

ETSI EN 303 204 V2.1.2 (2016-09)



**Network Based Short Range Devices (SRD);
Radio equipment to be used in the 870 MHz to 876 MHz
frequency range with power levels ranging up to 500 mW;
Harmonised Standard covering the essential requirements
of article 3.2 of the Directive 2014/53/EU**

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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
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Contents

Intellectual Property Rights	9
Foreword.....	9
Modal verbs terminology.....	9
Introduction	9
1 Scope	12
2 References	12
2.1 Normative references	12
2.2 Informative references.....	13
3 Definitions, symbols and abbreviations	13
3.1 Definitions	13
3.2 Symbols.....	15
3.3 Abbreviations	16
4 Technical requirements specifications	16
4.1 Environmental profile.....	16
4.2 General requirements	17
4.2.1 General considerations.....	17
4.2.2 Performance criteria.....	17
4.2.3 Limits.....	17
4.3 Requirements for transmitters	18
4.3.1 Frequency Tolerance.....	18
4.3.1.1 Applicability.....	18
4.3.1.2 Description	18
4.3.1.3 Limits	18
4.3.1.4 Conformance.....	18
4.3.2 Effective radiated power	18
4.3.2.1 Applicability.....	18
4.3.2.2 Description	18
4.3.2.3 Limits	18
4.3.2.4 Conformance.....	18
4.3.3 Transient power	19
4.3.3.1 Applicability.....	19
4.3.3.2 Description	19
4.3.3.3 Limits	19
4.3.3.4 Conformance.....	19
4.3.4 Occupied bandwidth	19
4.3.4.1 Applicability.....	19
4.3.4.2 Description	19
4.3.4.3 Limits	19
4.3.4.4 Conformance.....	19
4.3.5 Unwanted emissions in the out-of-band domain.....	20
4.3.5.1 Applicability.....	20
4.3.5.2 Description	20
4.3.5.3 Limits	21
4.3.5.4 Conformance.....	21
4.3.6 Unwanted emissions in the spurious domain	21
4.3.6.1 Applicability.....	21
4.3.6.2 Description	22
4.3.6.3 Limits	22
4.3.6.4 Conformance.....	22
4.3.7 Frequency stability under low-voltage conditions	22
4.3.7.1 Applicability.....	22
4.3.7.2 Description	22
4.3.7.3 Limits	23
4.3.7.4 Conformance.....	23

4.3.8	Duty cycle	23
4.3.8.1	Applicability	23
4.3.8.2	Description	23
4.3.8.3	Duty cycle	23
4.3.8.4	Short term behaviour	23
4.3.8.5	Limits	24
4.3.8.6	Conformance	24
4.3.9	Automatic/Adaptive Power Control	24
4.3.9.1	Applicability	24
4.3.9.2	Description	24
4.3.9.3	Limits	24
4.3.9.4	Conformance	24
4.4	Requirements for receivers	24
4.4.1	Receiver sensitivity	24
4.4.1.1	Applicability	24
4.4.1.2	Description	24
4.4.1.3	Limits	25
4.4.1.4	Conformance	25
4.4.2	Clear channel assessment threshold	25
4.4.2.1	Applicability	25
4.4.2.2	Description	25
4.4.2.3	Limits	25
4.4.2.4	Conformance	25
4.4.3	Adjacent channel selectivity	25
4.4.3.1	Applicability	25
4.4.3.2	Description	26
4.4.3.3	Limits	26
4.4.3.4	Conformance	26
4.4.4	Blocking	26
4.4.4.1	Applicability	26
4.4.4.2	Description	26
4.4.4.3	Limits	26
4.4.4.4	Conformance	26
4.4.5	Receiver spurious radiations	26
4.4.5.1	Applicability	26
4.4.5.2	Description	27
4.4.5.3	Limits	27
4.4.5.4	Conformance	27
4.5	Requirements for spectrum access	27
4.5.1	General limits	27
4.5.2	Listen before talk	27
4.5.2.1	Applicability	27
4.5.2.2	Description	27
4.5.2.3	Limits	28
4.5.2.4	Conformance	28
4.6	Other requirements	28
4.6.1	Channel adaptivity	28
4.6.1.1	Applicability	28
4.6.1.2	Description	28
4.6.1.3	Limits	28
4.6.1.4	Conformance	28
4.6.2	Short control signalling transmissions	28
4.6.2.1	Applicability	28
4.6.2.2	Description	29
4.6.2.3	Limits	29
4.6.2.4	Conformance	29
4.6.3	Coordination of network relay points	29
4.6.3.1	Applicability	29
4.6.3.2	Description	29
4.6.3.3	Limits	29
4.6.3.4	Conformance	30

