



**HARMONISED EUROPEAN STANDARD**

**ElectroMagnetic Compatibility (EMC) standard  
for radio equipment and services;  
Part 33: Specific conditions  
for Ultra-WideBand (UWB) devices;  
Harmonised Standard covering the essential requirements  
of article 3.1(b) of Directive 2014/53/EU**

---

Reference

REN/ERM-EMC-343

---

Keywords

EMC, harmonised standard, radio, UWB

**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

---

**Important notice**

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

---

**Copyright Notification**

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.

All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

# Contents

Intellectual Property Rights .....	5
Foreword.....	5
Modal verbs terminology.....	5
1 Scope .....	6
2 References .....	6
2.1 Normative references .....	6
2.2 Informative references.....	8
3 Definitions and abbreviations.....	8
3.1 Definitions .....	8
3.2 Abbreviations .....	8
4 Test conditions .....	8
4.1 General .....	8
4.2 Arrangements for test signals .....	8
4.2.1 General.....	8
4.2.2 Arrangements for test signals at the RF input of transmitters.....	8
4.2.3 Arrangements for test signals at the RF output of transmitters.....	9
4.2.4 Arrangements for test signals at the RF input of receivers .....	9
4.2.5 Arrangements for test signals at the RF output of receivers .....	9
4.2.6 Arrangements for testing transmitter and receiver together (as a system) .....	9
4.3 Exclusion bands.....	9
4.3.1 for EMC emission test .....	9
4.3.2 for EMC immunity test.....	9
4.4 Narrow band responses of receivers.....	9
4.5 Normal test modulation .....	10
5 Performance assessment.....	10
5.1 General .....	10
5.2 Equipment which can provide an UWB communications link.....	10
5.3 Equipment which does not provide an UWB communications link.....	10
5.4 Ancillary equipment.....	10
5.5 Equipment classification .....	10
6 Performance criteria .....	11
6.0 Introduction .....	11
6.1 Performance criteria for continuous phenomena applied to transmitters and receivers .....	11
6.2 Performance criteria for transient phenomena applied to transmitters and receivers .....	11
6.3 Performance criteria for equipment which does not provide an UWB communication link.....	11
6.4 Performance criteria for ancillary equipment tested on a stand alone basis .....	12
7 Applicability overview .....	12
7.1 Emission.....	12
7.2 Immunity .....	12
8 Methods of measurement and limits for EMC emissions .....	12
8.1 Test configuration.....	12
8.2 Enclosure port of ancillary equipment measured on a stand alone basis.....	12
8.2.1 General.....	12
8.2.2 Test method .....	12
8.2.3 Limits.....	13
8.3 DC power input/output ports .....	13
8.3.1 General.....	13
8.3.2 Test method .....	13
8.3.3 Limits.....	13
8.4 AC mains power input/output ports .....	13
8.4.1 General.....	13
8.4.2 Test method .....	14

8.4.3	Limits.....	14
8.4.3.1	General.....	14
8.4.3.2	AC Power port used for power supply only.....	14
8.4.3.3	AC power input port also used for PLC Communications.....	14
8.5	Harmonic current emissions (AC mains input port).....	14
8.6	Voltage fluctuations and flicker (AC mains input port).....	15
8.7	Wired network ports.....	15
8.7.1	General.....	15
8.7.2	Test method.....	15
8.7.3	Limits.....	15
9	Test methods and levels for immunity tests.....	15
9.1	Test configuration.....	15
9.2	Radio frequency electromagnetic field (80 MHz to 6 000 MHz).....	16
9.2.1	General.....	16
9.2.2	Test method.....	16
9.2.3	Performance criteria.....	16
9.3	Electrostatic discharge.....	16
9.3.1	General.....	16
9.3.2	Test method.....	16
9.3.3	Performance criteria.....	17
9.4	Fast transients, common mode.....	17
9.4.1	General.....	17
9.4.2	Test method.....	17
9.4.3	Performance criteria.....	17
9.5	Radio frequency, common mode.....	17
9.5.1	General.....	17
9.5.2	Test method.....	18
9.5.3	Performance criteria.....	18
9.6	Transients and surges in the vehicular environment.....	18
9.6.1	General.....	18
9.6.2	Test method.....	18
9.6.3	Performance criteria.....	18
9.7	Voltage dips and interruptions.....	19
9.7.1	General.....	19
9.7.2	Test method.....	19
9.7.3	Performance criteria.....	19
9.8	Surges.....	19
9.8.1	General.....	19
9.8.2	Test method.....	19
9.8.2.0	General.....	19
9.8.2.1	Test method for wired network ports directly connected to outdoor cables.....	20
9.8.2.2	Test method for wired network ports connected to indoor cables.....	20
9.8.2.3	Test method for mains ports.....	20
9.8.3	Performance criteria.....	20
<b>Annex A (informative):</b>	<b>Relationship between the present document and the essential requirements of Directive 2014/53/EU.....</b>	<b>21</b>
<b>Annex B (informative):</b>	<b>Change history.....</b>	<b>23</b>
History.....		24

