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Candidate Harmonized European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 4: Harmonized standard for IMT-2000, CDMA Multi-Carrier (cdma2000) (UE) covering essential requirements of article 3.2 of the R&TTE Directive

Reference

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Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document is part 4 of a multi-part deliverable covering the Base Stations (BS) and User Equipment (UE) for IMT-2000 Third-Generation cellular networks, as identified below:

Part 1: "Harmonized standard for IMT-2000, Introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive";

Part 2: "Harmonized standard for IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 3: "Harmonized standard for IMT-2000, CDMA Direct Spread (UTRA FDD) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 4: "Harmonized standard for IMT-2000, CDMA Multi-Carrier (cdma2000) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 5: "Harmonized standard for IMT-2000, CDMA Multi-Carrier (cdma2000) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 6: "Harmonized standard for IMT-2000, CDMA TDD (UTRA TDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 7: "Harmonized standard for IMT-2000, CDMA TDD (UTRA TDD) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 8: "Harmonized standard for IMT-2000, TDMA Single-Carrier (UWC 136) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 9: "Harmonized standard for IMT-2000, TDMA Single-Carrier (UWC 136) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";

Part 10: "Harmonized standard for IMT-2000 FDMA/TDMA (DECT) covering essential requirements of article 3.2 of the R&TTE Directive".

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

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

Proposed national transposition dates	
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

Introduction

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

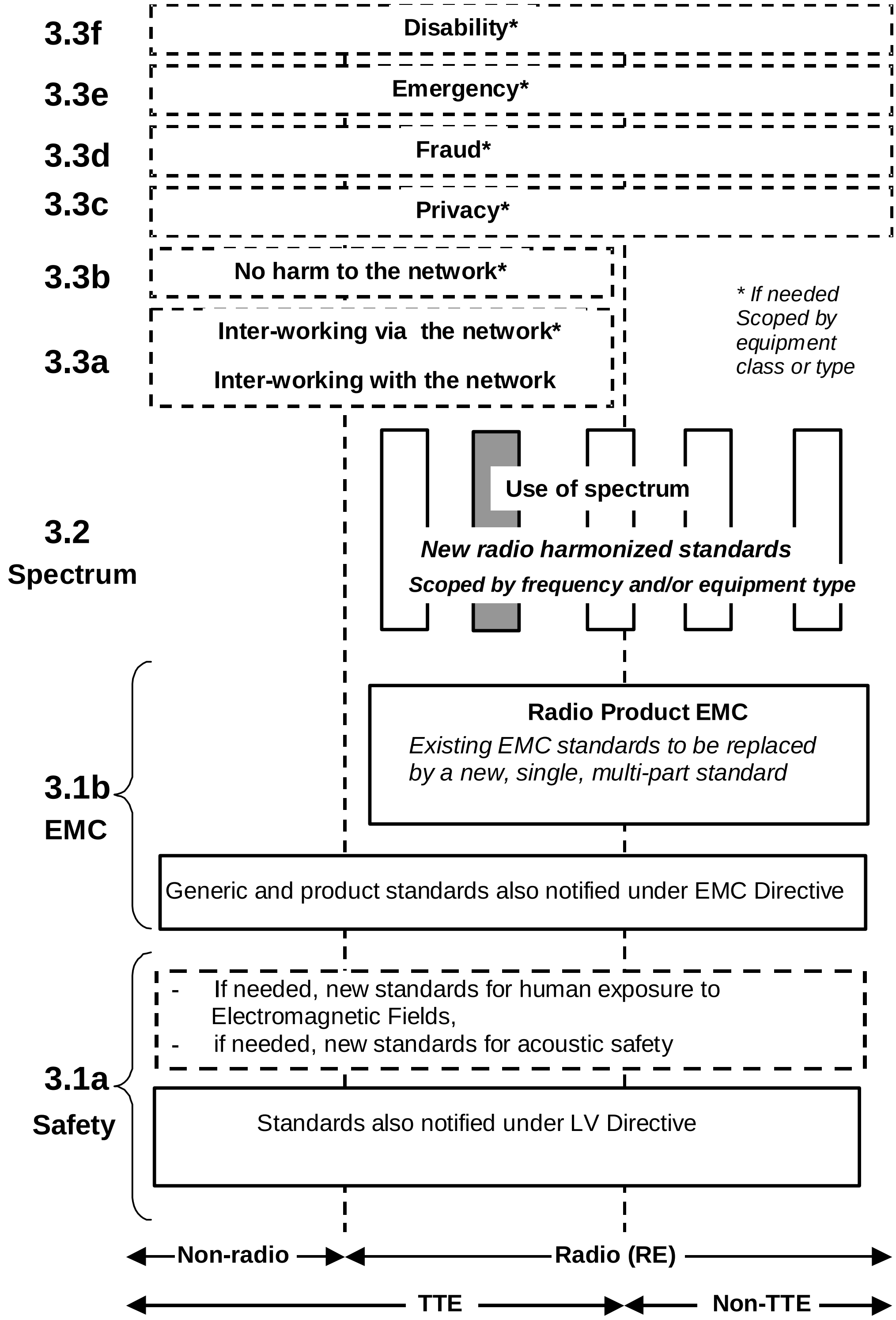

Figure 1: Modular structure for the various standards used under the R&TTE Directive

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

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

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

For article 3.1b the diagram shows EN 301 489 [10], the multi-part product EMC standard for radio, and the existing collection of generic and product standards currently used under the EMC Directive [2].

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

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

The modularity principle has been taken because:

- it minimizes the number of standards needed. Because equipment may, in fact, have multiple interfaces and functions it is not practicable to produce a single standard for each possible combination of functions that may occur in an equipment;
- it provides scope for standards to be added:
  - under article 3.2 when new frequency bands are agreed; or
  - under article 3.3 should the Commission take the necessary decisions,

  without requiring alteration of standards that are already published;
- it clarifies, simplifies and promotes the usage of Harmonized Standards as the relevant means of conformity assessment.

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

1 Scope

The present document applies to the following radio equipment type:

- Mobile stations for IMT-2000 CDMA Multi-Carrier (cdma2000).

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

Table 1: CDMA Multi-Carrier mobile stations service frequency bands

Direction of transmission	CDMA Multi-Carrier mobile stations service frequency bands
Transmit	1 920 MHz to 1 980 MHz
Receive	2 110 MHz to 2 170 MHz

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

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

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

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply.

[1] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).

[2] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).

[3] Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).

[4] TIA/EIA/98-D: "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations", 2001.

[5] TIA/EIA/IS-2000.2-A-1: "Physical Layer Standard for cdma2000 Spread Spectrum Systems", October 2000.

[6] TIA/EIA/97-D: "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations", 2001.

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

[8] TIA/EIA/IS-870: "Test Data Service Option (TDSO) for cdma2000 Spread Spectrum Systems", 2001.

