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**ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 17: Specific conditions for
Broadband Data Transmission Systems;
Harmonised Standard for ElectroMagnetic Compatibility**

Reference
REN/ERM-EMC-370

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Contents

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Foreword

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

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.12] 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 17 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

National transposition dates	
Date of adoption of this EN:	8 September 2020
Date of latest announcement of this EN (doa):	31 December 2020
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Date of withdrawal of any conflicting National Standard (dow):	30 June 2022

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 Broadband Data Transmission System equipment including the associated ancillary equipment in respect of electromagnetic compatibility, as detailed in ~~annex B~~table 1.

Technical specifications related to the antenna port and emissions from the enclosure port of the radio 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 ~~wideband~~Broadband data ~~communication~~transmission systems as detailed in table 1.

~~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.~~Table 1: Radio Technologies in scope of the present document

Technology	ETSI Standard
Data transmission systems operating in the 2,4 GHz ISM band and using wide band modulation techniques	ETSI EN 300 328 [i.8]
5 GHz high performance RLAN systems	ETSI EN 301 893 [i.3]
6 GHz high performance RLAN systems	ETSI EN 303 687 [i.2]
Broadband data transmitting systems operating in the band 5 725 MHz to 5 875 MHz	ETSI EN 302 502 [i.4]
Multi-Gigabit Wireless Systems (MGWS) in the 60 GHz band	ETSI EN 302 567 [i.6]

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.

NOTE: The relationship between the present document ~~covers the~~and essential requirements of article 3.1(b) of Directive 2014/53/EU [i.1] ~~under the conditions identified~~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 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) (02-2017~~2.3) (11-2019): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard ~~covering the essential requirements of article~~ for ElectroMagnetic Compatibility~~3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU~~".

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] ~~Void.~~ETSI EN 303 687: "6 GHz RLAN Harmonised Standard for access to radio spectrum".

[i.3] ETSI EN 301 893: "~~Broadband Radio Access Networks (BRAN); 5~~ GHz ~~high performance~~ RLAN; ~~Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive~~Harmonised Standard for access to radio spectrum".

[i.4] ETSI EN 302 502: "~~Broadband Radio~~Wireless Access ~~Networks (BRAN~~Systems (WAS); 5,8 GHz fixed broadband data transmitting systems; ~~Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive~~Harmonised Standard for access to radio spectrum".

~~[i.5] ETSI EN 302 544-2: "Broadband Data Transmission Systems operating in the 2 500 MHz to 2 690 MHz frequency band; Part 2: TDD User Equipment Stations; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".~~

] Void.

[i.6] ETSI EN 302 567: "~~WAS/RLAN systems; Multiple-Gigabit WAS/RLAN~~/s radio equipment operating in the 60 GHz band; Harmonised Standard covering the essential requirements of article 3.2 of ~~the~~ Directive 2014/53/EU".

~~[i.7] ETSI EN 302 623: "Broadband Wireless Access Systems (BWA) in the 3 400 MHz to 3 800 MHz frequency band; Mobile Terminal Stations; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".~~

] Void.

[i.8] ETSI EN 300 328: "Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ~~ISM~~ band ~~and using wide band modulation techniques~~; Harmonised Standard ~~covering the essential requirements of article 3.2 of Directive 2014/53/EU~~for access to radio spectrum".

[i.9] Void.

~~[i.10] ETSI EN 301 908-19: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 19: OFDMA TDD WMAN (Mobile WiMAXTM) TDD User Equipment (UE)".~~

] Void.

~~[i.11] ETSI EN 301 908-21: "IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 21: OFDMA TDD WMAN (Mobile WiMAX™) FDD User Equipment (UE)".~~

] Void.

[i.12] 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 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI EN 301 489-1 [1] and the following apply:

ancillary equipment: electrical or electronic equipment, that is intended to be used with a receiver or transmitter

NOTE 1: It is considered as an ancillary equipment if:

- the equipment is intended for use with a receiver or transmitter to provide additional operational and/or control features to the radio equipment, (e.g. to extend control to another position or location); and
- the ancillary equipment cannot be used without being connected to radio equipment to provide user functions independently of a receiver or transmitter; and
- the receiver or transmitter, to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

NOTE 2: An example of ancillary equipment would be a docking station for radio equipment whose interface is dedicated to a particular product or range of products.