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## 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 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.

The present document is part 33 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

<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

---

## 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.

---

# 1 Scope

The present document, together with ETSI EN 301 489-1 [1], specifies technical characteristics and methods of measurements for radio devices based on UWB technology in respect of ElectroMagnetic Compatibility (EMC).

The present document applies to fixed, mobile or portable UWB devices, e.g.:

- stand alone radio equipment with or without its own control provisions;
- plug-in radio devices intended for use with, or within, a variety of host systems, e.g. personal computers, hand-held terminals, etc.;
- plug-in radio devices intended for use within combined equipment, e.g. cable modems, set-top boxes, access points, etc.;
- combined equipment or a combination of a plug-in radio device and a specific type of host equipment;
- equipment for use in road and rail vehicles;
- Ground and wall probing radar equipment;
- (tank) level probing radar equipment;
- Material sensing devices.

NOTE: If a system includes transponders, these are measured together with the transmitter and examples of Ultra-WideBand equipment are given in the related harmonised standards of article 3.2 of Directive 2014/53/EU.

Technical specifications related to the antenna port and emissions from the enclosure port of Ultra-WideBand (UWB) equipment are not included in the present document. Such technical specifications are found in the relevant product standards for the effective use of the radio spectrum.

The present document specifies the applicable test conditions, performance assessment and performance criteria for Ultra-WideBand (UWB) equipment and associated ancillary equipment.

Examples of Ultra-WideBand equipment are given in the related harmonised standards.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and ETSI EN 301 489-1 [1], the provisions of the present document take precedence.

The environmental classification and the emission and immunity requirements used in the present document are as stated in ETSI EN 301 489-1 [1], except for any special conditions included in the present document.

The present document covers the essential requirements of article 3.1b of Directive 2014/53/EU under the conditions identified in annex A.

---

## 2 References

### 2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version applies.

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 301 489-1 (V2.1.1) (11-2016): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU".
- [2] ETSI EN 302 065-1 (V2.1.1) (11-2016): "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 1: Requirements for Generic UWB applications".
- [3] ETSI EN 302 065-2 (V2.1.1) (11-2016): "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 2: Requirements for UWB location tracking".
- [4] ETSI EN 302 065-3 (V2.1.1) (11-2016): "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".
- [5] ETSI EN 302 065-4 (V1.1.1) (11-2016): "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 4: Material Sensing devices using UWB technology below 10,6 GHz".
- [6] ETSI EN 302 066 (V2.1.1) (10-2016): "Short Range Devices (SRD); Ground- and Wall- Probing Radar applications (GPR/WPR) imaging systems; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [7] ETSI EN 302 372 (V2.1.1) (10-2016): "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".
- [8] ETSI EN 302 729 (V2.1.1) (10-2016): "Short Range Devices (SRD); 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; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [9] CENELEC EN 55032:2015: "Electromagnetic compatibility of multimedia equipment - Emission Requirements".
- [10] CENELEC EN 61326-1:2013: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements".
- [11] CENELEC EN 61326-2-3:2013: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning".
- [12] CENELEC EN 61326-2-5:2013: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-5: Particular requirements - Test configurations, operational conditions and performance criteria for field devices with interfaces according to IEC 61748-1, CP 3/2".
- [13] CENELEC EN 61000-6-2:2005: "Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments".
- [14] CENELEC EN 61000-6-3:2007 "Electromagnetic compatibility (EMC) - Part 6-3: Generic standards -Emission standard for residential, commercial and light-industrial environments".
- [15] ETSI EN 303 883 (V1.1.1) (09-2016): "Short Range Devices (SRD) using Ultra Wide Band (UWB);Measurement Techniques".

