Draft ETSI EN 302 372 V3.0.0 (2025-03)

**Short Range Devices (SRD)
using Ultra Wide Band technology (UWB);
Harmonised standard for access to radio spectrum;
Tank Level Probing Radar (TLPR) equipment operating in the frequency ranges 4,5 GHz to 7 GHz, 8,5 GHz to 10,6 GHz, 24,05 GHz to 27 GHz, 57 GHz to 64 GHz, 75 GHz to 85 GHz**

Reference
REN/ERM-TGUWB-151

Keywords
EHF, harmonised standard, radar, regulation, SHF, short range, SRD, testing, UWB

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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 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.

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

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

In order to cover the requirements concerning the receiver requirements communicated by the European Commission the present document is a revision of ETSI EN 302 372 V2.1.1 [i.13] a harmonised standard for Tank Level Probing Equipment within the scope of the Directive 2014/53/EU [i.1]. The standard has been published in the OJEU without restrictions on 10 March 2017 [i.6].

Unlike LPRs [i.7] the TLPRs are always configured to pre-drilled harmonised openings and flanges of the tanks. Thus, with very small openings of e.g. a few centimetres most of the TLPR antennae cannot fulfil the characteristics as required by ETSI EN 302 729-1 [i.7]. Since TLPRs are always installed on metallic tanks, TLPR manufactures have greater freedom creating a TLPR architecture in order to suit the needs of its customers.

1 Scope

The present document specifies technical requirements, limits and test methods for Tank Level Probing Radar (TLPR) equipment operating in the frequency ranges 4,5 GHz to 7 GHz, 8,5 GHz to 10,6 GHz, 24,05 GHz to 27 GHz, 57 GHz to 64 GHz and 75 GHz to 85 GHz.

Tank Level Probing Radars in the scope of the present document consist of a combined transmitter and receiver and are equipped with an integral or dedicated antenna provided and specified by the EUT manufacturer.

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

Technical and regulatory requirements for TLPR are provided in European Commission Implementing Decision (EU) 2025/105 [i.5].

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

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) (2024-08): "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) (2024-08): "Short Range Devices (SRD) and Ultra Wide Band (UWB); Part 2: Measurement techniques for receiver requirements".

[3] ETSI TS 103 789 (V1.1.1) (2023-05): "Short Range Devices (SRD) and Ultra Wide Band (UWB); Radar related parameters and physical test setup for object detection, identification and RCS measurement".

[4] ETSI TS 103 941 (V1.1.1) (2024-01): "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.

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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 (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] CEPT ERC Recommendation 74-01 (May 2022): "Unwanted emissions in the spurious domain".

[i.4] Void.

[i.5] Commission Implementing Decision (EU) 2025/105 of 22 January 2025 amending Decision 2006/771/EC updating harmonised technical conditions in the area of radio spectrum use for short-range devices and repealing Implementing Decision 2014/641/EU on harmonised technical conditions of radio spectrum use by wireless audio programme making and special events equipment in the Union.

[i.6] 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.7] ETSI EN 302 729-1 (V3.1.0) (2025-03): "Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised standard for access to radio spectrum; Part 1: Level Probing Radar (LPR) equipment operating in the frequency ranges 6 GHz to 8,5 GHz, 24,05 GHz to 26,5 GHz, 57 GHz to 64 GHz, 75 GHz to 85 GHz for strictly vertical downward installation".

[i.8] Void.

[i.9] ETSI EG 203 336 (V1.2.1) (2020-05): "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.10] ETSI TS 103 567 (V1.1.1) (2019-09): "Requirements on signal interferer handling".

[i.11] CEPT ERC Recommendation 70-03 (June 2024): "Relating to the use of Short Range Devices (SRD)".

[i.12] ETSI TS 103 361 (V1.1.1) (2016-03): "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.13] ETSI EN 302 372 (V2.1.1): "Short Range Devices (SRD); Tank Level Probing Radar (TLPR) equipment operating in the frequency ranges 4,5 GHz to 7 GHz, 8,5 GHz to 10,6 GHz, 24,05 GHz to 27 GHz, 57 GHz to 64 GHz, 75 GHz to 85 GHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".

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:

duty cycle over measurement period (DC_T_{on}): ratio of the sum of all the pulse durations t_{pulse} to the active measurement period T_{on}

duty cycle over signal repetition period (DC_T_{rep}): ratio of the sum of all active measurement periods T_{on} (bursts, sweeps, scans) to the signal repetition period T_{rep}

Equipment Under Test (EUT): TLPR under test

Frequency Modulated Continuous Wave (FMCW) radar: modulation scheme based on a periodically linear frequency sweep of the transmit signal (see also clause E.2 and ETSI EN 303 883-1 [1], clause C.2.2)

pulsed radar (or here simply "pulsed TLPR"): modulation scheme based on a periodically transmission of short RF pulses (see also clause E.1and ETSI EN 303 883-1 [1], clause C.2.1)

radiation: signals emitted intentionally for level measurements

step response time (of an TLPR): time span after a sudden distance change until the output value (distance value) reaches 90 % of the final value for the first time

