SLOVENSKI STANDARD
SIST EN 300 328 V2.2.2:2020

01-januar-2020

Širokopasovni prenosni sistemi - Oprema za prenos podatkov v frekvenčnem pasu 2,4 GHz - Harmonizirani standard za dostop do radijskega spektra

Wideband transmission systems - Data transmission equipment operating in the 2,4 GHz band - Harmonised Standard for access to radio spectrum

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Ta slovenski standard je istoveten z: ETSI EN 300 328 V2.2.2 (2019-07)

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ICS:

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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
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

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

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The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.14] 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].

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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 adoption of this EN:	1 July 2019
Date of latest announcement of this EN (doa):	31 October 2019
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 April 2020
Date of withdrawal of any conflicting National Standard (dow):	31 October 2021

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 covers Wideband Data Transmission equipment.

Examples of Wideband Data Transmission equipment are equipments such as IEEE 802.11™ RLANs [i.3], Bluetooth® wireless technologies, Zigbee™, etc.

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1 Scope

The present document applies to Wideband Data Transmission equipment.

The present document also describes spectrum access requirements to facilitate spectrum sharing with other equipment.

Wideband Data Transmission equipment covered by the present document is operated in accordance with the ERC Recommendation 70-03 [i.6], annex 3 or Commission Decision 2006/771/EC [i.7] (and its amendments).

This radio equipment is capable of operating in the band provided in table 1.

Table 1: Service frequency bands

	Service frequency bands
Transmit	2 400 MHz to 2 483,5 MHz
Receive	2 400 MHz to 2 483,5 MHz

Equipment using Ultra Wide Band (UWB) technology is not covered by the present document.

NOTE: 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.

2 References

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2.1 Normative references

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

Not applicable.

2.2 Informative references

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[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] Void.

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[i.3] IEEE 802.11™-2016: "IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements. Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".

[i.4] IEEE 802.15.4™-2015: "IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements. Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs)".

[i.5] Void.

[i.6] CEPT ERC Recommendation 70-03: "Relating to the use of Short Range Devices (SRD)".

[i.7] Commission Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices.

[i.8] ETSI TR 102 273-2 (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; Part 2: Anechoic chamber".

[i.9] ETSI TR 102 273-3 (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; Part 3: Anechoic chamber with a ground plane".

[i.10] 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".

[i.11] ETSI TR 100 028-2 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".

[i.12] ETSI EG 203 367 (V1.1.1) (06-2016): "Guide to the application of harmonised standards covering articles 3.1b and 3.2 of the Directive 2014/53/EU (RED) to multi-radio and combined radio and non-radio equipment".

[i.13] Void.

[i.14] 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.15] ETSI TR 100 028-1 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".

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3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in Directive 2014/53/EU [i.1] and the following apply:

adaptive equipment: equipment using a mechanism which allows it to adapt to its radio environment by identifying frequencies that are being used by other equipment

adaptive frequency hopping: mechanism that allows FHSS equipment to adapt to its radio environment by identifying channels that are being used and excluding them from the list of available channels

adjacent channel: channels on either side of the nominal channel separated by the Nominal Channel Bandwidth

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adjacent hopping frequency: neighbouring hopping frequency which is separated by the minimum hopping frequency separation

antenna assembly: combination of the antenna (integral or dedicated), its feeder (e.g. coaxial cable) and if applicable, its antenna connector and associated switching components

antenna assembly gain: in-band antenna assembly gain (G) in dBi which does not include the additional gain that may result out of beamforming.