[9] TIA/EIA/IS-871: "Markov Service Option (MSO) for cdma2000 Spread Spectrum Systems", 2001.

[10] ETSI EN 301 489: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [1], and the followingapply.

Access Attempt: sequence of one or more access probe sequences on the Access Channel or Enhanced Access Channel containing the same message
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
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 bps rate

Access Probe: One Access Channel transmission consisting of a preamble and a message
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
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.

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 1 9 600 bps primary traffic only, with bit errors
See also Good Frame.

Band Class: set of frequency channels and a numbering scheme for these channels
Band classes are defined in TIA/EIA/98-D [4], clause 3.1, and TIA/EIA/97-D [6], clause 3.1.

Band Class 6: Frequencies as identified in table 1.

Base Station: fixed station used for communicating with mobile stations
Depending upon the context, the term base station may refer to a cell, a sector within a cell, an MSC, or other part of the wireless system. See also MSC.

Basic Access Mode: mode used on the Enhanced Access Channel where a mobile station transmits an Enhanced Access Channel preamble and Enhanced Access data in a method similar to that used on the Access Channel

Broadcast Control Channel: code channel in a Forward CDMA Channel used for transmission of control information from a base station to a mobile station

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

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

CDMA Channel Number: 11-bit number corresponding to the center of the CDMA frequency assignment

CDMA Frequency Assignment: 1,23 MHz segment of spectrum
For Band Class 0, the channel is centered on one of the 30 kHz channels. For Band Classes 1, 4, 6, 7, 8, and 9, the channel is centered on one of the 50 kHz channels. For Band Classes 2 and 3, the channel is centered on one of the 25 kHz channels. For Band Class 5, the channel is centered on one of the 20 kHz or 25 kHz channels.

CDMA Preferred Set: set of CDMA channel numbers in a CDMA system corresponding to frequency assignments that a mobile station will normally search to acquire a CDMA Pilot Channel

Code Channel: subchannel of a Forward CDMA Channel or Reverse CDMA Channel
Each subchannel uses an orthogonal Walsh function or quasi-orthogonal function.

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

Code Symbol: output of an error-correcting encoder. Information bits are input to the encoder and code symbols are output from the encoder
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
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
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
For the case of DTX operation on the Forward Dedicated Control Channel, the Forward Power Control Subchannel is still transmitted.

Effective Isotropic Radiated Power: product of the power supplied to the antenna and the antenna gain in a direction relative to an isotropic antenna

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
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

Forward CDMA Channel: CDMA Channel from a base station to mobile stations
The Forward CDMA Channel contains one or more code channels that are transmitted on a CDMA frequency assignment using a particular pilot PN offset.

Forward Common Control Channel: control channel used for the transmission of digital control information from a base station to one or more mobile stations

Forward Dedicated Control Channel: portion of a Radio Configuration 3 through 9 Forward Traffic Channel used for the transmission of higher-level data, control information, and power control information from a base station to a mobile station

Forward Fundamental Channel: portion of a Forward Traffic Channel which carries a combination of higher-level data and power control information

Forward Pilot Channel: unmodulated, direct-sequence spread spectrum signal transmitted continuously by each CDMA base station
The Pilot Channel allows a mobile station to acquire the timing of the Forward CDMA Channel, provides a phase reference for coherent demodulation, and provides means for signal strength comparisons between base stations for determining when to handoff.

Forward Power Control Subchannel: subchannel on the Forward Fundamental Channel or Forward Dedicated Control Channel used by the base station to control the power of a mobile station when operating on the Reverse Traffic Channel

Forward Supplemental Channel: portion of a Radio Configuration 3 through 9 Forward Traffic Channel which operates in conjunction with a Forward Fundamental Channel or a Forward Dedicated Control Channel in that Forward Traffic Channel to provide higher data rate services, and on which higher-level data is transmitted

Forward Supplemental Code Channel: portion of a Radio Configuration 1 and 2 Forward Traffic Channel which operates in conjunction with a Forward Fundamental Channel in that Forward Traffic Channel to provide higher data rate services, and on which higher-level data is transmitted

Forward Traffic Channel: One or more code channels used to transport user and signaling traffic from the base station to the mobile station
See Forward Fundamental Channel, Forward Dedicated Control Channel, Forward Supplemental Channel, and Forward Supplemental Code Channel.

Frame: basic timing interval in the system
For the Sync Channel, a frame is 26,666... ms long. For the Access Channel, the Paging Channel, the Broadcast Channel, the Forward Supplemental Code Channel, and the Reverse Supplemental Code Channel, a frame is 20 ms long. For the Forward Supplemental Channel and the Reverse Supplemental Channel, a frame is 20 ms, 40 ms, or 80 ms long. For the Enhanced Access Channel, the Forward Common Control Channel, and the Reverse Common Control Channel, a frame is 5 ms, 10 ms, or 20 ms long. For the Forward Fundamental Channel, Forward Dedicated Control Channel, Reverse Fundamental Channel, and Reverse Dedicated Control Channel, a frame is 5 ms or 20 ms long. For the Common Assignment Channel, a frame is 5 ms long.

Frame Activity: ratio of the number of active frames to the total number of frames during channel operation

Frame Error Rate: Frame Error Rate of Forward Traffic Channel
The value of Frame Error Rate may be estimated by using Service Option 2, 9, 32, 54, or 55 (see TIA/EIA/98-D [4], clause 1.3).

Frame Quality Indicator: CRC check applied to 9,6 kbps and 4,8 kbps Traffic Channel frames of Radio Configuration 1, to all Forward Traffic Channel frames for Radio Configurations 2 through 9, to all Reverse Traffic Channel frames for Radio Configurations 2 through 6, the Broadcast Channel, Common Assignment Channel, Enhanced Access Channel, and to the Reverse Common Control Channel.

Good Frame: frame not classified as a bad frame
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
Hard handoffs occur when the mobile station is transferred between disjoint Active Sets, the CDMA frequency assignment changes, the frame offset changes, or the mobile station is directed from a CDMA Traffic Channel to an analog voice channel. See also Soft Handoff.

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

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
Mobile stations include portable units (e.g., hand-held personal units) and units installed in vehicles.

Mobile Station Class: Mobile station classes define mobile station characteristics, such as slotted operation and transmission power

Mobile Switching Center: configuration of fixed equipment that provides cellular or PCS service

Non-Slotted Mode: operation mode of the mobile station in which the mobile station continuously monitors the Paging Channel

Orthogonal Channel Noise Simulator: hardware mechanism used to simulate the users on the other orthogonal channels of a Forward CDMA Channel

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

Paging Channel: code channel in a Forward CDMA Channel used for transmission of control information and pages from a base station to a mobile station

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
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-Eb/Nt curve in which the FER vertical axis is in log scale and the Eb/Nt 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-Eb/Nt curve in which the MER vertical axis is in log scale and the Eb/Nt 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
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
Different base stations are identified by different pilot PN sequence offsets.

