



SLOVENSKI STANDARD
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01-oktober-2020

Naprave kratkega dosega (SRD) - Radijska oprema za železniške sisteme Euroloop - Harmonizirani standard, ki zajema bistvene zahteve člena 3.2 direktive 2014/53/EU

Short Range Devices (SRD) - Radio equipment for Euroloop railway systems - Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

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**Short Range Devices (SRD);
Radio equipment for Euroloop communication systems;
Harmonised Standard for access to radio spectrum**

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Contents

Intellectual Property Rights	6
Foreword.....	6
Modal verbs terminology.....	6
Introduction	7
1 Scope	8
2 References	8
2.1 Normative references	8
2.2 Informative references.....	9
3 Definition of terms, symbols and abbreviations.....	10
3.1 Terms.....	10
3.2 Symbols.....	10
3.3 Abbreviations	10
4 Technical requirements specifications	11
4.1 Environmental profile.....	11
4.2 Transmitter conformance requirements.....	11
4.2.1 OBE TX field strength and Transmitter mask	11
4.2.1.1 Applicability.....	11
4.2.1.2 Limits	11
4.2.1.3 Conformance.....	11
4.2.2 OBE unwanted emissions	12
4.2.2.1 Applicability.....	12
4.2.2.2 Limits	12
4.2.2.3 Conformance.....	12
4.2.3 Trackside Equipment transmitter field strength.....	12
4.2.3.1 Applicability.....	12
4.2.3.2 Limits	12
4.2.3.3 Conformance.....	12
4.2.4 Trackside Equipment transmitter mask.....	12
4.2.4.1 Applicability.....	12
4.2.4.2 Limit.....	13
4.2.4.3 Conformance.....	13
4.3 Receiver Conformance requirements	13
4.3.1 OBE Receiver sensitivity.....	13
4.3.1.1 Applicability.....	13
4.3.1.2 Limits	13
4.3.1.3 Conformance.....	13
4.3.2 OBE Receiver error behaviour at high wanted input signal level.....	13
4.3.2.1 Applicability.....	13
4.3.2.2 Limits	14
4.3.2.3 Conformance.....	14
4.3.3 OBE Receiver distortion immunity	14
4.3.3.1 Applicability.....	14
4.3.3.2 Limits	14
4.3.3.3 Conformance.....	14
4.3.4 OBE Receiver inter-modulation immunity.....	14
4.3.4.1 Applicability.....	14
4.3.4.2 Limits	14
4.3.4.3 Conformance.....	14
4.3.5 OBE Receiver co-channel rejection.....	14
4.3.5.1 Applicability.....	14
4.3.5.2 Limits	14
4.3.5.3 Conformance.....	14
4.3.6 OBE Receiver blocking	14
4.3.6.1 Applicability.....	14

4.3.6.2	Limits	15
4.3.6.3	Conformance	15
4.3.7	OBE Receiver dynamic receiver performance	15
4.3.7.1	Applicability	15
4.3.7.2	Limits	15
4.3.7.3	Conformance	15
4.3.8	OBE Receiver multipath dynamic performance	15
4.3.8.1	Applicability	15
4.3.8.2	Limits	15
4.3.8.3	Conformance	15
4.3.9	OBE Receiver tolerable centre frequency error	15
4.3.9.1	Applicability	15
4.3.9.2	Limits	15
4.3.9.3	Conformance	15
4.3.10	OBE Receiver tolerable chip rate error	16
4.3.10.1	Applicability	16
4.3.10.2	Limits	16
4.3.10.3	Conformance	16
4.3.11	OBE Receiver tolerable MTIE of the chip rate	16
4.3.11.1	Applicability	16
4.3.11.2	Limits	16
4.3.11.3	Conformance	16
4.3.12	Trackside Equipment Receiver sensitivity	16
4.3.12.1	Applicability	16
4.3.12.2	Limits	16
4.3.12.3	Conformance	16
5	Testing for compliance with technical requirements	16
5.1	Environmental conditions for testing	16
5.2	General conditions for testing	17
5.2.1	Test conditions	17
5.2.2	Test power source	17
5.2.3	Normal test conditions	17
5.2.3.1	Normal temperature and humidity	17
5.2.3.2	Normal test power source	17
5.2.3.2.1	Mains voltage	17
5.2.3.2.2	Other power sources	17
5.2.4	Extreme test conditions	17
5.2.5	Choice of equipment for test suites	18
5.2.5.1	Choice of model	18
5.2.5.2	Measuring receiver	18
5.3	Void	18
6	Performance Test Suites	18
6.1	Conformance methods of measurement for transmitters	18
6.1.1	OBE Tx field strength and Transmitter Mask	18
6.1.2	OBE Unwanted Emission	19
6.1.3	Trackside Equipment field strength measurements	19
6.1.4	Trackside Equipment transmitter conducted measurements	20
6.2	Conformance Methods of Measurement for Receiver	20
6.2.1	OBE receiver sensitivity	20
6.2.2	OBE receiver error behaviour at high wanted input signal level	20
6.2.3	OBE receiver distortion immunity	20
6.2.4	OBE receiver inter-modulation immunity	20
6.2.5	OBE Receiver co-channel rejection	20
6.2.6	OBE Receiver blocking	21
6.2.7	OBE receiver dynamic receiver performance	21
6.2.8	OBE receiver multipath dynamic performance	21
6.2.9	OBE receiver tolerable centre frequency error	21
6.2.10	OBE Receiver tolerable chip rate error	21
6.2.11	OBE Receiver tolerable MTIE of the chip rate	21
6.2.12	Trackside Equipment receiver sensitivity	21

Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	22
Annex B (normative):	Field strength measurements along the Euroloop	24
Annex C (normative):	Radiated measurements	25
C.1	Test sites and general arrangements for measurements involving the use of radiated fields	25
C.1.0	General	25
C.1.1	Anechoic chamber	25
C.1.2	Anechoic chamber with a conductive ground plane	26
C.1.3	Open Area Test Site (OATS)	28
C.1.3.0	General	28
C.1.3.1	Measurements below 30 MHz	28
C.1.3.2	Measurements above 30 MHz	28
Annex D (normative):	H-field measurements and limits at 3 m and 30 m	30
D.0	General	30
D.1	Limits for measurements at 30 m distance	30
D.2	Limits for measurements at 3 m distance	31
Annex E (informative):	Maximum measurement uncertainty	33
Annex F (informative):	Selection of receiver parameters	34
F.1	OBE Receiver parameters as listed in ETSI EG 203 336 V1.1.1	34
F.1.1	Receiver sensitivity	34
F.1.2	Adjacent channel selectivity	34
F.1.3	Blocking	34
F.1.4	Co-channel rejection	34
F.1.5	Spurious response rejection	35
F.1.6	Inter-modulation	35
F.1.7	Dynamic range	35
F.1.8	Reciprocal mixing	35
F.1.9	Desensitization	35
F.1.10	Signal interference handling	35
F.2	Other receiver parameters	36
F.2.1	Receiver Multipath dynamic performance	36
F.2.2	Receiver tolerable centre frequency	36
F.2.3	Receiver tolerable chip rate error	36
F.2.4	Receiver tolerable MTIE	36
F.2.5	Receiver error behaviour at high wanted input signal	36
F.2.6	Receiver distortion immunity	36
Annex G (informative):	Change History	37
History	38

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Foreword

This draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.7] 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.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
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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).

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Introduction

The Euroloop communication system is defined by the specifications [1] and [2] of the UNISIG consortia.

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1 Scope

The present document specifies technical characteristics and methods of measurements for radio transmitters and receivers used in the Euroloop communications system. The system is used in railway systems.

The present document applies to the following equipment:

- 1) The On-Board Equipment (OBE) transmitting the tele-powering to wake-up the Trackside Equipment and receiving the Euroloop signal. The OBE comprises a receiver fitted with a dedicated antenna.
- 2) The Trackside Equipment receiving the tele-powering and transmitting the Euroloop signal. The antenna is a leaky feeder cable that is always installed in an inner or outer foot of a rail.

NOTE 1: For the purposes of the present document term "Euroloop" will be used as a descriptive term of the Euroloop communication system as defined by the specifications [1] and [2] of the UNISIG consortia.

The Euroloop transmission system operates in frequency bands listed in table 1 in accordance with the EC Decision 2013/752/EU [i.2], and ERC Recommendation 70-03 [i.3], annex 4.

These radio equipment types are capable of operating at the following frequencies as given below in table 1.

Table 1: Radio communications frequencies

Radio communications frequencies	
OBE receive frequency band	11,1 MHz -16,0 MHz
OBE transmit frequency band	27,09 MHz - 27,10 MHz
OBE transmit modulation	un-modulated RF carrier, continuous wave
Trackside Equipment receiver frequency band	27,09 MHz - 27,10 MHz
Trackside Equipment transmit frequency band	11,1 MHz -16,0 MHz
Trackside Equipment transmit modulation	BPSK, DSSS chip rate 4,516 MHz

NOTE 2: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.1] is given in annex A.

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.

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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.

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

- [1] ERTMS/ETCS: "FFFIS for Euroloop", SUBSET-044, Issue 2.4.0, 29th February 2012.

NOTE: Available at https://www.era.europa.eu/content/set-specifications-2-etcs-b3-mr1-gsm-r-b1_en.

[2] ERTMS/ETCS: "Test Specification for Euroloop", SUBSET-103, Issue 1.1.0, 29th February 2012.

NOTE: Available at https://www.era.europa.eu/content/set-specifications-2-etcs-b3-mr1-gsm-r-b1_en.

