

ETSI EN 301 489-3 V1.3.1 (2001-11)

Candidate Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 3: Specific conditions for Short-Range Devices (SRD)
operating on frequencies between 9 kHz and 40 GHz**



Reference

REN/ERM-EMC-225-3

Keywords

EMC, radio, RTTT, short range, regulation

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

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, send your comment to:

editor@etsi.fr

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 2001.
All rights reserved.

Contents

Intellectual Property Rights	5
Foreword.....	5
1 Scope	7
2 References	7
3 Definitions and abbreviations.....	8
3.1 Definitions	8
3.2 Abbreviations	8
4 Test conditions	8
4.1 General	8
4.2 Arrangements for test signals	9
4.2.1 Arrangements for test signals at the input of the transmitter	9
4.2.2 Arrangements for test signals at the output of the transmitter	9
4.2.3 Arrangements for test signals at the input of the receiver	9
4.2.4 Arrangements for test signals at the output of the receiver	9
4.2.5 Arrangements for testing transmitter and receiver together (as a system)	9
4.3 Exclusion bands.....	9
4.3.1 Exclusion bands for receivers	10
4.3.2 Exclusion band for transmitters	11
4.4 Narrow band responses of receivers	11
4.5 Normal test modulation	11
5 Performance assessment.....	11
5.1 General	11
5.2 Equipment which can provide a continuous communications link	12
5.3 Equipment which does not provide a continuous communications link.....	12
5.4 Ancillary equipment	12
5.5 Equipment classification	12
6 Performance criteria	12
6.1 Classification of SRD equipment	12
6.2 General performance criteria.....	13
6.3 Performance table.....	13
6.4 Performance criteria for Continuous phenomena applied to Transmitters (CT)	13
6.5 Performance criteria for Transient phenomena applied to Transmitters (TT)	14
6.6 Performance criteria for Continuous phenomena applied to Receivers (CR).....	14
6.7 Performance criteria for Transient phenomena applied to Receivers (TR)	14
6.8 Performance criteria for ancillary equipment tested on a stand alone basis	14
7 Applicability overview	14
7.1 Emission	14
7.1.1 General.....	14
7.1.2 Special conditions	15
7.2 Immunity	15
7.2.1 General.....	15
7.2.2 Special conditions	15
Annex A (informative): Examples of Short Range Devices (SRD) in the scope of the present document	16
A.1 Short Range Devices (SRD) with RF power levels ranging up to 500 mW and intended for operation in the frequency range 25 MHz to 1 000 MHz.....	16
A.2 Short Range Devices (SRD) intended for operation in the frequency range 9 kHz to 25 MHz, and inductive loop systems intended for operation in the frequency range 9 kHz to 30 MHz	16
A.3 Short Range Devices (SRD) intended for operation in the frequency range 1 GHz to 40 GHz	16

Annex B (normative):	Performance classification of Short Range Devices.....	17
Annex C (informative):	Bibliography.....	19
History		20

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://www.etsi.org/legal/home.htm>).

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 Candidate 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 [4] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document, together with EN 301 489-1 [1], is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility ("the EMC Directive") (89/336/EEC [3] as amended), and 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 ("the R&TTE Directive [2]").

The present document is part 3 of a multi-part deliverable covering the ElectroMagnetic Compatibility (EMC) standard for radio equipment and services, as identified below:

- Part 1: "Common technical requirements";
- Part 2: "Specific conditions for radio paging equipment";
- Part 3: "Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz";**
- Part 4: "Specific conditions for fixed radio links and ancillary equipment and services";
- Part 5: "Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech)";
- Part 6: "Specific conditions for Digital Enhanced Cordless Telecommunications (DECT) equipment";
- Part 7: "Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)";
- Part 8: "Specific conditions for GSM base stations";
- Part 9: "Specific conditions for wireless microphones and similar Radio Frequency (RF) audio link equipment";
- Part 10: "Specific conditions for First (CT1 and CT1+) and Second Generation Cordless Telephone (CT2) equipment";
- Part 11: "Specific conditions for analogue terrestrial sound broadcasting (Amplitude Modulation (AM) and Frequency Modulation (FM)) service transmitters";
- Part 12: "Specific conditions for Very Small Aperture Terminal, Satellite Interactive Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the Fixed Satellite Service (FSS)";
- Part 13: "Specific conditions for Citizens' Band (CB) radio and ancillary equipment (speech and non-speech)";