5	Testing for compliance with technical requirements.....	30
5.1	Environmental conditions for testing	30
5.2	General conditions for testing	30
5.2.1	General considerations.....	30
5.2.2	Provider declared information	30
5.2.3	Presentation of equipment for testing purposes	31
5.2.3.1	General Considerations	31
5.2.3.2	Choice of model for testing.....	31
5.2.3.2.1	General considerations	31
5.2.3.2.2	EUT with an external RF connector.....	32
5.2.3.2.3	EUT without an external RF connector.....	32
5.2.3.3	Testing of modular equipment	32
5.2.3.4	Transmitter shut-off facility	33
5.2.3.5	Battery saving circuit	33
5.2.3.6	Test power source	33
5.2.3.6.1	General considerations	33
5.2.3.6.2	External test power source.....	33
5.2.3.6.3	Internal test power source.....	33
5.2.4	Normal and extreme test conditions.....	33
5.2.4.1	Normal temperature and humidity	33
5.2.4.2	Extreme temperatures.....	34
5.2.4.2.1	Procedure for tests at extreme temperatures.....	34
5.2.4.2.2	Procedure for equipment designed for continuous operation	34
5.2.4.2.3	Procedure for equipment designed for intermittent operation	34
5.2.4.2.4	Extreme temperature ranges	34
5.2.4.3	Normal test power source.....	35
5.2.4.3.1	Mains voltage	35
5.2.4.3.2	Regulated lead-acid battery power sources	35
5.2.4.3.3	Other power sources	35
5.2.4.4	Extreme test source voltages	35
5.2.4.4.1	Mains voltage	35
5.2.4.4.2	Regulated lead-acid battery power sources	35
5.2.4.4.3	Power sources using other types of batteries.....	35
5.2.4.4.4	Other power sources	36
5.2.5	Conducted measurements	36
5.2.5.1	Artificial antenna.....	36
5.2.5.2	Voltage Standing Wave Ratio (VSWR).....	36
5.2.6	Radiated measurements	36
5.2.7	Measuring receiver	36
5.2.7.1	General considerations.....	36
5.2.7.2	Reference Bandwidth.....	37
5.2.8	Transmitter test signals	37
5.2.9	Applicable measurement methods	38
5.2.10	Modes of operation	39
5.2.10.1	Test mode.....	39
5.2.10.2	Transmitter operation.....	39
5.2.10.3	Testing of multi-frequency or channel agile equipment.....	40
5.2.10.4	Non-uniform maximum transmit power.....	40
5.3	Interpretation of the measurement results	40
5.4	Conformance methods of measurement for transmitters.....	41
5.4.1	Frequency tolerance.....	41
5.4.1.1	Test conditions	41
5.4.1.2	Radiated measurement	41
5.4.1.3	Conducted measurement	41
5.4.1.4	Alternate conducted measurement	41
5.4.1.5	Measurement procedure	42
5.4.2	Effective radiated power	42
5.4.2.1	Test conditions	42
5.4.2.2	Radiated measurement procedure	43
5.4.2.3	Conducted measurement procedure	43
5.4.3	Transient power	44
5.4.3.1	Test conditions	44

