

STN	Zariadenia s krátkym dosahom (SRD) Rádiové zariadenia vo frekvenčnom rozsahu od 9 kHz do 25 MHz a systémy s indukčnou slučkou vo frekvenčnom rozsahu od 9 kHz do 30 MHz Harmonizovaná norma vzťahujúca sa na základné požiadavky podľa článku 3.2 smernice 2014/53/EÚ	STN EN 300 330 V2.1.1 87 0330
------------	--	---

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; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 01/18

Obsahuje: EN 300 330 V2.1.1:2017

125977

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2018
Podľa zákona č. 264/1999 Z. z. o technických požiadavkách na výrobky a o posudzovaní zhody a o zmene a doplnení niektorých zákonov v znení neskorších predpisov sa slovenská technická norma a časti slovenskej technickej normy môžu rozmnožovať alebo rozširovať len so súhlasom slovenského národného normalizačného orgánu.

ETSI EN 300 330 V2.1.1 (2017-02)



HARMONISED EUROPEAN STANDARD

**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;
Harmonised Standard covering the essential requirements
of article 3.2 of Directive 2014/53/EU**

Reference

REN/ERM-TG28-507

Keywords

harmonised standard, radio, RFID, 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

Important noticeThe present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (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
<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:
<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2017.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI 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	8
Foreword.....	8
Modal verbs terminology.....	8
Introduction	9
1 Scope	10
2 References	11
2.1 Normative references	11
2.2 Informative references.....	11
3 Definitions, symbols and abbreviations	12
3.1 Definitions	12
3.2 Symbols.....	13
3.3 Abbreviations	13
4 Technical requirements specifications	14
4.1 Environmental conditions.....	14
4.2 General	14
4.2.1 General performance criteria	14
4.2.2 Presentation of equipment for testing purposes	14
4.2.2.0 General	14
4.2.2.1 Choice of model for testing.....	15
4.2.2.2 Testing of equipment with alternative radiated H-field strengths	15
4.2.2.3 Testing of equipment that does not have an external 50 Ω RF connector (integral antenna equipment)	15
4.2.2.3.1 Equipment with an internal permanent or temporary antenna connector	15
4.2.2.3.2 Equipment with a temporary antenna connector	15
4.2.2.4 On-site testing	16
4.2.3 Mechanical and electrical design	16
4.2.3.1 General	16
4.2.3.2 Controls	16
4.2.3.3 Transmitter shut-off facility	16
4.2.3.4 Receiver mute or squelch	16
4.3 Transmitter conformance requirements.....	16
4.3.1 Permitted range of operating frequencies	16
4.3.1.1 Applicability.....	16
4.3.1.2 Description	16
4.3.1.3 Limits	16
4.3.1.4 Conformance.....	16
4.3.2 Operating frequency ranges	16
4.3.2.1 Applicability.....	16
4.3.2.2 Description	17
4.3.2.3 Limits	17
4.3.2.4 Conformance.....	17
4.3.3 Modulation bandwidth.....	17
4.3.3.1 Applicability.....	17
4.3.3.2 Description	17
4.3.3.3 Limits	17
4.3.3.4 Conformance.....	17
4.3.4 Transmitter H-field requirements	18
4.3.4.1 Applicability.....	18
4.3.4.2 Description	18
4.3.4.3 Limits	18
4.3.4.4 Conformance.....	19
4.3.5 Transmitter RF carrier current	19
4.3.5.1 Applicability.....	19
4.3.5.2 Description.....	19

