times$  (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.

$\frac{\text{Traffic } E_c}{I_{\text{or}}}$	ratio of the average transmit energy-per-PN chip for the forward traffic channel to the total transmit power spectral density
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### 3.3 Abbreviations

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

1XDO	Spreading rate 1 Data Optimized System
AC	Alternating Current
ACK Channel	ACKnowledgement Channel
ACLR	Adjacent Channel Leakage Ratio
AWGN	Additive White Gaussian Noise
BC	Band Class
BCCH	Broadcast Control CHannel
BIH	Bureau International de l'Heure
BS	Base Station
CDMA	Code Division Multiple Access
CRC	Cyclic Redundancy Code
CW	Continuous Waveform
DC	Direct Current
DRC	Data Rate Control
DTX	Discontinuous Transmission
E-UTRA	Evolved Universal Terrestrial Radio Access
EACH	Enhanced Access CHannel

eirp	equivalent isotropically radiated power
EMC	ElectroMagnetic Compatibility
ERM	Electromagnetic compatibility and Radio spectrum Matters
erp	effective radiated power
FCCCH	Forward Common Control CHannel
FCH	Forward Fundamental CHannel
F-DCCH	Forward Dedicated Control CHannel
FER	Frame Error Rate
FMCTAP	Forward MultiCarrier Test Application Protocol
FTAP	Forward Test Application Protocol
GPS	Global Positioning System
HRPD	High Rate Packet Data
MAC	Medium Access Control
Mcps	Megachips per second (10 <sup>6</sup> chips per second)
MER	Message Error Rate

NOTE:  $MER = 1 - \frac{\text{Number of good messages received}}{\text{Number of messages transmitted}}$

MSG	Mobile Standards Group
OCNS	Orthogonal Channel Noise Simulator
OOK	On-Off-Keying
PCH	Paging CHannel
PCS	Personal Communication System
PER	Packet Error Rate

NOTE:  $PER = 1 - \frac{\text{Number of good packets received}}{\text{Number of packets transmitted}}$

PN	Pseudorandom Noise
PPP	Point-to-Point Protocol
PUF	Power Up Function
R&TTE	Radio and Telecommunications Terminal Equipment
R-DCCH	Reverse Dedicated Control CHannel
RF	Radio Frequency
R-FCH	Reverse Fundamental CHannel
RMCTAP	Reverse MultiCarrier Test Application Protocol
R-PICH	Reverse Pilot CHannel
R-SCH	Reverse Supplemental CHannel
RTAP	Reverse Test Application Protocol
SR	Spreading Rate
TFES	Task Force for European Standards for IMT
UE	User Equipment
UMB	Ultra Mobile Broadband
UTC	Universal Time Coordinated
UTRA	Universal Terrestrial Radio Access

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## 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 B of the present document.

## 4.2 Conformance requirements

The requirements in the present document are based on the assumption that the operating band (e.g. BC 6, 8, 9 and 13) is shared between systems of the IMT-2000 family (for BC 8 and 9 also GSM) or systems having compatible characteristics. Requirements for UMB access terminals are given in EN 301 908-16 [11].

### 4.2.1 Introduction

To meet the essential requirement under article 3.2 of Directive 1999/5/EC [i.2] (R&TTE Directive) for IMT-2000 User equipment (UE) eight essential parameters in addition to those in EN 301 908-1 [10] have been identified. Table 4.2.1-1 provides a cross reference between these eight essential parameters and the eleven corresponding technical requirements for equipment within the scope of the present document.

**Table 4.2.1-1: Cross references**

Essential parameter	Corresponding technical requirements
Spectrum emissions mask	4.2.2 Conducted spurious emissions when transmitting
Conducted spurious emissions in active mode	4.2.2 Conducted spurious emissions when transmitting
Accuracy of maximum output power	4.2.3 Maximum RF output power
Prevention of harmful interference through control of power	4.2.4 Minimum controlled output power
Conducted spurious emission in idle mode	4.2.5 Conducted spurious emissions when not transmitting
Impact of interference on receiver performance	4.2.6 Receiver blocking characteristics
	4.2.7 Intermodulation spurious response attenuation
Receiver adjacent channel selectivity	4.2.8 Adjacent channel selectivity
Control and Monitoring functions	4.2.5 Conducted spurious emissions when not transmitting
	4.2.9 Supervision of Paging channel or Forward Common Control Channel (see note 1)
	4.2.10 Supervision of forward traffic channel (see note 1)
	4.2.11 Supervision of control channel (see note 2)
	4.2.12 Supervision procedures in variable rate state (see note 2)
NOTE 1: This technical requirement is only applicable for operation in type 1 cdma2000 Spread Spectrum Systems as defined in 3GPP2 C.S0002-E [2].	
NOTE 2: This technical requirement is only applicable for operation in type 2 cdma2000 High Rate Packet Data Systems as defined in 3GPP2 C.S0024-200-C [7].	

NOTE: Mobile stations operating in type 2 cdma2000 systems as defined in 3GPP2 C.S0024-200-C [7] are also termed access terminals in the present document. Access terminals as defined herein always use spreading rate 1 and are data optimized (1XDO).

The technical requirements in the present document apply for UEs supporting type 1 and type 2 cdma2000 systems in the declared operating bands. UEs supporting UMB shall fulfil the requirements in EN 301 908-16 [11].

### 4.2.2 Conducted spurious emissions when transmitting

#### 4.2.2.1 Definition

Conducted spurious emissions are emissions at frequencies that are outside the assigned CDMA Channel, measured at the mobile station antenna connector. This test measures the spurious emissions during continuous transmission.

#### 4.2.2.2 Limits

When transmitting in Band Classes 6, 8, 9 and 13, the spurious emissions in the respective mobile station's receive band shall be less than -76 dBm measured in a 1 MHz resolution bandwidth.



#### 4.2.2.2.1 Mobile stations operating in type 1 cdma2000 systems using spreading rate 1 or operating in type 2 cdma2000 systems

When transmitting with spreading rate 1, the spurious emissions shall be less than the limits specified in table 4.2.2.2.1-1.

**Table 4.2.2.2.1-1: Transmitter spurious emission limits for spreading rate 1**

For $ \Delta f $ within the range	Emission limit
885 kHz to 1,25 MHz (BC 9 only)	less stringent of -42 dBc/30 kHz or -54 dBm/1,23 MHz
1,25 MHz to 1,98 MHz	less stringent of -42 dBc/30 kHz or -54 dBm/1,23 MHz
1,98 MHz to 4,00 MHz (BC 9 only)	less stringent of -54 dBc/30 kHz or -54 dBm/1,23 MHz
1,98 MHz to 2,25 MHz (BC 6, 8 and 13 only)	less stringent of -50 dBc/30 kHz or -54 dBm/1,23 MHz
2,25 MHz to 4,00 MHz (BC 6, 8 and 13 only)	$-(13 + 1 \times (\Delta f - 2,25 \text{ MHz}))$ dBm/1 MHz
> 4,00 MHz	-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 $\Delta f$ = centre frequency - closer edge frequency (f) of the measurement filter.	

When transmitting with spreading rate 1, the spurious emissions shall also be less than the requirements in table 4.2.2.2.1-2.

**Table 4.2.2.2.1-2: Additional transmitter spurious emission limits for spreading rate 1**

Measurement frequency	Emission limit	Victim band	Applies to Operating Band
921 MHz to 925 MHz	-60 dBm/100 kHz	GSM900	BC 6, 8, 13
925 MHz to 935 MHz	-67 dBm/100 kHz	GSM900	BC 6, 8, 13
935 MHz to 960 MHz	-79 dBm/100 kHz	GSM900	BC 6, 8, 13
1 805 MHz to 1 880 MHz	-71 dBm/100 kHz	DCS1800	BC 6, 9, 13
2 110 MHz to 2 170 MHz	-60 dBm/1,23 MHz	IMT-2000 BC 6	BC 8, 9, 13
2 590 MHz to 2 620 MHz	-50 dBm/1,23 MHz	IMT-2000 BC 13 TDD	BC 13
2 620 MHz to 2 690 MHz	-60 dBm/1,23 MHz	IMT-2000 BC 13 FDD	BC 9, 13
NOTE: Measurements apply only when the measurement frequency is at least 5,625 MHz from the CDMA tx centre frequency. The measurements shall be made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the spurious emission limits in table 4.2.2.2.1-1 are allowed.			

#### 4.2.2.2.2 Mobile stations operating in type 1 cdma2000 systems using spreading rate 3

When transmitting in BC 6, 8, 9 and 13 with spreading rate 3, the spurious emissions shall be less than the limits specified in table 4.2.2.2.2-1.

**Table 4.2.2.2.2-1: Transmitter spurious emission limits for spreading rate 3**

For $ \Delta f $ within the range	Emission limit
2,5 MHz to 2,7 MHz	-14 dBm/30 kHz
2,7 MHz to 3,5 MHz	$-(14 + 15 \times (\Delta f - 2,7 \text{ MHz}))$ dBm/30 kHz
3,08 MHz	-33 dBc/3,84 MHz
3,5 MHz to 7,5 MHz	$-(13 + 1 \times (\Delta f - 3,5 \text{ MHz}))$ dBm/1 MHz
7,5 MHz to 8,5 MHz	$-(17 + 10 \times (\Delta f - 7,5 \text{ MHz}))$ dBm/1 MHz
8,08 MHz	-43 dBc/3,84 MHz
8,5 MHz to 12,5 MHz	-27 dBm/1 MHz
> 12,5 MHz	-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 $\Delta f$ = centre frequency - closer edge frequency (f) of the measurement filter. The requirements at offsets of 3,08 MHz and 8,08 MHz are equivalent to ACLR requirements of 33 dB and 43 dB from a spreading rate 3 mobile station transmitter into a spreading rate 3 or IMT-2000 CDMA Direct Spread mobile station receiver offset by 5 MHz and 10 MHz respectively.

A mobile station transmitting with spreading rate 3 shall also meet the requirements in table 4.2.2.2.2-2.

**Table 4.2.2.2.2-2: Additional transmitter spurious emission limits for spreading rate 3**

Measurement frequency	Emission limit	Victim band	Applies to Operating Band
921 MHz to 925 MHz	-60 dBm/100 kHz	GSM900	BC 6, 8, 13
925 MHz to 935 MHz	-67 dBm/100 kHz	GSM900	BC 6, 8,13
935 MHz to 960 MHz	-79 dBm/100 kHz	GSM900	BC 6, 8,13
1 805 MHz to 1 880 MHz	-71 dBm/100 kHz	DCS1800	BC 6, 9,13
2 110 MHz to 2 170 MHz	-60 dBm/3,69 MHz	IMT-2000 BC 6	BC 8, 9,13
2 590 MHz to 2 620 MHz	-50 dBm/3,69 MHz	IMT-2000 BC 13 TDD	BC 13
2 620 MHz to 2 690 MHz	-60 dBm/3,69 MHz	IMT-2000 BC 13 FDD	BC 9, 13
NOTE:	Measurements apply only when the measurement frequency is at least 12,5 MHz from the CDMA tx centre frequency. The measurements shall be made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the unwanted emission limits in table 4.2.2.2.2-1 are allowed.		