Equipment Under Test (EUT): equipment subject to the performance requirements of the present document

fixed ~~station~~equipment: equipment intended for use in a fixed location and fitted with one or more antennas

NOTE: The equipment may be fitted with either antenna socket(s) or integral antenna(s) or both.

~~**hand-portable station:** equipment normally used on a stand-alone basis and to be carried by a person~~

~~NOTE: The equipment may be fitted with one or more antennas. The equipment may be fitted with either antenna socket(s) or integral antenna(s) or both.~~

host: any equipment which has complete user functionality when not connected to the radio equipment part and to which the radio equipment part provides additional functionality and to which connection is necessary for the radio equipment part to offer functionality

plug-in radio device: equipment, including slide-in radio cards, intended to be used with or within a variety of host systems, using their control functions and power supply

portable equipment: radio equipment intended for portable use and powered by integral batteries or battery

NOTE: Devices will typically be handheld.

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

vehicular equipment: radio equipment intended for installation and use in a vehicle, and powered by the main battery of the vehicle

3.2 Symbols

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

Pmin minimum power required to establish a communication link

3.3 Abbreviations

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

AC	Alternating Current
ACK	ACKnowledgement
ARQ	Automatic Retransmission reQuest
BRAN	Broadband Radio Access Networks
~~BWA~~	~~Broadband Wireless Access~~
~~CR~~	~~Continuous phenomena applied to Receivers~~
~~CT~~	~~Continuous phenomena applied to Transmitters~~
DC	Direct Current
EMC	ElectroMagnetic Compatibility
ERM	~~Electromagnetic compatibility~~EMC and Radio Spectrum Matters
EUT	Equipment Under Test
FER	Frame Error Rate
ISM	Industrial, Scientific and Medical
MGWS	Multi-Gigabit Wireless Systems
~~MUS~~	~~Maximum Usable Sensitivity~~
NACK	Not ACKnowledgement
PER	Packet Error Rate
RF	Radio Frequency
RLAN	Radio Local Area Network
~~TR~~	~~Transient phenomena applied to Receivers~~
~~TT~~	~~Transient phenomena applied to Transmitters~~

4 Test conditions

4.1 General

For the purposes of the present document, the test conditions of ETSI EN 301 489-1 [1], clause 4, shall apply as appropriate. Further product related test conditions for wideband data communications systems are specified in clauses 4.2 to 4.5.

The radio equipment may take forms which may require special software and/or test fixtures. Equipment which requires connection to a host equipment to function shall use ~~the~~a test configuration ~~as defined by the manufacturer. In all cases the EUT shall be exercised in a manner~~ representative of ~~normal~~the EUT's intended use and shall be recorded in the test report.

4.2 Arrangements for test signals

~~4.2.0 General~~

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

4.2.1 Arrangements for test signals at the input of transmitters

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

The wanted signals and/or controls required to establish a ~~communications~~communication link and shall be ~~defined by~~representative of the ~~manufacturer.~~ EUTs intended use.

The transmitter shall be operated at maximum rated power.

4.2.2 Arrangements for test signals at the output of transmitters

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

~~The manufacturer may provide a~~A suitable companion receiver ~~that can~~shall be used to receive messages or to set up a communication link.

4.2.3 Arrangements for test signals at the input of receivers

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

~~The wanted signals required to establish a communications link shall be defined by the manufacturer.~~

~~The~~For radiated immunity, the level of the wanted signal at the input of the receiver or the enclosure port of the EUT, shall be ~~at least~~ 30 dB (±6 dB) above the ~~declared Maximum Usable Sensitivity (MUS).~~Pmin for the EUT. For all other tests the level of the wanted signal, required to establish a communication link, should be representative of the EUT intended use.

NOTE: Simple method to establish the required communication link is establish link, reduce power to point of link failure then increase by 30 dB (±6 dB).

4.2.4 Arrangements for test signals at the output of receivers

The measuring equipment for the output signal from the receiver under test shall be located outside the test environment.

It shall be possible to assess the performance of the equipment by appropriately monitoring the receiver output.

If the receiver has an output connector or port providing the wanted output signal, then this port shall be used via a cable, consistent with the standard cable used in normal operation, connected to the external measuring equipment outside the test environment. ~~The measuring equipment may be supplied by the manufacturer.~~

Precautions shall be taken to ensure that any effect on the test due to the coupling means is minimized.