4.3.5.3	Limits	19
4.3.5.4	Conformance	20
4.3.6	Transmitter radiated E-field	20
4.3.6.1	Applicability	20
4.3.6.2	Description	20
4.3.6.3	Limits	20
4.3.6.4	Conformance	20
4.3.7	Transmitter conducted spurious emissions	20
4.3.7.1	Applicability	20
4.3.7.2	Description	20
4.3.7.3	Limits	21
4.3.7.4	Conformance	21
4.3.8	Transmitter radiated spurious domain emission limits < 30 MHz	21
4.3.8.1	Applicability	21
4.3.8.2	Description	21
4.3.8.3	Limits	21
4.3.8.4	Conformance	21
4.3.9	Transmitter radiated spurious domain emission limits > 30 MHz	21
4.3.9.1	Applicability	21
4.3.9.2	Description	22
4.3.9.3	Limits	22
4.3.9.4	Conformance	22
4.3.10	Transmitter Frequency stability	22
4.3.10.1	Applicability	22
4.3.10.2	Description	22
4.3.10.3	Limits	22
4.3.10.4	Conformance	22
4.4	Receiver Conformance requirements	23
4.4.1	General	23
4.4.2	Receiver spurious emissions	23
4.4.2.1	Applicability	23
4.4.2.2	Description	23
4.4.2.3	Limits	23
4.4.2.4	Conformance	23
4.4.3	Adjacent channel selectivity	24
4.4.3.1	Applicability	24
4.4.3.2	Description	24
4.4.3.3	Limits	24
4.4.3.4	Conformance	24
4.4.4	Receiver blocking or desensitization	24
4.4.4.1	Applicability	24
4.4.4.2	Description	24
4.4.4.3	Limits	25
4.4.4.4	Conformance	25
5	Testing for compliance with technical requirements	25
5.1	Environmental conditions for testing	25
5.2	General conditions for testing	25
5.2.1	Product information	25
5.3	Normal and extreme test conditions	25
5.4	Test power source	26
5.4.0	General	26
5.4.1	External test power source	26
5.4.2	Internal test power source	26
5.5	Normal test conditions	26
5.5.1	Normal temperature and humidity	26
5.5.2	Normal test power source	26
5.5.2.1	Mains voltage	26
5.5.2.2	Regulated lead-acid battery power sources	27
5.5.2.3	Other power sources	27
5.6	Extreme test conditions	27
5.6.1	Extreme temperatures	27

5.6.1.1	Procedure for tests at extreme temperatures.....	27
5.6.1.1.0	General	27
5.6.1.1.1	Procedure for equipment designed for continuous operation	27
5.6.1.1.2	Procedure for equipment designed for intermittent operation	27
5.6.1.2	Extreme temperature ranges.....	28
5.6.2	Extreme test source voltages.....	28
5.6.2.1	Mains voltage	28
5.6.2.2	Regulated lead-acid battery power sources	28
5.6.2.3	Power sources using other types of batteries.....	28
5.6.2.4	Other power sources.....	28
5.7	Auxiliary test equipment	29
5.8	Normal test signals and test modulation.....	29
5.8.0	General.....	29
5.8.1	Normal test signals for analogue speech.....	29
5.8.2	Normal test signals for data	29
5.9	Artificial antenna.....	29
5.9.0	General.....	29
5.9.1	Artificial antenna for inductive transmitters (non 50 Ω).....	29
5.9.2	Artificial antenna for transmitters with 50 Ω impedance connector	30
5.10	Test fixture	30
5.11	Test sites and general arrangements for radiated measurements	31
5.12	Measuring receiver	31
5.13	Measurement uncertainty	31
5.14	Interpretation of the measurement results	32
5.14.0	General.....	32
5.14.1	Measurement uncertainty is equal to or less than maximum acceptable uncertainty.....	32
6	Conformance methods of measurement for transmitters and receivers	32
6.1	Transmitter requirements	32
6.1.1	Transmitter definitions.....	32
6.1.2	Equipment Product Classes	33
6.1.3	Modes of operation of the transmitter.....	33
6.2	Conformance methods of measurement for transmitter	33
6.2.1	General.....	33
6.2.2	Operating frequency ranges	33
6.2.2.1	General	33
6.2.2.2	OFR measurement with spectrum analyser.....	34
6.2.3	Modulation bandwidth.....	34
6.2.4	Transmitter H-field	35
6.2.5	Transmitter RF carrier current	35
6.2.6	Transmitter radiated E-field.....	35
6.2.7	Transmitter conducted spurious emissions	35
6.2.7.1	Transmitter conducted spurious emissions < 30 MHz	35
6.2.7.2	Transmitter conducted spurious emissions \geq 30 MHz	36
6.2.8	Transmitter radiated spurious domain emission limits < 30 MHz	36
6.2.9	Transmitter radiated spurious domain emission limits > 30 MHz	36
6.2.10	Transmitter Frequency stability under low voltage conditions	37
6.2.10.1	Test conditions	37
6.3	Conformance methods of measurement for receiver.....	37
6.3.1	Receiver spurious emissions	37
6.3.2	Adjacent channel selectivity	38
6.3.3	Receiver blocking or desensitization	38
6.3.3.1	Measurement for channelized, narrowband or broadband equipment.....	38
6.3.3.2	Measurement for tagging systems.....	39
Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	40
Annex B (normative):	Transmitter definitions.....	42
B.1	Transmitter definitions	42
B.1.0	General	42

