ICS 33.060.20 SLOVENSKÁ TECHNICKÁ NORMA Máj 2015

STN	**Elektromagnetická kompatibilita a záležitosti rádiového spektra (ERM). Sieťové zariadenia s krátkym dosahom (SRD). Rádiové zariadenia na použitie vo frekvenčnom rozsahu od 870 MHz do 876 MHz s výkonom do 500 mW. Časť 1: Technické charakteristiky a skúšobné metódy**	**STN EN 303 204-1 V1.1.1** 87 3204

Electromagnetic compatibility and Radio spectrum Matters (ERM); 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; Part 1: Technical characteristics and test methods

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. 04/15

Obsahuje: EN 303 204-1 V1.1.1:2014

120577

ETSI EN 303 204-1 V1.1.1 (2014-10)

Electromagnetic compatibility and Radio spectrum Matters (ERM); 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; Part 1:Technical characteristics and test methods

Reference
DEN/ERM-TG28-503

Keywords
radio, SRD

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

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

The present document is part 1 of a multi-part deliverable covering 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, as identified below:

Part 1: "Technical characteristics and test methods";

Part 2: "Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

National transposition dates	
Date of adoption of this EN:	17 October 2014
Date of latest announcement of this EN (doa):	31 January 2015
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 July 2015
Date of withdrawal of any conflicting National Standard (dow):	31 July 2015

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**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 is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.2]. The modular structure is shown in EG 201 399 [i.5].

For non EU countries the present document may be used for regulatory (Type Approval) purposes.

The present document describes test and performance requirements for licence exempt Short Range Devices (SRDs) intending to use the frequency range 870 - 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.6] assigned to the frequency range 873 - 876 MHz. Less restrictive duty cycle limits may apply to certain infrastructure SRDs (Network Relay Points) under individual licence.

The present document defines signal and operating constraints within the frequency band as well as at the band edges and when devices operate within range of ER-GSM [i.6] services operating within 873 - 876 MHz:

- SRDs may operate on a specific frequency or may be channel agile and operate on a number of different frequencies. When operating as a system, frequency control should be sufficiently accurate to promote effective use of the spectrum as required by regulation. Transmitted signals are constrained within defined bandwidth limits. Frequency accuracy limits allow implementers to trade signal bandwidth for frequency accuracy in their designs.

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

- Although no channel raster is defined for either fixed frequency or channel agile SRDs, channel separation is limited by regulation to $\leq$ 200 kHz. A preferred regular channel raster of 200 kHz separation allows sub-divisions of 100 kHz, 50 kHz, etc. for lower data rate applications using narrower bandwidth signals.

- 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.6] to minimise potential interference.

- 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.

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 channel spacings.

- Specifications are included for devices implementing channel sensing before transmitting.

- 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 TS 102 887-1 [i.7] and TS 102 887-2 [i.8].

- Other 'polite' spectrum access mechanisms are also described in the present document to emphasise the need to design for effective use of the shared spectrum.

The present document is structured as follows:

- Clauses 1 and 3 provide a general description of the types of equipment covered by the present document and the definitions of terms and abbreviations used.

- Clause 4 provides details on presentation of equipment for testing.

- Clauses 5 and 6 specify the test and general conditions for testing of the device.

- Clause 7 specifies the spectrum utilization parameters of transmitters which are required to be measured. Its sub-clauses provide details on how the equipment should be tested and the conditions which should be applied.

- Clause 8 specifies receiver parameters.

- Clause 9 specifies polite spectrum access parameters.

- Clause 10 gives the maximum measurement uncertainty values.
- Annex A (normative) is Void.
- Annex B (normative) provides specifications concerning radiated measurements.
- Annex C (normative) contains specifications for the test fixture.
- Annex D (normative) is Void.
- Annex E (normative) provides the spectrum analyser specification.
- Annex F (informative) Bibliography covers 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 fixed Network Based SRDs supporting interconnection of a network of SRDs with an external network or service.

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

NOTE 2: In addition, it should be noted that other frequency bands may be available for networked short range devices in a country. See European Commission Decision on Short Range Devices [i.3] and CEPT/ERC/REC 70-03 [i.1] as implemented through National Radio Interfaces (NRI) or additional NRI as relevant.

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.

2 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 reference document (including any amendments) applies.

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

2.1 Normative references

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

[1] Recommendation ITU-T O.153: "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): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

2.2 Informative references

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] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).

[i.3] Commission Decision 2006/771/EC on harmonization of the radio spectrum for use by short-range devices as amended by subsequent Commission Decisions.

[i.4] CISPR 16 (2006) (parts 1-1, 1-4 and 1-5): "Specification for radio disturbance and immunity measuring apparatus and methods; Part 1: Radio disturbance and immunity measuring apparatus".

[i.5] ETSI EG 201 399 (V2.2.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".

[i.6] UIC Code 951 (Version 15.3.0, 2012): "European Integrated Railway Radio Enhanced Network, System Requirements Specification".

[i.7] 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.8] 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.9] ETSI TR 102 273-2 (V1.2.1): "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.10] ETSI TR 102 273-3 (V1.2.1): "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.11] ETSI TR 102 273-4 (V1.2.1): "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".