PN Chip: One bit in the PN sequence

PN Sequence: Pseudonoise sequence
A 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
See also Power Control Bit.

Power Controlled Access Mode: mode used on the Enhanced Access Channel where a mobile station transmits an Enhanced Access preamble, an Enhanced Access header, and Enhanced Access data in the Enhanced Access probe using closed loop power control

Power Up Function: method by which the mobile station increases its output power to support location services

Preamble: see Access Channel preamble, Enhanced Access Channel preamble, Reverse Common Control Channel preamble, and Reverse Traffic Channel Preamble

Primary Paging Channel: default code channel (code channel 1) assigned for paging on a CDMA Channel

PUF Probe: One or more consecutive frames on the Reverse Traffic Channel within which the mobile station transmits the PUF pulse

PUF Pulse: Portion of PUF probe which may be transmitted at elevated output power

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

Quick Paging Channel: uncoded, spread, and On-Off-Keying (OOK) modulated spread spectrum signal sent by a base station to inform mobile stations operating in the slotted mode during the idle state whether to receive the Forward Common Control Channel or the Paging Channel starting in the next Forward Common Control Channel or Paging Channel frame

Radio Configuration: set of Forward Traffic Channel and Reverse Traffic Channel transmission formats that are characterized by physical layer parameters such as transmission rates, modulation characteristics, and spreading rate
Radio Configurations are defined in TIA/EIA/IS-2000.2-A-1 [5], clauses 2.1.3 and 3.1.3.

Received Signal Quality Indicator: Reverse Traffic Channel measure of signal quality related to the received Eb/N0
See also Eb.

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
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
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
The Reverse Common Control Channel can operate in a Reservation Access Mode or Designated Access Mode. It can be power controlled in the Reservation Access Mode or Designated Access Mode, and may support soft handoff in the Reservation Access Mode.

Reverse Common Control Channel Preamble: non-data bearing portion of the Reverse Common Control Channel sent by the mobile station to assist the base station in initial acquisition and channel estimation

Reverse Dedicated Control Channel: portion of a Radio Configuration 3 through 6 Reverse Traffic Channel used for the transmission of higher-level data and control information from a mobile station to a base station

Reverse Fundamental Channel: portion of a Reverse Traffic Channel which carries higher-level data and control information from a mobile station to a base station

Reverse Pilot Channel: unmodulated, direct-sequence spread spectrum signal transmitted continuously by a CDMA mobile station
A reverse pilot channel provides a phase reference for coherent demodulation and may provide a means for signal strength measurement.

Reverse Power Control Subchannel: subchannel on the Reverse Pilot Channel used by the mobile station to control the power of a base station when operating on the Forward Traffic Channel with Radio Configurations 3 through 9

Reverse Supplemental Channel: portion of a Radio Configuration 3 through 6 Reverse Traffic Channel which operates in conjunction with the Reverse Fundamental Channel or the Reverse Dedicated Control Channel in that Reverse Traffic Channel to provide higher data rate services, and on which higher-level data is transmitted

Reverse Supplemental Code Channel: portion of a Radio Configuration 1 and 2 Reverse Traffic Channel which operates in conjunction with the Reverse Fundamental Channel in that Reverse Traffic Channel, and (optionally) with other Reverse Supplemental Code Channels to provide higher data rate services, and on which higher-level data is transmitted

Reverse Traffic Channel: traffic channel on which data and signaling are transmitted from a mobile station to a base station
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
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 as specified in TIA/EIA/IS-870 [8].

Service Option 9: Loopback service option for Radio Configuration 2 as specified in TIA/EIA/IS-870 [8].

Service Option 30: Mobile station data loopback test mode for Multiplex Option 1 Supplemental Channel as specified in TIA/EIA/IS-870 [8].

Service Option 31: Mobile station data loopback test mode for Multiplex Option 2 Supplemental Channel as specified in TIA/EIA/IS-870 [8].

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 as specified in TIA/EIA/IS-870 [8].

Service Option 54: Markov service option for Radio Configurations 1 through 6 on the Reverse Traffic Channel and Radio Configurations 1 through 9 on the Forward Traffic Channel as specified in TIA/EIA/IS-871 [9].

Service Option 55: Loopback service option for Radio Configurations 1 through 6 on the Reverse Traffic Channel and Radio Configurations 1 through 9 on the Forward Traffic Channel as specified in TIA/EIA/IS-870 [8].

Serving 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. This handoff is characterized by commencing communications with a new base station on the same CDMA frequency assignment before terminating communications with the old base station
See Hard Handoff.

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

Spreading Rate: PN chip rate of the Forward CDMA Channel or the Reverse CDMA Channel, defined as a multiple of 1,2288 Mcps

Spreading Rate 1: Spreading Rate 1 is often referred to as "1X." A Spreading Rate 1 Forward CDMA Channel uses a single direct-sequence spread carrier with a chip rate of 1,2288 Mcps
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: Spreading Rate 3 is often referred to as "3X." 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
A Spreading Rate 3 Reverse CDMA Channel uses a single direct-sequence spread carrier with a chip rate of 3,6864 Mcps.

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

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

Valid Power Control Bit: valid power control bit is sent on the Forward Traffic Channel 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
See TIA/EIA/IS-2000.2-A-1 [5], clause 3.1.3.1.10.

Walsh Function: One of 2^N time orthogonal binary functions (note that 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:

$\frac{\textbf{BCCH } \mathbf{E_c}}{\mathbf{I_{or}}}$	The ratio of the average transmit energy-per-PN energy-per-PNchip for the Broadcast Control Channel to the total transmit power spectral density
dBc	The ratio (in dB) of the sideband power of a signal, measured in a given bandwidth at a given frequency offset from the center 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 center frequency of the CDMA signal.
dBm	A measure of power expressed in terms of its ratio (in dB) to one milliwatt
dBm/Hz	A 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	A measure of power expressed in terms of its ratio (in dB) to one watt
Eb	Energy per information bit at the base station RF input port or the mobile station antenna connector. For Radio Configurations 1 and 2, this is the energy for the Access Channel or Traffic Channel. For the Reverse Enhanced Access Channel with Radio Configurations 3 through 6, this is the energy for the Reverse Enhanced Access Channel and the Reverse Pilot Channel. For the Reverse Common Control Channel with Radio Configurations 3 through 6, this is the energy for the Reverse Common Control Channel and the Reverse Pilot Channel. For the Reverse Traffic Channel with Radio Configurations 3 through 6, this is the energy for the Reverse Traffic Channel, the Reverse Pilot Channel, and the Reverse Power Control Subchannel.
Eb/Nt	The 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}	The ratio in dB between the energy accumulated over one PN chip period (Ec) to the total transmit power spectral density
E_c/I_o	The ratio in dB between the pilot energy accumulated over one PN chip period (Ec) to the total power spectral density (Io) in the received bandwidth
$\frac{\textbf{FCACH } \mathbf{E_c}}{\mathbf{I_{or}}}$	The ratio of the average transmit energy-per-PN chip for the Forward Common Assignment Channel to the total transmit power spectral density
$\frac{\textbf{FCCCH } \mathbf{E_c}}{\mathbf{I_{or}}}$	The ratio of the average transmit energy-per-PN chip for the Forward Common Control Channel to the total transmit power spectral density
$\frac{\textbf{FCPCCH } \mathbf{E_c}}{\mathbf{I_{or}}}$	The 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 s	Indicates the channel that is associated with the Primary Reverse Power Control Subchannel and the channel (Forward Dedicated Control Channel or Forward Fundamental Channel) that includes a Forward Power Control Subchannel.
GHz	Gigahertz (10^9 Hertz)
I_o	The total received power spectral density, including signal and interference, as measured at the mobile or base station antenna connector