- Part 14: "Specific conditions for analogue and digital terrestrial TV broadcasting service transmitters".
- Part 15: "Specific conditions for commercially available amateur radio equipment";
- Part 16: "Specific conditions for analogue cellular radio communications equipment, mobile and portable";
- Part 17: "Specific conditions for Wideband data and HIPERLAN equipment";
- Part 18: "Specific conditions for Terrestrial Trunked Radio (TETRA) equipment";
- Part 19: "Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications";
- Part 20: "Specific conditions for Mobile Earth Stations (MES) used in the Mobile Satellite Services (MSS)";
- Part 22: "Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment";
- Part 23: "Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) Base Station (BS) radio, repeater and ancillary equipment";
- Part 24: "Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) for Mobile and portable (UE) radio and ancillary equipment";
- Part 25: "Specific conditions for IMT-2000 CDMA Multi-carrier Mobile Stations and ancillary equipment";
- Part 26: "Specific conditions for IMT-2000 CDMA Multi-carrier Base Stations and ancillary equipment".

National transposition dates	
Date of adoption of this EN:	9 November 2001
Date of latest announcement of this EN (doa):	28 February 2002
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 August 2002
Date of withdrawal of any conflicting National Standard (dow):	31 August 2003

1 Scope

The present document, together with EN 301 489-1 [1], covers the assessment of Short Range Devices (SRD) and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of Short Range Devices (SRD) are not included in the present document. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum.

Examples of SRDs are given in annex A.

The present document specifies the applicable test conditions, performance assessment, and performance criteria for Short Range Devices (SRD) and the associated ancillary equipment.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and the EN 301 489-1 [1], the provisions of the present document take precedence.

The environmental classification and the emission and immunity requirements used in the present document are as stated in the EN 301 489-1 [1], except for any special conditions included in the present document.

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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] ETSI EN 301 489-1 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".
- [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".
- [3] Council Directive 89/336/EEC: "of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility".
- [4] 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".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 489-1 [1], clause 3 and the following apply:

receiver: stand alone receiver or receiver being part of a transceiver

Short Range Device (SRD): piece of apparatus which includes a transmitter, and/or a receiver and or parts thereof, used in alarm, telecommand and telemetry applications, etc. operating with analogue speech/music or data (analogue and/or digital) or with combined analogue speech/music and data, using any modulation type

NOTE: These devices can be used in a fixed, mobile or portable application.

transmitter: stand alone transmitter or transmitter being part of a transceiver

3.2 Abbreviations

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

AC	Alternating Current
CR	Continuous phenomena applied to Receivers
CT	Continuous phenomena applied to Transmitters
DC	Direct Current
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
RF	Radio Frequency
SINAD	Signal plus noise plus distortion to noise plus distortion
SRD	Short Range Device
TR	Transient phenomena applied to Receivers
TT	Transient phenomena applied to Transmitters

4 Test conditions

For the purposes of the present document, the test conditions of the EN 301 489-1 [1], clause 4, shall apply as appropriate. Further product related test conditions for Short Range Devices (SRD) are specified in the present document.

4.1 General

For emission and immunity tests the normal test modulation, test arrangements, etc., as specified in the present document, clauses 4.1 to 4.5, shall apply.

Whenever the Equipment Under Test (EUT) is provided with a detachable antenna, the EUT shall be tested with the antenna fitted in a manner typical of normal intended use, unless specified otherwise.

For the purpose of the present document Short Range Devices are divided into three types of equipment, based on the technical nature of the primary function.

Table 1

Equipment Type	Technical nature of the primary function
I	Transfer of messages (digital or analogue signals)
II	Transfer of audio (speech or music)
III	Others

4.2 Arrangements for test signals

The provisions of the EN 301 489-1 [1], clause 4.2, shall apply.

4.2.1 Arrangements for test signals at the input of the transmitter

The provisions of the EN 301 489-1 [1], clause 4.2.1, shall apply with the following modifications.

The transmitter shall be modulated with normal test modulation as specified for that type of equipment (clause 4.5). Where transmitters do not have a modulation input port, the internal equipment modulation shall be used.

4.2.2 Arrangements for test signals at the output of the transmitter

The provisions of the EN 301 489-1 [1], clause 4.2.2, shall apply with the following modifications.

The transmitter shall be operated at its maximum rated RF output power as specified for that type of equipment (clause 4.5).

The manufacturer may provide a suitable companion receiver that can be used to set up a communications link and/or to receive messages.