#### 4.2.2.2.3 Mobile stations operating in multicarrier HRPD systems

When performing Test 2 defined in clause 5.3.1.3 and transmitting in Band Classes 6, 8 or 13, the spurious emissions with ten or more averages shall be less than the limits specified in table 4.2.2.2.3-1. When transmitting in Band Class 9, the spurious emissions with ten or more averages shall be less than the limits specified in table 4.2.2.2.3-2.

A single exception will be allowed for spurious emission frequencies between the two reverse CDMA channels (for both tables 4.2.2.2.3-1 and 4.2.2.2.3-2).

**Table 4.2.2.2.3-1: Band Classes 6, 8 and 13 Transmitter Spurious Emission Limits for Test 2**

For $ \Delta f $ Within the Range	Emission Limit
1,25 MHz to 2,25 MHz	6 dBm/1 MHz
> 2,25 MHz to 3,5xNs MHz	-13 dBm/1 MHz
> 3,5xNs MHz (ITU Category B)	-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 $\Delta f$ is measured as the frequency offset from the centre frequency of each channel. Except for ITU Category B, emission limits shall apply between the carriers when $\text{MaxReverseLinkBandwidth} \times 0,0025 \geq 4 \times 1,25$ MHz. $N_s = \text{MaxReverseLinkBandwidth} \times 0,0025$ .

**Table 4.2.2.2.3-2: Band Class 9 Transmitter Spurious Emission Limits for Test 2**

For $ \Delta f $ Within the Range	Emission Limit
885 kHz to 1,885 MHz	6 dBm/1 MHz
> 1,885 MHz	-13 dBm/1 MHz
NOTE:	All frequencies in the measurement bandwidth shall satisfy the restrictions on $ \Delta f $ where $\Delta f$ is measured as the frequency offset from the centre frequency of each reverse CDMA channel. Emission Limits shall apply between the reverse CDMA channels when $\text{MaxReverseLinkBandwidth} \geq 4 \times 1,23$ MHz.

When performing Test 3 defined in clause 5.3.1.3, for adjacent reverse CDMA channels, the spurious emissions with ten or more averages shall be less than the limits specified in table 4.2.2.2.2-1 for  $N = 3$  and table 4.2.2.2.3-3 for  $N \neq 3$ .

**Table 4.2.2.2.3-3: Adjacent Multi-carrier Transmitter Spurious Emission Limits for Number of adjacent reverse CDMA channels,  $N \neq 3$** 

For $ \Delta f $ Within the Range	Emission Limit
$2,5 + \Delta$ MHz to $3,5 + \Delta$ MHz	-13 dBm/(12,5 kHz $\times$ N) kHz
$3,5 + \Delta$ MHz to $3,125 \times (N+1)$ MHz	-13 dBm/1 MHz
> $3,125 \times (N+1)$ MHz	-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 $\Delta f = \text{centre frequency} - \text{closer measurement edge frequency (f)}$ . $\Delta = (N-3) \times 625$ kHz, where N is the number of carriers ( $N \geq 2$ ).

### 4.2.2.3 Conformance

Conformance tests described in clause 5.3.1 shall be carried out.

## 4.2.3 Maximum RF output power

### 4.2.3.1 Definition

For each reverse traffic channel radio configuration that the mobile station supports, when operating in a type 1 and/or type 2 cdma2000 system, the maximum radiated RF output power shall be determined by the measurement of the maximum power that the mobile station transmits as measured at the mobile station antenna connector plus the antenna gain recommended by the mobile station manufacturer. The antenna gain shall be determined by using the Radiated Signal Measurement Procedures (see ANSI/TIA-98 [1], clause 2.6) and calculating the antenna gain for eirp or erp as appropriate.

### 4.2.3.2 Limits

For each radio configuration that the mobile station operating in a type 1 and/or type 2 cdma2000 system supports, the maximum output power of each mobile station class shall be such that the maximum radiated power for the mobile station class using the antenna gain recommended by the mobile station manufacturer is within the limits specified in table 4.2.3.2-1. The antenna gain shall be determined using the Radiated Signal Measurement Procedures (see ANSI/TIA-98 [1], clause 2.6) and calculating the antenna gain for eirp or erp as appropriate.

When the mobile station is operating in type 1 cdma2000 systems and transmitting using one of the test mode channel configurations specified in table 4.2.3.2-2, the maximum output power requirements of the mobile station specified in table 4.2.3.2-1 may be reduced by the applicable output power backoff allowance specified in table 4.2.3.2-2.

For mobile stations operating in type 2 cdma2000 systems, in Test 1 specified in clause 5.3.2.2, the maximum output power of each access terminal class shall be such that the maximum radiated power for the access terminal class using the antenna gain recommended by the access terminal manufacturer is within the limits specified in table 4.2.3.2-1. For mobile stations operating in type 2 cdma2000 systems and using multicarrier HRPD operation, in Test 2 specified in clause 5.3.2.2, the maximum output power (of all active carriers) of each access terminal class shall be such that the maximum radiated power for the access terminal class using the antenna gain recommended by the access terminal manufacturer is within the limits specified in table 4.2.3.2-1 less transmit power backoff of 3,3 dB.

**Table 4.2.3.2-1: Effective radiated power at maximum output power**

Band Class	Mobile station Class	Radiating Measurement	Lower Limit	Upper Limit
9	Class I	eirp	31 dBm (1,25 W)	38 dBm (6,3 W)
	Class II	eirp	27 dBm (0,5 W)	34 dBm (2,5 W)
	Class III	eirp	23 dBm (0,2 W)	30 dBm (1,0 W)
6, 8, 13	Class I	eirp	28 dBm (0,63 W)	33 dBm (2,0 W)
	Class II	eirp	23 dBm (0,2 W)	30 dBm (1,0 W)
	Class III	eirp	18 dBm (63 mW)	27 dBm (0,5 W)
	Class IV	eirp	13 dBm (20 mW)	24 dBm (0,25 W)
	Class V	eirp	8 dBm (6,3 mW)	21 dBm (0,13 W)
NOTE: Applicable to mobile stations operating in type 1 and/or type 2 cdma2000 systems.				

The eirp for a Class II through Class V mobile station may drop by 2 dB at 60 °C and higher.

**Table 4.2.3.2-2: Maximum output power backoff allowances**

Test mode Configuration	Output Power Reduction
R-PICH + R-DCCH	2,5 dB
R-PICH + R-DCCH + R-FCH (1 500 bit/s)	2,0 dB
R-PICH + R-FCH (9 600 bit/s) + R-SCH0 (9 600 bit/s)	2,0 dB
R-PICH + R-DCCH + R-SCH0 (9 600 bit/s)	1,5 dB

### 4.2.3.3 Conformance

Conformance tests described in clause 5.3.2 shall be carried out.

## 4.2.4 Minimum controlled output power

### 4.2.4.1 Definition

The minimum controlled output power of the mobile station is the mean output power, measured at the mobile station antenna connector, when both closed loop and open loop power control indicate minimum output.

#### 4.2.4.2 Limits

With both closed loop and open loop power control set to minimum, the mean output power of the mobile station shall be:

- 1) less than -50 dBm/1,23 MHz, centred at the CDMA Channel frequency, for mobile stations operating in type 1 cdma2000 systems using spreading rate 1, and for mobile stations operating in type 2 cdma2000 systems; or
- 2) -50 dBm/3,69 MHz, centred at the CDMA Channel frequency, for mobile stations operating in type 1 cdma2000 systems using spreading rate 3.

#### 4.2.4.3 Conformance

Conformance tests described in clause 5.3.3 shall be carried out.

### 4.2.5 Conducted spurious emissions when not transmitting

#### 4.2.5.1 Definition

Conducted spurious emissions when not transmitting are spurious emissions generated or amplified in a receiver that appear at the mobile station antenna connector.

#### 4.2.5.2 Limits

The conducted spurious emissions when not transmitting for a mobile station operating in type 1 and/or type 2 cdma2000 systems shall not exceed the limits given in tables 4.2.2.2.1-2 and 4.2.2.2.2-2. Furthermore the following requirements shall be met:

- 1) Less than -76 dBm, measured in a 1 MHz resolution bandwidth at the mobile station antenna connector, for frequencies within the mobile station receive band (see table 1-1).
- 2) Less than -61 dBm, measured in a 1 MHz resolution bandwidth at the mobile station antenna connector, for frequencies within the mobile station transmit band (see table 1-1).
- 3) Less than -57 dBm, measured in a 100 kHz resolution bandwidth at the mobile station antenna connector, for frequencies from 30 MHz to 1 GHz.
- 4) Less than -47 dBm, measured in a 1 MHz resolution bandwidth at the mobile station antenna connector, for all other frequencies in the range from 1 GHz to 12,75 GHz.

#### 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

The receiver blocking characteristic is a measure of the receiver's ability to receive a CDMA signal at its assigned channel frequency in the presence of a single tone on frequencies other than those of the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit.

## 4.2.6.2 Limits

### 4.2.6.2.1 Mobile station operating in type 1 cdma2000 systems

The following requirements apply independently for each supported test mode.

The FER in Tests 1 through 5 as defined in clause 5.3.5.1 shall not exceed 10 % with 90 % confidence (see ANSI/TIA-98 [1], clause 6.6). With up to a combined total between Tests 6 and 7 as defined in clause 5.3.5.1 of twenty-four (24) exceptions at spurious response frequencies in each assigned frequency channel, the FER in Tests 6 and 7 shall not exceed 10 % with 90 % confidence (see ANSI/TIA-98 [1], clause 6.6). For each spurious response exception, the FER shall not exceed 10 % with 90 % confidence (see ANSI/TIA-98 [1], clause 6.6) when using the alternate CW tone power as defined in clause 5.3.5.1 for interference at the one or more spurious response frequencies.

### 4.2.6.2.2 Mobile station operating in type 2 cdma2000 systems

The PER in Tests 1 through 5 shall not exceed 10 % with 90 % confidence (see 3GPP2 C.S0033-B [8], clause 8.8). With up to twenty-four (24) exceptions at spurious response frequencies, the PER in Tests 6 and 7 shall not exceed 10 % with 90 % confidence (see 3GPP2 C.S0033-B [8], clause 8.8). In case of such spurious response exception(s) in Tests 6 or 7, the PER shall not exceed 10 % with 90 % confidence (see 3GPP2 C.S0033-B [8], clause 8.8) when using the Alternate CW Tone Power for interference at the one or more spurious response frequencies.

## 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

The intermodulation spurious response attenuation is a measure of a receiver's ability to receive a CDMA 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 mobile stations operating in type 1 cdma2000 systems, the receiver performance shall be measured by the Frame Error Rate (FER).

For mobile stations operating in type 2 cdma2000 systems, the receiver performance shall be measured by the Packet Error Rate (PER).

