
**Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) -
Naprave kratkega dosega (SRD) - Radijska oprema v frekvenčnem območju od 9
kHz do 25 MHz in sistemi z indukcijsko zanko v frekvenčnem območju od 9 kHz do
30 MHz - 1. del: Tehnične karakteristike in preskusne metode**

Electromagnetic compatibility and Radio spectrum Matters (ERM) - Short Range Devices
(SRD) - Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop
systems in the frequency range 9 kHz to 30 MHz - Part 1: Technical characteristics and
test methods

ITeH STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 300 330-1 V1.7.1:2010](https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8e2e-7ae534eaeaf0c/sist-en-300-330-1-v1-7-1-2010)

<https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8e2e-7ae534eaeaf0c/sist-en-300-330-1-v1-7-1-2010>

Ta slovenski standard je istoveten z: EN 300 330-1 Version 1.7.1

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 300 330-1 V1.7.1:2010 **en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 300 330-1 V1.7.1:2010

<https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8e2e-7ae534eae0c/sist-en-300-330-1-v1-7-1-2010>

ETSI EN 300 330-1 V1.7.1 (2010-02)

European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
Short Range Devices (SRD);
Radio equipment in the frequency range
9 kHz to 25 MHz and inductive loop systems
in the frequency range 9 kHz to 30 MHz;
Part 1: Technical characteristics and test methods**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 300 330-1 V1.7.1:2010](https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8e2e-7ae534eacf0c/sist-en-300-330-1-v1-7-1-2010)

<https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8e2e-7ae534eacf0c/sist-en-300-330-1-v1-7-1-2010>



Reference

REN/ERM-TG28-0424-1

Keywords

radio, SRD, testing**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 300 330-1 V1.7.1:2010<https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8e2e-7ae534eae1f4/etsi-en-300-330-1-v1-7-1-2010>**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 2010.
All rights reserved.

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

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

LTE™ is a Trade Mark of ETSI currently being registered

for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	7
Foreword.....	7
Introduction	7
1 Scope	8
2 References	9
2.1 Normative references	10
2.2 Informative references.....	10
3 Definitions, symbols and abbreviations	10
3.1 Definitions	10
3.2 Symbols.....	11
3.3 Abbreviations	12
4 Technical requirements specifications	12
4.1 General requirements	12
4.1.1 Receiver categorization.....	12
4.1.2 General performance criteria	12
4.2 Presentation of equipment for testing purposes.....	13
4.2.1 Choice of model for testing	13
4.2.2 Testing of equipment with alternative radiated H-field strengths.....	13
4.2.3 Testing of equipment that does not have an external 50 Ω RF connector (integral antenna equipment)	14
4.2.3.1 Equipment with an internal permanent or temporary antenna connector.....	14
4.2.3.2 Equipment with a temporary antenna connector.....	14
4.2.4 On-site testing.....	14
4.3 Mechanical and electrical design.....	14
4.3.1 General.....	14
4.3.2 Controls	14
4.3.3 Transmitter shut-off facility	14
4.3.4 Receiver mute or squelch.....	14
4.3.5 Marking (equipment identification).....	14
4.3.5.1 Equipment identification	15
4.3.5.2 Equipment marking	15
4.4 Declarations by the provider	15
4.5 Auxiliary test equipment	15
4.6 Interpretation of the measurement results	15
5 Test conditions, power sources and ambient temperatures	15
5.1 Normal and extreme test conditions	15
5.2 Test power source.....	15
5.2.1 External test power source.....	16
5.2.2 Internal test power source	16
5.3 Normal test conditions.....	16
5.3.1 Normal temperature and humidity	16
5.3.2 Normal test power source	16
5.3.2.1 Mains voltage.....	16
5.3.2.2 Regulated lead-acid battery power sources	16
5.3.2.3 Other power sources.....	16
5.4 Extreme test conditions	17
5.4.1 Extreme temperatures	17
5.4.1.1 Procedure for tests at extreme temperatures.....	17
5.4.1.1.1 Procedure for equipment designed for continuous operation	17
5.4.1.1.2 Procedure for equipment designed for intermittent operation	17
5.4.1.2 Extreme temperature ranges.....	17
5.4.2 Extreme test source voltages.....	18
5.4.2.1 Mains voltage.....	18

