



**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 within 3,8 GHz to 4,2 GHz or 6 GHz to 8,5 GHz**

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# Foreword

This final 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 Vote phase of the ETSI Standardisation Request deliverable Approval Procedure (SRdAP).

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.

The present document is part 3, sub-part 1 of a multi-part deliverable covering Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised standard for access to radio spectrum, as identified below:

Part 1: "Generic UWB devices":

Sub-part 1: "Communication devices within 3,1 GHz to 4,8 GHz using LDC mitigation or within the 6 GHz to 8,5 GHz".

Part 2: "Ultra Wide Band location tracking devices":

Sub-part 1: "Requirements for devices within 6 GHz to 8,5 GHz";

Sub-part 2: "Requirements for devices in the frequency band between 3,1 GHz to 4,8 GHz utilizing LDC mitigation technique";

Sub-part 3: "Requirements for fixed infrastructure UWB based localization systems in the frequency band between 3,1 GHz to 4,8 GHz deploying Detect-And-Avoid (DAA) mitigation technique";

Sub-part 4: "Requirements for fixed outdoor devices within 6,0 GHz to 8,5 GHz";

Sub-part 5: "Requirements for enhanced indoor devices within 6,0 GHz to 8,5 GHz".

**Part 3: "UWB devices installed in motor and railway vehicles":**

**Sub-part 1: "Requirements for UWB devices for vehicular access systems within 3,8 GHz to 4,2 GHz or 6 GHz to 8,5 GHz";**

Sub-part 2: "Requirements for location tracking devices installed in rail and road vehicles operating in the frequency range of 3,1 GHz to 4,8 GHz or 6,0 GHz to 8,5 GHz";

Sub-part 3: "Requirements for UWB radiodetermination applications operating within 6,0 GHz to 8,5 GHz".

**Part 4: "Material Sensing devices":**

Sub-part 1: "Building material analysis below 10,6 GHz";

Sub-part 2: "UWB Material Sensing devices for Security Scanning";

Sub-part 3: "Ground humidity and condition sensor";

Sub-part 4: "Exterior material sensing applications for ground based vehicles below 10,6 GHz";

Sub-part 5: "UWB surveillance devices for parking lot sensors below 10,6 GHz".

**Part 5: "Devices using UWB technology onboard aircraft";**

**Part 6: "Ultra Wide Band radio-determination for radar sensing devices":**

Sub-part 1: "Requirements for presence detection applications within 6,0 GHz to 8,5 GHz";

Sub-part 2: "Requirements for generic UWB through-air non-contact vital signs applications within 6,0 GHz to 8,5 GHz";

Sub-part 3: "Requirements for fixed outdoor presence detection devices within 6,0 GHz to 8,5 GHz";

Sub-part 4: "Requirements for fixed outdoor through-air non-contact vital signs applications within 6,0 GHz to 8,5 GHz";

Sub-part 5: "Requirements for enhanced indoor presence detection devices within 6,0 GHz to 8,5 GHz";

Sub-part 6: "Requirements for enhanced indoor through-air non-contact vital signs applications within 6,0 GHz to 8,5 GHz".

NOTE 1: The list above shows the planned multi-part deliverable, at the time, when the present document was finalized.

NOTE 2: Part 4, sub-parts 2 (UWB Material Sensing devices for Security Scanning), 3 (Ground humidity and condition sensor below 10,6 GHz) and 5 (UWB surveillance devices for parking lot sensors below 10,6 GHz) of this multi-part deliverable are under discussion (change WI) or will be stopped.

<b>Proposed national transposition dates</b>	
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.

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## Introduction

For 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 [i.12] 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).

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 requirements, limits and test methods for equipment employing UWB for vehicular access devices installed in motor and railway vehicles in the frequency ranges 3,8 GHz to 4,2 GHz and 6,0 GHz to 8,5 GHz.

These equipment types are intended to be utilized for vehicle access, vehicle immobilization and extended vehicle access control functionalities (like closing windows or remotely starting the car).

Further details of the covered EUT can be found in clause 4.2.

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.

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# 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.

Referenced documents which are not found to be publicly available in the expected location might be found in the [ETSI docbox](#).

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 \(V2.1.1\) \(08-2024\)](#): "Short Range Devices (SRD) and Ultra Wide Band (UWB); Part 1: Measurement techniques for transmitter requirements".
- [2] [ETSI EN 303 883-2 \(V2.1.1\) \(08-2024\)](#): "Short Range Devices (SRD) and Ultra Wide Band (UWB); Part 2: Measurement techniques for receiver requirements".
- [3] [ETSI TS 103 941 \(V1.1.1\) \(01-2024\)](#): "Short Range Devices (SRD) and Ultra Wide Band (UWB); Measurement setups and specifications for testing under full environmental profile (normal and extreme environmental conditions)".