### 4.2.7.2 Limits

#### 4.2.7.2.1 Mobile station operating in type 1 cdma2000 systems

The FER in Tests 1, 2 as defined in clause 5.3.6.1 shall not exceed 1,0 % with 95 % confidence (see ANSI/TIA-98 [1], clause 6.6).

#### 4.2.7.2.2 Mobile stations operating in type 2 cdma2000 systems

The PER in Tests 1, 2, 5 and 6 as defined in clause 5.3.6.2 shall not exceed 1,0 % with 95 % confidence (see 3GPP2 C.S0033-B [8], clause 8.8). The PER in Tests 3 and 4 as defined in clause 5.3.6.2 shall not exceed 1,0 % with 95 % confidence (see 3GPP2 C.S0033-B [8], clause 8.8).

### 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 on the assigned channel frequency in the presence of another CDMA signal that is offset from the centre frequency of the assigned channel by  $\pm 2,5$  MHz for spreading rate 1 or  $\pm 5$  MHz for spreading rate 3.

### 4.2.8.2 Limits

#### 4.2.8.2.1 Mobile station operating in type 1 cdma2000 systems

The FER in each test shall not exceed 1,0 % with 95 % confidence (see ANSI/TIA-98 [1], clause 6.6).

#### 4.2.8.2.2 Mobile station operating in type 2 cdma2000 systems

The PER in each test shall not exceed 1,0 % with 95 % confidence (see 3GPP2 C.S0033-B [8], clause 8.8).

### 4.2.8.3 Conformance

Conformance tests described in clause 5.3.7 shall be carried out.

## 4.2.9 Supervision of paging channel or Forward Common Control Channel

### 4.2.9.1 Definition

NOTE: Applicable to mobile station operating in type 1 cdma2000 systems.

These requirements verify mobile station supervision when in the System Access State, where the mobile station shall monitor the paging channel or Forward Common Control Channel at all times per clause 2.6.3.1.8 of 3GPP2 C.S0005-E [6].

### 4.2.9.2 Limits

The mobile station shall set a timer for 1 second whenever a valid message is received on the paging channel or Forward Common Control Channel, whether addressed to the mobile station or not. For testing this requirement, no valid messages shall be sent after disabling of the paging channel or Forward Common Control Channel. For Test 2 as defined in clause 5.3.8, the Broadcast Control Channel shall also be disabled to ensure no valid messages are received, even though the supervision requirement only applies to the Forward Common Control Channel when in the System Access State.

The mobile station shall transmit access attempts as a response to the page. The mobile station shall stop transmitting access attempts between 1 s and 1,3 s after the paging channel or Forward Common Control Channel is disabled.

### 4.2.9.3 Conformance

Conformance tests described in clause 5.3.8 shall be carried out.

## 4.2.10 Supervision of forward traffic channel

### 4.2.10.1 Definition

NOTE: Applicable to mobile station operating in type 1 cdma2000 systems.

This requirement is split into three parts:

- part 1: supervision of forward traffic channel is the capability that the mobile station monitoring the forward traffic channel disables its transmitter after receiving a certain period with insufficient signal quality and re-enables its transmitter after receiving another certain period with sufficient signal quality;
- part 2: supervision of forward traffic channel is the capability that the mobile station monitoring the forward traffic channel disables its transmitter and declares a loss of the forward traffic channel after receiving insufficient signal quality for a certain period of time;
- part 3: supervision of forward traffic channel is the capability that the mobile station does not disable its transmitter while receiving a certain period with sufficient signal quality with power control bits only, but no data.

#### 4.2.10.2 Limits

Test 1 in clause 5.3.9:

- the mobile station shall disable its transmitter between  $12 \times 0,02$  s and  $12 \times 0,02 + 0,02$  s after the forward traffic channel is disabled. The mobile station shall re-enable its transmitter between  $2 \times 0,02$  s and  $2 \times 0,02 + 0,02$  s after the start of the first re-enabled forward traffic channel frame.

Test 2 in clause 5.3.9:

- in 85 % of the trials with 90 % confidence, the mobile station shall disable its transmitter between 5 s and  $5 + 0,02$  s after the first forward traffic channel frame has been disabled. The mobile station shall not re-enable its transmitter.

Test 3 in clause 5.3.9:

- the mobile station shall not disable its transmitter during the 2 s.

#### 4.2.10.3 Conformance

Conformance tests described in clause 5.3.9 shall be carried out.

### 4.2.11 Supervision of control channel

#### 4.2.11.1 Definition

NOTE: Applicable to mobile station operating in type 2 cdma2000 systems.

When entering the *Active State* of the Default Control Channel MAC Protocol described in 3GPP2 C.S0024-300-C [13] the access terminal sets the Control Channel supervision timer for  $T_{\text{CCMPSupervision}}$ . If a Control Channel capsule is received while the timer is active, the timer is reset and restarted. If the timer expires the protocol returns a *SupervisionFailed* indication and disables the timer.

This Default Control Channel MAC Protocol's *SupervisionFailed* indication is received by the Default Air-Link Management Protocol of the Connection layer. Upon the reception of a *ControlChannelMAC.SupervisionFailed* indication, the Default Air-Link Management Protocol proceeds as follows:

- If the access terminal is in the *Idle State* of the Default Air-Link Management Protocol, it deactivates the access channel MAC and transitions to the *Initialization State*.
- If the access terminal is in the *Connected State*, of the Default Air-Link Management Protocol, it closes the current connection and transitions to the *Idle State*.

Test 1 verifies that when the access terminal is in the *Idle State* of the Default Air-Link Management Protocol, and the timer  $T_{\text{CCMPSupervision}}$  expires, the access terminal stops sending access probes.

Test 2 verifies that when the access terminal is in the *Connected State* of the Default Air-Link Management Protocol and the timer  $T_{\text{CCMPSupervision}}$  expires, the access terminal disables the reverse traffic channel.



#### 4.2.11.2 Limits

##### Test 1:

The access terminal shall transmit access attempts as a response to the page. The access terminal shall stop transmitting access probes between  $T_{\text{CCMPSupervision}} \times 0,4267$ , and  $T_{\text{CCMPSupervision}} \times 0,4267 + 0,04$  s after the Control Channel is disabled.

##### Test 2:

The access terminal shall disable the reverse traffic channel transmitter between  $T_{\text{CCMPSupervision}} \times 0,4267$ , and  $T_{\text{CCMPSupervision}} \times 0,4267 + 0,04$  s after the Control channel is disabled.

#### 4.2.11.3 Conformance

Conformance tests described in clause 5.3.10 shall be carried out.

### 4.2.12 Supervision procedures in variable rate state

#### 4.2.12.1 Definition

NOTE: Applicable to mobile station operating in type 2 cdma2000 systems.

When in the *Variable Rate State* of the Default forward traffic channel MAC Protocol, the access terminal performs supervision on the DRC and monitors the *ForwardTrafficValid* bit as follows.

The access terminal sets the DRC supervision timer for  $T_{\text{FTCMDRCSupervision}}$  when it transmits a null rate DRC. If the access terminal requests a non-null rate while the DRC supervision timer is active, the access terminal disables the timer. If the DRC supervision timer expires, the access terminal disables the reverse traffic channel transmitter and sets the reverse traffic channel Restart timer for time  $T_{\text{FTCMPRestartTx}}$ . If the access terminal generates consecutive non-null rate DRC values for more than  $N_{\text{FTCMPRestartTx}}$  slots, the access terminal disables the reverse traffic channel Restart timer and enables the reverse traffic channel transmitter.

If the reverse traffic channel Restart timer expires, the access terminal returns a *SupervisionFailed* indication.

The access terminal monitors the bit associated with its MACIndex in the *ForwardTrafficValid* field made available by the OverheadMessages Protocol. If this bit is set to 0, the access terminal shall return a *SupervisionFailed* indication.

Test 1 verifies that the access terminal disables its transmitter when the DRC supervision timer expires.

Test 2 verifies that the access terminal disables its transmitter when its corresponding *ForwardTrafficValid* bit is set to 0.

#### 4.2.12.2 Limits

##### Test 1:

The access terminal shall disable its transmitter between the time interval  $T_{\text{FTCMDRCSupervision}} - 0,001667$  and  $T_{\text{FTCMDRCSupervision}} + 0,04$  s after the access network received the first null DRC in the sequence of consecutive null DRC received at the access network.

##### Test 2:

$T_1$  is the time when the *QuickConfig Message*, with the *ForwardTrafficValid* bit corresponding to the access terminal set to 0, is sent. The access terminal shall disable its transmitter between the time interval  $T_1$  and  $T_1 + 0,04$  s.

#### 4.2.12.3 Conformance

Conformance tests described in clause 5.3.11 shall be carried out.

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## 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-98 [1] or 3GPP2 C.S0033-B [8]). 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 B.

#### 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 under test 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 mobile station equipment may include ancillary equipment during tests, provided that the ancillary equipment is normally used in the operation of the equipment under test. For mobile station equipment, this may include power supplies, handsets, cradles, charging stands, control cables and battery cables.

### 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 shall 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-98 [1], clause 6.4 or 3GPP2 C.S0033-B [8], clause 8.4, shall be used; the test set-up of each test shall be equivalent to the test set-up descriptions in ANSI/TIA-98 [1], clause 6.5;
- 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-98 [1], clause 6.4 or 3GPP2 C.S0033-B [8], clause 8.5.

### 5.3 Essential radio test suites

This clause describes the test suites for type 1 and type 2 cdma2000 systems. UMB User Equipment test suites are in EN 301 908-16 [11].