[3] CISPR 16-1-4:2019: "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

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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, (OJ L153, 22.5.2014, p.62).
- [i.2] EC Decision 2013/752/EU: "Commission Implementing Decision of 11 December 2013 amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2005/928/EC".
- [i.3] CEPT/ERC/Recommendation 70-03: "Relating to the use of Short Range Devices (SRD)".
- [i.4] ETSI TR 100 028-1 (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".
- [i.5] ETSI TR 100 028-2 (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".
- [i.6] EN 50121-2 (2015-03): "Railway applications - Electromagnetic compatibility - Part 2: Emission of the whole railway system to the outside world" / Applies in conjunction with EN 50121-1 (2000-09)" (produced by CENELEC).
- [i.7] 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.8] 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.9] 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.10] 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.11] ETSI EG 203 336 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

dedicated antenna: removable antenna supplied and tested with the radio equipment, designed as an indispensable part of the equipment

Eurobalise: trackside transmission unit that uses the magnetic transponder technology

NOTE: Its main function is to transmit and/or receive signals through the air gap. The Eurobalise is a single device mounted on the track, which communicates with a train passing over it.

Euroloop: trackside transmission unit that uses the magnetic transmission technology

NOTE: Its main function is to transmit signals through the air gap. The Euroloop is a single device (leaky feeder cable) mounted on the track, which communicates with a train passing over it.

magnetic transmission technology: method that uses magnetic coupling in the air gap between a transmitter and a receiver

NOTE: In the Euroloop transmission system context, it considers systems using the band 11,1 - 16,0 MHz for Uplink (track to train) transmission.

RF carrier: fixed radio frequency prior to modulation

tele-powering: signal transmitted by the OBE, which activates the Trackside Equipment

uplink: transmission link from the Trackside Equipment to the OBE

3.2 Symbols

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

f	Frequency
Ω	Ohm
R	Distance
R_C	Chip rate
λ	wavelength

3.3 Abbreviations

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

BER	Bit Error Ratio
BPSK	Binary Phase Shift Keying
CW	Continuous Wave
dB	decibel

NOTE: Logarithmic scale.

DSSS	Direct Sequence Spread Spectrum
EMC	ElectroMagnetic Compatibility
ERC	European Radiocommunications Committee
EUT	Equipment Under Test
LOOMO	LOOp MOdem
MTIE	Maximum Time Interval Error
OATS	Open Area Test Site
OBE	On-Board Equipment

R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
RMS	Root Mean Square
SRD	Short Range Device
TX	Transmitter
UNISIG	UNion Industry of SIGnalling
VSWR	Voltage Standing Wave Ratio

4 Technical requirements specifications

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be in accordance with its intended use. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the operational environmental profile defined by its intended use.

4.2 Transmitter conformance requirements

4.2.1 OBE TX field strength and Transmitter mask

4.2.1.1 Applicability

This test only applies to the OBE. The radiated H-field mask is defined in the direction of maximum field strength under specified conditions of measurement.

NOTE: Eurobalise-OBE tele-powering is used for wake-up of the Trackside Equipment.

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4.2.1.2 Limits

The limits of figure 1 (expressed in dB μ A/m at a distance of 10 m) shall not be exceeded.

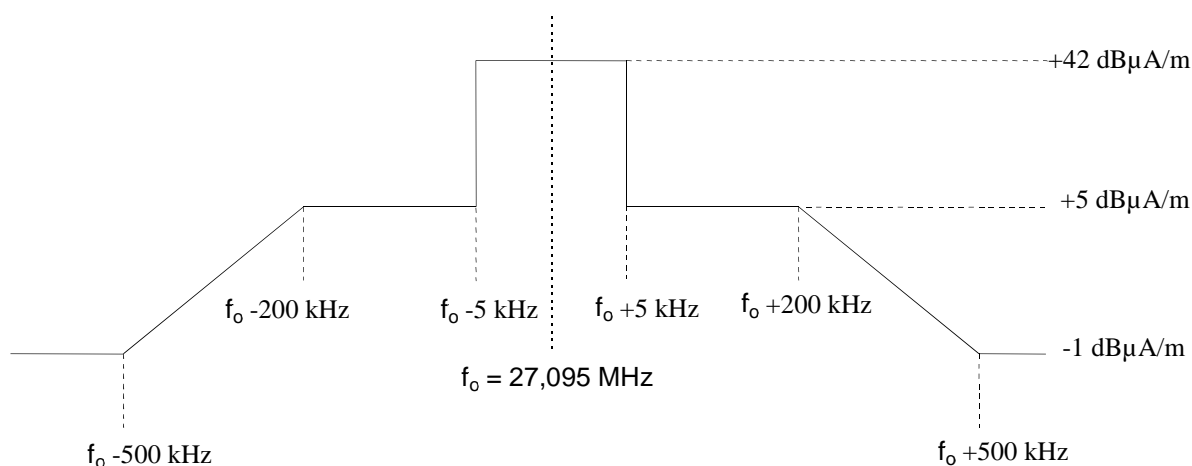


Figure 1: OBE transmitter mask

The maximum OBE TX field strength of +42 dB μ A/m at 10 m distance is in accordance with the EC Decision for SRDs [i.2] and ERC Recommendation 70-03 [i.3], annex 4.

4.2.1.3 Conformance

The conformance test suite for OBE transmitter mask shall be as defined in clause 6.1.1.