4.2.3 Arrangements for test signals at the input of the receiver

The provisions of EN 301 489-1 [1], clause 4.2.3, shall apply with the following modifications:

- the wanted RF input signal, coupled to the receiver, shall be modulated with normal test modulation as specified for that type of equipment (clause 4.5);
- the level of the wanted RF input signal shall be chosen to a value significantly above the threshold sensitivity but below the overload characteristics of the receiver;
- the manufacturer may provide a suitable companion transmitter that can be used to set up a communications link and/or to transmit messages.

4.2.4 Arrangements for test signals at the output of the receiver

The provisions of EN 301 489-1 [1], clause 4.2.4, shall apply.

4.2.5 Arrangements for testing transmitter and receiver together (as a system)

The provisions of EN 301 489-1 [1], clause 4.2.5, shall apply with the following modification.

The transmitter and receiver may be tested together, if appropriate (size of equipment, etc.). In this case the transmitter and the receiver shall be located inside the test environment and shall be exposed at the same time to the EMC phenomena. Instead of coupling the output signal of the transmitter to the measuring equipment outside the test environment, this signal shall be coupled, inside the test environment, to input of the receiver, via an attenuator, if required, to prevent overload of the receiver.

4.3 Exclusion bands

The frequencies on which Short Range Devices (SRD) are intended to operate, shall be excluded from the conducted and radiated RF immunity tests.

The frequencies on which the SRD transmitters are intended to operate shall be excluded from conducted and radiated emission measurements when performed in transmit mode of operation.

There shall be no frequency exclusion band applied to emission measurements of SRD receivers, and/or associated ancillary equipment.

The emission measurement and immunity test exclusions are referred to as "exclusion bands" and are defined in the clauses 4.3.1 and 4.3.2 of the present document.

4.3.1 Exclusion bands for receivers

The exclusion band for receivers (including receivers part of transceivers) intended to be used in a channelized frequency band, is determined as follows:

- For receivers capable of operating on only one single frequency and not having an alignment range, the lower frequency of the exclusion band is the lower frequency of the used frequency channel minus the extension value given in table 2, and the upper frequency of the exclusion band is the upper frequency of the used frequency channel plus the extension value given in table 2. The calculated extension value shall be based on the operating frequency.
- For receivers capable of operating on only one single frequency and having an alignment range, the lower frequency of the exclusion band is the lower frequency of the alignment range minus the extension value given in table 2, and the upper frequency of the exclusion band is the upper frequency of the alignment range plus the extension value given in table 2. The calculated extension values shall be based on the centre frequency of the alignment range. However, if the alignment range is more than 10 % of the upper frequency of the alignment range the calculated value shall be based on 10 % of the upper value of the alignment range.
- For receivers capable of operating on more than one frequency in an operating frequency band the width of which is less than 20 % of the centre frequency of the operating band, the lower frequency of the exclusion band is the lower frequency of the operating band minus the extension value given in table 2, and the upper frequency of the exclusion band is the upper frequency of the operating band plus the extension value given in table 2. The calculated extension value shall be based on the centre frequency of the operating band.
- For receivers capable of operating on a number of frequencies over a frequency band wider than the band specified above, immunity tests shall be made over a selected number of test frequencies. The selected test frequencies shall be located at three evenly spaced points per logarithmic decade of the frequency band. For each test frequency the lower frequency of the exclusion band is the lower frequency of the used test frequency channel minus the extension value given in table 2, and the upper frequency of the exclusion band is the upper frequency of the used test frequency channel plus the extension value given in table 2. The calculated extension value shall be based on the used test frequency.

For wide band receivers, i.e. receivers operating in a non-channelized frequency band, the lower frequency of the exclusion band is the lower frequency of the intended operating frequency band minus the extension value given in table 2 and the upper frequency of the exclusion band is the upper frequency of the intended operating band plus the extension value given in table 2, or the total exclusion band is twice the intended operating frequency band of the receiver centred around the centre frequency of the intended operating band, whichever is greater.