5.4.3.2	Radiated measurement	44
5.4.3.3	Conducted measurement	45
5.4.3.4	Measurement procedure	45
5.4.4	Occupied bandwidth	46
5.4.4.1	Test conditions	46
5.4.4.2	Radiated measurement	46
5.4.4.3	Conducted measurement	46
5.4.4.4	Alternate conducted measurement	46
5.4.4.5	Measurement procedure	47
5.4.5	Unwanted emissions in the out-of-band domain	48
5.4.5.1	Test conditions	48
5.4.5.2	Radiated measurement	48
5.4.5.3	Conducted measurement	48
5.4.5.4	Measurement procedure	48
5.4.6	Unwanted emissions in the spurious domain	50
5.4.6.1	Test conditions	50
5.4.6.2	Radiated measurement	50
5.4.6.3	Alternate Radiated measurement	50
5.4.6.4	Conducted measurement	51
5.4.6.5	Measurement procedure	51
5.4.6.5.1	Conducted measurement	51
5.4.6.5.2	Radiated measurement	52
5.4.7	Frequency stability under low-voltage conditions	53
5.4.7.1	Test conditions	53
5.4.7.2	Radiated measurement	53
5.4.7.3	Conducted measurement	53
5.4.7.4	Alternate conducted measurement	53
5.4.7.5	Measurement procedure	53
5.4.8	Duty cycle	54
5.4.8.1	(Long Term Duty Cycle)	54
5.4.8.1.1	Measurement procedure	54
5.4.8.2	(Short Term Duty Cycle)	54
5.4.8.2.1	Test conditions	54
5.4.8.2.2	Radiated measurement	54
5.4.8.2.3	Conducted measurement	55
5.4.8.2.4	Alternate conducted measurement	55
5.4.8.2.5	Measurement procedure	55
5.4.9	Automatic / Adaptive Power Control	56
5.4.9.1	Test conditions	56
5.4.9.2	Radiated measurement	56
5.4.9.3	Conducted measurement	56
5.4.9.4	Measurement procedure	56
5.5	Conformance test suites for receivers	57
5.5.1	Receiver sensitivity	57
5.5.1.1	Test Conditions	57
5.5.1.2	Radiated measurement	58
5.5.1.3	Conducted measurement	58
5.5.1.4	Measurement procedure	58
5.5.2	Clear channel assessment threshold	59
5.5.2.1	Test conditions	59
5.5.2.2	Radiated measurement	59
5.5.2.3	Conducted measurement	59
5.5.2.4	Measurement procedure	60
5.5.3	Adjacent channel selectivity	61
5.5.3.1	Test conditions	61
5.5.3.2	Radiated measurement	61
5.5.3.3	Conducted measurement	61
5.5.3.4	Measurement procedure	62
5.5.4	Blocking	62
5.5.4.1	Test conditions	62
5.5.4.2	Radiated measurement	63
5.5.4.3	Conducted measurement	63

5.5.4.4	Measurement procedure	63
5.5.5	Receiver spurious radiation.....	64
5.5.5.1	Test conditions	64
5.5.5.2	Radiated measurement	64
5.5.5.3	Alternate radiated measurement.....	65
5.5.5.4	Conducted measurement	65
5.5.5.5	Measurement procedure	65
5.5.5.5.1	Conducted measurement.....	65
5.5.5.5.2	Radiated measurement.....	65
5.6	Conformance test suites for spectrum access	66
5.6.1	Listen before talk	66
5.6.1.1	Measurement procedure	66
5.7	Other test suites	66
5.7.1	Transmitter test suites	66
5.7.2	Receiver test suites.....	66
5.7.3	Polite spectrum access test suites.....	67
5.7.3.1	Channel adaptivity	67
5.7.3.1.1	Measurement procedure	67
5.7.3.2	Short control signalling transmissions	67
5.7.3.2.1	Measurement procedure	67
5.7.3.3	Coordination of network relay points.....	67
5.7.3.3.1	Measurement procedure	67
Annex A (normative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	68
Annex B (normative):	Test sites and arrangements for radiated measurement	70
B.1	General considerations	70
B.2	Radiation test sites.....	70
B.2.1	Open Area Test Site (OATS)	70
B.2.2	Semi Anechoic Room.....	71
B.2.3	Fully Anechoic Room (FAR).....	72
B.2.4	Measurement Distance	73
B.3	Antennae.....	74
B.3.1	General considerations	74
B.3.2	Measurement antenna.....	74
B.3.3	Substitution antenna	74
B.4	Guidance on the use of radiation test sites	75
B.4.1	General considerations	75
B.4.2	Power supplies for the battery powered EUT.....	75
B.4.3	Site preparation	75
B.5	Coupling of signals.....	76
B.5.1	General	76
B.5.2	Data signals	76
B.6	Measurement procedures for radiated measurement.....	76
B.6.1	General considerations	76
B.6.2	Radiated measurements in an OATS or SAR.....	76
B.6.3	Radiated measurements in a FAR	77
B.6.4	Substitution measurement	77
B.7	Guidance for testing technical requirements	78
B.7.1	Essential radio test suites and corresponding test sites.....	78
Annex C (normative):	Test fixture	79
C.1	General considerations	79
C.2	Validation of the test-fixture in the temperature chamber.....	80
C.3	Mode of use.....	82