5.4.2.2	Regulated lead-acid battery power sources	18
5.4.2.3	Power sources using other types of batteries	18
5.4.2.4	Other power sources	18
6	General conditions	18
6.1	Normal test signals and test modulation	18
6.1.1	Normal test signals for analogue speech	19
6.1.2	Normal test signals for data	19
6.2	Artificial antenna	19
6.2.1	Artificial antenna for inductive transmitters (non 50 Ω)	19
6.2.2	Artificial antenna for transmitters with 50 Ω impedance connector	19
6.3	Test fixture	20
6.4	Test sites and general arrangements for radiated measurements	20
6.5	Modes of operation of the transmitter	20
6.6	Measuring receiver	21
7	Transmitter requirements	21
7.1	Transmitter definitions	21
7.1.1	The inductive loop coil transmitters	22
7.1.2	The large size loop transmitters	22
7.1.3	Other transmitters	22
7.1.4	Product Classes	22
7.2	Transmitter carrier output levels	25
7.2.1	H-field (radiated)	25
7.2.1.1	Definition	25
7.2.1.2	Methods of measurement	25
7.2.1.3	Limits	25
7.2.2	RF carrier current (Product Class 3 only)	26
7.2.2.1	Definition	26
7.2.2.2	Methods of measurement	26
7.2.2.3	Limits	27
7.2.3	Radiated E-field (Product Class 4 only)	27
7.2.3.1	Definition	27
7.2.3.2	Methods of measurement	27
7.2.3.3	Limits	27
7.3	Permitted range of operating frequencies	28
7.3.1	Definition	28
7.3.2	Method of measurement	28
7.3.3	Limits	28
7.4	Permitted frequency range of the modulation bandwidth	28
7.4.1	Definition	28
7.4.2	Method of measurement	29
7.4.3	Limits	29
7.5	Spurious domain emission limits	29
7.5.1	Definition	29
7.5.2	Conducted spurious emissions (Product class 3 only)	29
7.5.2.1	Methods of measurement (< 30 MHz)	29
7.5.2.2	Limits	30
7.5.2.3	Methods of measurement (\geq 30 MHz)	30
7.5.2.4	Limits	30
7.5.3	Radiated field strength	30
7.5.3.1	Methods of measurement (< 30 MHz)	30
7.5.3.2	Limits	31
7.5.4	Effective radiated power	31
7.5.4.1	Methods of measurement (\geq 30 MHz)	31
7.5.4.2	Limits	32
8	Receiver requirement	32
8.1	Adjacent channel selectivity - in band	32
8.1.1	Definition	32
8.1.2	Method of measurement	32
8.1.3	Limits	33
8.2	Blocking or desensitization (Receiver category 1 and 2 only)	33

8.2.1	Definition.....	33
8.2.2	Methods of measurement.....	33
8.2.3	Limits.....	34
8.3	Receiver spurious radiation	35
8.3.1	Definition.....	35
8.3.2	Methods of measurement.....	35
8.3.3	Limits.....	35
8.3.3.1	Radiated emissions below 30 MHz.....	35
8.3.3.2	Radiated emissions above 30 MHz.....	35
9	Measurement uncertainty	36
10	Interpretation of results	36
10.1	Measurement uncertainty is equal to or less than maximum acceptable uncertainty	36
Annex A (normative): Radiated measurement.....		37
A.1	Test sites and general arrangements for measurements involving the use of radiated fields.....	37
A.1.1	Anechoic chamber.....	37
A.1.2	Anechoic chamber with a conductive ground plane.....	38
A.1.3	Open Area Test Site (OATS)	39
A.1.4	Test antenna.....	40
A.1.5	Substitution antenna	41
A.1.6	Measuring antenna	41
A.2	Guidance on the use of radiation test sites	41
A.2.1	Verification of the test site	41
A.2.2	Preparation of the EUT.....	41
A.2.3	Power supplies to the EUT.....	41
A.2.4	Range length.....	42
A.2.4.1	Far-field length above 30 MHz.....	42
A.2.4.2	Near-field and Far-field length below 30 MHz.....	42
A.2.5	Site preparation	43
A.3	Coupling of signals.....	43
A.3.1	General	43
A.3.2	Data signals	43
A.4	Standard test position	43
A.5	Test fixture	44
A.5.1	Description.....	44
A.5.2	Calibration.....	45
A.5.3	Mode of use.....	45
A.6	Technical performance of the spectrum analyser.....	46
Annex B (normative): H-field limit correction factor for generated E-fields.....		47
Annex C (normative): Customized loop antennas.....		48
C.1	Product classes related to the antenna loop.....	48
C.1.1	Antenna loops below 1 MHz.....	48
C.1.2	Antenna loops above 1 MHz.....	49
Annex D (informative): Test fixture for measuring inductive transmitter carrier and harmonic currents by use of an artificial antenna (Product Class 3 only).....		51
Annex E (informative): E-fields in the near field at low frequencies.....		53
Annex F (normative): H-field measurements and limits at 3 m and 30 m		55
F.1	Limits for measurements at 30 m distance.....	55
F.2	Limits for measurements at 3 m distance.....	56