Table 2: Exclusion bands for Short Range Devices

Operating Receiver Frequency f_o	EMC exclusion band for SRD equipment		
	Receiver Class 1	Receiver Class 2	Receiver Class 3
< 300 kHz	$f_o \pm 200$ kHz (see note 1)	$f_o \pm 300$ kHz (see note 1)	$f_o \pm 300$ kHz (see note 1)
300 kHz to < 30 MHz	$f_o \pm 2$ MHz (see note 1)	$f_o \pm 3$ MHz (see note 1)	$f_o \pm 5$ MHz (see note 1)
30 MHz to < 1 GHz	$f_o \pm 10$ MHz, or $\pm 2\% \times f_o$, whichever is greater	$f_o \pm 15$ MHz, or $\pm 5\% \times f_o$, whichever is greater	$f_o \pm 15$ MHz, or $10\% \times f_o$ whichever is greater
1 GHz to < 2 GHz	$f_o \pm 75$ MHz (see note 2)	$f_o \pm 100$ MHz (see note 2)	$f_o \pm 300$ MHz (see note 2)
NOTE 1: Measurements shall not be carried out below 150 kHz.			
NOTE 2: Operating frequencies above 2 GHz do not require an exclusion band as there are no immunity tests required above 2 GHz.			

4.3.2 Exclusion band for transmitters

For transmitters operating, or intended to operate, in a channelized frequency band, the exclusion band is three times the maximum occupied bandwidth allowed for that service, centred around the operating frequency.

For wide band transmitters, i.e. transmitters in a non-channelized frequency band, the exclusion band is twice the intended operating frequency band centred around the centre frequency of the intended operating frequency band.

In case the receiver and transmitter are tested together as a system (clause 4.2.5 of EN 301 489-1 [1]) the exclusion band defined for receivers or the exclusion band defined for transmitters shall be used, whichever is greater.

4.4 Narrow band responses of receivers

The provision of EN 301 489-1 [1], clause 4.4, shall apply.

4.5 Normal test modulation

For equipment type I the RF carrier shall be modulated with a test signal, representing a practical selection of usable selective messages/commands. The agreed test signal may be formatted and may contain error detection and correction. Where transmitters do not have a modulation input port, the internal equipment modulation is used.

For equipment type II (audio equipment):

- the wanted input signal of the receiver under test shall be set to the nominal frequency of the receiver, modulated with a sinusoidal audio frequency of 1 000 Hz having a modulation corresponding to 60 % of the peak system modulation;
- the transmitter under test shall be modulated with a sinusoidal audio frequency of 1 000 Hz having a modulation corresponding to 60 % of the system peak modulation.

For equipment type III the manufacturer shall specify the normal test modulation, if any.

5 Performance assessment

5.1 General

The provision of EN 301 489-1 [1], clause 5.1, shall apply.

The manufacturer shall at the time of submission of the equipment for test, supply the necessary general information as requested in EN 301 489-1 [1], clause 5.1. Additionally he shall supply the following product-related information:

- the applicable equipment type according to table 1 (see clause 4.1);
- the class of equipment selected by the manufacturer according to table 3 (see clause 6.1).

The performance assessment is dependent on the equipment type (see clause 4.1).

For all types of equipment the performance assessment is based on:

- the maintenance of function(s);
- the way the eventual loss of function(s) can be recovered;
- unintentional behaviour of the EUT.

Additionally:

- for equipment type I it shall be possible to assess the performance of the equipment by appropriately monitoring (observing) the receiver reaction;
- for equipment type II the degradation in performance during the radio frequency immunity tests is expressed in a minimum SINAD Decibel value;
- for equipment type III the manufacturer shall specify the way the degradation in performance should be measured and expressed.

5.2 Equipment which can provide a continuous communications link

The provisions of EN 301 489-1 [1], clause 5.2, shall apply.

5.3 Equipment which does not provide a continuous communications link

The provisions of EN 301 489-1 [1], clause 5.3, shall apply with the following modification:

- for equipment type III the manufacturer shall always define the test method(s) for the assessment of the actual level of performance or degradation of performance during and/or after the EMC exposure.

5.4 Ancillary equipment

The provisions of EN 301 489-1 [1], clause 5.4, shall apply.

5.5 Equipment classification

The provisions of EN 301 489-1 [1], clause 5.5, shall apply.

6 Performance criteria

6.1 Classification of SRD equipment

The product family of Short Range Devices is divided into three classes of equipment, each having its own set of minimum performance criteria. This classification is based upon the impact on persons and/or goods in case the equipment does not operate above the specified minimum performance level under EMC stress.

Table 3

Class of SRD equipment	Risk assessment of receiver performance
1	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person)
2	Medium reliable SRD communication media; e.g. causing inconvenience to persons, which cannot simply be overcome by other means
3	Standard reliable SRD communication media; e.g. inconvenience to persons, which can simply be overcome by other means (e.g. manual)

A non-exhaustive list of SRD equipment and its classification is given in annex B.