### 5.3.1 Conducted spurious emissions when transmitting

#### 5.3.1.1 Test procedure for mobile stations supporting operation in type 1 cdma2000 systems

- 1) Connect the Base Station to the mobile station antenna connector as shown in ANSI/TIA-98 [1], figure 6.5.1-4. The AWGN generator and the interference generator are not applicable in this test. Connect a spectrum analyser (or other suitable test equipment) to the mobile station antenna connector.
- 2) For each band class and radio configuration that the mobile station supports, configure the Base Station and mobile station to operate in that radio configuration and band class, and perform steps 3 through 26.
- 3) If the mobile station supports reverse traffic channel radio configuration 1 and forward traffic channel radio configuration 1, set up a call using fundamental channel test mode 1 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 14 through 16.
- 4) If the mobile station supports the radio configuration 3 reverse fundamental channel and demodulation of radio configuration 3, 4, or 5, set up a call using fundamental channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 14 through 16.
- 5) If the mobile station supports the radio configuration 3 reverse dedicated control channel and demodulation of radio configuration 3, 4, or 5, set up a call using dedicated control channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and 100 % frame activity and perform steps 14 through 16.
- 6) If the mobile station supports the radio configuration 3 reverse fundamental channel, radio configuration 3 reverse dedicated control channel and demodulation of radio configuration 3, 4 or 5, set up a call using fundamental channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 1 500 bit/s fundamental channel data rate only and 9 600 bit/s dedicated control channel with 100 % frame activity, and perform steps 17 through 26.
- 7) If the mobile station supports the radio configuration 3 reverse fundamental channel, radio configuration 3 reverse supplemental Channel 0 and demodulation of radio configuration 3, 4 or 5, set up a call using supplemental Channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s fundamental channel and 9 600 bit/s supplemental Channel 0 data rate, and perform steps 17 through 26.
- 8) If the mobile station supports the radio configuration 3 reverse dedicated control channel, radio configuration 3 reverse supplemental Channel 0 and demodulation of radio configuration 3, 4 or 5, set up a call using supplemental Channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s dedicated control channel with 100 % frame activity and 9 600 bit/s supplemental Channel 0 data rate, and perform steps 17 through 26.
- 9) If the mobile station supports the radio configuration 5 reverse fundamental channel and demodulation of radio configuration 6, 7, 8, or 9, set up a call using fundamental channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 14 through 16.
- 10) If the mobile station supports the radio configuration 5 reverse dedicated control channel and demodulation of radio configuration 6, 7, 8, or 9, set up a call using dedicated control channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and 100 % frame activity and perform steps 14 through 16.
- 11) If the mobile station supports the radio configuration 5 reverse fundamental channel, radio configuration 5 reverse dedicated control channel and demodulation of radio configuration 6, 7, 8 or 9, set up a call using fundamental channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 1 500 bit/s fundamental channel data rate only and 9 600 bit/s dedicated control channel with 100 % frame activity, and perform steps 14 through 16.
- 12) If the mobile station supports the radio configuration 5 reverse fundamental channel, radio configuration 5 reverse supplemental Channel 0 and demodulation of radio configuration 6, 7, 8 or 9, set up a call using supplemental Channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s fundamental channel and 9 600 bit/s supplemental Channel 0 data rate, and perform steps 17 through 26.

- 13) If the mobile station supports the radio configuration 5 reverse dedicated control channel, radio configuration 5 reverse supplemental Channel 0 and demodulation of radio configuration 6, 7, 8 or 9, set up a call using supplemental Channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s dedicated control channel with 100 % frame activity and 9 600 bit/s supplemental Channel 0 data rate, and perform steps 17 through 26.
- 14) Set the test parameters as specified in table 5.3.1.1-1.
- 15) Send continuously "0" power control bits to the mobile station.
- 16) Measure the unwanted emission levels.
- 17) Set the test parameters as specified in table 5.3.1.1-2.
- 18) Send alternating "0" and "1" power control bits to the mobile station using the smallest supported closed loop power control step size supported by the mobile station.
- 19) Determine the active channel configuration. If the desired channel configuration is not active, increase  $\hat{I}_{or}$  by 1 dB and repeat this step until the desired channel configuration becomes active.
- 20) Measure the mobile station output power at the mobile station antenna connector.
- 21) Decrease  $\hat{I}_{or}$  by 0,5 dB.
- 22) Determine the active channel configuration. If the active channel configuration is the desired channel configuration, measure the mobile station output power at the mobile station antenna connector.
- 23) Repeat steps 21 and 22 until the output power no longer increases or the desired channel configuration is no longer active.
- 24) Set  $\hat{I}_{or}$  to the value at which the highest mobile station output power was achieved with the desired channel configuration active. Verify the desired channel configuration is active.
- 25) Measure the mobile station output power at the mobile station antenna connector.
- 26) Measure the spurious emission levels.

**Table 5.3.1.1-1: Test parameters for testing spurious emissions at maximum RF output power**

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1,23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7,4

**Table 5.3.1.1-2: Test parameters for testing spurious emissions at maximum RF output power**

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1,23 MHz	-86
$\text{Pilot } E_c/I_{or}$	dB	-7
$\text{Traffic } E_c/I_{or}$	dB	-7,4

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 mobile stations supporting operation in type 2 cdma2000 systems

- 1) Set the following parameters of the *AccessParameters Message* as specified in table 5.3.1.2-1.

**Table 5.3.1.2-1: Test values for parameters of the *AccessParameters Message***

Parameter	Value (Decimal)
OpenLoopAdjust	81 (-81 dB) for BC 9 84 (-84 dB) for BC 6, 8 and 13
ProbInitialAdjust	15 (15 dB)
ProbeNumStep	15 (15 probes/sequence)

- 2) Set the following fields of the *InitialConfiguration* attribute of the Default access channel MAC Protocol as specified in table 5.3.1.2-2.

**Table 5.3.1.2-2: Test values for fields of the *InitialConfiguration* attribute**

Parameter	Value (Decimal)
PowerStep	15 (7,5 dB/step)
ProbeSequenceMax	15 (15 sequences)

- 3) Connect the sector to the access terminal antenna connector as shown in 3GPP2 C.S0033-B [8], figure 8.5.1-4. The AWGN generator and the CW generator are not applicable in this test. Connect a spectrum analyser (or other suitable test equipment) to the access terminal antenna connector.
- 4) If the access terminal supports Subtype 0 or 1 Physical Layer, perform steps 6) through 9) using Subtype 0 or 1 Physical Layer.
- 5) If the access terminal supports Subtype 2 Physical Layer, perform steps 6) through 9) using Subtype 2 Physical Layer.
- 6) Set up a test application session. Open a connection. For Subtype 0 or 1 Physical Layer, configure the test application RTAP so that the reverse Data Channel rate corresponds to 153,6 kbit/s. For Subtype 2 Physical Layer, configure the test application RETAP so that the reverse Data Channel payload size corresponds to 4 096 bits with Termination Target of 4 sub-packets. Configure the test application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) so that the forward traffic channel data rate corresponds to the 2-slot version of 307,2 kbit/s, and the ACK Channel is transmitted at all the slots. Set RAB to '0' at all times.
- 7) Set  $\hat{I}_{OR}$  to -85,5 dBm/1,23 MHz.
- 8) Send continuously "0" power control bits to the access terminal.
- 9) Measure the spurious emission levels (Test 1).

The results obtained shall be compared to the limits in clauses 4.2.2.2.1 and 4.2.2.2.2 in order to prove compliance.

### 5.3.1.3 Test procedure for mobile stations supporting multicarrier HRPD operation

- 1) For an access terminal that supports Subtype 3 physical layer and two or more reverse CDMA channels, configure the access terminal to transmit on the two carriers at the maximum possible frequency separation (MaxReverseLinkBandwidth) between them.

**NOTE:** The parameter MaxReverseLinkBandwidth represents the maximum separation between the highest and lowest reverse link CDMA channels within a Band Class that can be assigned to the access terminal in units of 2,5 kHz. See table 1.9.7.1-1 in 3GPP2 C.S0024-400-C [14] for more details.

- 2) Set up a Test Application session for Subtype 3 Physical Layer. Configure the Test Application RMCTAP defined in 3GPP2 C.S0029-B [9] so that the Reverse Data Channel payload size corresponds to 4 096 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP (for Subtype 3 Physical Layer) defined in 3GPP2 C.S0029-B [9] so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307,2 kbps, and the ACK Channel is transmitted at all the slots.
- 3) Set  $\hat{I}_{or}$  to -85 dBm/1,23 MHz for each of the channels.
- 4) Send continuously "0" power control bits to the access terminal.
- 5) Measure the spurious emission levels (Test 2). Integration measurement techniques of ten or more subintervals shall be used for measurement bandwidths of 100 kHz and greater to minimize errors induced by spectrum analyzer filter response.
- 6) For an access terminal that supports Subtype 3 physical layer and two or more reverse link channels, configure the access terminal to transmit on all the adjacent reverse CDMA channels at a spacing of 1,23 MHz (for Band Class 0) and 1,25 MHz (for all other Band Classes) between the centre frequencies.
- 7) Set up a Test Application session for Subtype 3 Physical Layer. Configure the Test Application RMCTAP defined in 3GPP2 C.S0029-B [9] so that the Reverse Data Channel payload size corresponds to 4 096 bits with Termination Target of 16 slots. Configure the Test Application FMCTAP (for Subtype 3 Physical Layer) defined in 3GPP2 C.S0029-B [9] so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307,2 kbps, and the ACK Channel is transmitted at all the slots.
- 8) Set  $\hat{I}_{or}$  to -85 dBm/1,23 MHz for each of the channels.
- 9) Send continuously "0" power control bits to the access terminal.
- 10) Measure the spurious emission levels (Test 3).

The results obtained in step 5 (Test 2) and step 10 (Test 3) shall be compared to the limits in clause 4.2.2.2.3 in order to prove compliance.

## 5.3.2 Maximum RF output power

### 5.3.2.1 Test procedure for mobile stations supporting operation in type 1 cdma2000 systems

**Test environment:** standard test conditions and extreme conditions (for guidance see annex B).

- 1) Connect the Base Station to the mobile station antenna connector as shown in ANSI/TIA-98 [1], figure 6.5.1-4. The AWGN generator and the interference generator are not applicable in this test.
- 2) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 3 through 35.
- 3) If the mobile station supports reverse traffic channel radio configuration 1 and forward traffic channel radio configuration 1, set up a call using fundamental channel test mode 1 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 6 through 8.
- 4) If the mobile station supports the radio configuration 3 reverse fundamental channel and demodulation of radio configuration 3, 4, or 5, set up a call using fundamental channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 6 through 8.
- 5) If the mobile station supports the radio configuration 3 reverse dedicated control channel and demodulation of radio configuration 3, 4, or 5, set up a call using dedicated control channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate and 100 % frame activity and perform steps 6 through 8.
- 6) Set the test parameters as specified in table 5.3.2.1-1.
- 7) Send continuously "0" power control bits to the mobile station.
- 8) Measure the mobile station output power at the mobile station antenna connector.