## 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.
- [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.

---

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EN 301 489-1, clause 3 [1] apply.

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given of ETSI EN 301 489-1, in clause 3 [1] and in specific UWB standards ETSI EN 302 065 parts 1 [2], 2 [3], 3 [4] and 4 [5], ETSI EN 302 066 [6], ETSI EN 302 372 [7] and ETSI EN 302 729 [8] apply.

---

## 4 Test conditions

### 4.1 General

For the purposes of the present document, the test conditions of ETSI EN 301 489-1, clause 4 [1] shall apply as appropriate. Further product related test conditions for UWB equipment are specified in the present document.

For emission and immunity tests the test modulation, test arrangements, etc., as specified in the present document, clauses 4.1 to 4.5, shall apply.

### 4.2 Arrangements for test signals

#### 4.2.1 General

The provisions of ETSI EN 301 489-1, clause 4.2 [1] shall apply.

#### 4.2.2 Arrangements for test signals at the RF input of transmitters

The provisions of ETSI EN 301 489-1, clause 4.2.1 [1] shall apply.



### 4.2.3 Arrangements for test signals at the RF output of transmitters

The provisions of ETSI EN 301 489-1, clause 4.2.2 [1] shall apply with the following modification.

The transmitter shall be operated at its maximum rated RF output power, modulated with normal test modulation (see clause 4.5).

### 4.2.4 Arrangements for test signals at the RF input of receivers

The provisions of ETSI EN 301 489-1, clause 4.2.3 [1] shall apply with the following modification.

A communication link shall be established if appropriate at the start of the test and maintained during the test.

For all radio determination devices, the normal operation mode shall be applied.

### 4.2.5 Arrangements for test signals at the RF output of receivers

The provisions of ETSI EN 301 489-1, clause 4.2.4 [1] shall apply.

### 4.2.6 Arrangements for testing transmitter and receiver together (as a system)

The provisions of ETSI EN 301 489-1, clause 4.2.5 [1] shall apply with the following modification.

For the immunity tests of duplex transceivers, the EUT may be configured in the repeater mode, consistent with the conditions given above.

## 4.3 Exclusion bands

### 4.3.1 for EMC emission test

The exclusion band for UWB equipment under EMC emission testing is the operating bandwidth(s), see related harmonised standards ETSI EN 302 065 parts 1 [2], 2 [3], 3 [4] and 4 [5], ETSI EN 302 066 [6], ETSI EN 302 372 [7] and ETSI EN 302 729, clause 4.3.1 [8] and using the definition in ETSI EN 303 883, clause 7.2.2 [15]:

- The lower frequency of the exclusion band (EXband(lower) in ETSI EN 301 489-1, clause 4.3 [1]) is the lower frequency of the operating bandwidth(s) (see ETSI EN 303 883, clause 7.2.2 [15]).
- The upper frequency of the exclusion band (EXband(upper) in ETSI EN 301 489-1, clause 4.3 [1]) is the upper frequency of the operating bandwidth(s) (see ETSI EN 303 883, clause 7.2.2 [15]).

### 4.3.2 for EMC immunity test

The exclusion band for UWB equipment under EMC immunity testing is calculated according to ETSI EN 301 489-1, clause 4.3.3.3 [1] with parameter  $n = 1$ , where:

- BWRX corresponds to the operating bandwidth of the UWB device (see ETSI EN 303 883, clause 7.2.2 [15]).
- BandRX(lower) corresponds to the lower edge of the operating bandwidth (see ETSI EN 303 883, clause 7.2.2 [15]).
- BandRX(upper) corresponds to the upper edge of the operating bandwidth (see ETSI EN 303 883, clause 7.2.2 [15]).

## 4.4 Narrow band responses of receivers

This clause does not apply for TLPR [7] and LPR [8].

