

ETSI EN 301 908-17 V4.2.1 (2010-03)

Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Base Stations (BS), Repeaters and User Equipment (UE)
for IMT-2000 Third-Generation cellular networks;
Part 17: Harmonized EN for IMT-2000,
Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS)
covering the essential requirements
of article 3.2 of the R&TTE Directive**

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Foreword

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

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [i.1] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [i.2] of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

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

The present document is part 17 of a multi-part deliverable covering the Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks, as identified below:

- Part 1: "Harmonized EN for IMT-2000, introduction and common requirements, covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 2: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 3: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 4: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 5: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) and Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 6: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 7: "Harmonized EN for IMT-2000, CDMA TDD (UTRA TDD and E-UTRA TDD) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 8: "Harmonized EN for IMT-2000, TDMA Single-Carrier (UWC 136) (UE) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 9: "Harmonized EN for IMT-2000, TDMA Single-Carrier (UWC 136) (BS) covering essential requirements of article 3.2 of the R&TTE Directive";

- Part 10: "Harmonized EN for IMT-2000, FDMA/TDMA (DECT) covering essential requirements of article 3.2 of the R&TTE Directive";
- Part 11: "Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 12: "Harmonized EN for IMT-2000, CDMA Multi-Carrier (cdma2000) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 13: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 14: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 15: "Harmonized EN for IMT-2000, Evolved Universal Terrestrial Radio Access (E-UTRA) (FDD Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 16: "Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (UE) covering the essential requirements of article 3.2 of the R&TTE Directive";
- Part 17: "Harmonized EN for IMT-2000, Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) (BS) covering the essential requirements of article 3.2 of the R&TTE Directive".**

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

Introduction

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

1 Scope

The present document applies to the following radio equipment types:

- Base Stations (also denoted as Access Network) for Evolved CDMA Multi-Carrier Ultra Mobile Broadband (UMB) compliant with TIA-1121.001 [4].

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

Table 1-1: UMB Base Station operating bands

Band Class (BC)	Direction of transmission	UMB Base Station operating bands
6	Transmit	2 110 MHz to 2 170 MHz
	Receive	1 920 MHz to 1 980 MHz
8	Transmit	1 805 MHz to 1 880 MHz
	Receive	1 710 MHz to 1 785 MHz
9	Transmit	925 MHz to 960 MHz
	Receive	880 MHz to 915 MHz
13	Transmit	2 620 MHz to 2 690 MHz
	Receive	2 500 MHz to 2 570 MHz

The present document covers requirements for UMB Base Stations.

The present document is intended to cover the provisions of Directive 1999/5/EC [i.2] (R&TTE Directive), Article 3.2, which states that "..... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of Article 3 of the R&TTE Directive [i.2] may apply to equipment within the scope of the present document.

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

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

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

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

2.1 Normative references

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

- [1] ETSI EN 301 908-1 (V4.1.2): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering the essential requirements of article 3.2 of the R&TTE Directive".
- [2] 3GPP2 C.S0088-0 V1.0, (March 2009): "Recommended Minimum Performance Standards for cdma2000 Ultra Mobile Broadband (UMB) Access Network" (to be published as TIA-1170).

NOTE: Available at http://www.3gpp2.org/Public_html/specs/C.S0088_v1.0_AN_MPS_for_UMB-090402.pdf.

- [3] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".
- [4] TIA-1121.001 (December 2007): "Physical Layer for Ultra Mobile Broadband (UMB) Air Interface Specification".
- [5] 3GPP2 C.S0089-0 Version 1.0, (March 2009): "Recommended Minimum Performance Standards for cdma2000 Ultra Mobile Broadband Access Terminal" (to be published as TIA-1171).

NOTE: Available at http://www.3gpp2.org/Public_html/specs/C.S0089_v1.0_AT_MPS_for_UMB-090402.pdf.

- [6] 3GPP2 C.S0090-0 Version 1.0, (March 2009): "Test Application Specification for cdma2000 Ultra Mobile Broadband (UMB)" (to be published as TIA-1172).

NOTE: Available at http://www.3gpp2.org/Public_html/specs/C.S0090-0_v1.0_TAS_for_UMB-090402.pdf.

2.2 Informative references

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

- [i.1] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- [i.2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [i.3] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

access network: network equipment providing data connectivity between a packet switched data network (typically the Internet) and the access terminals

NOTE: Connectivity is typically provided at the Link Layer (PPP). An access network is equivalent to a Base Station in TIA-1121.001 [4]. In the context of transmitter testing, an access network applies to operation with a single carrier and single sector active only.

access terminal: device providing data connectivity to a user

NOTE: An access terminal may be connected to a computing device such as a laptop personal computer or may be self-contained data device such as a personal digital assistant.

ACK channel: used by the access terminal to inform the access network whether a data packet transmitted on the Forward Traffic Channel has been received successfully or not

active set: set of pilots assigned to a particular access terminal

adjacent channel leakage power ratio: ratio of the on-channel transmit power to the power measured in one of the adjacent channels with no active channel in the adjacent channel

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

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

control channel: portion of the Forward Channel that carries control information

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

Effective Radiated Power (ERP): product of the power supplied to the antenna and the antenna gain relative to a half-wave dipole in a given direction

error: when referring to packet error, an error event occurs when a packet FCS does not check

NOTE: When referring to a symbol error, an error event occurs when the symbol is classified as a valid symbol different from the transmitted symbol.

forward channel: UMB Channel from an access network to access terminals

NOTE: The Forward Channel is transmitted on a CDMA frequency assignment using a particular pilot PN offset.