- 9) If the mobile station supports the radio configuration 3 reverse fundamental channel, radio configuration 3 reverse dedicated control channel and demodulation of radio configuration 3, 4 or 5, set up a call using fundamental channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 1 500 bit/s fundamental channel data rate only and 9 600 bit/s dedicated control channel with 100 % frame activity, and perform steps 12 through 19.
- 10) If the mobile station supports the radio configuration 3 reverse fundamental channel, radio configuration 3 reverse supplemental Channel 0 and demodulation of radio configuration 3, 4 or 5, set up a call using supplemental Channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s fundamental channel and 9 600 bit/s supplemental Channel 0 data rate, and perform steps 12 through 19.
- 11) If the mobile station supports the radio configuration 3 reverse dedicated control channel, radio configuration 3 reverse supplemental Channel 0 and demodulation of radio configuration 3, 4 or 5, set up a call using supplemental Channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s dedicated control channel with 100 % frame activity and 9 600 bit/s supplemental Channel 0 data rate, and perform steps 12 through 19.
- 12) Set the test parameters as specified in table 5.3.2.1-2.
- 13) Send alternating "0" and "1" power control bits to the mobile station using the smallest supported closed loop power control step size supported by the mobile station.
- 14) Determine the active channel configuration. If the desired channel configuration is not active, increase  $\hat{I}_{or}$  by 1 dB and repeat this step until the desired channel configuration becomes active.
- 15) Measure the mobile station output power at the mobile station antenna connector.
- 16) Decrease  $\hat{I}_{or}$  by 0,5 dB.
- 17) Determine the active channel configuration. If the active channel configuration is the desired channel configuration, measure the mobile station output power at the mobile station antenna connector.
- 18) Repeat steps 16 and 17 until the output power no longer increases or the desired channel configuration is no longer active. Record the highest output power achieved with the desired channel configuration active.
- 19) Repeat steps 12 through 18 ten times and average the results.
- 20) If the mobile station supports the radio configuration 5 reverse fundamental channel and demodulation of radio configuration 6, 7, 8 or 9, set up a call using fundamental channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 22 through 24.
- 21) If the mobile station supports the radio configuration 5 reverse dedicated control channel and demodulation of radio configuration 6, 7, 8 or 9, set up a call using dedicated control channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and 100 % frame activity and perform steps 22 through 24.
- 22) Set the test parameters as specified in table 5.3.2.1-3.
- 23) Send continuously "0" power control bits to the mobile station.
- 24) Measure the mobile station output power at the mobile station antenna connector.
- 25) If the mobile station supports the radio configuration 5 reverse fundamental channel, radio configuration 5 reverse dedicated control channel and demodulation of radio configuration 6, 7, 8 or 9, set up a call using fundamental channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 1 500 bit/s fundamental channel data rate only and 9 600 bit/s dedicated control channel with 100 % frame activity, and perform steps 28 through 35.
- 26) If the mobile station supports the radio configuration 5 reverse fundamental channel, radio configuration 5 reverse supplemental Channel 0 and demodulation of radio configuration 6, 7, 8 or 9, set up a call using supplemental Channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s fundamental channel and 9 600 bit/s supplemental Channel 0 data rate, and perform steps 28 through 35.

- 27) If the mobile station supports the radio configuration 5 reverse dedicated control channel, radio configuration 5 reverse supplemental Channel 0 and demodulation of radio configuration 6, 7, 8, or 9, set up a call using supplemental Channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s dedicated control channel with 100 % frame activity and 9 600 bit/s supplemental Channel 0 data rate, and perform steps 28 through 35.
- 28) Set the test parameters as specified in table 5.3.2.1-4.
- 29) Send alternating "0" and "1" power control bits to the mobile station using the smallest supported closed loop power control step size supported by the mobile station.
- 30) Determine the active channel configuration. If the desired channel configuration is not active, increase  $\hat{I}_{or}$  by 1 dB and repeat this step until the desired channel configuration becomes active.
- 31) Measure the mobile station output power at the mobile station antenna connector.
- 32) Decrease  $\hat{I}_{or}$  by 0,5 dB.
- 33) Determine the active channel configuration. If the active channel configuration is the desired channel configuration, measure the mobile station output power at the mobile station antenna connector.
- 34) Repeat steps 32 and 33 until the output power no longer increases or the desired channel configuration is no longer active. Record the highest output power achieved with the desired channel configuration active.
- 35) Repeat steps 28 through 34 ten times and average the results.

**Table 5.3.2.1-1: Test parameters for maximum RF output power for spreading rate 1**

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1,23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7,4

**Table 5.3.2.1-2: Test Parameters for Maximum RF Output Power for spreading rate 1**

Parameter	Units	Value
$\hat{I}_{or}$ dBm/1,23	MHz	-86
Pilot $E_c/I_{or}$	dB	-7
Traffic $E_c/I_{or}$	dB	-7,4

**Table 5.3.2.1-3: Test parameters for maximum RF output power for spreading rate 3**

Parameter	Units	Value
$\hat{I}_{or}$	dBm/3,69 MHz	-99
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-10
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-12,4



**Table 5.3.2.1-4: Test Parameters for Maximum RF Output Power for spreading rate 3**

Parameter	Units	Value
$\hat{I}_{or}$	dBm/3,69 MHz	-81
Pilot $E_c/I_{or}$	dB	-10
Traffic $E_c/I_{or}$	dB	-12,4

The results obtained shall be compared to the limits in clause 4.2.3.2 in order to prove compliance.

### 5.3.2.2 Test procedure for mobile stations supporting operation in type 2 cdma2000 systems

Test environment: standard test conditions and extreme conditions (for guidance see annex B).

- 1) Configure all of the open loop parameters to their maximum settings. Set the following parameters of the *AccessParameters Message* as specified in table 5.3.2.2-1.

**Table 5.3.2.2-1: Test values for parameters of the *AccessParameters Message***

Parameter	Value (Decimal)
OpenLoopAdjust	81 (-81 dB) for BC 9 84 (-84 dB) for BC 6, 8 and 13
ProbInitialAdjust	15 (15 dB)
ProbeNumStep	15 (15 probes/sequence)

- 2) Set the following fields of the *InitialConfiguration* attribute of the Default access channel MAC Protocol as specified in table 5.3.2.2-2.

**Table 5.3.2.2-2: Test values for fields of the *InitialConfiguration* attribute**

Parameter	Value (Decimal)
PowerStep	15 (7,5 dB/step)
ProbeSequenceMax	15 (15 sequences)

- 3) Connect the sector to the access terminal antenna connector as shown in 3GPP2 C.S0033-B [8], figure 8.5.1-4. The AWGN generator and the CW generator are not applicable in this test.
- 4) Set up a test application session. Open a connection and configure the test application RTAP so that the reverse Data Channel rate corresponds to 153,6 kbit/s. Configure the test application FTAP so that the forward traffic channel data rate corresponds to the 2-slot version of 307,2 kbit/s, and the ACK Channel is transmitted at all the slots.
- 5) Set  $\hat{I}_{or}$  to -85,5 dBm/1,23 MHz.
- 6) Send continuously "0" power control bits to the access terminal.
- 7) Measure the access terminal output power at the access terminal antenna connector (Test 1).
- 8) For Subtype 3 physical layer, configure the access terminal to transmit on N carriers at the closest possible frequency separation between them, where N is the maximum number of carriers supported by the access terminal, not to exceed 3 carriers.
- 9) Set up a Test Application session for Subtype 3 Physical Layer. Configure the Test Application RMCTAP defined in 3GPP2 C.S0029-B [9] so that the Reverse Data Channel payload size corresponds to 4 096 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP (for Subtype 3 Physical Layer) defined in 3GPP2 C.S0029-B [9] so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307,2 kbps, and the ACK Channel is transmitted at all the slots.
- 10) Set  $\hat{I}_{or}$  to -85 dBm/1,23 MHz for each of the carriers.

- 11) Send continuously "0" power control bits to the access terminal.
- 12) Measure the mean access terminal output power at the access terminal antenna connector (Test 2).

The results obtained in step 7 (Test 1) and step 12 (Test 2) shall be compared to the limits in clause 4.2.3.2 in order to prove compliance.

### 5.3.3 Minimum controlled output power

#### 5.3.3.1 Test procedure for mobile stations supporting operation in type 1 cdma2000 systems

Test environment: standard test conditions and extreme conditions (for guidance see annex B).

- 1) Connect the Base Station to the mobile station antenna connector as shown in ANSI/TIA-98 [1], figure 6.5.1-4. The AWGN generator and the interference generator are not applicable in this test.
- 2) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 3 through 7.
- 3) If the mobile station supports demodulation of radio configuration 1, 2, 3, 4 or 5, set up a call using fundamental channel test mode 1 or 3 or dedicated control channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 5 through 7.
- 4) If the mobile station supports demodulation of radio configuration 6, 7, 8 or 9, set up a call using fundamental channel test mode 7 or control channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 5 through 7.
- 5) Set the test parameters as specified in table 5.3.3.1-1.
- 6) Send continuously "1" power control bits to the mobile station.
- 7) Measure the mobile station output power at the mobile station antenna connector.

**Table 5.3.3.1-1: Test parameters for minimum controlled output power**

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1,23 MHz	-25
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7,4

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 mobile stations supporting operation in type 2 cdma2000 systems

- 1) Connect the sector to the access terminal antenna connector as shown in 3GPP2 C.S0033-B [8], figure 8.5.1-4. The AWGN generator and the CW generator are not applicable in this test.
- 2) Set up a test application session. Open a connection and configure the test application RTAP so that the reverse Data Channel rate corresponds to 9,6 kbit/s.
- 3) Set  $\hat{I}_{or}$  to -25 dBm/1,23 MHz.

- 4) Send continuously "1" power control bits to the access terminal.
- 5) Measure the access terminal output power at the access terminal antenna connector.

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

### 5.3.4 Conducted spurious emissions when not transmitting

#### 5.3.4.1 Test procedure for mobile stations supporting operation in type 1 and/or type 2 cdma2000 systems

- 1) Connect a spectrum analyser (or other suitable test equipment) to the mobile station antenna connector.
- 2) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 3 and 4.
- 3) Enable the mobile station receiver for CDMA-only mode, so that the mobile station continuously cycles between the *System Determination Substate* and the *pilot channel Acquisition Substate* of the *Mobile Station Initialization State*. Since there is no forward CDMA Channel for this configuration, the mobile station should not pass the *pilot channel Acquisition Substate*.
- 4) Sweep the spectrum analyser over a frequency range from 30 MHz to 12,75 GHz and measure the spurious emission levels.

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 mobile stations supporting operation in type 1 cdma2000 systems

- 1) Connect the Base Station and an interfering CW tone to the mobile station antenna connector as shown in ANSI/TIA-98 [1], figure 6.5.1-4.
- 2) For all tests, forward Link Power Control shall be disabled in the Base Station.
- 3) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 4 through 16.
- 4) If the mobile station supports demodulation of radio configuration 1 or 2, set up a call using fundamental channel test mode 1 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 7 through 15.
- 5) If the mobile station supports demodulation of radio configuration 3, 4 or 5, set up a call using Fundamental test mode 1 or 3 or dedicated control channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 7 through 15.
- 6) If the mobile station supports demodulation of radio configuration 6, 7, 8 or 9, set up a call using Fundamental test mode 7 or dedicated control channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 7 through 15.
- 7) Set the test parameters for Test 1 as specified in table 5.3.5.1-1 and perform step 15.
- 8) Set the test parameters for Test 2 as specified in table 5.3.5.1-1 and perform step 15.
- 9) Set the test parameters for Test 3 as specified in table 5.3.5.1-1 and perform step 15.
- 10) Set the test parameters for Test 4 as specified in table 5.3.5.1-1 and perform step 15.
- 11) Set the test parameters for Test 5 as specified in table 5.3.5.1-2 and perform steps 14 and 15 using the Default CW Tone Power.

- 12) Set the test parameters for Test 6 as specified in table 5.3.5.1-2 and perform steps 14 and 15 using the Default CW Tone Power.
- 13) Set the test parameters for Test 7 as specified in table 5.3.5.1-2 and perform steps 14 and 15 using the Default CW Tone Power.
- 14) Step the CW tone frequency through each inclusive range of frequencies given for the current test in table 5.3.5.1-2 at 1 MHz intervals and perform step 15.
- 15) Count, at the Base Station, the number of frames transmitted and the number of good frames received at the mobile station.
- 16) If spurious responses occurred in Tests 6 or 7 repeat step 15 for each spurious response frequency using the Alternate CW Tone Power given in table 5.3.5.1-2.