~~The manufacturer may provide a~~A suitable companion transmitter ~~that can~~shall be used to transmit messages or to set up a communication link.

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

The provisions of ETSI EN 301 489-1 [1], clause 4.2.~~5~~0 shall apply.

~~The manufacturer may provide a~~A suitable companion transceiver or transmitter and receiver ~~that can~~shall be used to send and receive messages or to set up a communication link.

Both the EUT and the companion equipment shall transmit the normal test modulation. Further, the output of the radio equipment under test shall be monitored by the test system.

4.2.6 Equipment with an external antenna connector

If access to the antenna connector involves modification or dismantling of the EUT then this clause does not apply.

The EUT may be tested with its antenna removed.

In the case of testing with the antenna removed, the wanted RF input and output signals shall be delivered between the EUT antenna connector and the measuring and/or test equipment by a shielded transmission line, such as a coaxial cable. Adequate measures shall be taken to minimize the effect of common mode currents on the transmission line at the point of entry to the EUT and at the measuring/test equipment.

4.2.7 Equipment without an external antenna connector (integral antenna)

This clause applies to EUT to which clause 4.2.6 does not apply. Such EUT are generally known as integral antenna or dedicated antenna equipment.

The EUT shall be tested with its antenna fitted in a manner typical of ~~normal~~ intended use.

4.2.8 Equipment with more than one antenna

If the EUT has more than one antenna port, e.g. separate antennas for Tx and Rx or separate antennas for different operating frequencies or diversity antennas, then:

- If clause 4.2.6 applies to all the antenna ports, then the EUT may be tested according to clause 4.2.6, with all antenna ports treated the same.
- Otherwise it shall be tested according to clause 4.2.7.

NOTE: The reason is that replacing one antenna by a transmission line may affect the operation of any other antennas.

4.3 Exclusion bands

4.3.1 General

The frequencies on which the transmitter part of the EUT is intended to operate shall be excluded from radiated emission measurements when performed in transmit mode of operation.

There shall be no frequency exclusion band applied to emission measurements of the receiver part of transceivers or the stand alone receiver under test, and/or associated ancillary equipment.

For EUT that operate above 6 GHz there is no exclusion band specified as test ranges stop at 6 GHz.

NOTE: All of the receiver exclusion band ranges detailed within clauses 4.3.2, 4.3.3 and 4.3.4 also cover the relevant blocking test ranges specified in the relevant product standards for the effective use of the radio spectrum (see table 1).

4.3.2 Data transmission systems operating in the 2,4 GHz ISM band and using wide band modulation techniques

The exclusion band for immunity testing of equipment operating in the 2,4 GHz band shall be:

- lower limit of exclusion band = lowest allocated band edge frequency -120 MHz, i.e. 2 280 MHz;
- upper limit of exclusion band = highest allocated band edge frequency -+120 MHz, i.e. 2 603,5 MHz.

NOTE: This is based upon a channel size of 40 MHz and a value of n = 3 from ETSI EN 301 489-1 [1], clause 4.3.3.

4.3.3 5 GHz high performance RLAN systems

The exclusion band for immunity testing of equipment operating in the 5 GHz Wi-Fi band shall be:

- lower limit of exclusion band = lowest allocated band edge frequency ~~-270~~320 MHz, i.e. 4 ~~880~~830 MHz;
- ~~upper limit of exclusion band = highest allocated band edge frequency +270 MHz, i.e. 5 995 MHz.~~
- as the immunity requirements have an upper frequency range of 6 GHz and any upper edge exclusion band would be greater than this for both the 5 470 MHz - 5 725 MHz and 5 725 MHz - 5 850 MHz bands. Therefore the test stops at the lower limit of exclusion band (i.e. 4 830 MHz).

NOTE: This is based upon a channel size of 80 MHz and a value of n = 4 from ETSI EN 301 489-1 [1], clause 4.3.3.

4.3.4 Broadband data transmitting systems operating in the band 5 725 MHz to 5 875 MHz

The exclusion band for immunity testing of ~~equipment~~Broadband data transmitting systems operating in the 5,8 GHz band shall be:

- lower limit of exclusion band = lowest allocated band edge frequency ~~-270~~440 MHz, i.e. 5 ~~455~~285 MHz;
- as the immunity requirements have an upper frequency range of 6 GHz and any upper edge exclusion band would be greater than this for the 5,8 GHz band. ~~The above frequency shall also be regarded as the upper end of the test range.~~ Therefore the test stops at the lower limit of exclusion band (i.e. 5 285 MHz).

