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**Omrežne naprave kratkega dosega (SRD) - Radijska oprema, ki se uporablja v frekvenčnem območju od 870 MHz do 876 MHz z močnostnimi nivoji do največ 500 mW - Harmonizirani standard, ki zajema bistvene zahteve člena 3.2 direktive 2014/53/EU**

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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**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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## 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.

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| National transposition dates   |                  |
|--|------------------|
| Date of latest announcement of this EN (doa):  | 31 December 2016 |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 30 June 2017     |
| Date of withdrawal of any conflicting National Standard (dow):                         | 31 December 2019 |

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## 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.

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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 presence 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.

[SIST EN 303 204 V2.1.2:2016](https://standards.iteh.ai/catalog/standards/sist/72baf00-2441-45d9-bff1-)  
<https://standards.iteh.ai/catalog/standards/sist/72baf00-2441-45d9-bff1->

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

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] 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".  
<https://standards.iteh.ai/catalog/standards/sist/72baf00-2441-45d9-bff1-355555555555/sist-102-887-1-v1-1-1>
- [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.

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## 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