B.1.1	The inductive loop coil transmitters	42
B.1.2	The large size loop transmitters	42
B.1.3	Other transmitters	42
B.2	Product Classes	42
B.2.0	General	42
B.2.1	Product Class 1	43
B.2.2	Product Class 2	43
B.2.3	Product Class 3	43
B.2.4	Product Class 4	44
Annex C (normative):	Radiated measurement.....	46
C.0	General	46
C.1	Test sites and general arrangements for measurements involving the use of radiated fields	46
C.1.0	Test sites	46
C.1.1	Anechoic chamber	46
C.1.2	Anechoic chamber with a conductive ground plane	47
C.1.3	Open Area Test Site (OATS)	49
C.1.3.0	General for OATS	49
C.1.3.1	Measurements below 30 MHz	49
C.1.3.2	Measurements above 30 MHz	49
C.1.4	Test antenna	50
C.1.5	Substitution antenna	51
C.1.6	Measuring antenna	51
C.2	Guidance on the use of radiation test sites	51
C.2.0	General	51
C.2.1	Verification of the test site	51
C.2.2	Preparation of the EUT	51
C.2.3	Power supplies to the EUT	52
C.2.4	Range length	52
C.2.4.1	Far-field length above 30 MHz	52
C.2.4.2	Near-field and Far-field length below 30 MHz	53
C.2.5	Site preparation	53
C.3	Coupling of signals	53
C.3.1	General	53
C.3.2	Data signals	53
C.4	Standard test position	54
C.5	Test fixture	54
C.5.0	Usage Test fixture	54
C.5.1	Description	54
C.5.2	Calibration	55
C.5.3	Mode of use	56
C.6	Technical performance of the spectrum analyser	56
Annex D (normative):	H-field limit correction factor for generated E-fields.....	57
Annex E (normative):	Customized loop antennas.....	58
E.1	Product classes related to the antenna loop	58
E.2	Antenna loops below 1 MHz	58
E.3	Antenna loops above 1 MHz	59
Annex F (informative):	Artificial antenna for measuring inductive transmitter carrier and harmonic currents (Product Class 3 only).....	60
Annex G (informative):	E-fields in the near field at low frequencies.....	62

Annex H (normative):	H-field measurements and limits at 3 m and 30 m	64
H.0	General	64
H.1	Limits for measurements at 30 m distance	64
H.2	Limits for measurements at 3 m distance	65
Annex I (normative):	Transmitter emission levels and spectrum mask measurements.....	67
Annex J (normative):	Generic inductive loop limits in the frequency range 148,5 kHz to 30 MHz	70
J.1	Introduction	70
J.2	Radiated H-field strength	70
J.2.1	Methods of measurements.....	70
J.2.2	Radiated H-field strength limit.....	70
J.2.2.1	Radiated total H-field and H-field density limits according to the measurements in clause J.2.1 indent a)	70
J.2.2.2	Radiated bandwidth and H-field density limits according to the measurements in clause J.2.1 indent b)	71
Annex K (informative):	Determination and use of the measurement bandwidth.....	72
Annex L (informative):	Bibliography	73
Annex M (informative):	Change History	76
History		77

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 (<https://ipr.etsi.org/>).

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 Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.11] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.4].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive and associated EFTA regulations.