~~NOTE: These receiver exclusion band ranges align with the relevant blocking test ranges.~~

~~4.4 Narrow band responses on receivers or receivers which are part~~NOTE: This is based upon a channel size of ~~transceivers~~

~~The provision~~40 MHz and a value of n = 11 from ETSI EN- 301- 489-~~-~~1- [1], clause 4.~~4 shall apply~~3.3.

4.4 Void

4.5 Normal test modulation

The modulated test signal shall represent ~~normal~~ intended use, and may contain data formatting, error detection and correction information.

5 Performance assessment

5.1 General

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

The manufacturer ~~shall~~should supply at the time of submission of the equipment for test, the information required in ETSI EN 301 489-1 [~~1~~1], ~~clause 5.1~~annex C and the following which ~~shall~~should be recorded in the test report:

- the operating frequency range(s) of the equipment and, where applicable, band(s) of operation;
- the type of the equipment, for example: stand-alone or plug-in radio device;
- the host equipment to be combined with the radio equipment for testing;
- the minimum performance level under the application of EMC stress (see clause 6.2);
- the normal test modulation, the format, the type of error correction and any control signals e.g. ACKnowledgement (ACK)/Not ACKnowledgement (NACK) or Automatic Retransmission reQuest (ARQ).

5.2 Arrangements for the assessment of host ~~dependant~~dependent equipment and plug-in cards

~~5.2.0 Introduction~~

~~For equipment parts for which integration with a host equipment is necessary in order to offer functionality, two alternative approaches defined in clauses 5.2.1 and 5.2.2 may be used. The manufacturer shall declare which alternative shall be used.~~

~~5.2.1 Alternative A: composite equipment~~

~~A combination of the radio equipment part and a specific type of host equipment may be used for assessment according to the present document.~~

~~Where a specific combination of host equipment and a radio equipment part is tested as a composite system for compliance, repeat testing shall not be required for:~~

- ~~those other combinations of hosts and radio equipment parts which are based on substantially similar host models in the circumstance that the variations in mechanical and electrical properties between such host models are unlikely to significantly influence the intrinsic immunity and unwanted emissions of the radio equipment part;~~
- ~~the radio equipment part which cannot be used without mechanical, electrical, or software modification in variations of host equipment different from those represented by the units for which compliance to the present document has been demonstrated.~~

~~For all other combinations, each combination shall be tested separately.~~

~~5.2.2 Alternative B: use of a test jig or host~~

Where the radio equipment part is intended for use with a variety of host systems, ~~the manufacturer shall supply~~ a suitable test configuration consisting of either a host system representative of intended ~~for normal~~ use or a test jig that is representative of the range of host systems in which the device may be used. The test jig shall allow the radio equipment part to be powered and stimulated in a way similar to the way it would be powered and stimulated when connected to or inserted into host equipment.

5.3 Assessment procedures

The performance assessment shall be based upon:

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

The test system shall set up a communications link in the same manner as the Equipment Under Test's (EUT) ~~normal~~ intended use.

Any user defined data fields in the memory or storage of the EUT shall be filled in a way representative of ~~normal~~ intended use.

The assessment procedure shall verify that the communications link is maintained and that there is no loss of user control functions ~~as declared by the manufacturer~~ or loss of ~~the~~critical stored ~~user defined~~ data.

~~5.4 Ancillary equipment~~

~~The provision of ETSI EN 301 489-1 [1], clause 5.4 shall not apply as ancillary equipment is outside~~Where the EUT is capable of operation in multiple frequency bands, each band (e.g. 2,4 GHz and 5 GHz) shall be subject to assessment.

Where the EUT is capable of operating in multiple radio technologies, the operation of each technology shall be assessed.

NOTE: For radio technologies within the scope of the present document.

5.5 Equipment classification

Hand portable equipment, or combinations of equipment, declared as capable of being powered for that are intended use by the main battery of a vehicle shall additionally be to be permanently operational and assessing the radio in idle mode is not considered as vehicular mobile equipment.

Hand portable or mobile equipment, or combinations of equipment, declared as capable of being powered for intended use by ac mains shall additionally be considered as fixed station equipmentnecessary.