Annex G (normative):	Transmitter emission levels and spectrum mask measurements.....	57
Annex H (informative):	Generic inductive loop limit in the frequency range 148,5 kHz to 30 MHz	59
H.1	Introduction	59
H.2	Radiated H-field strength	59
H.2.1	Methods of measurements.....	59
H.2.2	Radiated H-field strength limit.....	59
H.2.2.1	Radiated total H-field and H-field density limits according to the measurements in clause H.2.1 indent a)	59
H.2.2.2	Radiated bandwidth and H-field density limits according to the measurements in clause H.2.1 indent b).....	60
H.3	Other requirements.....	60
Annex I (informative):	Determination and use of the measurement bandwidth.....	61
Annex J (informative):	Other limits.....	62
Annex K (informative):	Bibliography.....	63
History		64

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 300 330-1 V1.7.1:2010

<https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8e2e-7ae534eae0c/sist-en-300-330-1-v1-7-1-2010>

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).

The present document includes improvements to the previous version of the standard that take advantage of technical developments within the SRD industry.

The present document is part 1 of a multi-part deliverable covering Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz, as identified below:

- Part 1:** "Technical characteristics and test methods";
- Part 2: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

SIST EN 300 330-1 V1.7.1:2010

<https://standards.iteh.ai/catalog/standards/sist/739-41aa-8e2e-7ae534eac10c/sist-en-300-330-1-v1-7-1-2010>

National transposition dates

Date of adoption of this EN:	8 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 2010

Introduction

The present document has been prepared to include the frequency band for RFID systems in the range of 119 kHz to 135 kHz and the alignment of the emission levels in the range of 9 kHz to 135 kHz.

1 Scope

The present document applies to the following Short Range Device major equipment types:

- 1) Generic Short range Devices including transmitters operating in the range from 9 kHz to 25 MHz; and
- 2) inductive loop transmitters operating from 9 kHz to 30 MHz including Radio Frequency Identification (RFID) and EAS equipments;
- 3) receivers operating from 9 kHz to 30 MHz.

These radio equipment types are capable of operating in the permitted frequency bands within the 9 kHz to 30 MHz range as specified in table 1:

- either with a Radio Frequency (RF) output connection and dedicated antenna or with an integral antenna;
- for all types of modulation;
- with or without speech.

Table 1 shows a list of the frequency bands as designated to Short Range Devices and the CEPT/ERC/REC 70-03 [i.1] as known at the date of publication of the present document.

When selecting parameters for new SRDs, which may have inherent safety of human life implications, manufacturers and users should pay particular attention to the potential for interference from other systems operating in the same or adjacent bands.

The present document covers fixed stations, mobile stations and portable stations. If a system includes transponders, these are measured together with the transmitter.

All types of modulation for radio devices are covered by the present document, provided the requirements of clause 7.3 are met.

The radio equipment, covered by the classification SRD is divided into several classes based on the maximum radiated magnetic field strength. The field strength designation in the present document is based on CEPT/ERC/REC 70-03 [i.1] and National SRD-frequency designations.

Three types of measuring methods are defined in the present document due to the varied nature of the antenna types for equipment used in this band. One method measures the RF carrier current, another measures the radiated H-field and the third the conducted power.

The present document covers requirements for radiated emissions below as well as above 30 MHz.

Additional standards or specifications may be required for equipment such as that intended for connection to the Public Switched Telephone Network (PSTN).