National transposition dates	
Date of adoption of this EN:	23 January 2017
Date of latest announcement of this EN (doa):	30 April 2017
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 October 2017
Date of withdrawal of any conflicting National Standard (dow):	31 October 2018

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The present document has been prepared to conform to the requirements of the new Radio Equipment Directive (RED) [i.4].

The present document is structured as follows:

- Clause 2 provides references.
- Clause 3 provides definitions, symbols and abbreviations.
- Clause 4 provides technical requirements specifications.
- Clause 5 provides the testing procedures for compliance with technical requirements.
- Clause 6 provides conformance methods of measurement for transmitters and receivers.
- Annex A (informative): Relationship between the present document and the essential requirements of Directive 2014/53/EU.
- Annex B (normative): Transmitter definitions.
- Annex C (normative): Radiated measurement.
- Annex D (normative): H-field limit correction factor for generated E-fields.
- Annex E (normative): Customized loop antennas.
- Annex F (informative): Artificial antenna for measuring inductive transmitter carrier and harmonic currents (Product Class 3 only).
- Annex G (informative): E-fields in the near field at low frequencies.
- Annex H (normative): H-field measurements and limits at 3 m and 30 m.
- Annex I (normative): Transmitter emission levels and spectrum mask measurements.
- Annex J (normative): Generic inductive loop limits in the frequency range 148,5 kHz to 30 MHz.
- Annex K (informative): Determination and use of the measurement bandwidth.
- Annex L (informative): Bibliography.
- Annex M (informative): Change History.

1 Scope

The present document specifies technical characteristics and methods of measurements for the following Short Range Device major equipment types:

- 1) Generic Short range Devices including transmitters and receivers operating in the range from 9 kHz to 25 MHz; and
- 2) inductive loop transmitters and receivers operating from 9 kHz to 30 MHz including Radio Frequency Identification (RFID), Near Field Communication (NFC) and Electronic Article Surveillance (EAS) operating in LF and HF ranges.

Also the present document covers fixed, mobile and portable stations.

NOTE: If a system includes transponders, these are measured together with the transmitter.

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.

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 MHz to 30 MHz	Inductive devices, Generic use
Transmit and Receive	3 155 kHz to 3 400 kHz	Inductive devices, Generic use
Transmit and Receive	984 kHz to 7 484 kHz (Note 3, Centre frequency is 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	11,810 MHz to 15,310 MHz (Centre frequency is 13,56 MHz)	RFID only
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	27,090 MHz to 27,100 MHz	Inductive devices, Railway applications
NOTE 1: 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.		
NOTE 2: On non-harmonised 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.		
NOTE 3: Transmitting only on receipt of a Balise/Eurobalise tele-powering signal from a train.		

The frequency ranges and limits of the present document are based on the European Commission Decision for SRDs [i.10], CEPT/ERC/REC 70-03 [i.1].

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 radio equipment, covered by the present document is divided into several classes which are dependent on the antenna used (see annex B). 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 conducted power.

The present document covers the essential requirements of article 3.2 of Directive 2014/53/EU [i.4] under the conditions identified in annex A.

2 References

2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://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.

The following referenced documents are necessary for the application of the present document.

- [1] Void.
- [2] CISPR 16-1-4:2010+AMD1:2012: "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] CEPT/ERC/REC 70-03: "Relating to the use of Short Range Devices (SRD)".
- [i.2] Recommendation ITU-T 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] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC Text with EEA relevance.
- [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.
- [i.9] ETSI TR 103 059 (V1.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short-Range Devices (SRD) for operation in the 13,56 MHz band; System Reference Document for Radio Frequency Identification (RFID) equipment".
- [i.10] Commission Decision 2013/752/EC on harmonisation of the radio spectrum for use by short-range devices as amended by subsequent Commission Decisions.
- [i.11] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.
- [i.12] Recommendation ITU-T O.41: "Psophometer for use on telephone-type circuits".
- [i.13] ITU Radio Regulations.
- [i.14] ETSI TR 100 028 (all parts) (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

koniec náhľadu – text ďalej pokračuje v platenej verzii STN