

9`Y_fca U[bYfbUnXfi y`fj cgh]b`nUXYj Yj`nj Yn]`n`fUX]`g_`ja `gdY_fca `fØFAŁ!
BUdfUj Y`fUh_Y[UXcgY[UfGF8łž_]i dcfUV`Uc`i`hfUý]fc_cdUgcj bc`fl K6Ł
hM bc`c[]c`!`CdfYa UnUg`YXYb`Yž_]XYi`Yj`žY_j Yb bYa`cVa c`f`cX`*`; <n`Xc
, ž` ; <n`!`%`XY.`hM b] bY`fU`hf]gh_Y]b`dfYg_i gbYa YtcXY

Electromagnetic compatibility and Radio spectrum Matters (ERM) - Short Range Devices (SRD) using Ultra WideBand (UWB) technology - Location Tracking equipment operating in the frequency range from 6 GHz to 8,5 GHz - Part 1: Technical characteristics and test methods

ITeH STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 302 500-1 V1.2.1:2008](https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008)

<https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008>

Ta slovenski standard je istoveten z: EN 302 500-1 Version 1.2.1

ICS:

33.060.20	Sprejemna in oddajna oprema	Receiving and transmitting equipment
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

SIST EN 302 500-1 V1.2.1:2008 **en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 302 500-1 V1.2.1:2008

<https://standards.iteh.ai/catalog/standards/sist/f18213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008>

ETSI EN 302 500-1 V1.2.1 (2008-06)

European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Short Range Devices (SRD) using
Ultra WideBand (UWB) technology;
Location Tracking equipment operating in
the frequency range from 6 GHz to 8,5 GHz;
Part 1: Technical characteristics and
test methods**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 302 500-1 V1.2.1:2008](https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008)

<https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008>



Reference

REN/ERM-TG31C-257-1

Keywords

radio, regulation, SRD, testing, UWB

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 302 500-1 V1.2.1:2008

<https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6332/EN-302-500-1-v1-2-1-2008>

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2008.
All rights reserved.

DECTTM, **PLUGTESTS**TM, **UMTS**TM, **TIPHON**TM, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPPTM is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

Contents

Intellectual Property Rights	5
Foreword.....	5
1 Scope	7
2 References	7
2.1 Normative references	7
2.2 Informative references.....	8
3 Definitions, symbols and abbreviations	8
3.1 Definitions.....	8
3.2 Symbols.....	9
3.3 Abbreviations	9
4 Technical requirement specifications	9
4.1 General requirements	9
4.2 Presentation of equipment for testing purposes.....	9
4.2.1 Choice of model for testing	10
4.2.1.1 Auxiliary test equipment	10
4.2.1.2 Declarations by the provider	10
4.3 Mechanical and electrical design.....	10
4.3.1 General.....	10
4.3.2 Controls	10
4.3.3 Transmitter shut-off facility.....	10
4.3.4 Marking	10
4.3.4.1 Equipment identification.....	10
4.3.4.2 Additional information for the user.....	10
4.4 Other device emissions.....	11
5 Test conditions, power sources and ambient temperatures	11
5.1 Normal and extreme test conditions.....	11
5.2 Test power source.....	11
5.2.1 External test power source.....	11
5.2.2 Internal test power source	11
5.3 Normal test conditions.....	12
5.3.1 Normal temperature and humidity.....	12
5.3.2 Normal test power source	12
5.3.2.1 Mains voltage.....	12
5.3.2.2 Regulated lead-acid battery power sources	12
5.3.2.3 Other power sources.....	12
6 General conditions.....	12
6.1 Normal test signals	12
6.2 Test sites and general arrangements for radiated measurements	12
6.3 Modes of operation of the transmitter	13
7 Interpretation of results	13
7.1 Measurement uncertainty	13
7.1.1 Measurement uncertainty is equal to or less than maximum acceptable uncertainty.....	14
7.1.2 Measurement uncertainty is greater than maximum acceptable uncertainty.....	14
7.2 Other emissions from device circuitry.....	14
8 Methods of measurement and limits for transmitter parameters	15
8.1 General	15
8.2 Maximum mean e.i.r.p. spectral density.....	15
8.2.1 Definition.....	15
8.2.2 Methods of measurement.....	15
8.2.3 Limits.....	16
8.3 Frequency of highest maximum mean e.i.r.p. spectral density.....	16

