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01-oktober-2021

Naprave kratkega dosega (SRD), ki uporabljajo ultra širokopasovno (UWB) tehnologijo - Harmonizirani standard za dostop do radijskega spektra - 3. del: Naprave UWB, vgrajene v motorna in železniška vozila - 1. poddel: Zahteve za ultra širokopasovne (UWB) naprave za avtomobilske sisteme za dostop

Short Range Devices (SRD) using Ultra Wide Band technology (UWB) - Harmonised standard for access to radio spectrum - Part 3: UWB devices installed in motor and railway vehicles - Sub-part 1: Requirements for UWB devices for vehicular access systems

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Ta slovenski standard je istoveten z: **ETSI EN 302 065-3-1 V3.1.0 (2021-07)**

ICS:

33.060.99	Druga oprema za radijske komunikacije	Other equipment for radiocommunications
43.040.15	Avtomobilska informatika. Vgrajeni računalniški sistemi	Car informatics. On board computer systems

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2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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Draft ETSI EN 302 065-3-1 V3.1.0 (2021-07)

Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised standard for access to radio spectrum; Part 3: UWB devices installed in motor and railway vehicles Sub-part 1: Requirements for UWB devices for vehicular access systems

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Reference
REN/ERM-TGUWB-150-3-1

Keywords
harmonised standard, SRD, UWB

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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.2] 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
Date of withdrawal of any conflicting National Standard (dow):	18 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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

For the case of the present document, the applicable harmonised standard has been ETSI EN 302 065-3 [i.12], for UWB devices for ground based vehicular applications, which was published in the OJEU without restriction at 10 March 2017 [i.9] and then published at 5 February 2020 [i.10] with the following restriction:

- *"This harmonised standard does not set out technical specifications for 'trigger before-transmit techniques'. Implementing Decision (EU) 2019/785, however, imposes, as of 16 November 2019, technical requirements to be used within the bands 3,8-4.2 GHz and 6-8,5 GHz for vehicular access systems using trigger-before transmit. Therefore compliance with this harmonised standard does not ensure compliance with Decision (EU) 2019/785 and accordingly does not confer a presumption of conformity with those essential requirements set out in Article 3 (2) of Directive 2014/53/EU which relate to 'trigger-before-transmit techniques'".*

In order to consider the above points, ETSI ERM TGUWB decided to develop more specific standards; for the present document this means instead of a generic ETSI EN 302 065-3 standard for all road and rail vehicles applications, an ETSI EN 302 065-3-1 for UWB devices for vehicular access systems. Other sub-parts for UWB devices installed in motor and railway vehicles may follow (ETSI EN 302 065-3-x).

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More details on the changes of the present document to previous versions are provided in Annex F.

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1 Scope

The present document specifies technical characteristics and methods of measurements for equipment employing UWB devices for vehicle access systems, which use pulse based, packet oriented UWB signals for data transfer and/or distance bounding and/or localization purpose.

EXAMPLE: Radio equipment employing UWB technology for vehicle access systems is equipment intended to be utilized for vehicle access, vehicle immobilization and extended vehicle access control functionalities (like closing windows or remotely starting the car).

Following types of equipment are covered by the present document:

1) Equipment Type 1: Vehicle transceivers, which meet the conditions below:

   a) Vehicle transceivers communicate on a "trigger-before-transmit" basis with:

      i) vehicle ID devices (equipment type 2); and/or

      ii) other vehicle transceivers (equipment type 1); and/or

      iii) other UWB devices (e.g. smartphones).

   b) Vehicle transceivers are installed in the vehicle.

   c) Vehicle transceivers are capable of operating in the permitted frequency range as specified in Table 1 with either an integral antenna or a Radio Frequency (RF) output connection and dedicated antenna.

2) Equipment type 2: Vehicle ID devices (e.g. key fobs), which meet the conditions below:

   a) Vehicle ID devices are handheld devices.

   b) Vehicle ID devices communicate with vehicle transceivers (equipment type 1).

   c) Vehicle ID devices are paired with one specific vehicle and are an accessory to this vehicle.

   d) Vehicle ID devices are capable of operating in the permitted frequency range as specified in Table 1 using an integral antenna.

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NOTE 1: Other UWB devices - like UWB enabled smartphones - are not covered by the present document.

The permitted frequency bands are defined in Table 1.

Table 1: Permitted frequency bands for vehicular access systems

	Frequency Band	Application
Transmit and Receive	3,8 GHz to 4,2 GHz	vehicular access
Transmit and Receive	6,0 GHz to 8,5 GHz	vehicular access

NOTE 2: Permitted frequency bands are based on ECC/DEC/(06)04 [i.4], Annex 1.2, Table 3.

NOTE 3: 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

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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Referenced documents which are not found to be publicly available in the expected location might be found at https://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] ETSI EN 303 883-1 (V1.2.1) (02-2021): "Short Range Devices (SRD) and Ultra Wide Band (UWB); Part 1: Measurement techniques for transmitter requirements".

[2] ETSI EN 303 883-2 (V1.2.1) (02-2021): "Short Range Devices (SRD) and Ultra Wide Band (UWB); Part 2: Measurement techniques for receiver requirements".

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 (RE-Directive).

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[i.2] 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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[i.3] ETSI TR 103 416 (V1.1.1) (07-2016): "System Reference document (SRdoc); Short Range Devices (SRD) using Ultra Wide Band (UWB); Technical characteristics and spectrum requirements for UWB based vehicular access systems for operation in the 3,4 GHz to 4,8 GHz and 6 GHz to 8,5 GHz frequency ranges".