NOTE: This term (antenna assembly) refers to an antenna connected to one transmit chain.

beamforming gain: additional (antenna) gain realized by using beamforming techniques in smart antenna systems

NOTE: Beamforming gain as used in the present document, does not include the gain of the antenna assembly.

blacklisted frequency: hopping frequency occupied by FHSS equipment without having transmissions during the dwell time

Clear Channel Assessment (CCA): mechanism used by an equipment to identify other transmissions in the channel

combined equipment: combination of a non-radio product and one or more radio equipments whereby the radio equipment(s) is (are) incorporated into the non-radio product in a permanently affixed manner

dedicated antenna: removable antenna(s) assessed together with the radio equipment against the requirements of the present document

Detect And Avoid (DAA): mechanism which mitigates interference potential by avoiding use of frequencies upon detection of other transmissions on those frequencies

dwell time: time between frequency changes for FHSS equipment

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NOTE: The dwell time might comprise transmit, receive and idle phases of the equipment.

energy detect: mechanism used by an LBT based adaptive equipment to determine the presence of other devices operating on the channel based on detecting the signal level of that other device

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environmental profile: range of environmental conditions for the equipment

frame based equipment: equipment where the transmit/receive structure is not demand-driven but has fixed timing

Frequency Hopping Spread Spectrum (FHSS) equipment: equipment using a frequency hopping technique in which it occupies a number of frequencies in time, each for some period of time, referred to as the dwell time

NOTE: Transmitter and receiver follow the same frequency hop pattern. The frequency range is determined by the lowest and highest hop positions and the bandwidth per hop position.

hopping frequency: any of the (centre) frequencies defined within the hopping sequence of an FHSS equipment

idle period: period in time following a transmission sequence during which the equipment does not transmit

integral antenna: antenna designed as a fixed part of the equipment, without the use of an external connector and which cannot be disconnected from the equipment by a user with the intent to connect another antenna

NOTE: An integral antenna may be fitted internally or externally. In the case where the antenna is external, a non-detachable cable may be used. An antenna using internal connectors to connect to the internal radio part (e.g. printed circuit board) is considered to be an integral antenna.

Listen Before Talk (LBT): mechanism by which an equipment first applies CCA before using the channel

load based equipment: equipment where the transmit/receive structure is demand-driven

multi-radio equipment: combined equipment with more than one radio equipment

Nominal Channel Bandwidth: bandwidth of frequencies assigned to a single channel

NOTE: The Nominal Channel Bandwidth is declared by the manufacturer as outlined in clause 5.4.1.

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non-adaptive equipment: equipment not capable of adapting to its radio environment by identifying frequencies that are being used by other equipment

operating frequency: nominal frequency at which the equipment can be operated

NOTE: Equipment may be adjustable for operation at more than one operating frequency.

plug-in radio equipment: radio equipment module intended to be used within combined or multi-radio equipment, using their control functions and power supply

power envelope: RF power versus frequency contour

receive chain: receiver circuit with an associated antenna assembly

NOTE: Two or more receive chains are combined in a smart antenna assembly.

smart antenna systems: equipment that combines multiple transmit and/or receive chains with a signal processing function to increase the throughput and/or to optimize its transmission and/or reception capabilities

NOTE: These are techniques such as spatial multiplexing, beamforming, cyclic delay diversity, MIMO, etc.

stand-alone radio equipment: equipment that is intended primarily as communications equipment and that is normally used on a stand-alone basis

transmission burst: period in time during a transmission during which the transmitter is continuously on

transmit chain: transmitter circuit with an associated antenna assembly

NOTE: Two or more transmit chains are combined in a smart antenna system.

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ultra wide band technology: technology for short-range radiocommunication, involving the intentional generation and transmission of radio-frequency energy that spreads over a very large frequency range, which may overlap several frequency bands allocated to radiocommunication services

wideband data transmission equipment: equipment using modulation or spreading techniques resulting in a wideband signal

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NOTE: Examples of such techniques include FHSS, DSSS, OFDM, etc.

3.2 Symbols

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

A_{ch}	number of active transmit chains
BW_{CHAN}	Channel Bandwidth
dBm	dB relative to 1 milliwatt
dBr	dB relative to peak power
dBW	dB relative to 1 Watt
F	Frequency
F_{HS}	Hopping Frequency Separation
GHz	GigaHertz
Hz	Hertz
kHz	kiloHertz
MHz	MegaHertz
mW	milliWatt
ms	millisecond
MS/s	Mega Samples per second
N	Number of hopping frequencies
P	Power
P_{out}	RF Output Power
TxOff	Transmitter Off
TxOn	Transmitter On