**Table 5.3.5.1-1: Test parameters for receiver blocking characteristics (in-band)**

Parameter		Units	Test 1	Test 2	Test 3	Test 4
CW Tone Offset from Carrier	SR 1	kHz	+5 000	-5 000	+7 500	-7 500
	SR 3	kHz	+10 000	-10 000	+15 000	-15 000
CW Tone Power		dBm	-56		-44	
$\hat{I}_{or}$		dBm/1,23 MHz	-101			
$\frac{\text{Pilot } E_c}{I_{or}}$		dB	-7			
$\frac{\text{Traffic } E_c}{I_{or}}$		dB	-15,6 (SR 1) -20,6 (SR 3)			
NOTE: For the case of a spreading rate 3 system, $\hat{I}_{or}$ is the received power on each carrier.						

**Table 5.3.5.1-2: Test parameters for receiver blocking characteristics (out-of-band)**

Parameter	Units	Test 5	Test 6	Test 7
CW Tone Frequency for BC 6 operation	MHz	2 051 to 2 095 2 185 to 2 230	2 026 to 2 050 2 231 to 2 255	1 to 2 025 2 256 to 12 750
CW Tone Frequency for BC 8 operation	MHz	1 746 to 1 790 1 895 to 1 940	1 721 to 1 745 1 941 to 1 965	1 to 1 720 1 966 to 12 750
CW Tone Frequency for BC 9 operation	MHz	866 to 910 975 to 1 020	841 to 865 1 021 to 1 045	1 to 840 1 046 to 12 750
CW Tone Frequency for BC 13 operation	MHz	2 571 to 2 605 2 706 to 2 750	Not applicable 2 751 to 2 775	1 to 2 570 2 776 to 12 750
Default CW Tone Power	dBm	-44	-30	-15
Alternate CW Tone Power	dBm	-	-44	-44
$\hat{I}_{or}$	dBm/1,23 MHz	-101		
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7		
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-15,6 (SR 1) -20,6 (SR 3)		
NOTE: For the case of a spreading rate 3 system, $\hat{I}_{or}$ is the received power on each carrier.				

The results obtained shall be compared to the limits in clause 4.2.6.2 in order to prove compliance.

### 5.3.5.2 Test procedure for mobile stations supporting operation in type 2 cdma2000 systems

- 1) Connect the sector and an interfering CW tone to the access terminal connector as shown in 3GPP2 C.S0033-B [8], figure 8.5.1-4.

- 2) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 3 through 13.
- 3) Set up a test application session. Open a connection and configure the test application FTAP so that the forward traffic channel rate corresponds to the 2-slot version of 307,2 kbit/s.
- 4) Set the test parameters for Test 1 as specified in table 5.3.5.2-1 and perform step 12.
- 5) Set the test parameters for Test 2 as specified in table 5.3.5.2-1 and perform step 11.
- 6) Set the test parameters for Test 3 as specified in table 5.3.5.2-1 and perform step 11.
- 7) Set the test parameters for Test 4 as specified in table 5.3.5.2-1 and perform step 11.
- 8) Set the test parameters for Test 5 as specified in table 5.3.5.2-2 and perform steps 10 and 11 using the Default CW Tone Power.
- 9) Set the test parameters for Test 6 as specified in table 5.3.5.2-2 and perform steps 10 and 11 using the Default CW Tone Power.
- 10) Set the test parameters for Test 7 as specified in table 5.3.5.2-2 and perform steps 10 and 11 using the Default CW Tone Power.
- 11) Step the CW tone frequency through each inclusive range of frequencies given for the current test in table 5.3.5.2-2 at 1 MHz intervals and perform step 11.
- 12) From the number of packets transmitted and the number of bad packets received calculate the PER for this test.
- 13) If spurious responses occurred in Tests 6 or 7 repeat step 11 for each spurious response frequency using the Alternate CW Tone Power given in table 5.3.5.2-2.

**Table 5.3.5.2-1: Test parameters for receiver blocking characteristics (in-band)**

Parameter	Units	Test 1	Test 2	Test 3	Test 4
CW Tone Offset From Carrier	kHz	+5 000	-5 000	+7 500	-7 500
CW Tone Power	dBm	-56		-44	
$\hat{I}_{or}$	dBm/1,23 MHz	-102,5			

**Table 5.3.5.2-2: Test parameters for receiver blocking characteristics (out-of-band)**

Parameter	Units	Test 5	Test 6	Test 7
CW Tone Frequency for BC 6 operation	MHz	2 051 to 2 095 2 185 to 2 230	2 026 to 2 050 2 231 to 2 255	1 to 2 025 2 256 to 12 750
CW Tone Frequency for BC 8 operation	MHz	1 746 to 1 790 1 895 to 1 940	1 721 to 1 745 1 941 to 1 965	1 to 1 720 1 966 to 12 750
CW Tone Frequency for BC 9 operation	MHz	866 to 910 975 to 1 020	841 to 865 1 021 to 1 045	1 to 840 1 046 to 12 750
CW Tone Frequency for BC 13 operation	MHz	2 571 to 2 605 2 706 to 2 750	Not applicable 2 751 to 2 775	1 to 2 570 2 776 to 12 750
Default CW Tone Power	dBm	-44	-30	-15
Alternate CW Tone Power	dBm	-	-44	-44
$\hat{I}_{or}$	dBm/1,23 MHz	-102,5		

The results obtained shall be compared to the limits in clause 4.2.6.4 in order to prove compliance.

### 5.3.6 Intermodulation spurious response attenuation

#### 5.3.6.1 Test procedure for mobile stations supporting operation in type 1 cdma2000 systems

- 1) Connect the Base Station and two interfering CW tones to the mobile station antenna connector as shown in ANSI/TIA-98 [1], figure 6.5.1-4.
- 2) For all tests, forward traffic channel closed loop power control shall be disabled in the Base Station simulator.
- 3) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 4 through 8.
- 4) If the mobile station supports demodulation of radio configuration 1,2,3, 4 or 5, set up a call using fundamental channel test mode 1 or 3 or dedicated control channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 6 through 8.
- 5) If the mobile station supports demodulation of radio configuration 6, 7, 8 or 9, set up a call using fundamental channel test mode 7 or dedicated control channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 6 through 8.
- 6) Set the test parameters for Test 1 as specified in table 5.3.6.1-1 and perform step 8.
- 7) Set the test parameters for Test 2 as specified in table 5.3.6.1-1 and perform step 8.
- 8) Count, at the Base Station, the number of frames transmitted and the number of good frames received at the mobile station.

**Table 5.3.6.1-1: Test Parameters for intermodulation spurious response attenuation (Tests 1 and 2)**

Parameter		Units	Test 1	Test 2
Tone 1 Offset from Carrier	SR 1	MHz	+2,5	-2,5
	SR 3	MHz	+5	-5
Tone 1 Power	SR 1	dBm		-48
	SR 3	dBm		-46
Tone 2 Offset from Carrier	SR 1	MHz	+4,9	-4,9
	SR 3	MHz	+9,7	-9,7
Tone 2 Power	SR 1	dBm		-48
	SR 3	dBm		-46
$I_{or}$		dBm/ 1,23 MHz		-101
$\frac{Pilot E_C}{I_{or}}$		dB		-7
$\frac{Traffic E_C}{I_{or}}$		dB	-15,6 (SR 1) -20,6 (SR 3)	
NOTE: For the case of a spreading rate 3 system, $I_{or}$ is the received power on each carrier. When operating a spreading rate 3 system that is overlaid on a spreading rate 1 carrier, the spreading rate 1 intermodulation tests shall not apply.				

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 mobile stations supporting operation in type 2 cdma2000 systems

- 1) Connect the sector and two interfering CW tones to the access terminal antenna connector as shown in 3GPP2 C.S0033-B [8], figure 8.5.1-4.
- 2) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 3 through 6.

- 3) Set up a test application session. Open a connection and configure the test application FTAP so that the forward traffic channel rate corresponds to the 2-slot version of 307,2 kbit/s.
- 4) Set the test parameters for Test 1 as specified in table 5.3.6.2-1 and perform step 6.
- 5) Set the test parameters for Test 2 as specified in table 5.3.6.2-1 and perform step 6.
- 6) From the number of packets transmitted and the number of bad packets received calculate the PER for this test.

**Table 5.3.6.2-1: Test Parameters for Intermodulation Spurious Response Attenuation (Tests 1 and 2)**

Parameter	Units	Test 1	Test 2
Tone 1 Offset from Carrier	MHz	+2,5	-2,5
Tone Power 1	dBm	-48	
Tone 2 Offset from Carrier	MHz	+4,9	-4,9
Tone Power 2	dBm	-48	
$\hat{I}_{or}$	dBm/1,23 MHz	-102,4	

The results obtained shall be compared to the limits in clause 4.2.7.2.2 in order to prove compliance.

## 5.3.7 Adjacent channel selectivity

### 5.3.7.1 Test procedure for mobile stations supporting operation in type 1 cdma2000 systems

- 1) Connect the Base Station and an interfering CDMA signal to the mobile station antenna connector as shown in ANSI/TIA-98 [1], figure 6.5.1-4. The modulated interference shall be a signal modulated with a combination of Pilot, Sync, Paging and traffic channels as specified in table 5.3.7.1-1. The source shall be radio configuration 3 with full rate traffic channels for spreading rate 1 tests, and radio configuration 6 with full rate traffic channels for spreading rate 3 tests.
- 2) For all tests, forward traffic channel closed loop power control should be disabled in the Base Station simulator.
- 3) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 4 through 9.
- 4) If the mobile station supports demodulation of radio configuration 1 or 2, set up a call using fundamental channel test mode 1 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 7 and 8.
- 5) If the mobile station supports demodulation of radio configuration 3, 4, or 5, set up a call using fundamental channel test mode 1 or 3 or dedicated control channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 7 and 8.
- 6) If the mobile station supports demodulation of radio configuration 6, 7, 8 or 9, set up a call using fundamental channel test mode 7 or dedicated control channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 7 and 8.
- 7) Set the test parameters for Test 1 as specified in table 5.3.7.1-2 and perform step 9.
- 8) Set the test parameters for Test 2 as specified in table 5.3.7.1-2 and perform step 9.
- 9) Count, at the Base Station, the number of frames transmitted and the number of good frames received at the mobile station.

Table 5.3.7.1-1: Configuration for interference source

Channel type	Number of Channels	Fraction of Power (linear)	Fraction of Power (dB)	Comments
forward Pilot	1	0,2000	-7,0	Code $W_0^{128}$
Sync	1	0,0471	-13,3	Code channel $W_{32}^{64}$ ; always 1/8 rate
Paging	1	0,1882	-7,3	Code channel $W_1^{64}$ ; full rate only
Traffic	6	0,09412	-10,3	Variable code channel assignments; full rate only

NOTE: The code channels are defined in 3GPP2 C.S0002-E [2], clause 2.1.3.1.8.