The provision of ETSI EN 301 489-1, clause 4.4 [1] shall apply with the exception of those GPR/WPR equipment [6] that do not permit a narrow band response of the receivers.

## 4.5 Normal test modulation

The manufacturer may have to supply the test modulation/demodulation equipment.

The test signal generator (modulation) shall be able to produce a continuous stream of data or a repetitive message.

The test signal receiver (de-modulator) shall be, where appropriate, able to produce a readout of Bit Error Ratio (BER) of a continuous data stream or a repetitive readout of message acceptance.

This requirement does not apply for GPR/WPR [6], (T)LPR [7], [8] and Material Sensing Devices [5].

---

# 5 Performance assessment

## 5.1 General

The provision of ETSI EN 301 489-1, clause 5.1 [1] shall apply with the following modifications.

For GPR/WPR [6] the manufacturer shall declare weather the DUT performance assessment is based on:

- the maintenance of function(s); or
- the way the eventual loss of function(s) can be recovered; or
- unintentional behaviour of the DUT.

## 5.2 Equipment which can provide an UWB communications link

The provision of ETSI EN 301 489-1, clause 5.2 [1] shall apply.

## 5.3 Equipment which does not provide an UWB communications link

The provision of ETSI EN 301 489-1, clause 5.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6.4 [10], with CENELEC EN 61326-2-3, clause 6.4 [11] or with CENELEC EN 61326-2-5, clause 6.4 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14] or CENELEC EN 61000-6-2, clause 8 [13].

## 5.4 Ancillary equipment

The provision of ETSI EN 301 489-1, clause 5.4 [1] shall apply.

## 5.5 Equipment classification

The provision of ETSI EN 301 489-1, clause 5.5 [1] shall apply.

---

## 6 Performance criteria

### 6.0 Introduction

The performance criteria are used to take a decision on whether a radio equipment passes or fails immunity tests.

For the purpose of the present document four categories of performance criteria apply:

- performance criteria for continuous phenomena applied to transmitters and receivers;
- performance criteria for transient phenomena applied to transmitters;
- performance criteria for transient phenomena applied to receivers.

### 6.1 Performance criteria for continuous phenomena applied to transmitters and receivers

The provision of ETSI EN 301 489-1, clause 6.1 [1] shall apply.

### 6.2 Performance criteria for transient phenomena applied to transmitters and receivers

The provision of ETSI EN 301 489-1, clause 6.2 [1] shall apply.

### 6.3 Performance criteria for equipment which does not provide an UWB communication link

For radio equipment which does not provide an UWB communication link, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation.

The manufacturer shall furthermore define the test method(s) for the assessment of the actual level of performance or degradation of performance during and/or after the EMC exposure. Under these circumstances the manufacturer shall additionally provide the following information also for inclusion in the test report:

- the functions of the EUT during and after EMC stress;
- the intended functions of the EUT which shall be in accordance with the documentation accompanying the equipment;
- suitable pass/fail criteria for the EUT;
- the method of monitoring the actual level of performance and/or the actual degradation of performance of the EUT.

The assessment of the actual performance or its degradation which is carried out during and/or after the EMC exposure, shall be simple, but at the same time give adequate proof that the primary functions of the equipment fulfil the manufacturer defined acceptable level of performance or degradation of performance.

## 6.4 Performance criteria for ancillary equipment tested on a stand alone basis

If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account.

---

## 7 Applicability overview

### 7.1 Emission

Table 1 in ETSI EN 301 489-1 [1] contains the applicability of EMC emission measurements to the relevant ports of radio and/or associated ancillary equipment.

### 7.2 Immunity

Table 2 of ETSI EN 301 489-1 [1] contains the applicability of EMC immunity measurements to the relevant ports of radio and/or associated ancillary equipment.