6 Performance criteria

6.1 General performance criteria

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

6.2 Performance table

6.2.1 Performance criteria overview

Table ~~1~~2: Performance criteria

Criteria	During test	After test (i.e. as a result of the application of the test)
A	Shall operate as intended. (~~see~~See note ~~1~~). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance ~~(see note 3).~~. Shall be no loss of function. Shall be no loss of critical stored data ~~or user programmable functions~~.
B	May ~~show~~be loss of function ~~(one or more).~~. ~~May show degradation of performance (see note 2).~~ ~~Shall be no unintentional transmissions.~~	Functions shall be self-recoverable. Shall operate as intended after recovering. ~~Shall be no degradation of performance (see note 3).~~ Shall be no loss of critical stored data ~~or user programmable functions~~.
C	May be loss of function ~~(one or more).~~.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no ~~degradation of performance (see note 3).~~loss of critical stored data.

~~NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.~~

~~NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.~~
~~If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.~~

~~NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.~~
~~If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.~~NOTE: Operate as intended during the test allows a level of degradation in accordance with clause 6.2.2.

6.2.2 Minimum performance level

For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.

6.3 Performance criteria for Continuous phenomena ~~applied to Transmitters (CT)~~

The performance criteria A shall apply.

~~Tests shall be repeated with~~Where the EUT is a transmitter in standby mode ~~(if applicable) to ensure that,~~ unintentional transmission ~~does~~shall not occur~~. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK)~~ during the test.

Where the EUT is a transceiver in receive mode, unintentional transmission ~~may~~shall not occur~~, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.~~ during the test.

6.4 Performance criteria for Transient phenomena ~~applied to Transmitters (TT)~~

The performance criteria B shall apply, except for voltage dips ~~of~~greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

~~Tests shall be repeated with~~Where the EUT is a transmitter in standby mode ~~(if applicable) to ensure that,~~ unintentional transmission ~~does~~shall not occur~~. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the~~ as a result of the application of the test ~~is correctly interpreted.~~

~~6.5 Performance criteria for Continuous phenomena applied to Receivers (CR)~~

~~The performance criteria A shall apply.~~

Where the EUT is a transceiver~~, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from~~ in receive mode, unintentional transmission shall not occur as a result of the application of the test ~~is correctly interpreted.~~

~~6.6 Performance criteria for Transient phenomena applied to Receivers (TR)~~

~~The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply.~~

~~Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.~~

~~7 Applicability overview~~

7 Requirements

7.1 Emission

7.1.1 General

~~ETSI EN 301 489-1 [1], table 1~~Table 3 contains the ~~applicability of~~ EMC emission ~~measurements to~~ requirements for the relevant ports of radio and ancillary equipment.

~~7.1.2 Special conditions~~

~~Arrangements for~~ The EUT test ~~conditions~~configuration shall be ~~as specified~~ in accordance with ETSI EN 301 489-1 [1], clause ~~4~~8.1.2.

Table 3: Emission requirements

Phenomenon	Port	Applicability			Reference clause
		Fixed equipment	Vehicular equipment	Portable equipment	
radiated emission	enclosure of ancillary equipment	applicable	applicable	applicable	ETSI EN 301 489-1 [1], clause 8.2
conducted emission	DC power input/output port	applicable	applicable	not applicable	ETSI EN 301 489-1 [1], clause 8.3
conducted emission	AC mains input/output port	applicable	not applicable	not applicable	ETSI EN 301 489-1 [1], clause 8.4
harmonic current emissions	AC mains input port	applicable	not applicable	not applicable	ETSI EN 301 489-1 [1], clause 8.5
voltage fluctuations and flicker	AC mains input port	applicable	not applicable	not applicable	ETSI EN 301 489-1 [1], clause 8.6
conducted emission	wired network port	applicable	not applicable	not applicable	ETSI EN 301 489-1 [1], clause 8.7

Portable equipment, or combinations of equipment, capable of being powered for intended use by the main battery of a vehicle shall additionally be considered as vehicular equipment.

Portable or vehicular equipment, or combinations of equipment, capable of being powered for intended use by AC mains shall additionally be considered as fixed equipment.

7.2 Immunity

7.2.1 General

~~ETSI EN 301 489-1 [1], table 2~~Table 4 contains the ~~applicability of~~ EMC immunity ~~measurements to~~ test requirements for the relevant ports of radio equipment.