I_{oc}	The power spectral density of a band-limited white noise source (simulating interference from other cells) as measured at the mobile station antenna connector
I_{or}	The total transmit power spectral density of the Forward CDMA Channel at the base station antenna connector
$\hat{I}_{or}$	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)
µs.	Microsecond (10^{-6} second)
ms	Millisecond (10^{-3} second)
ns	Nanosecond (10^{-9} second)
N0	The effective inband noise or interference power spectral density
OCNS Ec	Average energy-per-PN chip for the OCNS
$\frac{\textbf{OCNS } E_c}{I_{or}}$	The ratio of the average transmit energy-per-PN chip for the OCNS to the total transmit power spectral density
Pa	Pascal
Paging Ec	Average energy-per-PN chip for the Paging Channel
$\frac{\textbf{Paging } E_c}{I_{or}}$	The 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 $\frac{E_c}{I_o}$	The ratio of the combined pilot energy per chip, Ec, 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.
$\frac{\textbf{Pilot } E_c}{I_{or}}$	The ratio of the average transmit energy-per-PN chip for the Pilot Channel to the total transmit power spectral density
Power Control E_c	Average energy-per-PN chip for the power control subchannel. For the case when the power control sub-channel is assumed to be transmitted at the same power level that is used for the 9 600 bps or 14 400 bps 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 bps, v equals 2 for 4 800 bps, v equals 4 for 2 400 bps, and v equals 8 for 1 200 bps 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 bps, v equals 2 for 7200 bps, v equals 4 for 3600 bps, and v equals 8 for 1800

bps 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 bps, v equals 2 for 4 800 bps, v equals 4 for 2700 bps, and v equals 8 for 1 500 bps 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 bps, v equals 2 for 7 200 bps, v equals 4 for 3 600 bps, and v equals 8 for 1 800 bps traffic data rate. The total Forward Traffic Channel is comprised of traffic data and a power control sub-channel.

$\frac{\textbf{Power Control } E_c}{I_{or}}$ The ratio of the average transmit energy-per-PN chip for the power control subchannel to the total transmit power spectral density

$\frac{\textbf{Quick Paging } E_c}{I_{or}}$ The 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 enrgy-per-PN chip for one Forward Supplemental Code Channel

Supplemental $\frac{E_c}{I_{or}}$ The ratio of the average transmit enrgy-per-PN chip for one Forward Supplemental to the total transmit power spectral density

Sync E_c Average enrgy-per-PN chip for the Sync Channel

$\frac{\textbf{Sync } E_c}{I_{or}}$ The ratio of the average transmit enrgy-per-PN chip for the Sync Channel to the total transmit power spectral density

Traffic E_c Average enrgy-per-PN chip for the Forward Fundamental Channel. For the case when the power control sub-channel is assumed to be transmitted at the same power level that is used for the 9 600 bps or 14 400 bps data rate, the following equations apply:

For Radio Configuration 1, it is equal to $\frac{11}{11+v} \times$ (total Forward Fundamental Channel enrgy-per-PN chip), where v equals 1 for 9 600 bps, v equals 2 for 4 800 bps, v equals 4 for 2 400 bps, and v equals 8 for 1 200 bps traffic data rate. For Radio Configuration 2, it is equal to $\frac{23}{23+v} \times$ (total Forward Fundamental Channel enrgy-per-PN chip), where v equals 1 for 14 400 bps, v equals 2 for 7200 bps, v equals 4 for 3600 bps, and v equals 8 for 1800 bps 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 enrgy-per-PN chip), where v equals 1 for 9 600 bps, v equals 2 for 4 800 bps, v equals 4 for 2700 bps, and v equals 8 for 1 500 bps 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 bps, v equals 2 for 7 200 bps, v equals 4 for 3 600 bps, and v equals 8 for 1800 bps traffic data rate. The total Forward Traffic Channel is comprised of traffic data and a power control sub-channel.

$\frac{\textbf{Traffic } E_c}{I_{or}}$ The ratio of the average transmit energy-per-PN chip for the Forward Traffic Channel to the total transmit power spectral density

3.3 Abbreviations

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

ACLR	Adjacent Channel Leakage Ratio
AWGN	Additive White Gaussian Noise
bps	Bits per second
CDMA	Code Division Multiple Access
CRC	Cyclic Redundancy Code
DTX	Discontinuous Transmission
EIRP	Effective Isotropic Radiated Power
EMC	Electro-Magnetic Compatibility
ERP	Effective Radiated Power
FER	Frame Error Rate
HPSK	Hybrid phase shift keying
LV	Low Voltage
Mcps	Megachips per second (106 chips per second).
MER	Message Error Rate, MER = 1 -
MSC	Mobile Switching Center
OCNS	Orthogonal Channel Noise Simulator
PN	Pseudonoise
PUF	Power Up Function
R&TTE	Radio and Telecommunications Terminal Equipment
SR	Spreading Rate
UTC	Universal Temps Coordiné

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

4.2.1 Introduction

To meet the essential requirement under article 3.2 of the R&TTE Directive [1] for IMT-2000 user equipment (UE) eight (8) essential parameters have been identified. Table 2 provides a cross-reference between these essential parameters and the corresponding technical requirements for equipment within the scope of the present document.

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

Table 2: Cross references

Essential parameter	Corresponding technical requirements
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 Receiver adjacent channel selectivity
Control and Monitoring functions	4.2.5 Conducted spurious emissions when not transmitting
	4.2.9 Paging channel
	4.2.10 Forward traffic channel

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

4.2.2.2.1 Spreading rate 1

When transmitting with spreading rate 1, the spurious emissions shall be less than the limits specified in table 3.