---

## 8 Methods of measurement and limits for EMC emissions

### 8.1 Test configuration

The provision of ETSI EN 301 489-1, clause 8.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

### 8.2 Enclosure port of ancillary equipment measured on a stand alone basis

#### 8.2.1 General

The provision of ETSI EN 301 489-1, clause 8.2.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

#### 8.2.2 Test method

The test method shall be in accordance with CENELEC EN 55032 [9] with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

### 8.2.3 Limits

The ancillary equipment shall meet the class B limits given in CENELEC EN 55032 [9] or for ancillary equipment intended to be used in and industrial environment or telecommunication centers, the class A limits given in CENELEC EN 55032 [9] may be used, with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

## 8.3 DC power input/output ports

### 8.3.1 General

The provision of ETSI EN 301 489-1, clause 8.3.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

### 8.3.2 Test method

The provision of ETSI EN 301 489-1, clause 8.3.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

### 8.3.3 Limits

The provision of ETSI EN 301 489-1, clause 8.3.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

## 8.4 AC mains power input/output ports

### 8.4.1 General

The provision of ETSI EN 301 489-1, clause 8.4.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

## 8.4.2 Test method

The provision of ETSI EN 301 489-1, clause 8.4.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

## 8.4.3 Limits

### 8.4.3.1 General

The provision of ETSI EN 301 489-1, clause 8.4.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

### 8.4.3.2 AC Power port used for power supply only

The provision of ETSI EN 301 489-1, clause 8.4.3.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

### 8.4.3.3 AC power input port also used for PLC Communications

The provision of ETSI EN 301 489-1, clause 8.4.3.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

## 8.5 Harmonic current emissions (AC mains input port)

The provision of ETSI EN 301 489-1, clause 8.5 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.

- 2) CENELEC EN 61000-6-3, clause 7 [14].

## 8.6 Voltage fluctuations and flicker (AC mains input port)

The provision of ETSI EN 301 489-1, clause 8.6 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

## 8.7 Wired network ports

### 8.7.1 General

The provision of ETSI EN 301 489-1, clause 8.7.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

### 8.7.2 Test method

The provision of ETSI EN 301 489-1, clause 8.7.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

### 8.7.3 Limits

The provision of ETSI EN 301 489-1, clause 8.7.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 7 [10], with CENELEC EN 61326-2-3, clause 7 [11] or with CENELEC EN 61326-2-5, clause 7 [12] as applicable.
- 2) CENELEC EN 61000-6-3, clause 7 [14].

---

# 9 Test methods and levels for immunity tests

## 9.1 Test configuration

The provision of ETSI EN 301 489-1, clause 9.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.

- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.2 Radio frequency electromagnetic field (80 MHz to 6 000 MHz)

### 9.2.1 General

The provision of ETSI EN 301 489-1, clause 9.2.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.2.2 Test method

The provision of ETSI EN 301 489-1, clause 9.2.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.2.3 Performance criteria

The provision of ETSI EN 301 489-1, clause 9.2.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.3 Electrostatic discharge

### 9.3.1 General

The provision of ETSI EN 301 489-1, clause 9.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.3.2 Test method

The provision of ETSI EN 301 489-1, clause 9.3.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.



- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.3.3 Performance criteria

The provision of ETSI EN 301 489-1, clause 9.3.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.4 Fast transients, common mode

### 9.4.1 General

The provision of ETSI EN 301 489-1, clause 9.4.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.4.2 Test method

The provision of ETSI EN 301 489-1, clause 9.4.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.4.3 Performance criteria

The provision of ETSI EN 301 489-1, clause 9.4.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.5 Radio frequency, common mode

### 9.5.1 General

The provision of ETSI EN 301 489-1, clause 9.5.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.5.2 Test method

The provision of ETSI EN 301 489-1, clause 9.5.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.5.3 Performance criteria

The provision of ETSI EN 301 489-1, clause 9.5.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

# 9.6 Transients and surges in the vehicular environment

## 9.6.1 General

The provision of ETSI EN 301 489-1, clause 9.6.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.6.2 Test method

The provision of ETSI EN 301 489-1, clause 9.6.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.6.3 Performance criteria

The provision of ETSI EN 301 489-1, clause 9.6.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.7 Voltage dips and interruptions

### 9.7.1 General

The provision of ETSI EN 301 489-1, clause 9.7.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.7.2 Test method

The provision of ETSI EN 301 489-1, clause 9.7.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.7.3 Performance criteria

The provision of ETSI EN 301 489-1, clause 9.7.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.8 Surges

### 9.8.1 General

The provision of ETSI EN 301 489-1, clause 9.8.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.8.2 Test method

#### 9.8.2.0 General

The provision of ETSI EN 301 489-1, clause 9.8.2.0 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.8.2.1 Test method for wired network ports directly connected to outdoor cables

The provision of ETSI EN 301 489-1, clause 9.8.2.1 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.8.2.2 Test method for wired network ports connected to indoor cables

The provision of ETSI EN 301 489-1, clause 9.8.2.2 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

### 9.8.2.3 Test method for mains ports

The provision of ETSI EN 301 489-1, clause 9.8.2.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## 9.8.3 Performance criteria

The provision of ETSI EN 301 489-1, clause 9.8.3 [1] shall apply with the following exclusions.