~~7.2.2 Special conditions~~

~~Arrangements for test conditions shall be as specified in clause 4.~~

~~Arrangements for performance criteria shall be as specified in clause 6.~~

Table 4: Immunity test requirements

Phenomenon	Port	Applicability			Reference clause	Performance criteria clauses
		Fixed equipment	Vehicular equipment	Portable equipment		
RF electromagnetic field (80 MHz to 6 000 MHz)	enclosure	applicable	applicable	applicable	ETSI EN 301 489-1 [1], clauses 9.2.1 and 9.2.2	6.3
electrostatic discharge	enclosure	applicable	applicable	applicable	ETSI EN 301 489-1 [1], clauses 9.3.1 and 9.3.2	6.4
fast transients common mode	signal, wired network and control	applicable	not applicable	not applicable	ETSI EN 301 489-1 [1], clauses 9.4.1 and 9.4.2	6.4
	DC power	applicable	not applicable (see note)	not applicable		6.4

Phenomenon	Port	Applicability			Reference clause	Performance criteria clauses
		Fixed equipment	Vehicular equipment	Portable equipment		
	AC mains power	applicable	not applicable	not applicable		6.4
RF common mode 0,15 MHz to 80 MHz	signal, wired network and control	applicable	applicable	not applicable	ETSI EN 301 489-1 [1], clauses 9.5.1 and 9.5.2	6.3
	DC power	applicable	applicable	not applicable		6.3
	AC mains power	applicable	applicable	not applicable		6.3
transients and surges	DC power input	not applicable	applicable	not applicable	ETSI EN 301 489-1 [1], clauses 9.6.1 and 9.6.2	6.4
voltage dips and interruptions	AC mains power input	applicable	not applicable	not applicable	ETSI EN 301 489-1 [1], clauses 9.7.1 and 9.7.2	6.4
surges, line to line and line to ground	AC mains power input	applicable	not applicable	not applicable	ETSI EN 301 489-1 [1], clauses 9.8.1 and 9.8.2	6.4
	wired network	applicable	not applicable (see note)	not applicable		6.4
NOTE: This requirement is covered by the transients and surges test on DC power input ports.						

Portable equipment, or combinations of equipment, capable of being powered for intended use by the main battery of a vehicle shall additionally be considered as vehicular equipment.

Portable or vehicular equipment, or combinations of equipment, capable of being powered for intended use by AC mains shall additionally be considered as fixed equipment.

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.12~~i.12] 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 301 489-17					
Requirement				Requirement Conditionality	
No	**Description**	**Essential requirements of Directive**	**~~Reference:~~ Clause ~~No~~(s) of the present document**	**U/C**	**Condition**
1	Emissions: Enclosure of ancillary equipment measured on a ~~stand alone~~standalone basis	3.1(b)~~ETSI EN 301 489-1 [1] clause 8.2~~	7.1	U	
2	Emissions: DC power input/output ports	3.1(b)~~Clause 7.1 and ETSI EN 301 489-1 [1] clause 8.3~~	7.1	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	Emissions: AC mains power input/output ports	3.1(b)	~~Clause 7.1 and ETSI EN 301 489-1 [1] clause 8.4~~7.1	C	Only where equipment has AC mains power input and/or output ports
4	Emissions: Harmonic current emission (AC mains input port)	3.1(b)	~~Clause 7.1 and ETSI EN 301 489-1 [1] clause 8.5~~7.1	C	Only where equipment has AC mains power input ports
5	Emissions: Voltage fluctuations and flicker (AC mains input ports)	3.1(b)	~~Clause 7.1 and ETSI EN 301 489-1 [1] clause 8.6~~7.1	C	Only where equipment has AC mains power input ports
6	Emissions: Wired network ports	3.1(b)	~~Clause 7.1 and ETSI EN 301 489-1 [1] clause 8.7~~7.1	C	Only ~~where~~applies to fixed equipment~~ has wired network ports~~
7	Immunity: Radio frequency electromagnetic field (80 MHz to 6 000 MHz)	3.1(b)	~~Clause 7.2 and ETSI EN 301 489-1 [1] clause 9.2~~7.2	U	
8	Immunity: Electrostatic discharge	3.1(b)	~~Clause 7.2 and ETSI EN 301 489-1 [1] clause 9.3~~7.2	U	
9	Immunity: Fast transients common mode	3.1(b)	~~Clause 7.2 and ETSI EN 301 489-1 [1] clause 9.4~~7.2	C	~~Only where equipment has AC mains power input ports or DC power ports or wired network ports with cables longer than 3 m~~Only applies to fixed equipment
10	Immunity: Radio frequency common mode	3.1(b)	~~Clause 7.2 and ETSI EN 301 489-1 [1] clause 9.5~~7.2	C	~~Only where equipment has AC mains power input ports or DC power ports or wired network ports with cables longer than 3 m~~Only applies to fixed and/or vehicular equipment