Table 5.3.7.1-2: Test parameters for adjacent channel selectivity

Parameter	Units	Tests 1	Tests 2
Adjacent CDMA Channel Offset from Carrier	SR 1	+2,5	-2,5
	SR 3	+5,0	-5,0
Interference Source, modulated source	dBm/1,23 MHz	-37 (SR 1)	
	dBm/3,69 MHz	-50 (SR 3)	
$\hat{I}_{or}$	dBm/1,23 MHz	-101	
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7	
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-15,6 (SR 1)	
		-20,6 (SR 3)	

NOTE: For the case of a spreading rate 3 system,  $\hat{I}_{or}$  is the received power on each carrier.

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 mobile stations supporting operation in type 2 cdma2000 systems

- 1) Connect the sector and an interfering HRPD signal to the access terminal antenna connector as shown in 3GPP2 C.S0033-B [8], figure 8.5.1-5.
- 2) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 3 through 8.
- 3) Set up a test application session. Open a connection and configure the test application FTAP so that the forward traffic channel rate corresponds to the 2-slot version of 307,2 kbit/s.
- 4) Set the test parameters for Test 1 as specified in table 5.3.7.2-1 and perform step 6.
- 5) Set the test parameters for Test 2 as specified in table 5.3.7.2-1 and perform step 6.
- 6) From the number of packets transmitted and the number of bad packets received calculate the PER for this test.
- 7) Connect the sector and an interfering CDMA signal to the access terminal antenna connector as shown in 3GPP2 C.S0033-B [8], figure 8.5.1-5.
- 8) Repeat steps 2 through 6.



**Table 5.3.7.2-1: Test Parameters for Adjacent Channel Selectivity**

Parameter	Units	Test 1	Test 2
Adjacent HRPD Channel or CDMA Channel Offset from Carrier	MHz	+2,5	-2,5
Adjacent HRPD Channel or CDMA Channel Power	dBm	-37	
$\hat{I}_{or}$	DBm/1,23 MHz	-102,4	

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

### 5.3.8 Supervision of paging channel or Forward Common Control Channel

NOTE: Applicable to mobile station operating in type 1 cdma2000 systems.

- 1) Connect the Base Station to the mobile station antenna connector as shown in ANSI/TIA-98 [1], figure 6.5.1-4. The AWGN generator and the interference generator are not applicable in this test.
- 2) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 3 through 17.
- 3) Set the Base Station to ignore all access attempts.
- 4) Set the Base Station to disable access entry handoff, access probe handoff and access handoff.
- 5) Set the test parameters as specified in table 5.3.8-3.
- 6) Set the following parameters of the access parameters message to the value specified table 5.3.8-1.

**Table 5.3.8-1: Access parameters message**

Parameter	Value (Decimal)
NUM_STEP	15 (16 probes/sequence)
MAX_RSP_SEQ	15 (15 sequences)

- 7) Set the Base Station to send at least one valid message in every paging channel slot.
- 8) Send a page to the mobile station on the paging channel.
- 9) Wait for two seconds and disable the paging channel.
- 10) Monitor the mobile station output power (Test 1).
- 11) If the mobile station supports the Forward Common Control Channel, perform steps 12 through 17.
- 12) Set the test parameters as specified in table 5.3.8-4.
- 13) Set the following parameters of the Enhanced Access Parameters Message to the value specified in table 5.3.8-2.

**Table 5.3.8-2: Enhanced access parameters message**

Parameter	Value (Decimal)
EACH_NUM_STEP	15 (16 probes/sequence)
MAX_RSP_SEQ	15 (15 sequences)

- 14) Set the Base Station to send at least one valid message in every Forward Common Control Channel slot.
- 15) Send a page to the mobile station on the Forward Common Control Channel.

- 16) Wait for two seconds and then disable both the Forward Common Control Channel and Broadcast Control Channel.
- 17) Monitor the mobile station output power (Test 2).

**Table 5.3.8-3: Test parameters for supervision of paging channel**

Parameter	Units	Value
$I_{or}$	dBm/1,23 MHz	-55
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Paging } E_c}{I_{or}}$	dB	-16
PCH Data Rate	bit/s	9 600

**Table 5.3.8-4: Test parameters for supervision of forward common control channel**

Parameter	Units	Value
$I_{or}$	dBm/1,23 MHz	-55
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{BCCH } E_c}{I_{or}}$	dB	-15,7 (Rate = 1/4) or -15,2 (Rate = 1/2)
$\frac{\text{FCCCH } E_c}{I_{or}}$	dB	-13,0 (Rate = 1/4) or -12,6 (Rate = 1/2)
BCCH Data Rate	bit/s	9 600 (80 ms)
FCCCH Data Rate	bit/s	19 200 (20 ms)

The results obtained shall be compared to the limits in clause 4.2.9.2 in order to prove compliance.

### 5.3.9 Supervision of forward traffic channel

NOTE: Applicable to mobile station operating in type 1 cdma2000 systems.

This test shall be performed on the forward fundamental channel and the forward dedicated control channel if they are supported. The test shall be performed separately for each supported channel. During this test PUF, CDMA Candidate Frequency searches, Analogue searches, and GPS measurements shall be disabled.

- 1) Connect the Base Station to the mobile station antenna connector as shown in ANSI/TIA-98 [1], figure 6.5.1-4. The AWGN generator and the interference generator are not applicable in this test.
- 2) For each band class that the mobile station supports, configure the mobile station to operate in that band class and perform steps 3 through 7.
- 3) If the mobile station supports demodulation of radio configuration 1 or 2 and does not support demodulation of radio configuration 3, set up a call using fundamental channel test mode 1 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 8 through 15.
- 4) If the mobile station supports the fundamental channel and demodulation of radio configuration 3, 4 or 5, set up a call using fundamental channel test mode 1 or 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 8 through 15.
- 5) If the mobile station supports the dedicated control channel and demodulation of radio configuration 3, 4 or 5, set up a call using dedicated control channel test mode 3 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate and 20 ms frame length and perform steps 8 through 19.

- 6) If the mobile station supports the fundamental channel and demodulation of radio configuration 6, 7, 8 or 9, set up a call using fundamental channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate only and perform steps 8 through 15.
- 7) If the mobile station supports the dedicated control channel and demodulation of radio configuration 6, 7, 8 or 9, set up a call using dedicated control channel test mode 7 (see ANSI/TIA-98 [1], clause 1.3) with 9 600 bit/s data rate and 20 ms frame length and perform steps 8 through 19.
- 8) Set the Base Station simulator so as to not drop a call.
- 9) Set the test parameters as specified in table 5.3.9-1. Forward traffic channel open loop power control should be effectively disabled in the Base Station by setting identical the outer loop setpoint values while achieving the specified test conditions.
- 10) Send the forward fundamental channel with 9 600 bit/s data rate only or the forward dedicated control channel with power control bits but no data (i.e. F-DCCH frame activity = 0 %).
- 11) Disable the transmission on the forward fundamental channel or the forward dedicated control channel starting at a frame boundary for exactly  $12 \times 0,02$  s. When transmission is re-enabled, send the forward fundamental channel with 9 600 bit/s data rate only or the forward dedicated control channel with 9 600 bit/s data rate (i.e. F-DCCH frame activity = 100 %).
- 12) Monitor the mobile station output power (Test 1).
- 13) Set the test parameters as specified in table 5.3.9-1.
- 14) Disable and enable, on an alternating frame-by-frame basis, the transmission of the forward fundamental channel or the forward dedicated control channel frames for at least 5 s starting at the beginning of the first disabled forward traffic channel frame.
- 15) Monitor the mobile station output power (Test 2).
- 16) If the mobile station supports the dedicated control channel, set up a call using the same dedicated control channel test mode used in Tests 1 and 2.
- 17) Set the test parameters as specified in table 5.3.9-1.
- 18) Send 100 frames with power control bits only, but no data on the forward dedicated control channel (i.e. frame activity = 0 %), starting at a forward traffic channel frame boundary.
- 19) Monitor the mobile station output power (Test 3).

**Table 5.3.9-1: Test parameters for supervision of forward traffic channel**

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1,23 MHz	-75
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-16

The results obtained shall be compared to the limits in clause 4.2.10.2 in order to prove compliance.

### 5.3.10 Supervision of control channel

NOTE: Applicable to mobile stations operating in type 2 cdma2000 systems.

- 1) Connect the sector to the access terminal antenna connector as shown in 3GPP2 C.S0033-B [8], figure 8.5.1-4. The AWGN generator and the CW generator are not applicable in this test.
- 2) Set  $\hat{I}_{or}$  to -75 dBm.

**Test 1:**

- 3) Set the access network to ignore all access attempts.
- 4) Set the parameter ProbeNumStep to 15 (15 probes/sequence) in the AccessParameters Message.
- 5) Send a page to the access terminal.
- 6) Wait for at least two seconds and disable the Control Channel right after a Control Channel capsule has been sent.
- 7) Monitor the access terminal's output power.

**Test 2:**

- 8) Open a connection.
- 9) Wait for at least two seconds and disable the Control Channel right after a Control Channel capsule has been sent.
- 10) Monitor the access terminal's output power.
- 11) The results obtained shall be compared to the limits in clause 4.2.11 in order to prove compliance.

### 5.3.11 Supervision procedures in variable rate state

NOTE: Applicable to mobile station operating in type 2 cdma2000 systems.

- 1) Connect the sector to the access terminal antenna connector as shown 3GPP2 C.S0033-B [8], figure 8.5.1-4. The AWGN generator and the CW generator are not applicable in this test.
- 2) Set  $\hat{I}_{or}$  to -75 dBm.
- 3) Set DRCLength to "1" (1 slot) in the *TrafficChannelAssignment Message*.

**Test 1:**

- 4) Open a connection.
- 5) Wait for at least 2 seconds and disable the forward link.
- 6) Monitor the access terminal's output power and the access terminal's DRC values received at the access network.

**Test 2:**

- 7) Open a connection.
- 8) In the *QuickConfig Message* set the *ForwardTrafficValid* bit corresponding to the access terminal to 0.
- 9) Monitor the access terminal's output power.

The results obtained shall be compared to the limits in clause 4.2.12 in order to prove compliance.

## Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT)

The HS Requirements and conformance Test specifications Table (HS-RTT) in table A-1 serves a number of purposes, as follows:

- it provides a statement of all the requirements in words and by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it provides a statement of all the test procedures corresponding to those requirements by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it qualifies each requirement to be either:
  - Unconditional: meaning that the requirement applies in all circumstances; or
  - Conditional: meaning that the requirement is dependent on the manufacturer having chosen to support optional functionality defined within the schedule.
- in the case of Conditional requirements, it associates the requirement with the particular optional service or functionality;
- it qualifies each test procedure to be either:
  - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement shall be demonstrated to be met in accordance with the referenced procedures;
  - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.