Annex D (normative):	Technical performance of the spectrum analyser	83
Annex E (informative):	Bibliography	84
Annex F (informative):	Change History	85
History		86

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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.8] 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.1].

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 latest announcement of this EN (doa):	31 December 2016
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Date of withdrawal of any conflicting National Standard (dow):	31 December 2019

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).

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Introduction

The present document defines technical requirements to support the essential requirements of clause 3.2 of the Directive 2014/53/EU (Radio Equipment Directive) [i.1] which states "*radio equipment shall be so constructed that it both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference*".

The present document describes performance requirements and conformance test procedures for licence exempt Short Range Devices (SRDs) intending to use the frequency range 870 MHz - 876 MHz at power levels up to 500 mW and duty cycle up to 2,5 %. The frequency band is shared with other SRDs intended to support applications with more restrictive power levels and duty cycles as well as ER-GSM [i.4] assigned to the frequency range 873 MHz - 876 MHz. Less restrictive duty cycle limits may apply to certain infrastructure SRDs (Network Relay Points).

Equipment covered by the present document may operate on a specific frequency or may be channel agile and operate on a number of different frequencies:

- Channel agile SRDs operate on two or more channels with signals constrained to the same limits as non-agile devices.

Transmitter requirements include:

- Frequency accuracy and occupied bandwidth constraints to precisely locate the signal.
- Signal masks to ensure satisfactory out-of-band characteristics both within the operating frequency band and to protect frequencies above and below the operating frequency band.
- Transient emissions from switching of the radio transmitter on and off as occurs at the start and end of each packet or data transmission.
- Spurious domain behaviour to limit potential interference in frequencies far from the operating channel.
- Adaptive/automatic power control to reduce transmitted power in strong link conditions.

Taking into account that equipment operating channel widths are between 25 kHz and 200 kHz in a frequency range without specific centre frequency raster, receiver performance is assured by a combination of sensitivity and blocking:

- Sensitivity behaviour to ensure equipment operates effectively in the presence of other signals in, or overlapping, the operating channel.
- Adjacent channel selectivity performance to ensure equipment operates effectively in the presence of unwanted signals in frequencies adjacent to the operating channel.
- Blocking performance to ensure equipment operates effectively in the present of unwanted signals beyond the adjacent channels.

Equipment employing listen-before-talk procedures is subject to requirements governing channel sensing:

- Clear channel assessment threshold performance to ensure deferral in the presence of other signals, balanced by the sensitivity requirement to avoid unnecessary deferral where harmful interference would be unlikely.

Equipment is subject to duty cycle limits for both overall (long term) operation in the operational frequency band and over short intervals on any specific operating channel.

- Signal transmissions are constrained in maximum duration and devices are required to wait for specified intervals before again transmitting in a given channel. After transmission limits have been reached on a specific channel, channel agile device operation may continue on a different channel whilst respecting the limits on each channel and overall limits applicable in the operational frequency band.

Other constraints are defined for devices operating within range of ER-GSM [i.4] services operating within 873 - 876 MHz:

- When deployed in locations where GSM-R services are in operation, devices may implement cognitive procedures such as sensing the medium for GSM-R signalling information, or use a priori information from GSM-R operators to determine if additional sharing mechanisms are needed. In such cases, the preferred values of operating frequency should align with the channel raster of ER-GSM [i.4] to minimize potential interference.