6.2 General performance criteria

The performance criteria for the different classes of SRD equipment (see table 3) in combination with the different equipment types (see table 1) during and after immunity test are specified in this clause:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria for immunity tests with power interruptions exceeding a certain time are specified in clause 7.2.2, table 6.

The equipment shall meet the performance criteria as specified in the following clauses, for the appropriate class of SRD equipment.

6.3 Performance table

Table 4

Class 1 SRD equipment		
Criteria	During test	After test
A	Operate as intended No loss of function For equipment type II the minimum performance shall be 12 dB SINAD No unintentional responses	Operate as intended For equipment type II the communication link shall be maintained No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Class 2 SRD equipment		
Criteria	During test	After test
A	Operate as intended No loss of function For equipment type II the minimum performance shall be 6 dB SINAD No unintentional responses	Operate as intended For equipment type II the communication link shall be maintained No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Class 3 SRD equipment		
Criteria	During test	After test
A and B	May be loss of function (one or more) No unintentional responses	Operate as intended, for equipment type II the communication link may be lost, but shall be recoverable by user No degradation of performance Lost functions shall be self-recoverable

6.4 Performance criteria for Continuous phenomena applied to Transmitters (CT)

For equipment of type I or II including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable class as given in clause 6.3 shall apply.

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

6.5 Performance criteria for Transient phenomena applied to Transmitters (TT)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable class as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

6.6 Performance criteria for Continuous phenomena applied to Receivers (CR)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable class as given in clause 6.3 shall apply.

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

6.7 Performance criteria for Transient phenomena applied to Receivers (TR)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable class as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

6.8 Performance criteria for ancillary equipment tested on a stand alone basis

The provision of EN 301 489-1 [1], clause 6.4, shall apply.

7 Applicability overview

7.1 Emission

7.1.1 General

EN 301 489-1 [1], table 2, contains the applicability of EMC emission measurements to the relevant ports of radio and/or associated ancillary equipment.

7.1.2 Special conditions

The following special conditions set out in table 5, relate to the emission test methods used in EN 301 489-1 [1], clause 8.

Table 5: Special conditions for EMC emission measurements

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 489-1 [1], clause 8
8.3.2 and 8.4.2: Test method; DC power input/output ports, and AC mains input/output ports	Attention: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz (see clause 4.3.2).

7.2 Immunity

7.2.1 General

EN 301 489-1 [1], table 3, contains the applicability of EMC immunity measurements to the relevant ports of radio and/or associated ancillary equipment.

7.2.2 Special conditions

The following special conditions set out in table 6, relate to the immunity test methods and performance criteria used in EN 301 489-1 [1], clause 9.

Table 6: Special conditions for EMC immunity tests

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 489-1 [1], clause 9
9.2.2: Test method; Radio frequency electromagnetic field (80 MHz - 2 000 MHz)	Attention: The width of the steps for the test frequency increments is class-dependent: <ul style="list-style-type: none"> - for SRDs of class 1 or class 2, the stepped frequency increments shall be 1 % of the momentary used test frequency; - for SRDs of class 3, the stepped frequency increments shall be 10 % of the momentary used test frequency.
9.5.2: Test method; Radio frequency, common mode	Attention: The width of the steps for the test frequency increments is class-dependent: <ul style="list-style-type: none"> - for SRDs of class 1 or class 2, the stepped frequency increments shall be 1 % of the momentary used test frequency in the frequency range 5 MHz to 80 MHz; - for SRDs of class 3, the stepped frequency increments shall be 10 % of the momentary used test frequency in the frequency range 5 MHz to 80 MHz.
9.7.3: Performance criteria; Voltage dips and interruptions	Attention: The performance criteria are equipment class dependent: <p>For a voltage dip corresponding to a reduction of the supply voltage of 30 % for 10 ms the performance criteria CT or CR specified in clauses 6.4 or 6.6 shall apply as appropriate.</p> <p>For a voltage dip corresponding to a reduction of the supply voltage of 60 % for 100 ms the following class-dependent performance criteria shall apply:</p> <ul style="list-style-type: none"> - for transmitters, belonging to class 1 equipment, the performance criteria CT (clause 6.4); - for transmitters, belonging to class 2 or 3 equipment, the performance criteria TT (clause 6.5); - for receivers, belonging to class 1 equipment, the performance criteria CR (clause 6.6); - for receivers, belonging to class 2 or 3 equipment, the performance criteria TR (clause 6.7). <p>For a voltage interruption corresponding to a reduction of the supply voltage of > 95 % for 5 000 ms the performance criteria TT or TR specified in clauses 6.5 or 6.7 shall apply as appropriate.</p>

Annex A (informative): Examples of Short Range Devices (SRD) in the scope of the present document

A.1 Short Range Devices (SRD) with RF power levels ranging up to 500 mW and intended for operation in the frequency range 25 MHz to 1 000 MHz

The present document applies to Short Range Devices (SRD) with RF power levels ranging up to 500 mW and intended for operation in the frequency range 25 MHz to 1 000 MHz, and associated ancillary equipment. Definitions of such SRD radio equipment and associated ancillary equipment are found in the following functional radio standard:

- EN 300 220-1: "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; Part 1: Technical characteristics and test methods".