Table 1: Short Range Devices within the 9 kHz to 30 MHz permitted frequency bands

	Frequency Bands/frequencies	Applications
Transmit and Receive	9 kHz to 90 kHz	Inductive devices, Generic use
Transmit and Receive	90 kHz to 119 kHz	Inductive devices, Generic use
Transmit and Receive	119 kHz to 140 kHz	Inductive devices, Generic use
Transmit and Receive	140 kHz to 148,5 kHz	Inductive devices, Generic use
Transmit and Receive	148,5 kHz to 5 MHz	Inductive devices, Generic use
Transmit and Receive	400 kHz to 600 kHz	RFID only
Transmit and Receive	5 kHz to 30 MHz	Inductive devices, Generic use
Transmit and Receive	3 155 kHz to 3 400 kHz	Inductive devices, Generic use
Transmit and Receive	4 234 kHz	Inductive devices, Railway applications
Transmit and Receive	4 516 kHz	Inductive devices, Railway applications
Transmit and Receive	6 765 kHz to 6 795 kHz	Inductive devices, Generic use
Transmit and Receive	7 400 kHz to 8 800 kHz	Inductive devices, Generic use
Transmit and Receive	10 200 kHz to 11,000 MHz	Inductive devices, Generic use
Transmit and Receive	12,5 MHz to 20 MHz	Inductive devices, Wireless healthcare
Transmit and Receive	13,553 MHz to 13,567 MHz	Inductive devices, Generic use
Transmit and Receive	26,957 MHz to 27,283 MHz	Inductive devices, Generic use
Transmit and Receive	27,095 MHz	Inductive devices, Railway applications

NOTE 1: It should be noted that table 1 represents the most widely implemented position within the European Union and the CEPT countries, but it should not be assumed that all designated bands are available in all countries.

NOTE 2: In addition, it should be noted that other frequency bands may be available in a country within the frequency range 9 kHz to 30 MHz covered by the present document.

NOTE 3: On non-harmonized parameters, national administrations may impose certain conditions such as the type of modulation, frequency, channel/frequency separations, maximum transmitter radiated power, duty cycle, and the inclusion of an automatic transmitter shut-off facility, as a condition for the issue of an Individual Rights for use of spectrum or General Authorization, or as a condition for use under "licence exemption" as it is in most cases for Short Range Devices.

<https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8c2e->

The present document covers fixed stations, mobile stations and portable stations.

Applications using Ultra-WideBand (UWB) technology are not covered by the present document.

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] Void.
- [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).
- [3] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [4] ITU-T Recommendation O.41: "Psophometer for use on telephone-type circuits".
- [5] CISPR 16-2-3: "Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements".

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] CEPT/ERC/REC 70-03: "Relating to the use of Short Range Devices (SRD)".
- [i.2] ITU-T Recommendation O.153: "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [i.3] ANSI C63.5: "American National Standard for Electromagnetic Compatibility-Radiated Emission Measurements in Electromagnetic Interference (EMI) Control-Calibration of Antennas (9 kHz to 40 GHz)".
- [i.4] Void.
- [i.5] ETSI TR 102 273-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 2: Anechoic chamber".
- [i.6] ETSI TR 102 273-3: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 3: Anechoic chamber with a ground plane".
- [i.7] ETSI TR 102 273-4: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 4: Open area test site".
- [i.8] Void.

3 Definitions, symbols and abbreviations

3.1 Definitions

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

alarm: use of radio communication or a sensing device for indicating alert information at a distant location

artificial antenna: tuned reduced-radiating dummy load equal to the nominal impedance specified by the provider

assigned frequency band: frequency band within which the device is authorized to operate

conducted measurements: measurements which are made using a direct connection to the equipment under test

customized antenna: antenna built according to manufacturers' antenna design rules inside tested limits

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

NOTE: The antenna has been designed or developed for one or more specific types of equipment. It is the combination of dedicated antenna and radio equipment that is expected to be compliant with the regulations.

fixed station: equipment intended for use in a fixed location

H-field test antenna: electrically screened loop or equivalent antenna, with which the magnetic component of the field can be measured

identification system: equipment consisting of a transmitter(s), receiver(s) (or a combination of the two) and an antenna(s) to identify objects by means of a transponder

integral antenna: antenna designed as a fixed part of the equipment, without the use of an external connector and as such which cannot be disconnected from the equipment by the user

magnetic dipole moment: product of (Number of coil turns) \times (coil area) \times (coil current)

NOTE: Air coils only.

mobile station: equipment normally installed in a vehicle

portable station: equipment intended to be carried, attached or implanted

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

telecommand: use of radio communication for the transmission of signals to initiate, modify or terminate functions of equipment at a distance <https://standards.iteh.ai/catalog/standards/sist/09087419-73f9-41aa-8e2e-7ae534eae10c/sist-en-300-330-1-v1-7-1-2010>

telemetry: use of radio communication for indicating or recording data at a distance

transponder: device that responds to an interrogation signal

type designation: providers' marking of the equipment

3.2 Symbols

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

Ω	ohm
A	loop antenna area
C	correction factor
E	electrical field strength
f	frequency
f_C	carrier frequency in Hz
H	magnetic field strength
H_{ef}	H field-strength generated by an e-field antenna
H_f	H-field-strength limit
H_C	carrier H-field strength
H_S	H-field-strength limit for radiated spurious emissions
I_C	transmitter carrier output current
I_S	transmitter spurious output current
λ	Wave length
m	magnetic dipole moment
N	number of turns for a loop antenna