Harmonised Standard ETSI EN 301 489-17					
Requirement				Requirement Conditionality	
No	**Description**	**Essential requirements of Directive**	~~**Reference:**~~ **Clause ~~No~~(s) of the present document**	**U/C**	**Condition**
11	Immunity: Transients and surges in the vehicular environment	3.1(b)	~~Clause 7.2 and ETSI EN 301 489-1 [1] clause 9.6~~7.2	C	Only ~~where~~applies to vehicular equipment~~ is fitted to a vehicle power supply~~
12	Immunity: Voltage dips and interruptions	3.1(b)	~~Clause 7.2 and ETSI EN 301 489-1 [1] clause 9.7~~7.2	C	Only where equipment has AC mains power input ports
13	Immunity: Surges, line to line and line to ground	3.1(b)	~~Clause 7.2 and ETSI EN 301 489-1 [1] clause 9.8~~7.2	C	Only ~~where~~applies to fixed 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.

Essential requirements of Directive

Identification of article(s) defining the requirement in the Directive.

Clause ~~Number~~(s) of the present document

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):~~ ~~Examples of radio equipment in the scope of the present document~~

~~B.1 Introduction~~

~~The present document covers radio wideband transmission systems as set out below.~~

~~B.2 Data transmission systems operating in the 2,4 GHz ISM band and using wide band modulation techniques~~

~~Wideband transmission systems are defined in ETSI EN 300 328 [i.8].~~

~~B.3 5 GHz high performance RLAN systems~~

~~5 GHz high performance RLAN systems are those within the scope and compliant with ETSI EN 301 893 [i.3].~~

~~B.4 Broadband data transmitting systems operating in the band 5 725 MHz to 5 875 MHz~~

~~Broadband Data Transmitting systems are those within the scope and compliant with ETSI EN 302 502 [i.4].~~

~~B.5 Broadband data transmitting/BWA Terminal Stations~~

~~Examples of such systems are those within the scope of ETSI EN 302 544-2 [i.5] or ETSI EN 302 623 [i.7], ETSI EN 301 908-19 [i.10] or ETSI EN 301 908-21 [i.11].~~

~~B.6 Multi-Gigabit Wireless Systems (MGWS)~~

~~Examples of such systems are those within the scope of ETSI EN 302 567 [i.6] when operating in the frequency band 57 GHz to 66 GHz.~~

~~Annex C~~Annex B (informative): Change History

Version	Information about changes
3.1.1	Radiated immunity testing to a continuous sweep between 80 MHz and 6 000 MHz at 3 V/m, as opposed to the previous frequency range of 80 MHz to 1 000 MHz and 1 400 MHz to 2 700 MHz in earlier editions. New derivations of exclusion bands more closely linked to the operational characteristics of the radio link(s) in the EUT. New test arrangement for systems with multiple antennas.
3.2.1	Change to definition of performance criteria. Mapping of requirements to ETSI EN 301 489-1.
3.2.2	Removing manufacturer defined test conditions. Change of the signal strength of the test signals at the input of the receiver. Deletion of narrowband responses section as not applicable to technologies within the scope of the present document. Improve readability and accuracy of table 4. Annex B deleted with information updated and transferred to scope statement.

History

Document history				
V1.1.1	September 2000	Publication		
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V2.1.1	May 2009	Publication		
V2.2.1	September 2012	Publication		
V3.1.1	February 2017	Publication		
V3.2.0	March 2017	EN Approval Procedure	AP 20170613:	2017-03-15 to 2017-06-13
V3.2.2	December 2019	EN Approval Procedure	AP 20200311:	2019-12-12 to 2020-03-11
V3.2.3	July 2020	Vote	V 2020908:	2020-07-10 to 2020-09-08
V3.2.4	September 2020	Publication		