A.2 Short Range Devices (SRD) intended for operation in the frequency range 9 kHz to 25 MHz, and inductive loop systems intended for operation in the frequency range 9 kHz to 30 MHz

The present document applies to Short Range Devices (SRD) intended for operation in the frequency range 9 kHz to 25 MHz, inductive loop systems intended for operation in the frequency range 9 kHz to 30 MHz, and associated ancillary equipment. Definitions of such SRD radio equipment and associated ancillary equipment are found in the following functional radio standard:

- EN 300 330-1: "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".

A.3 Short Range Devices (SRD) intended for operation in the frequency range 1 GHz to 40 GHz

The present document applies to Short Range Devices (SRD) with RF power levels ranging up to 4 W and intended for operation in the frequency range 1 GHz to 40 GHz, and associated ancillary equipment. Definitions of such SRD radio equipment and associated ancillary equipment are found in the following functional radio standard:

- EN 300 440-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics and test methods".

Annex B (normative): Performance classification of Short Range Devices

This normative annex classifies Short Range Devices into three performance classes as mentioned in clause 6.1.

The classification is given in three tables for the applications "Telecommand/Telecontrol" equipment (see table B.1), "Telemetry" equipment, and "Wireless sensing/measuring" equipment (see table B.2), "Alarm" equipment (see table B.3), and in a separate table "Other applications" (see table B.4) for other SRD equipment.

The required performance class shall be selected according to the equipment application as mentioned in these tables, or in case a specific application is not mentioned, the application in the tables closest to the application of that specific equipment shall be selected.

NOTE: The items marked with an (*) in the tables can also be class 2 devices, as declared by the manufacturer.

Table B.1

Class	Application
	Telecommand/Telecontrol
3	Garage door openers
3	Car Lock/Unlock devices
1	Remote control, models - planes
2	Remote control, models - ships, cars, etc.
3	Remote control toys general
3	Radio remote control television, Audio, etc.
2	Remote control appliances and lighting, etc. for residential use only
3	RF door bell
3	Baby monitor
1	Remote control power and lighting
1	Remote surveillance switching
1	Remote control cranes, etc.
1	Remote control grass cutting tractors, etc.
1	Emergency shutdown controls
2	Level indicators

Table B.2

Class	Application
	Telemetry
1	Person identification*
2	Animal identification
2	Product identification
2	Cargo handling and/or store (warehouse) systems
2	Domestic telemetry
1	Telemetry in vehicles*
	Wireless sensing/measuring
1	Machine tools/robotics*
1	Fire detection
1	Crane weigher
1	Process control*
1	Position locator*
1	Mooring loads*
1	Wireless data communication*

Table B.3

Class	Application
	Alarms
1	Domestic security
2	Car alarms
2	Anti-theft
1	Guard systems
1	Personal security
1	Victims of avalanche
1	Elderly persons
1	Mental institutions, etc.
2	Building management systems
2	Radio call alert
1	Baby/nursery monitor - non domestic
2	Detection
2	Offender monitoring

Table B.4

Class	Application
	Other Applications
2	Video cordless terminals
2	Cordless local networks
2	Identification of rail wagons
1	Identification/Access control*
2	Domestic transmission of sound and vision
1	Medical telemetry*
2	Deaf education systems
2	Surface probing radar
2	Vehicle detection/monitoring

Annex C (informative): Bibliography

ETSI EN 300 220-1: "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; Part 1: Technical characteristics and test methods".

ETSI EN 300 330-1: "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".

ETSI EN 300 440-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics and test methods".

History

Document history		
V1.2.1	August 2000	Publication
V1.3.1	April 2001	Public Enquiry PE 20010817: 2001-04-18 to 2001-08-17
V1.3.1	September 2001	Vote V 20011109: 2001-09-10 to 2001-11-09
V1.3.1	November 2001	Publication