8.3.1	Definition.....	16
8.3.2	Methods of measurement.....	16
8.3.3	Limits.....	16
8.4	Maximum peak e.i.r.p.....	16
8.4.1	Definition.....	16
8.4.2	Methods of measurement.....	17
8.4.3	Limits.....	17
8.5	Minimum Pulse Repetition Frequency (PRF)	18
8.5.1	Definitions	18
8.5.2	Declaration.....	18
8.5.3	Limits.....	18
9	Methods of measurement and limits for receiver parameters.....	18
9.1	Receiver spurious emissions.....	18
9.1.1	Definition.....	18
9.1.2	Test procedure	18
9.1.3	Limit	19
Annex A (normative): Radiated measurement.....		20
A.1	Test sites and general arrangements for measurements involving the use of radiated fields	20
A.1.1	Anechoic chamber.....	20
A.1.2	Anechoic chamber with a conductive ground plane.....	21
A.1.3	Test antenna.....	22
A.1.4	Substitution antenna	23
A.2	Guidance on the use of radiation test sites	23
A.2.1	Verification of the test site	23
A.2.2	Preparation of the EUT.....	23
A.2.3	Power supplies to the EUT.....	23
A.2.4	Range length.....	24
A.2.5	Site preparation	24
A.2.6	General requirements for RF cables.....	25
A.3	Coupling of signals.....	25
A.3.1	General	25
A.3.2	Data Signals.....	25
A.4	Standard test position	25
A.5	Standard test methods.....	26
A.5.1	Calibrated setup.....	26
A.5.2	Substitution method.....	26
A.6	Standard calibration method.....	27
Annex B (normative): Technical performance of the spectrum analyser.....		30
Annex C (normative): Additional design requirements.....		31
C.1	Operation.....	31
C.2	Receipt-of-reception-acknowledgement.....	31
Annex D (informative): Measurement antenna and preamplifier specifications		32
Annex E (informative): Calculation of peak limit for 3 MHz measurement bandwidth.....		33
Annex F (informative): Bibliography.....		35
History		36

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

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

Foreword

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

For non EU countries the present document may be used for regulatory (Type Approval) purposes.

The present document is part 1 of a multi-part deliverable covering Short Range Devices (SRD) using Ultra WideBand (UWB) technology; Location Tracking equipment operating in the frequency range from 6 GHz to 8,5 GHz, as identified below:

Part 1: "Technical characteristics and test methods";

Part 2: "Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive".

Clauses 1 and 3 provide a general description on the types of equipment covered by the present document and the definitions and abbreviations used.

Clause 4 provides a guide as to the number of samples required in order that type tests may be carried out, and any markings on the equipment which the provider shall provide.

Clauses 5 and 6 give guidance on the test and general conditions for testing of the device.

Clause 7 gives the interpretation of results and maximum measurement uncertainty values.

Clause 8 specifies the transmitter spectrum utilization parameters which are required to be measured. The clauses provide details on how the equipment should be tested and the conditions which should be applied.

Clause 9 specifies the receiver spectrum utilization parameters which are required to be measured. The clauses provide details on how the equipment should be tested and the conditions which should be applied.

Annex A (normative) provides specifications concerning radiated measurements.

Annex B (normative) provides information on the spectrum analyser specification.

Annex C (normative) provides information on additional design requirements for equipment covered by the present document.

Annex D (informative) provides information on measurement antenna and preamplifier specifications.

Annex E (informative) provides information on peak measurements within a 3 MHz measurement bandwidth.

Annex F (informative) covers other supplementary information.

National transposition dates

Date of adoption of this EN:	27 June 2008
Date of latest announcement of this EN (doa):	30 September 2008
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 March 2009
Date of withdrawal of any conflicting National Standard (dow):	31 March 2009

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

[SIST EN 302 500-1 V1.2.1:2008](https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008)

<https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008>

1 Scope

The present document specifies the requirements for ultra-wideband location tracking equipment operating in all or part of the frequency range from 6 GHz to 8,5 GHz.

The present document applies for indoor as well as portable or mobile outdoor applications.

It covers ultra-wideband location tracking tags which are attached to people or objects and tags are tracked using a fixed receiver infrastructure to only receive the UWB emission emitted by the tags. Equipment covered by the present document is fitted with an integral or dedicated antenna.

The present document contains the technical characteristics and test methods for location tracking equipment and it does not necessarily include all the characteristics which may be required by a user, nor does it necessarily represent the optimum performance achievable.

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 <https://standards.iteh.ai/catalog/standards/sist/f8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008> or <http://docbox.etsi.org/Reference>.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

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 TR 100 028 (V1.4.1) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [2] CISPR 16-1-1 (2006): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus".
- [3] ANSI C63.5 (2006): "American National Standard for Calibration of Antennas Used for Radiated Emission Measurements in Electro Magnetic Interference".