Table 3: Transmitter spurious emission limits for spreading rate 1

For |Δf| Within the Range	Emission Limit	
1,25 MHz to 1,98 MHz	less stringent of -42 dBc/30 kHz or -54 dBm/1,23 MHz	
1,98 MHz to 2,25 MHz	less stringent of -50 dBc/30 kHz or -54 dBm/1,23 MHz	
2,25 MHz to 4,00 MHz	-[13 + 1 × (Δf – 2,25 MHz)] dBm / 1 MHz	
> 4,00 MHz	-36 dBm / 1 kHz; -36 dBm / 10 kHz; -36 dBm/100 kHz; -30 dBm / 1 MHz;	9 kHz < f < 150 kHz 150 kHz < f < 30 MHz 30 MHz < f < 1 GHz 1 GHz < f < 12,5 GHz
NOTE: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf = center 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.

Table 4: Additional transmitter spurious emission limits for spreading rate 1

Measurement Frequency	Emission Limit	Victim Band
1 893,5 MHz to 1 919,6 MHz	-41 dBm / 300 kHz	PHS
925 MHz to 935 MHz	-67 dBm / 100 kHz	GSM 900
935 MHz to 960 MHz	-79 dBm / 100 kHz	GSM 900
1 805 MHz to 1 880 MHz	-71 dBm / 100 kHz	DCS 1 800
NOTE: Measurements apply only when the measurement frequency is at least 11,25 MHz from the CDMA center frequency. The non-PHS band measurements are 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 3 are allowed.		

4.2.2.2.2 Spreading rate 3

When transmitting with spreading rate 3, the spurious emissions shall be less than the limits specified in table 5.

Table 5: Transmitter spurious emission limits for spreading rate 3

For |Δf| 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 × (Δf – 2,7 MHz)] dBm / 30 kHz	
3,08 MHz	-33 dBc / 3,84 MHz	
3,5 MHz to 7,5 MHz	-[13 + 1 × (Δf – 3,5 MHz)] dBm / 1 MHz	
7,5 MHz to 8,5 MHz	-[17 + 10 × (Δf – 7,5 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; -36 dBm / 10 kHz; -36 dBm/100 kHz; -30 dBm / 1 MHz;	9 kHz < f < 150 kHz 150 kHz < f < 30 MHz 30 MHz < f < 1 GHz 1 GHz < f < 12,5 GHz
NOTE: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf = center 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 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 6.

Table 6: Additional transmitter spurious emission limits for spreading rate 3

Measurement Frequency	Emission Limit	Victim Band
1 893,5 MHz to 1 919,6 MHz	-41 dBm / 300 kHz	PHS
925 MHz to 935 MHz	-67 dBm / 100 kHz	GSM 900
935 MHz to 960 MHz	-79 dBm / 100 kHz	GSM 900
1 805 MHz to 1 880 MHz	-71 dBm / 100 kHz	DCS 1800
NOTE: Measurements apply only when the measurement frequency is at least 12,5 MHz from the CDMA center frequency. The non-PHS band measurements are 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 5 are allowed.		

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, the maximum RF output power is defined as the maximum power that the mobile station transmits as measured at the mobile station antenna connector.

4.2.3.2 Limits

For each radio configuration that the mobile station 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 7. When the mobile station is transmitting only on the Reverse Dedicated Control Channel, the maximum output power requirements of the mobile station specified in table 7 may be reduced by 2,5 dB. When the mobile station is transmitting only with the combination of Reverse Dedicated Control Channel and 1 500 bps Reverse Fundamental Channel, the maximum output power requirements of the mobile station specified in table 7 may be reduced by 2 dB.

Table 7: Effective radiated power at maximum output power

Mobile Station Class	Radiating Measurement	Lower Limit	Upper Limit
Class I	EIRP	-2 dBW (0,63 W)	3 dBW (2,0 W)
Class II	EIRP	-7 dBW (0,2 W)	0 dBW (1,0 W)
Class III	EIRP	-12 dBW (63 mW)	-3 dBW (0,5 W)
Class IV	EIRP	-17 dBW (20 mW)	-6 dBW (0,25 W)
Class V	EIRP	-22 dBW (6,3 mW)	-9 dBW (0,13 W)

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

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 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 less than -50 dBm/1,23 MHz for spreading rate 1 or -50 dBm/3,69 MHz for spreading rate 3 centered at the CDMA Channel frequency.

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 shall be:

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).
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).
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

The FER in tests 1 through 5 as defined in clause 5.3.5 shall not exceed 10 % with 90 % confidence (see TIA/EIA/98-D [4], clause 6.6). With up to twenty-four (24) exceptions at spurious response frequencies, the FER in tests 6 and 7 as defined in clause 5.3.5 shall not exceed 10 % with 90 % confidence (see TIA/EIA/98-D [4], clause 6.6). In case of such spurious response exception(s) in tests 6 or 7 as defined in clause 5.3.5, the FER shall not exceed 10 % with 90 % confidence (see TIA/EIA/98-D [4], clause 6.6) when using the Alternate CW Tone Power as defined in clause 5.3.5 for interference at the spurious response frequencie(s).

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. The receiver performance is measured by the frame error rate (FER).

4.2.7.2 Limits

The FER in tests 1, 2 as defined in clause 5.3.6 shall not exceed 1,0 % with 95 % confidence (see TIA/EIA/98-D [4], clause 6.6).

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 center frequency of the assigned channel by ±2,5 MHz for Spreading Rate 1 or ±5 MHz for Spreading Rate 3.

4.2.8.2 Limits

The FER in each test shall not exceed 1,0 % with 95 % confidence (see TIA/EIA/98-D [4], clause 6.6).

4.2.8.3 Conformance

Conformance tests described in clause 5.3.7 shall be carried out.

4.2.9 Supervision of paging channel

4.2.9.1 Definition

When in the *System Access State*, the mobile station shall monitor the Paging Channel. The mobile station shall reset a timer for 3 seconds whenever a valid message is received on the Paging Channel, whether addressed to the mobile station or not. If the timer expires, the mobile station shall stop transmitting access attempts. This test verifies the mobile station supervision of the Paging Channel when it is in the *System Access State*.

4.2.9.2 Limits

The mobile station shall transmit access attempts as a response to the page. The mobile station shall stop transmitting access attempts 3 seconds after the Paging 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

When in the *Mobile Station Control on the Traffic Channel State*, the mobile station shall continuously monitor the Forward Channel, except:

- During a PUF probe in which it transmits on a PUF target frequency (see TIA/EIA/97-D [6], clause 2.6.4.1.7);
- During a search of pilots on a CDMA Candidate Frequency (see TIA/EIA/97-D [6], clause 2.6.6.2.8.3);
- During a search of analog frequencies (see TIA/EIA/97-D [6], clause 2.6.6.2.10).

The mobile station shall monitor the physical channel corresponding to FPC_PRI_CHANs.