## 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).
- [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.

- [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/DEC/\(06\)04](#): "ECC Decision 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 Decision (06)04), amended on 6 July 2007, amended 9 December 2011, amended on 8 March 2019 and amended 18 November 2022".
- [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 \(EU\) 2024/1467 of 27 May 2024](#) amending Implementing Decision (EU) 2019/785 on the harmonisation of radio spectrum for equipment using ultra-wideband technology in the Union.
- [i.8] [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.
- [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".
- [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.
- [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".
- [i.13] ETSI EG 203 336 (V1.2.1): "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".
- [i.14] ETSI TS 103 567 (V1.1.1): "Requirements on signal interferer handling".
- [i.15] [ERC Recommendation 74-01](#): "Unwanted emissions in the spurious domain", Approved 1998, Corrected 23 May 2022.

## 3 Definition of terms, symbols and abbreviations

### 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:

**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 in which the EUT initiates UWB transmission upon a system trigger event

NOTE: For more details see clause 4.3.7.2.

**message:** sequence or exchange of two or more packets in order to transfer information, in particular to generate a ranging information

NOTE: 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.

**receiver spurious emissions:** receiver unwanted emissions that emanate from the EUT

NOTE: Receiver spurious emissions are generated internally by the receiver or result from the interaction of the RX coupling with the TX signal.

**responder:** EUT role in an UWB transmission sequence in which the EUT responds to an UWB transmission

NOTE: Typically an UWB transmission is a received UWB packet (for more details see clause 4.3.7.2.).

**system trigger event:** trigger event on system level

NOTE: Usually out of scope for EUT.

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

**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:

d	Measurement distance from the EUT to the test antenna
D	Recommended measurement distance for the Receiver Baseline Sensitivity (RBS) test
$d_g$	Sensitivity degradation
delta $\Theta$	Delta of the elevation angle $\Theta$
delta $\Phi$	Delta of the azimuth angle $\Phi$

$f_c$	Centre frequency of wanted signal
$f_H$	Highest frequency of the operating frequency range
$f_L$	Lowest frequency of the operating frequency range
$F_{LOWER}$	Lower frequency for the spurious emissions test
$F_{UPPER}$	Upper frequency for the spurious emissions test
$OFR_{max}$	Maximum possible Operating Frequency Range (OFR)
$P_{@EUT}$	Sensitivity @ EUT
$P_{max}$	Maximum signal level in duty-cycle measurement
$P_{thres}$	Threshold level
s	Second (unit)
$t_{high}$	Highest temperature
$t_{low}$	Lowest temperature
$t_{steps}$	Temperature steps for TX behaviour under the complete environment
$T_{cease}$	Cease time, until a transmitter ceases transmission after a trigger event
$T_{dis}$	Disregard time
$T_{obs}$	Observation time
$T_{off}$	Time interval between two consecutive bursts when the UWB emission is kept idle
$T_{on}$	Duration of a burst irrespective of the number of pulses contained
$T_{on\_cum}$	cumulated $T_{on}$ time
$T_{off\ mean}$	Mean $T_{off}$
$T_{on\ max}$	Maximum $T_{on}$ time
$TBT_{timeout}$	Trigger-Before-Transmit timeout (cease time after EUT trigger)
$TBT_{On-Time}$	Trigger-Before-Transmit On-Time within any 10 s window after first EUT trigger
X	Parameter to specify the OFR of the emission
$X_{TXUE}$	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:

BLE	Bluetooth® Low Energy
BW	BandWidth
CW	Continuous Wave
DC	Duty Cycle
EC	European Commission
ECC	European Communication Committee
EFTA	European Free Trade Association
EIRP	Equivalent Isotropically Radiated Power
EN	European Norm
ERM	Electromagnetic compatibility and Radio spectrum Matters
EG	ETSI Guide
ETSI	European Telecommunications Standards Institute
EU	European Union
EUT	Equipment Under Test
ID	IDentification
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
OOB	Out Of band
RBR	Receiver Baseline Resilience
RBS	Receiver Baseline Sensitivity
RBW	Resolution BandWidth
RF	Radio Frequency
RLAN	Radio Local Area Network
RMS	Root Mean Square
RP	Radiated Power
RTTE	Radio and Telecommunications Terminal Equipment (Directive 1999/5/EC)