[i.4] ECC Decision (06)04 of 24 March 2006 on the Harmonised Use, Exemption From Individual Licensing And Free Circulation Of Devices Using Ultra-Wideband (UWB) Technology In Bands Below 10.6 GHz (ECC/Dec/(06)04). Amended On 6 July 2007, Amended 9 December 2011 and Amended On 8 March 2019.

[i.5] ETSI TS 103 361 (V1.1.1) (03-2016): "Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Receiver technical requirements, parameters and measurement procedures to fulfil the requirements of the Directive 2014/53/EU".

[i.6] ECC Report 278 (27 April 2018): "Specific UWB applications in the band 3.4-4.8 GHz and 6.0-8.5 GHz: Location tracking and sensor applications (LTA) for vehicular access systems".

[i.7] Commission implementing decision (EU) 2019/785 of 14 May 2019 on the harmonisation of radio spectrum for equipment using ultra-wideband technology in the Union and repealing Decision 2007/131/EC.

[i.8] Directive 1999/5/EC (9 March 1999) on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

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[i.9] Official Journal of the European Union, 13.7.2018: "Commission communication in the framework of the implementation of Directive 1999/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity and Directive 2014/53/EU of the European Parliament and of the Council 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".

NOTE: Available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=uriserv:OJ.C_.2018.246.01.0023.01.ENG.

[i.10] Commission Implementing Decision (EU) 2020/167 of 5 February 2020 on the harmonised standards for radio equipment drafted in support of Directive 2014/53/EU of the European Parliament and of the Council.

NOTE: Available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020D0167&from=EN.

[i.11] ECC/DEC/(20)/01: "ECC Decision of 20 November 2020 on the harmonised use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN)".

[i.12] ETSI EN 302 065-3 (V2.1.1): "Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 3: Requirements for UWB devices for ground based vehicular applications".

3 Definition of terms, symbols and abbreviations

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3.1 Terms

For the purposes of the present document, the terms given in ETSI EN 303 883-1 [1], ETSI EN 303 883-2 [2] and the following apply:

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control equipment: equipment capable of sending control messages to the EUT, as well as receiving responses to that control command or other status messages, in order to setup the EUT and perform a measurement procedure

control message: one or more commands used to control or configure the EUT

NOTE: Typically submitted on a specific, non-UWB control interface, like CAN-bus interface.

EUT trigger event: trigger event on EUT level

NOTE: Which is used for measurement procedures in the present document.

initiator: EUT role in an UWB transmission sequence: EUT initiates UWB transmissions upon a system trigger event

NOTE: For more details see clause 4.2.7.2.

message: sequence or exchange of two or more packets in order to transfer information, in particular to generate a ranging information (Time-of-Flight between EUT and companion device)

packet: used to refer to an UWB data frame or aggregated pulse sequence, that is sent over the air

NOTE: Typically, one packet represents a continuous T_{on} time.

responder: EUT role in an UWB transmission sequence: EUT responds to an UWB transmission (received UWB packet)

NOTE: For more details see clause 4.2.7.2.

system trigger event: trigger event on system level; usually out of scope for EUT

Time-of-Flight (ToF): travel time of the radio signal between transmitter and receiver

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Trigger-Before-Transmit (TBT): mitigation technique as required for vehicular access systems

NOTE: See ECC/DEC/(06)04 [i.4].

vehicle transceiver: UWB enabled unit, installed in the vehicle

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI EN 303 883-1 [1], ETSI EN 303 883-2 [2] and the following apply:

T_{cease}	cease time, until a transmitter ceases transmission after a trigger event
T_{on_cum}	cumulated Ton time
$TBT_{timeout}$	Trigger-Before-Transmit timeout (cease time after EUT trigger)
$TBT_{On\text{-}Time}$	Trigger-Before-Transmit On-Time within any 10 s window after first EUT trigger
f_L	lowest frequency of the operating frequency range
f_H	highest frequency of the operating frequency range
F_{LOWER}	Lower frequency for the spurious emissions test
F_{UPPER}	Upper frequency for the spurious emissions test
X_{TXUE}	Boundary value for determination of spurious domain

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 303 883-1 [1], ETSI EN 303 883-2 [2] and the following apply:

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BLE	Bluetooth® Low Energy
CW	Continuous Wave
EC	European Commission
ECC	European Communication Committee
EFTA	European Free Trade Association
EN	European Norm
ERM	Electromagnetic compatibility and Radio spectrum Matters
EU	European Union
EUT	Equipment Under Test
LDC	Low Duty Cycle
MSR	Message Success Rate
NFC	Near Field Communication
NLOS	Non Line Of Sight
OFR	Operating Frequency Range
OJEU	Official Journal of the European Union
RBR	Receiver Baseline Resilience
RBS	Receiver Baseline Sensitivity
RBW	Resolution BandWidth
RF	Radio Frequency
RP	Radiated Power
RTTE	Radio and Telecommunications Terminal Equipment (Directive 1999/5/EC)
RX	Receiver
s	second (unit)
TBT	Trigger-Before-Transmit
TG	Task Group
TGUWB	Task Group Ultra Wide Band
ToF	Time-of-Flight
TR	Technical Report
TS	Technical Specification
TX	Transmitter
TXUE	Transmitter Unwanted Emission
UWB	Ultra Wide Band
VLP	Very Low Power