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] CENELEC EN 55022:2006: "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement".
- [i.2] ITU-R Recommendation SM.1754: "Measurement techniques of ultra-wideband transmissions".
- [i.3] ETSI EN 300 220 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW".
- [i.4] ETSI EN 300 440 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range".
- [i.5] ETSI TR 102 070-2 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide to the application of harmonized standards to multi-radio and combined radio and non-radio equipment; Part 2: Effective use of the radio frequency spectrum".
- [i.6] ETSI TR 102 273 (V1.2.1) (all parts): "Electromagnetic compatibility and Radio Spectrum Matters (ERM): Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties".
- [i.7] CEPT/ERC/REC 70-03: "Relating to the use of Short Range Devices (SRD)".

iTeh STANDARD PREVIEW

3 Definitions, symbols and abbreviations

3.1 Definitions

SIST EN 302 500-1 V1.2.1:2008

<https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008>

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

dedicated antenna: removable antenna supplied and tested with the radio equipment, designed as an indispensable part of the equipment

fixed-mounted station: station which is fixed mounted and which is not intended to be operated while in motion; however, it behaves otherwise in the system like a mobile station

impulsive UWB signal: radiated, short transient ultra-wideband signal whose occupied bandwidth is defined by its time duration rather than by frequency-hopping or other techniques

integral antenna: antenna designed to be connected to the equipment without the use of a standard connector and considered to be part of the equipment

NOTE: An integral antenna may be fitted internally or externally to the equipment.

Mobile Station (MS): station intended to be used while in motion or during halts at unspecified points

portable station: mobile station that is portable but cannot comfortably be carried around by a person due to weight and/or size or having relatively high power consumption

provider: manufacturer or his authorized representative or the person responsible for placing on the market

pulse: radiated short transient UWB signal whose time duration is nominally the reciprocal of its -10 dB bandwidth

NOTE: See ITU-R Recommendation SM.1754 [i.2].

radiated measurements: measurements which involve the absolute measurement of a radiated field

Ultra WideBand (UWB): equipment incorporating, as an integral part or as an accessory, technology for short-range radiocommunication, involving the intentional generation and transmission of radio-frequency energy that spreads over a frequency range wider than 50 MHz, which may overlap several frequency bands allocated to radiocommunication services

3.2 Symbols

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

dB	decibel
R	distance
λ	wavelength

3.3 Abbreviations

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

e.i.r.p.	equivalent isotropically radiated power
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
LNA	Low Noise Amplifier
MS	Mobile Station
PRF	Pulse Repetition Frequency
R&TTE	Radio and Telecommunications Terminal Equipment
RBW	Resolution BandWidth
RF	Radio Frequency
rms	root mean square
SNR	Signal to Noise Ratio
SRD	Short Range Device
TX	Transmitter
UWB	Ultra WideBand
VBW	Video BandWidth
VSWR	Voltage Standing Wave Ratio

4 Technical requirement specifications

4.1 General requirements

Equipment supplied for testing against the present document shall be fitted with either an integral antenna or a dedicated antenna.

4.2 Presentation of equipment for testing purposes

Each equipment submitted for testing shall fulfil the requirements of the present document on all frequencies over which it is intended to operate.

To simplify and harmonize the testing procedures between the different testing laboratories, measurements shall be performed, according to the present document, on samples of equipment defined in clause 4.2.1.

These clauses are intended to give confidence that the requirements set out in the present document have been met without the necessity of performing measurements on all frequencies.

4.2.1 Choice of model for testing

The provider shall provide one or more samples of the equipment, as appropriate, for testing.

If an equipment has several optional features, considered not to affect the RF parameters then tests need only be performed on the equipment configured with that combination of features considered to be the most complex, as proposed by the provider and agreed by the test laboratory.

4.2.1.1 Auxiliary test equipment

All necessary test signal sources, setting up instructions and other product information shall accompany the equipment when it is submitted for testing.

4.2.1.2 Declarations by the provider

The provider shall declare the necessary information regarding the equipment with respect to all technical requirements set by the present document.

4.3 Mechanical and electrical design

4.3.1 General

The equipment submitted by the provider or his representative, shall be designed, constructed and manufactured in accordance with good engineering practice, and with the aim of minimizing harmful interference to other equipment and services.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

4.3.2 Controls

Those controls, which, if maladjusted, may increase the interfering potential of the equipment, shall not be easily accessible to the user.

<https://standards.iteh.ai/catalog/standards/sist/fl8213a5-37a2-4046-a8e4-1601713b6393/sist-en-302-500-1-v1-2-1-2008>

4.3.3 Transmitter shut-off facility

If the equipment is equipped with an automatic transmitter shut-off facility, it shall be possible to disable this feature for the purposes of testing. See clause 8.

4.3.4 Marking

The equipment shall be marked in a visible place. This marking shall be legible and durable. In cases where the equipment is too small to carry the marking, it is sufficient to provide the relevant information in the users' manual.

4.3.4.1 Equipment identification

The marking shall include as a minimum:

- The name of the manufacturer or his trademark.
- The type designation. This is the manufacturer's numeric or alphanumeric code or name that is specific to a particular equipment.

4.3.4.2 Additional information for the user

The following additional information shall be included in the users' manual:

- statements that the UWB transmitter equipment conforming to the present document shall not be:
 - installed at a fixed outdoor location;