If the mobile station receives 12 frames with insufficient signal quality (e.g. bad frames) on the physical channel corresponding to FPC_PRI_CHANs, it shall disable its transmitter. Thereafter, if the mobile station receives 2 frames with sufficient signal quality (e.g. good frames) on the physical channel corresponding to FPC_PRI_CHANs, then the mobile station should re-enable its transmitter.

The mobile station shall establish a Forward Traffic Channel fade timer. The timer shall be enabled when the mobile station first enables its transmitter when in the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the Traffic Channel State*. The fade timer shall be reset for 5 seconds whenever the mobile station receives 2 frames with sufficient signal quality (e.g. good frames) on the physical channel corresponding to FPC_PRI_CHANs. The mobile station shall disable the fade timer when it tunes to a PUF target frequency, and shall re-enable the fade timer at the end of the PUF probe. If the timer expires, the mobile station shall disable its transmitter and declare a loss of the Forward Traffic Channel.

The mobile station also enables, disables, and resets the fade timer when it performs a hard handoff or a periodic search, as described in TIA/EIA/97-D [6], clauses 2.6.6.2.8 and 2.6.6.2.10.

The mobile station shall not disable its transmitter in the case that it is not receiving data but is receiving continuous periods of sufficient signal quality power control bits on the Forward Dedicated Control Channel.

Test 1 in clause 5.3.9 verifies that the mobile station monitoring the Forward Traffic Channel disables its transmitter after receiving 12 frames with insufficient signal quality.

Test 2 in clause 5.3.9 verifies that the mobile station monitoring the Forward Traffic Channel disables its transmitter and declares a loss of the Forward Traffic Channel after not receiving 2 frames with sufficient signal quality for a period of 5 seconds.

Test 3 in clause 5.3.9 verifies that the mobile station does not disable its transmitter while receiving a period of 2 seconds 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 $12 \times 0{,}02 + 0{,}02$ seconds after the Forward Traffic Channel is disabled. The mobile station shall re-enable its transmitter $2 \times 0{,}02 + 0{,}02$ seconds after the start of the first enabled frame.

Test 2 in clause 5.3.9:

The mobile station shall disable its transmitter 5 s + 0,02 s after the first 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 seconds.

4.2.10.3 Conformance

Conformance tests described in clause 5.3.9 shall be carried out.

5 Testing for compliance with technical requirements

5.1 Conditions for testing

5.1.1 Introduction

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

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

Normally it should be sufficient for all tests to be conducted using standard test conditions except where otherwise stated. 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 environmental test conditions

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

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

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

5.1.3 Standard conditions for the primary power supply

5.1.3.1 General

The standard test voltages shall 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.

5.1.3.2 Standard DC test voltage from accumulator batteries

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

5.1.3.3 Standard AC voltage and frequency

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

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

5.1.4 Standard equipment under test

5.1.4.1 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.

5.1.4.2 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 will be used to decide whether an equipment meets the requirements of the present document;
- the value of the measurement uncertainty or the accuracy of each piece of test equipment used for the measurement of each parameter shall be included in the test report; only test equipment meeting the performance requirements for standard test equipment as defined in TIA/EIA/98-D [4], clause 6.4, shall be used; the test set-up of each test shall be equivalent to the test set-up descriptions in TIA/EIA/98-D [4], 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 TIA/EIA/98-D [4], clause 6.4.

5.3 Essential radio test suites

5.3.1 Conducted spurious emissions when transmitting

1) Connect the base station to the mobile station antenna connector as shown in TIA/EIA/98-D [4], figure 6.5.1-4. The AWGN generator and the CW generator are not applicable in this test. Connect a spectrum analyzer (or other suitable test equipment) to the mobile station antenna connector.
2) For each radio configuration that the mobile station supports, configure the base station and mobile station to operate in that radio configuration in band class 6 and perform steps 3 through 17.
3) Set the following parameters of the Access Parameters Message as specified in table 8.

Table 8: Access Parameters Message

Parameter	Value (Decimal)
NOM_PWR	7 (7 dB)
INIT_PWR	15 (15 dB)
PWR_STEP	7 (7 dB/step)
NUM_STEP	15 (16 probes/sequence)
MAX_RSP_SEQ	15 (15 sequences)

If the Enhanced Access Channel is used, set the following parameters of the Enhanced Access Parameters Message as specified in table 9.

Table 9: Enhanced Access Parameters message

Parameter	Value (Decimal)
NOM_PWR_EACH	15 (15 dB)
INIT_PWR_EACH	15 (15 dB)
PWR_STEP_EACH	7 (7 dB/step)
NUM_STEP_EACH	15 (16 probes/sequence)
EACH_MAX_RSP_SEQ	15 (15 sequences)

4) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 15 through 17.
5) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 15 through 17.

6) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and 100 % frame activity and perform steps 15 through 17.

7) 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 TIA/EIA/98-D [4], clause 1.3) with 1 500 bps Fundamental Channel data rate only and 9 600 bps Dedicated Control Channel with 100 % frame activity, and perform steps 15 through 17.

8) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps Fundamental Channel and 9 600 bps Supplemental Channel 0 data rate, and perform steps 15 through 17.

9) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps Dedicated Control Channel with 100 % frame activity and 9 600 bps Supplemental Channel 0 data rate, and perform steps 15 through 17.

10) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 15 through 17.

11) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and 100 % frame activity and perform steps 15 through 17.

12) 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 TIA/EIA/98-D [4], clause 1.3) with 1 500 bps Fundamental Channel data rate only and 9 600 bps Dedicated Control Channel with 100 % frame activity, and perform steps 15 through 17.

13) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps Fundamental Channel and 9 600 bps Supplemental Channel 0 data rate, and perform steps 15 through 17.

14) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps Dedicated Control Channel with 100 % frame activity and 9 600 bps Supplemental Channel 0 data rate, and perform steps 15 through 17.

15) Set the test parameters as specified in table 10.

16) Send continuously '0' power control bits to the mobile station.

17) Measure the unwanted emission levels.

Table 10: 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

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

5.3.2 Maximum RF output power

1) Configure all of the open loop parameters to their maximum settings.
   If the Access Channel is used, set the following parameters of the Access Parameters Message as specified in table 11.

Table 11: Access Parameters Message

Parameter	Value (Decimal)
NOM_PWR	7 (7 dB)
INIT_PWR	15 (15 dB)
PWR_STEP	7 (7 dB/step)
NUM_STEP	15 (16 probes/sequence)
MAX_RSP_SEQ	15 (15 sequences)

If the Enhanced Access Channel is used, set the following parameters of the *Enhanced Access Parameters Message* as specified table 12.

Table 12: Enhanced Access Parameters

Parameter	Value (Decimal)
NOM_PWR_EACH	15 (15 dB)
INIT_PWR_EACH	15 (15 dB)
PWR_STEP_EACH	7 (7 dB/step)
NUM_STEP_EACH	15 (16 probes/sequence)
EACH_MAX_RSP_SEQ	15 (15 sequences)

2) Connect the base station to the mobile station antenna connector as shown in TIA/EIA/98-D [4], figure 6.5.1-4. The AWGN generator and the CW generator are not applicable in this test.