**Table A-1: HS Requirements and conformance Test specifications Table (HS-RTT)**

<b>Harmonized Standard EN 301 908-4</b>						
The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive						
<b>Requirement</b>			<b>Requirement Conditionality</b>		<b>Test Specification</b>	
<b>No</b>	<b>Description</b>	<b>Reference: Clause No</b>	<b>U/C</b>	<b>Condition</b>	<b>E/O</b>	<b>Reference: Clause No</b>
1	Conducted spurious emissions when transmitting	4.2.2	U		E	5.3.1
2	Maximum RF output power	4.2.3	U		E	5.3.2
3	Minimum controlled output power	4.2.4	U		E	5.3.3
4	Conducted spurious emissions when not transmitting	4.2.5	U		E	5.3.4
5	Receiver blocking characteristics	4.2.6	U		E	5.3.5
6	Intermodulation spurious response attenuation	4.2.7	U		E	5.3.6
7	Adjacent channel selectivity	4.2.8	U		E	5.3.7
8	Supervision of paging channel	4.2.9	C	Applicable for type 1 cdma2000 systems	E	5.3.8
9	Supervision of forward traffic channel	4.2.10	C	Applicable for type 1 cdma2000 systems	E	5.3.9
10	Supervision of control channel	4.2.11	C	Applicable for type 2 cdma2000 systems	E	5.3.10
11	Supervision procedures in variable rate state	4.2.12	C	Applicable for type 2 cdma2000 systems	E	5.3.11

**Key to columns:****Requirement:**

**No** A unique identifier for one row of the table which may be used to identify a requirement or its test specification.

**Description** A textual reference to the requirement.

**Clause Number** Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

**Requirement Conditionality:**

**U/C** Indicates whether the requirement is to be *unconditionally* applicable (U) or is *conditional* upon the manufacturers claimed functionality of the equipment (C).

**Condition** Explains the conditions when the requirement shall or shall not be applicable for a technical requirement which is classified "conditional".

**Test Specification:**

**E/O** Indicates whether the test specification forms part of the Essential Radio Test Suite (E) or whether it is one of the Other Test Suite (O).

**NOTE:** All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement. The completion of all tests classified "E" as specified with satisfactory outcomes is a necessary condition for a presumption of conformity. Compliance with requirements associated with tests classified "O" or "X" is a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

**Clause Number** Identification of clause(s) defining the test specification in the present document unless another document is referenced explicitly. Where no test is specified (that is, where the previous field is "X") this field remains blank.

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## Annex B (normative): Environmental profile and standard test conditions

### B.1 Introduction

The following clause contains a copy of the description of environmental requirements as specified in ANSI/TIA-98 [1], clause 5 and 3GPP2 C.S0033-B [8], clause 8 and a definition of standard test conditions. This should provide some guidance on how the environmental profile can be declared for the purpose of the present document.

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### B.2 CDMA environmental requirements

#### B.2.1 Temperature and power supply voltage

##### B.2.1.1 Definition

The temperature and voltage ranges denote the ranges of ambient temperature and power supply input voltages over which the mobile station will operate and meet the requirements of these standards. The ambient temperature is the average temperature of the air surrounding the mobile station. The power supply voltage is the voltage applied at the input terminals of the mobile station. The manufacturer shall specify the temperature range and the power supply voltage over which the equipment is to operate. In order to provide a convenient means for the manufacturer to express the temperature range under which the mobile station conforms to these recommended minimum standards, temperature ranges designated by letters are defined in table B.2.1.1-1.

**Table B.2.1.1-1: Temperature ranges**

Designator	Range
A	-40 °C to +70 °C
B	-30 °C to +60 °C
C	-20 °C to +50 °C
D	0 °C to +45 °C

##### B.2.1.2 Method of measurement

The mobile station shall be installed in its normal configuration (i.e. in its normal mounting arrangement fully assembled) and placed in a temperature chamber. The temperature chamber shall be stabilized at the manufacturer's highest specified operating temperature, and the mobile station shall be operated over the power supply input voltage range specified by the manufacturer or  $\pm 10\%$ , whichever is greater. With the mobile station operating, the temperature shall be maintained at the specified test temperature without forced circulation of air from the temperature chamber being directly applied to the mobile station. The measurements specified in clause B.2.1.3 shall then be performed.

Turn the mobile station off, stabilize the mobile station in the chamber at room temperature, and repeat the measurements specified in clause B.2.1.3.

Turn the mobile station off, stabilize the mobile station in the chamber at the coldest operating temperature specified by the manufacturer, and repeat the measurements specified in clause B.2.1.3.

The overall temperature range may be reduced to a lesser range than -30 °C to +60 °C if the manufacturer uses circuitry that automatically inhibits RF transmission when the temperature falls outside the lesser range specified. Measurements shall be made at the specified extremes of the manufacturer's temperature range. The manufacturer shall verify that RF transmission is inhibited outside of the specified temperature range.

### B.2.1.3 Minimum standard

The mobile station equipment shall meet all of the minimum standards specified in ANSI/TIA-98 [1], clauses 3 and 4 under the standard environmental test conditions specified in ANSI/TIA-98 [1], clause 6.2 for all supported band classes. Over the ambient temperature and power supply ranges specified by the manufacturer, the operation of the mobile station equipment shall meet the following minimum standards for all supported band classes unless noted otherwise:

- 1) Receiver sensitivity and dynamic range as specified in ANSI/TIA-98 [1], clause 3.5.1.3. The received CDMA power,  $\hat{I}_{or}$ , used to measure receiver sensitivity may be increased 2 dB at 60 °C and higher.
- 2) Frequency accuracy as specified in ANSI/TIA-98 [1], clause 4.1.3.
- 3) Waveform quality as specified in ANSI/TIA-98 [1], clause 4.3.4.3.
- 4) Range of estimated open loop output power as specified in ANSI/TIA-98 [1], clause 4.4.1.3. For temperatures outside of the range +15 °C to +35 °C, the test tolerance lower limit may be relaxed to -12,5 dB.
- 5) Range of closed loop correction as specified in ANSI/TIA-98 [1], clause 4.4.4.3.
- 6) Maximum RF output power as specified in ANSI/TIA-98 [1], clause 4.4.5.3. For Temperature Range Designators A and B, the eirp for a Class II through V mobile station may drop by 2 dB at 60 °C and higher. These temperature range backoff allowances are in addition to the test mode configuration backoff allowances specified in ANSI/TIA-98 [1], clause 4.4.5.3-2. These requirements do not apply other than for coldest, room and highest operating temperature test points.
- 7) Minimum controlled output power as specified in ANSI/TIA-98 [1], clause 4.4.6.3.
- 8) Conducted spurious emissions as specified in ANSI/TIA-98 [1], clause 4.5.1.3.

## B.2.2 High humidity

### B.2.2.1 Definition

The term "high humidity" denotes the relative humidity at which the mobile station will operate with the specified performance.

### B.2.2.2 Method of measurement

The mobile station, after having operated normally under standard test conditions, shall be placed, inoperative (i.e. switched off), in a humidity chamber with the humidity maintained at 0,024 gm H<sub>2</sub>O/gm Dry Air at 50 °C (40 % Relative Humidity) for a period of not less than eight hours. The measurements specified in ANSI/TIA-98 [1], clause 3.5.1 (receiver sensitivity and dynamic range) and ANSI/TIA-98 [1], clause 4.3.2 (waveform quality) shall then be performed. No readjustment of the mobile station shall be allowed during this test.

Turn the mobile station off, stabilize the mobile station in the chamber at standard conditions within six hours, and perform the measurements specified in ANSI/TIA-98 [1], clauses 3 and 4.

### B.2.2.3 Minimum standard

The mobile station equipment shall meet the minimum standards specified in ANSI/TIA-98 [1], clauses 3.5.1.3 and 4.3.2.3 under the high humidity conditions. Once stabilized in standard conditions, the mobile station shall meet all the minimum standards specified in ANSI/TIA-98 [1], clauses 3 and 4.



## B.2.3 Vibration stability

### B.2.3.1 Definition

Vibration stability is the ability of the mobile station to maintain specified mechanical and electrical performance after being vibrated.

### B.2.3.2 Method of measurement

Sinusoidal vibration at 1,5 g acceleration swept through the range of 5 Hz to 500 Hz at the rate of 0,1 octave/s shall be applied to the mobile station in three mutually perpendicular directions (sequentially) for a single sweep rising in frequency followed by a single sweep falling in frequency.

### B.2.3.3 Minimum standard

The mobile station equipment shall meet all the minimum standards specified in ANSI/TIA-98 [1], clauses 3 and 4 after being subjected to the above vibration tests.

## B.2.4 Shock stability

### B.2.4.1 Definition

Shock stability is the ability of the mobile station to maintain specified mechanical and electrical performance after being shocked.

### B.2.4.2 Method of measurement

The mobile station shall be subjected to three test table impacts, in three mutually perpendicular directions and their negatives, for a total of 18 impacts. In all cases, the mobile station shall be secured to the test table by its normal mounting hardware. Each impact shall be a half sine wave, lasting from 7 ms to 11 ms, with at least 20 g peak acceleration.

### B.2.4.3 Minimum standard

The mobile station equipment shall meet all the minimum standards specified in ANSI/TIA-98 [1], clauses 3 and 4 and shall not suffer any mechanical damage after being subjected to the above shock tests.

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## B.3 Standard test conditions

### B.3.1 Standard environmental test conditions

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

Temperature:	5 °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).

## B.3.2 Standard conditions for the primary power supply

### B.3.2.1 General

The standard test voltages should be those specified by the manufacturer, or an equivalent type that duplicates the voltage, impedance, and ampere hours (if relevant for the measurement) of the recommended supply.

### B.3.2.2 Standard DC test voltage from accumulator batteries

The standard (or nominal) DC test voltage specified by the manufacturer should 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 or may be in a state of discharge when the equipment is being operated, the manufacturer should also test the equipment at anticipated voltage extremes above and below the standard voltage. The test voltages should not deviate from the stated values by more than  $\pm 2$  % during a series of measurements carried out as part of a single test on the same equipment.

### B.3.2.3 Standard AC voltage and frequency

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

The equipment should operate without degradation with input voltage variations of up to  $\pm 10$  %, and should 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 should be specified by the manufacturer.

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

The enlargement of the European Union (EU) resulted in a requirement from the EU for a larger number of languages for the translation of the titles of Harmonized Standards and mandated ENs that are to be listed in the Official Journal to support the implementation of this legislation.

For this reason the title translation concerning the present document can be consulted via the [e-approval](#) application.

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## Annex D (informative): Bibliography

ETSI TR 100 028 (V1.4.1): "Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

TIA/EIA-126-D (2001): "Loopback Service Options (LSO) for cdma2000 Spread Spectrum Systems".

Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC (EMC Directive).

Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).

CEPT/ERC/REC 74-01E (Siófok 1998, Nice 1999, Sesimbra 2002, Hradec Kralove 2005): "Unwanted Emissions in the Spurious Domain".

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## History

<b>Document history</b>		
V1.1.1	January 2002	Publication
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