P Power
t time

3.3 Abbreviations

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

EAS	Electronic Article Surveillance
EMC	ElectroMagnetic Compatibility
erp	effective radiated power
EUT	Equipment Under Test
ISM	Industrial, Scientific and Medical
ND	Noise and Distortion
NRI	National Radio Interfaces
OATS	Open Area Test Site
PSTN	Public Switched Telephone Network
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
RFID	Radio Frequency IDentification
SND	Signal, Noise and Distortion
SRD	Short Range Device
VSWR	Voltage Standing Wave Ratio

4 Technical requirements specifications

4.1 General requirements

4.1.1 Receiver categorization

The product family of short range radio devices is divided into three receiver categories, see table 2, each having its own set of minimum performance criteria. This classification is based upon the impact on persons in case the equipment does not operate above the specified minimum performance level.

Table 2

Receiver categories	Relevant receiver clauses	Risk assessment of receiver performance
1	8.1, 8.2 and 8.3	Safety critical SRD communication media; i.e. for devices serving systems where failure may result in a physical risk to a person.
2	8.2 and 8.3	Function critical SRD communication media; i.e. when a failure to operate correctly causes loss of function but does not constitute a safety hazard.
3	8.3	Non-critical SRD communication media whose failure to operate correctly causes loss of function which can be overcome by parallel means.

NOTE: With reference to the present document manufacturers are recommended to declare the categorization of their devices in accordance with table 2, as relevant. In particular where an SRD which may have an inherent safety of human life implication, manufacturers and users should pay particular attention to the potential for interference from other systems operating in the same or adjacent bands.

4.1.2 General performance criteria

For the purpose of the receiver performance tests, the receiver will produce an appropriate output under normal conditions as indicated below:

- a SND/ND ratio of 20 dB, measured at the receiver output through a telephone psophometric weighting network as described in ITU-T Recommendation O.41 [4]; or

- after demodulation, a data signal with a bit error ratio of 10^{-2} ; or
- after demodulation, a message acceptance ratio of 80 %.

Where the indicated performance cannot be achieved or if it is defined differently, the manufacturer shall declare and publish the performance criteria used to determine the performance of the receiver.

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.

The provider shall declare the frequency ranges, the range of operating conditions and power requirements as applicable, to establish the appropriate test conditions.

Additionally, technical documentation and operating manuals, sufficient to make the test, shall be supplied.

A test fixture for equipment with an integral antenna may be supplied by the provider (see clause 6.3). For equipment supplied without an antenna i.e. Product Class 3 as defined in clause 7.1.4, the provider will supply either a tuned reduced radiating load (see clause 6.2.1) or an artificial antenna as defined by annex E.

If an equipment is designed to operate with different transmitter radiated field strengths or power level, measurement of each transmitter parameter shall be performed, according to the present document, on samples of equipment defined in clause 4.2.1.

To simplify and harmonize the testing procedures between different testing laboratories, measurements shall be performed, according to the present document, on samples defined in clauses 4.2.1 to 4.2.4.

4.2.1 Choice of model for testing

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

Stand alone equipment shall be offered by the provider complete with any ancillary equipment needed for testing.

If an equipment has several optional features, considered not to affect the RF parameters then the tests need only to 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.

Where practicable, equipment offered for testing shall provide a 50 Ω connector for conducted RF power level measurements.

In the case of integral antenna equipment, if the equipment does not have an internal permanent 50 Ω connector then it is permissible to supply a second sample of the equipment with a temporary antenna connector fitted to facilitate testing, see clause 4.2.3.

The performance of the equipment submitted for testing shall be representative of the performance of the corresponding production model.

4.2.2 Testing of equipment with alternative radiated H-field strengths

If a family of equipment has alternative radiated field strengths provided by the use of separate power modules or add on stages, then these shall be declared by the provider. Each module or add on stage shall be tested in combination with the equipment. As a minimum, measurements of the radiated H-field strength and spurious emissions shall be performed for each combination and shall be stated in the test report.