3) Configure the mobile station to operate in band class 6 and perform steps 4 through 20.

4) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 10 through 12.

5) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 10 through 12.

6) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and 100 % frame activity and perform steps 10 through 12.

7) 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 TIA/EIA/98-D [4], clause 1.3) with 1 500 bps Fundamental Channel data rate only and 9 600 bps Dedicated Control Channel with 100 % frame activity, and perform steps 10 through 12.

8) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps Fundamental Channel and 9 600 bps Supplemental Channel 0 data rate, and perform steps 10 through 12.

9) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps Dedicated Control Channel with 100 % frame activity and 9 600 bps Supplemental Channel 0 data rate, and perform steps 10 through 12.

10) Set the test parameters as specified in table 13.

11) Send continuously '0' power control bits to the mobile station.

12) Measure the mobile station output power at the mobile station antenna connector.

13) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 18 through 20.

14) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and 100 % frame activity and perform steps 18 through 20.

15) 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 TIA/EIA/98-D [4], clause 1.3) with 1 500 bps Fundamental Channel data rate only and 9 600 bps Dedicated Control Channel with 100 % frame activity, and perform steps 18 through 20.

16) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps Fundamental Channel and 9 600 bps Supplemental Channel 0 data rate, and perform steps 18 through 20.

17) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps Dedicated Control Channel with 100 % frame activity and 9 600 bps Supplemental Channel 0 data rate, and perform steps 18 through 20.

18) Set the test parameters as specified in table 14.

19) Send continuously '0' power control bits to the mobile station.

20) Measure the mobile station output power at the mobile station antenna connector.

Table 13: 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 14: 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

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

5.3.3 Minimum controlled output power

1) Connect the base station to the mobile station antenna connector as shown in TIA/EIA/98-D [4], figure 6.5.1-4. The AWGN generator and the CW generator are not applicable in this test.
2) Configure the base station and mobile station to operate in band class 6 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 5 through 7.
5) Set the test parameters as specified in table 15.
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 15: 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.

5.3.4 Conducted spurious emissions when not transmitting

1) Connect a spectrum analyzer (or other suitable test equipment) to the mobile station antenna connector.
2) Configure the mobile station to operate in band class 6 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 analyzer 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

1) Connect the base station and an interfering CW tone to the mobile station antenna connector as shown in TIA/EIA/98-D [4], figure 6.5.1-4.
2) For all tests, Forward Link Power Control shall be disabled in the base station simulator.
3) Configure the base station to operate in Band Class 6.
4) If the mobile station supports demodulation of Radio Configuration 1 or 2, set up a call using Fundamental Channel Test Mode 1 (see TIA/EIA/98-D [4], clause 1.3) with 9 600 bps 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 7 through 15.
7) Set the test parameters for test 1 as specified in table 16 and perform step 15.
8) Set the test parameters for test 2 as specified in table 16 and perform step 15.
9) Set the test parameters for test 3 as specified in table 16 and perform step 15.
10) Set the test parameters for test 4 as specified in table 16 and perform step 15.
11) Set the test parameters for test 5 as specified in table 17 and perform steps 14 and 15 using the Default CW Tone Power.
12) Set the test parameters for test 6 as specified in table 17 and perform steps 14 and 15 using the Default CW Tone Power.
13) Set the test parameters for test 7 as specified in table 17 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 17 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 steps 15 for each spurious response frequency using the Alternate CW Tone Power given in table 17.

Table 16: Test parameters for receiver blocking characteristics (in-band)

Parameter		Units	Test 1	Tests 2	Tests 3	Tests 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 17: Test parameters for receiver blocking characteristics (out-of-band)

Parameter	Units	Test 5	Test 6	Test 7
CW Tone Frequency	MHz	2 051 – 2 095 2 185 – 2 230	2 026 – 2 050 2 231 – 2 255	1 – 2 025 2 255 – 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.

5.3.6 Intermodulation spurious response attenuation

1) Connect the base station and two interfering CW tones to the mobile station antenna connector as shown in TIA/EIA/98-D [4], 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) Configure the base station to operate in band class 6 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 7 through 9.

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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 7 through 9.

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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 7 through 9.

7) Set the test parameters for test 1 as specified in table 18 and perform step 9.

8) Set the test parameters for test 2 as specified in table 18 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 18: Test Parameters for intermodulation spurious response attenuation (tests 1 and 2)

Parameter		Units	Mobile Station Class I		Mobile Station Class II through Class V	
			Test 1	Test 2	Test 1	Test 2
Tone 1 Offset from Carrier	SR 1	MHz	+2,5	-2,5	+2,5	-2,5
	SR 3	MHz	+5	-5	+5	-5
Tone 1 Power	SR 1	dBm	-48		-48	
	SR 3	dBm	-46		-46	
Tone 2 Offset from Carrier	SR 1	MHz	+4,9	-4,9	+4,9	-4,9
	SR 3	MHz	+9,7	-9,7	+9,7	-9,7
Tone 2 Power	SR 1	dBm	-48		-48	
	SR 3	dBm	-46		-46	
$\hat{I}_{or}$		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, Îor 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 in order to prove compliance.

5.3.7 Adjacent channel selectivity

Connect the base station and an interfering CDMA signal to the mobile station antenna connector as shown in TIA/EIA/98-D [4], figure 6.5.1-4.

1) For all tests, Forward Traffic Channel closed loop power control should be disabled in the base station simulator.

2) Configure the base station to operate in Band Class 6 and perform steps 4 through 9.

3) If the mobile station supports demodulation of Radio Configuration 1 or 2, set up a call using Fundamental Channel Test Mode 1 (see TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 7 through 9.

4) 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 7 through 9.

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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 7 and 8.

6) Set the test parameters for test 1 as specified in table 19 and perform step 9.

7) Set the test parameters for test 2 as specified in table 19 and perform step 9.

8) Count, at the base station, the number of frames transmitted and the number of good frames received at the mobile station.

Table 19: Test parameters for adjacent channel selectivity

<table>
<tr><th colspan="2">Parameter</th><th>Units</th><th>Tests 1</th><th>Tests 2</th></tr>
<tr><td rowspan="2">Adjacent CDMA Channel Offset from Carrier</td><td>SR 1</td><td>MHz</td><td>+2,5</td><td>-2,5</td></tr>
<tr><td>SR 3</td><td>MHz</td><td>+5,0</td><td>-5,0</td></tr>
<tr><td colspan="2">CDMA Power</td><td>dBm</td><td colspan="2">-36 (SR 1)
-50 (SR 3)</td></tr>
<tr><td colspan="2">$\hat{I}_{or}$</td><td>dBm/
1,23 MHz</td><td colspan="2">-101</td></tr>
<tr><td colspan="2">$\frac{\text{Pilot } E_c}{I_{or}}$</td><td>dB</td><td colspan="2">-7</td></tr>
<tr><td colspan="2">$\frac{\text{Traffic } E_c}{I_{or}}$</td><td>dB</td><td colspan="2">-15,6 (SR 1)
-20,6 (SR 3)</td></tr>
<tr><td colspan="5">NOTE For the case of a Spreading Rate 3 system, $\hat{I}_{or}$ is the received power on each carrier.</td></tr>
</table>

The results obtained shall be compared to the limits in clause 4.2.8.2 in order to prove compliance.

