



SLOVENSKI STANDARD

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Inteligentni transportni sistemi (ITS) - Radiokomunikacijska oprema, ki deluje v frekvenčnem pasu od 5855 MHz do 5925 MHz - Harmonizirani EN, ki zajema bistvene zahteve člena 3.2 direktive R&TTE

Intelligent Transport Systems (ITS) - Radiocommunications equipment operating in the 5 855 MHz to 5 925 MHz frequency band - Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

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Harmonized European Standard

**Intelligent Transport Systems (ITS);
Radiocommunications equipment operating
in the 5 855 MHz to 5 925 MHz frequency band;
Harmonized EN covering the essential requirements
of article 3.2 of the R&TTE Directive**

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Foreword

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

The present document has been produced by ETSI in response to mandate M/284 issued from the European Commission under Directive 98/34/EC [i.1] as amended by Directive 98/48/EC [i.1].

The title and reference to the present document are intended to be included in the publication in the Official Journal of the European Union of titles and references of Harmonized Standard under the Directive 1999/5/EC [i.2].

See article 5.1 of Directive 1999/5/EC for information on presumption of conformity and Harmonised Standards or parts thereof the references of which have been published in the Official Journal of the European Union.

The requirements relevant to Directive 1999/5/EC [i.2] are summarised in annex A.

Equipment compliant with the present document can be intended for fitment into road vehicles, therefore it is subject to automotive EMC type approval and Directive 95/54/EC [i.3]. For use on vehicles outside the scope of Directive 95/54/EC [i.3], compliance with an EMC directive/standard appropriate for that use is required.

National transposition dates

Date of adoption of this EN:	29 August 2013
Date of latest announcement of this EN (doa):	30 November 2013
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 May 2014
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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.4].

1 Scope

The present document applies to corporate communications using radio transmitters and receivers for Intelligent Transport Systems (ITS). ITS communications may comprise vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-vehicle.

Table 1a: Radiocommunications service frequency bands

Radiocommunications service frequency bands	
Transmit	5 855 MHz to 5 925 MHz
Receive	5 855 MHz to 5 925 MHz

The equipment is comprised of a transmitter and associated encoder and modulator and/or a receiver and associated demodulator and decoder. The types of equipment covered by the present document are as follows:

- On Board Equipment (OBE equipment fitted with an integral or dedicated antenna(s), intended for use in vehicles, e.g. a road or a rail vehicle);
- Road Side Equipment (RSE equipment fitted with an antenna socket, integral or dedicated antenna(s), normally used as a fixed station); e.g. a road or rail infrastructure.

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.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference/standards.iteh.ai/catalog/standards/sist/0bac9fe4-d375-48f6-b270-4491a2620e58/sist-en-302-571-v1-2-1-2013>

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] 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".
- [2] CISPR 16 (parts 1-1 (2007), 1-4 (2008) and 1-5 (2003)): "Specifications for radio disturbance and immunity measuring apparatus and methods; Part 1: Radio disturbance and immunity measuring apparatus".
- [3] ETSI EN 302 663 (V1.2.1) (11-2012): "Intelligent Transport Systems (ITS); Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band".
- [4] ETSI TS 102 687 (V1.1.1) (07-2011): "Intelligent Transport Systems (ITS); Decentralized Congestion Control Mechanisms for Intelligent Transport Systems operating in the 5 GHz range; Access layer part".
- [5] ETSI TS 102 724 (V1.1.1) (10-2012): "Intelligent Transport Systems (ITS); Harmonized Channel Specifications for Intelligent Transport Systems operating in the 5 GHz frequency band".

- [6] ETSI TS 102 792 (V1.1.1) (10-2012): "Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (CEN DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range".
- [7] ETSI TS 102 917-1 (V1.1.1) (01-2013): "Intelligent Transport Systems (ITS); Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range; Part 1: Protocol Implementation Conformance Statement (PICS)".
- [8] ETSI TS 102 917-2 (V1.1.1) (01-2013): "Intelligent Transport Systems (ITS); Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range; Part 2: Test Suite Structure and Test Purposes (TSS & TP)".
- [9] ETSI TS 102 917-3 (V1.1.1) (01-2013): "Intelligent Transport Systems (ITS); Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range; Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)".

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] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- [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 Directive 95/54/EC of 31 October 1995 adapting to technical progress Council Directive 72/245/EEC on the approximation of the laws of the Member States relating to the suppression of radio interference produced by spark-ignition engines fitted to motor vehicles and amending Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers.
- [i.4] ETSI EG 201 399 (V2.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".
- [i.5] ETSI TR 102 070-2 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide to the application of harmonized standards to multi-radio and combined radio and non-radio equipment; Part 2: Effective use of the radio frequency spectrum".
- [i.6] ECC Decision (08)01: "ECC Decision of 14 March 2008 on the harmonized use of the 5875-5925 frequency band for Intelligent Transport Systems (ITS)".
- [i.7] ECC Recommendation (08)01: "Use of band 5855-5875 MHz for Intelligent Transport Systems (ITS)".
- [i.8] ECC Report 101: "Compatibility studies in the band 5855- 5925 MHz between Intelligent Transport Systems (ITS) and other systems".
- [i.9] ETSI TR 102 273 (2001-12) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement of radiated methods of measurement (using test sites) and evaluation of the corresponding measurement uncertainties".
- [i.10] ANSI C63.5 (2004): "American National Standard for Electromagnetic Compatibility-Radiated Emission Measurements in Electromagnetic Interference (EMI) Control-Calibration of Antennas (9 kHz to 40 GHz)".
- [i.11] ETSI TR 102 492-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Intelligent Transport Systems (ITS); Part 1: Technical characteristics for pan-European harmonized communications equipment operating in the 5 GHz frequency range and intended for critical road-safety applications; System Reference Document".