For (T)LPR [7] and [8] requirements, the following standards shall apply as listed in either 1 or 2:

- 1) CENELEC EN 61326-1, clause 6 [10], with CENELEC EN 61326-2-3, clause 6 [11] or with CENELEC EN 61326-2-5, clause 6 [12] as applicable.
- 2) CENELEC EN 61000-6-2, clause 8 [13].

## Annex A (informative): Relationship between the present document and the essential requirements of Directive 2014/53/EU

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.

**Table A.1: Relationship between the present document and the essential requirements of Directive 2014/53/EU**

Harmonised Standard ETSI EN 301 489-33				
Requirement			Requirement Conditionality	
No	Description	Reference: Clause No	U/C	Condition
1	Enclosure of ancillary equipment measured on a stand alone basis	8.2	U	
2	DC power input/output ports	8.3	C	Only where equipment has DC power input and/or output ports with a cable length greater than 3 m or from a vehicle power supply
3	AC mains power input/output ports	8.4	C	Only where equipment has AC mains power input and/or output ports
4	Harmonic current emission (AC mains input port)	8.5	C	Only where equipment has AC mains power input ports
5	Voltage fluctuations and flicker (AC mains input ports)	8.6	C	Only where equipment has AC mains power input ports
6	Wired network ports	8.7	C	Only where equipment has wired network ports
7	Radio frequency electromagnetic field (80 MHz to 6 000 MHz)	9.2	U	
8	Electrostatic discharge	9.3	U	
9	Fast transients common mode	9.4	C	Only where equipment has AC mains power input ports or DC power ports or wired network ports with cables longer than 3 m
10	Radio frequency common mode	9.5	C	Only where equipment has AC mains power input ports or DC power ports or wired network ports with cables longer than 3 m
11	Transients and surges in the vehicular environment	9.6	C	Only where equipment is connected to vehicle power supply
12	Voltage dips and interruptions	9.7	C	Only where equipment has AC mains power input ports
13	Surges	9.8	C	Only where equipment has AC mains power input ports and/or wired network ports

**Key to columns:****Requirement:**

**No** A unique identifier for one row of the table which may be used to identify a requirement.

**Description** A textual reference to the requirement.

**Clause Number** Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

**Requirement Conditionality:**

**U/C** Indicates whether the requirement is unconditionally applicable (U) or is conditional upon the manufacturer's claimed functionality of the equipment (C).

**Condition** Explains the conditions when the requirement is or is not applicable for a requirement which is classified "conditional".

Presumption of conformity stays valid only as long as a reference to the present document is maintained in the list published in the Official Journal of the European Union. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

Other Union legislation may be applicable to the product(s) falling within the scope of the present document.

---

## Annex B (informative): Change history

Version	Information about changes
1.1.1	Last publication as HS under R&TTE
2.1.1	<ul style="list-style-type: none"><li>• Revision for compliance with Directive 2014/53/EU</li><li>• Part will cover now the EMC requirements under article 3.1b for all UWB devices, including<ul style="list-style-type: none"><li>○ Generic UWB</li><li>○ UWB for location tracking applications</li><li>○ For vehicular use</li><li>○ Material sensing and object discrimination</li><li>○ GPR/WPR</li><li>○ (T)LPR</li></ul></li><li>• Merged with ETSI EN 301 489-32</li></ul>

---

## History

<b>Document history</b>		
V1.1.1	February 2009	Publication
V2.1.0	April 2016	EN Approval Procedure AP 20160717: 2016-04-18 to 2016-07-18
V2.1.1	November 2016	Vote V 20170127: 2016-11-28 to 2017-01-27