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_{pulse}	pulse duration time in pulsed modulation schemes and dwell time or sweep time for FMCW modulation schemes

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:

AUT	Antenna Under Test
EFTA	European Free Trade Association
FMCW	Frequency Modulated Continuous Wave
HPBW	Half Power BeamWidth
ITU-R	International Telecommunication Union - Radio sector
LPR	Level Probing Radar
TLPR	Tank Level Probing Radar

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, but as a minimum, shall be that specified in the test conditions contained in the present document. 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 Equipment categories

4.2.1 General

The present document covers Tank Level Probing Radar (TLPR) devices for operation on tanks as outlined in the scope (clause 1) of the present document.

Receive-only devices, equipment exhibiting a receive only mode or a standby mode are not covered by the scope of the present document.

NOTE: In addition, the manufacturer should consider further installation requirements as specified in Annex F and should provide this information to the user/installer. These installation requirements, however, are not subject to Annex A of the present document.

A categorization of this TLPR equipment category has been conducted based on:

- the used Operating Frequency Range (OFR), see clause 4.2.2;
- the used antenna connection, see clause 4.2.3.

4.2.2 Categorization by Operating Frequency Range (OFR)

The categorization of TLPR Equipment by the Operating Frequency Range is used as given by Table 1.

Table 1: Categorization by frequency ranges

EUT category	Frequency range
OFR 1	4,5 GHz ≤ f ≤ 7 GHz
OFR 2	8,5 GHz ≤ f ≤ 10,6 GHz
OFR 3	24,05 GHz ≤ f ≤ 27 GHz
OFR 4	57 GHz ≤ f ≤ 64 GHz
OFR 5	75 GHz ≤ f ≤ 85 GHz

This categorization has been conducted, reflecting the different permitted frequency ranges which can be used for Tank Level Probing Radars in accordance with Commission Implementing Decision (EU) 2025/105 [i.5].

4.2.3 Categorization by antenna connection

Each of the TLPR equipment may or may not be equipped with an antenna connector, therefore the second categorization is done by the kind of antenna connection:

- ANT1: TLPR equipment features an antenna connector - the equipment is equipped with a dedicated antenna (AUT).
- ANT2: TLPR equipment has no antenna connector-the equipment is equipped with an integral antenna.

4.2.4 Summary of TLPR equipment categories

All of the categories are subject to these clause 4 requirements. Differentiation is made by test cases under clause 5.

An overview of the applicability of transmitter requirements and receiver requirements for the different TLPR equipment categories is shown in Table 2 and Table 3.

Table 2: Applicability of transmitter requirements for the different TLPR equipment categories

TX requirements	Clause	Categorization	
		Operating Frequency Range	antenna connection
		OFR1 to OFR5	ANT1 and ANT2
Operating frequency range	4.3.2	applicable to any category (OFR1 to OFR5)	applicable to any category (ANT1 and ANT2)
Indirect emissions measured as mean e.i.r.p. spectral density	4.3.4		
Peak e.i.r.p. spectral density	4.3.3		
Transmitter unwanted emissions (TXUE)	4.3.5		

Table 3: Applicability of receiver requirements for the different TLPR equipment categories

RX requirements	Clause	Categorization	
		Operating Frequency Range	antenna connection
		OFR1 to OFR5	ANT1 and ANT2
Receiver Baseline Sensitivity (RBS)	4.4.3	applicable to any category (OFR1 to OFR5)	applicable to any category (ANT1 and ANT2)
Receiver Baseline Resilience (RBR)	4.4.4		

The categories which are supported by the TLPR equipment shall be stated in the technical documentation of the equipment (TLPR1 to TLPR10, see Table 4).

Table 4: TLPR equipment categories based on the categorization listed in clauses 4.2.2 and 4.2.3

TLPR Equipment category	Categorization	
	Operating Frequency Range	antenna connection
TLPR1	OFR1	ANT1
TLPR2	OFR1	ANT2
TLPR3	OFR2	ANT1
TLPR4	OFR2	ANT2
TLPR5	OFR3	ANT1
TLPR6	OFR3	ANT2
TLPR7	OFR4	ANT1
TLPR8	OFR4	ANT2
TLPR9	OFR5	ANT1
TLPR10	OFR5	ANT2

4.3 Transmitter Requirements

4.3.1 General

The transmitter requirements for TLPR equipment covered by the scope of the present document are justified in Table B.1 in Annex B.

4.3.2 Operating Frequency Ranges (OFR)

4.3.2.1 Applicability

The Operating Frequency Range requirement applies to all TLPR equipment categories as defined in clause 4.2, Table 4.

4.3.2.2 Description and general requirements

The Operating Frequency Range is described in clause 5.2 of ETSI EN 303 883-1 [1]. According to this description, a value of 20 dB shall be used for the parameter X.