- [i.12] ETSI TR 102 492-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Intelligent Transport Systems (ITS); Part 2: Technical characteristics for pan European harmonized communications equipment operating in the 5 GHz frequency range intended for road safety and traffic management, and for non-safety related ITS applications; System Reference Document".
- [i.13] Commission Decision 2008/671/EC of 5 August on the harmonised use of radio spectrum in the 5875-5905 MHz frequency band for safety related application of Intelligent Transport Systems (ITS).
- [i.14] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).
- [i.15] Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).

3 Definitions, symbols and abbreviations

3.1 Definitions

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

available channel: channel identified as available for use as an *Operating Channel* having performed a "listen before talk check" first

channel: amount of spectrum used by a single ITS device operating on one of the carrier frequencies listed in table 2b of the present document

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

NOTE: The dedicated antenna has been designed or developed for one or more specific types of equipment. It is the combination of dedicated antenna and radio equipment that is expected to be compliant with the regulations.

Decentralized Congestion Control (DCC): technique in which the transmitter output power and transmission timing limits are controlled resulting in less congestion on the radio channel

integral antenna: antenna designed as a fixed part of the equipment, without the use of an external connector and as such which can not be disconnected from the equipment by the user

NOTE: An integral antenna may be fitted internally or externally.

Listen Before Talk (LBT): monitoring method in which the RF channel is checked for activity before transmitting

radiated measurements: measurements which involve the absolute measurement of a radiated field

Transmit Power Control (TPC): technique in which the transmitter output power is controlled resulting in reduced interference to other users

Transmit Power Control range: power range over which the TPC is able to control the transmitter output power

vehicle: all kinds of land mobile vehicle, e.g. a road or rail vehicle

3.2 Symbols

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

dB	decibel
dBi	antenna gain relative to isotropic radiator in decibel
dBc	decibel relative to carrier power
E	electrical field strength
f	frequency
f_c	nominal centre frequency
G	antenna gain
PH	highest power level
R	distance
T_{max}	maximum temperature
T_{min}	minimum temperature
Tx on	effective transmitter on-time
Tx off	effective transmitter off-time
V_{max}	maximum voltage
V_{min}	minimum voltage
Ω	ohm
μs	microsecond

3.3 Abbreviations

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

BPSK	Binary Phase Shift Keying
BW	bandwidth
CEN	Comitee Europeen de Normalisation (European Committee for Standardization)
CISPR	Comité International Spécial des Perturbations Radioélectriques (International Special Committee on Radio Interference)
CW	Continuous Wave
DC	Direct Current
DCC	Decentralized Channel Control
DCR	Duty Cycle Restriction
DSRC	Dedicated Short Range Communication (CEN DRSC = tolling at 5,8 GHz)
e.i.r.p.	equivalent isotropically radiated power
e.r.p.	effective radiated power
EC	European Commission
ECC	Electronic Communication Committee
EMC	Electro Magnetic Compatibility
EUT	Equipment Under Test
FEC	Forward Error Correction
HS	Harmonized Standard
IF	Intermediate Frequency
ITS	Intelligent Transport Systems
ITS-G5	Frequency band for Intelligent Transportation Systems ranging from 5,875 up to 5,925 GHz
LBT	Listen Before Talk
OBE	On Board Equipment
PD	mean Power Density
PER	Packet Error Rate
PH	Highest power level
PL	Lowest power level
ppm	parts per million = 10^{-6}
PSD	Power Spectral Density
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RBW	Resolution Bandwidth
RF	Radio Frequency

RSE	Road Side Equipment
RSU	Road Side Unit
TPC	Transmit Power Control
TTE	Telecommunication Terminal Equipment
TX	Transmit
UUT	Unit Under Test
VSWR	Voltage Standing Wave Ratio

4 General

4.1 Presentation of equipment for testing purposes

Each equipment submitted for testing shall fulfil the requirements of the present document on all frequencies over which it is intended to operate.

The provider shall declare the frequency ranges, the range of operating conditions and power requirements as applicable, to establish the appropriate test conditions.

Additionally, technical documentation and operating manuals, sufficient to make the test, shall be supplied.

4.1.1 Choice of model for testing

The provider shall provide one or more samples of the equipment, as appropriate for testing.

Stand-alone equipment shall be offered by the provider complete with any ancillary equipment needed for testing.

If an equipment has several optional features considered not to affect the RF parameters, then the tests need only to be performed on the equipment configured with the combination of features considered to be the most complex, as proposed by the provider and agreed by the test laboratory.

Where practicable, equipment offered for testing shall provide a 50 Ω connector for conducted RF power level measurements.

In the case of a dedicated integral antenna equipment, if the equipment does not have an internal permanent 50 Ω connector, then it is permissible to supply a second sample of the equipment with a temporary antenna connector fitted to facilitate testing.

The performance of the equipment submitted for testing shall be representative of the performance of the corresponding production model.

The equipment may contain digital circuit elements, radio circuit elements and other elements whose performance is not covered by the present document. These elements of the equipment shall meet the appropriate performance requirements for those components, as specified in other standards.

An ITS device which is combined with other system(s) should meet at least the requirements of the present document (for the elements of the device concerned with radio communications), and the requirements of any relevant standard for EMC compatibility of the other equipment for the elements of the device which are not concerned with radio communications.

EXAMPLE: An ITS communications device combined with a navigation system.

NOTE: For further information on this topic see TR 102 070-2 [i.5].

4.1.1.1 Auxiliary test equipment

All necessary test signal sources, setting up instructions and other product information shall accompany the equipment when it is submitted for testing.