5.3.8 Supervision of paging channel

1) Connect the base station to the mobile station antenna connector as shown in TIA/EIA/98-D [4], figure 6.5.1-4. The AWGN generator and the CW generator are not applicable in this test.
2) Configure the mobile station to operate in band class 6 and perform steps 3 through 8.
3) Set the base station to ignore all access attempts.
4) Set the test parameters as specified in table 21.
5) Set the following parameters of the Access Parameters Message to the value specified table 20.

Table 20: Access parameters message

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

6) Send a page to the mobile station.
7) Wait for two seconds and disable the Paging Channel.
8) Monitor the mobile station output power.

Table 21: Test parameters for supervision of paging channel

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1,23 MHz	-55
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Paging } E_c}{I_{or}}$	dB	-16

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

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.

1) Connect the base station to the mobile station antenna connector as shown in TIA/EIA/98-D [4], figure 6.5.1-4. The AWGN generator and the CW generator are not applicable in this test.

2) Configure the mobile station to operate in band class 6 and perform steps 3 through 18.

3) If the mobile station supports demodulation of Radio Configuration 1 or 2, set up a call using Fundamental Channel Test Mode 1 (see TIA/EIA/98-D [4], clause 1.3) with 9 600 bps 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 8 through 18.

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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps 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 TIA/EIA/98-D [4], clause 1.3) with 9 600 bps data rate only and perform steps 8 through 18.

8) Set the base station simulator so as to not drop a call.

9) Set the test parameters as specified in table 22.

10) Send the Forward Fundamental Channel or the Forward Dedicated Control Channel with power control bits but no data (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 x 0,02 seconds.

12) Monitor the mobile station output power (test 1).

13) Set the test parameters as specified in table 22.

14) Alternately disable and enable the transmission of the Forward Fundamental Channel or the Forward Dedicated Control Channel frames for at least 5 seconds starting at the beginning of the first disabled frame.

15) Monitor the mobile station output power (test 2).

16) Set the test parameters as specified in table 22.

17) Send 100 frames with power control bits only, but no data, on the Forward Dedicated Control Channel starting at a frame boundary.

18) Monitor the mobile station output power (test 3).

Table 22: 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.

Annex A (normative): The EN Requirements Table (EN-RT)

The EN Requirements Table (EN-RT) serves a number of purposes, as follows:

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

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

EN Reference		**EN <xxx xxx-4>**				**Comment**
No.	**Reference**	**EN-R** (note)	**Status**			
1	4.2.2	Conducted spurious emissions when transmitting	M			
2	4.2.3	Maximum RF output power	M			
3	4.2.4	Minimum controlled output power	M			
4	4.2.5	Conducted spurious emissions when not transmitting	M			
5	4.2.6	Receiver blocking characteristics	M			
6	4.2.7	Intermodulation spurious response attenuation	M			
7	4.2.8	Adjacent channel selectivity	M			
8	4.2.9	Supervision of paging channel	M			
9	4.2.10	Supervision of forward traffic channel	M			
NOTE: These EN-Rs are justified under article 3.2 of the R&TTE Directive.						

Key to columns:

No Table entry number;

Reference Clause reference number of conformance requirement within the present document;

EN-R Title of conformance requirement within the present document;

Status Status of the entry as follows:

- M Mandatory, shall be implemented under all circumstances;
- O Optional, may be provided, but if provided shall be implemented in accordance with the requirements;
- O.n this status is used for mutually exclusive or selectable options among a set. The integer “n" shall refer to a unique group of options within the EN-RT. A footnote to the EN-RT shall explicitly state what the requirement is for each numbered group. For example, “It is mandatory to support at least one of these options", or, “It is mandatory to support exactly one of these options".

Comments To be completed as required.

Annex B (informative): Declaration of environmental profile

B.1 Introduction

The following clause contains a copy of the description of environmental requirements as specified in TIA/EIA/98-D [4], clause 5. This should provide some guidance on how the environmental profile can be declared for the purpose of the present document.

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.1.

Table B.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 ±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 TIA/EIA/98-D [4], clauses 3 and 4 under the standard environmental test conditions specified in TIA/EIA/98-D [4], 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 TIA/EIA/98-D [4], 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 TIA/EIA/98-D [4], clause 4.1.1.3.

3. Waveform quality as specified in TIA/EIA/98-D [4], clause 4.3.2.3.

4. Range of estimated open loop output power as specified in TIA/EIA/98-D [4], 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 TIA/EIA/98-D [4], clause 4.4.4.3.

6. Maximum RF output power as specified in TIA/EIA/98-D [4], clause 4.4.5.3. For Temperature Range Designators A and B, the ERP for a Class II through V mobile station may drop by 2 dB at 60 °C and higher. These requirements do not apply other than for coldest, room and highest operating temperature test points.

7. Minimum controlled output power as specified in TIA/EIA/98-D [4], clause 4.4.6.3.

8. Conducted spurious emissions as specified in TIA/EIA/98-D [4], 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, in a humidity chamber with the humidity maintained at 0,024 gm H_2O/gm Dry Air at 50 °C (40 % Relative Humidity) for a period of not less than eight hours. The measurements specified in TIA/EIA/98-D [4], clause 3.5.1 (receiver sensitivity and dynamic range) and TIA/EIA/98-D [4], 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 TIA/EIA/98-D [4], clauses 3 and 4.

B.2.2.3 Minimum standard

The mobile station equipment shall meet the minimum standards specified in TIA/EIA/98-D [4], 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 TIA/EIA/98-D [4], 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 to 500 Hz at the rate of 0,1 octave/second 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 TIA/EIA/98-D [4], 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 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 TIA/EIA/98-D [4], clauses 3 and 4 and shall not suffer any mechanical damage after being subjected to the above shock tests.

Annex C (informative): Bibliography

ETSI ETR 028 (1994): "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".

Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.

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

Language	EN title
Danish	
Dutch	
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 4: Harmonized standard for IMT-2000, CDMA Multi-Carrier (cdma2000) (UE) covering essential requirements of article 3.2 of the R&TTE Directive
Finnish	
French	
German	
Greek	
Icelandic	
Italian	
Portuguese	
Spanish	
Swedish	

History

Document history			
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