Forward Test Application Protocol (FTAP): Test Application protocol allowing Forward Link performance characterizations (see 3GPP2 C.S0090-0 [6])

Forward Traffic Channel (FTC): Forward Channel used to transport user and signalling traffic from an access network to an access terminal

Frame Check Sequence (FCS): Frame Check Sequence of the Physical Layer packets is a CRC (see CRC)

Line Impedance Stabilization Network (LISN): 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

packet: physical layer protocol data unit

power control bit: bit sent in every slot on the Reverse Power Control Channel that signals the access terminal to increase or decrease its transmit power

Received Signal Quality Indicator (RSQI): Reverse Traffic Channel measure of signal quality related to the received Data E_b/N_t

NOTE: See also E_b and N_t .

reverse channel: UMB Channel from the access terminal to the access network

NOTE: From the access network's perspective, the Reverse Channel is the sum of all access terminal transmissions on a UMB frequency assignment.

reverse traffic channel: Reverse Channel used to transport user and signalling traffic from a single access terminal to one or more sectors

sector: part of the access network that provides the land side modem

servicing sector: sector which is responsible for sending data to the access terminal

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

NOTE: All sectors use the same System Time (within a small error). Access terminals use the same System Time, offset by the propagation delay from the sector to the access terminal. See also Universal Coordinated Time.

traffic channel: communication path between an access terminal and an access network used for user and signalling traffic

NOTE: The term Traffic Channel implies a Forward Traffic Channel and Reverse Traffic Channel pair. See also Forward Traffic Channel and Reverse Traffic Channel.

Universal Coordinated Time (UTC): 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

3.2 Symbols

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

Bps	Bits per second
C	Confidence level
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
dBm	A measure of power expressed in terms of its ratio (in dB) to one milliwatt
dBm/Hz	A measure of power spectral density
NOTE:	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
E_b	Average energy per information bit for the Reverse Data Channel at the sector RF input ports
E_b/N_t	The ratio in dB of the combined received energy per bit to the effective noise power spectral density for the Reverse Data Channel at the sector RF input ports
GHz	Gigahertz (10^9 Hertz)
I_0	The total received power spectral density, including signal and interference, as measured at the sector RF input ports
I_{oc}	The power spectral density of a band-limited white noise source (simulating interference from other users and cells) as measured at the sector RF input ports
I_{or}	The total transmit power spectral density of the Reverse Channel at the access terminal simulator antenna connector
\hat{I}_{or}	The received power spectral density of the Reverse Channel as measured at the sector RF input ports
kbps	Kilobits per second
kHz	Kilohertz (10^3 Hertz)
K_{max}	The maximum number of errors in a test procedure
km/h	Kilometers per hour
λ_{lim}	Specification error rate limit
MHz	Megahertz (10^6 Hertz)
ms	Millisecond (10^{-3} second)
ns	Nanosecond (10^{-9} second)
N_t	The effective noise power spectral density at the sector RF input ports
ppm	Parts per million
μs	Microsecond (10^{-6} second)
χ^2	Chi-squared distribution

3.3 Abbreviations

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

AC	Alternating Current
ACLR	Adjacent Channel Leakage power Ratio
ACS	Adjacent Channel Selectivity
AWGN	Additive White Gaussian Noise
BS	Base Station
CBW	Channel BandWidth
CDMA	Code Division Multiple Access
CRC	Cyclic Redundancy Code
CW	Continuous Waveform
DC	Direct Current
E-UTRA	Evolved Universal Terrestrial Radio Access
EIRP	Effective Isotropic Radiated Power
ERP	Effective Radiated Power
FCS	Frame Check Sequence
FDD	Frequency Division Duplex
FER	Frame Error Rate
FLAB	Forward Link Assignment Block
FLCS	Forward Link Control Segment
F-PCCH	Forward Power Control Channel
FTAP	Forward Test Application Protocol
FTC	Forward Traffic Channel
GPS	Global Positioning System
HARQ	Hybrid Automatic Repeat reQuest
LAB	Link Assignment Block
LISN	Line Impedance Stabilization Network
PCP	Packet Consolidation Protocol
PER	Packet Error Rate
PN	PseudoNoise
PPP	Point-to-Point Protocol
R-ACKCH	Reverse Acknowledgement Channel
RBW	Resolution BandWidth
R-CDCCH	Reverse CDMA Dedicated Control Channel
RF	Radio Frequency
RL	Reverse Link
RLAB	Reverse Link Assignment Block
RMS	Root Mean Square
RSQI	Received Signal Quality Indicator
RTAP	Reverse Test Application Protocol
RTC	Reverse Traffic Channel
Rx	receive
TAP	Test Application Protocol
Tx	transmit
UMB	Ultra Mobile Broadband
UTC	Universel Temps Coordonné (Universal Coordinated Time)
UTRA	Universal Terrestrial Radio Access
VSWR	Voltage Standing Wave Ratio
WA	Wide Area