The present document is intended to promote equitable sharing of the radio resource amongst a variety of devices and intended uses:

- Spectrum sharing is enhanced when transmissions occupy their channel for the shortest time. The specifications included in the present document are not intended for devices operating at low data rates and in narrow operating channels.
- Although no specific mechanism is defined, implementations which distribute devices uniformly over the available channels are preferred. Examples of suitable radio specifications and medium access techniques which promote such behaviour can be found in ETSI TS 102 887-1 [i.5], ETSI TS 102 887-2 [i.6] and FCC Part 15.247 Regulations [i.7].
- Other 'polite' spectrum access mechanisms are also described in the present document to emphasize the need to design for effective use of the shared spectrum.

The present document is structured as follows:

- Clause 1 provides a general description of the types of equipment covered by the present document.
- Clause 2 provides normative and informative references.
- Clause 3 provides the definitions of terms and abbreviations used in the present document.
- Clause 4 specifies the technical requirements.
- Clause 5 specifies the tests and general conditions for testing the conformance of the device to the technical requirements.
- Annex A (normative) provides the relationship between the present document and the essential requirements of the Directive 2014/53/EU [i.1].
- Annex B (normative) provides specifications concerning radiated measurements.
- Annex C (normative) contains specifications for the test fixture.
- Annex D (normative) provides the spectrum analyser specification.
- Annex E (informative) provides references to other supplementary information.

1 Scope

The present document applies to the following radio equipment types:

- 1) Network Based SRDs which are SRDs intended to operate in association with other SRDs to form network topologies supporting the intended application.
- 2) Network Relay Points which are specific Network Based SRDs supporting interconnection of a network of SRDs with an external network or service.

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

Table 1a: Frequency bands designated to Network Based Short Range Devices

Network Based SRD frequency bands	
Transmit	870,00 MHz to 875,6 MHz
Receive	870,00 MHz to 875,6 MHz

NOTE 1: The availability of the frequency band in Table 1a in European Union and CEPT countries can be obtained from the EFIS (<http://www.efis.dk/>) and is also listed in Appendices 1 and 3 of REC 70-03 [i.2].

NOTE 2: In addition, it should be noted that other frequency bands may be available for network based short range devices in a country. See National Radio Interfaces (NRI) as relevant for additional guidance.

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 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.

The present document covers equipment intended for use in a fixed location, equipment normally fixed in a vehicle and equipment intended to be carried or attached.

The present document contains requirements to demonstrate that radio equipment both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference.

2 References

2.1 Normative 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.

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.

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

- [1] Recommendation ITU-T O.153 (10-1992): "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [2] 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".

- [3] CISPR 16 (parts 1-1 and 1-4 (2010) part 1-5 (2014)): "Specification for radio disturbance and immunity measuring apparatus and methods; Part 1: Radio disturbance and immunity measuring apparatus".
- [4] ETSI TR 102 273 (all parts) (V1.2.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties".

2.2 Informative references

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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] 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.
- [i.2] CEPT/ERC/REC 70-03: "Relating to the use of Short Range Devices (SRD)".
- [i.3] Void.
- [i.4] UIC Code 951 (Version 15.3.0, 2012): "European Integrated Railway Radio Enhanced Network, System Requirements Specification".
- [i.5] ETSI TS 102 887-1 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Smart Metering Wireless Access Protocol; Part 1: PHY layer".
- [i.6] ETSI TS 102 887-2 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Smart Metering Wireless Access Protocol; Part 2: Data Link Layer (MAC Sub-layer)".
- [i.7] "Code of Federal Regulations, Title 47 - Telecommunications, Section 15.247 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz".

NOTE: Available at <http://www.gpo.gov/fdsys/pkg/CFR-2005-title47-vol1/xml/CFR-2005-title47-vol1-sec15-247.xml>.

- [i.8] 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.

3 Definitions, symbols and abbreviations

3.1 Definitions

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

adjacent channel: frequency band equal to the width of the operating channel on either side of the operating channel