



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

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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 ETSI standards EN Approval Procedure.

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].

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).

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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, as detailed in annex B.

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 data communication systems.

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 3.1(b) of Directive 2014/53/EU [i.1] 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 (V2.2.3) (11-2019): "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility".

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.
- [i.2] Void.
- [i.3] ETSI EN 301 893: "5 GHz RLAN; Harmonised Standard for access to radio spectrum".
- [i.4] ETSI EN 302 502: "Wireless Access Systems (WAS); 5,8 GHz fixed broadband data transmitting systems; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

- [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".
- [i.6] ETSI EN 302 567: "Broadband Radio Access Networks (BRAN); 60 GHz Multiple-Gigabit WAS/RLAN Systems; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".
- [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".
- [i.8] ETSI EN 300 328: "Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard 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 WiMAX™) TDD User Equipment (UE)".
- [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)".
- [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:

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

fixed station: 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

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

3.2 Symbols

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

P_{min} 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 and Radio Matters
EUT	Equipment Under Test
ISM	Industrial, Scientific and Medical
MGWS	Multi-Gigabit Wireless Systems
MUS	Maximum Usable Sensitivity
NACK	Not ACKnowledgement
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 a test configuration representative of the EUT's intended use and shall be recorded in the test report.

4.2 Arrangements for test signals

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 communication link and shall be representative of the 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.

A suitable companion receiver 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 communication link shall be representative of the EUTs intended use.

The level of the wanted signal at the input of the receiver shall be not greater than 30 dB above the Pmin for the EUTs.

NOTE: Simple method to establish the required communication link is establish link, reduce power to point of link failure then increase by no more than 30 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.

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

A suitable companion transmitter 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 4.2.0 shall apply.

A suitable companion transceiver or transmitter and receiver 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 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

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.

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. 2 603,5MHz.

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 MHz, i.e. 4 880 MHz;
- upper limit of exclusion band = highest allocated band edge frequency +270 MHz, i.e. 5 995 MHz.

The exclusion band for immunity testing of equipment operating in the 5,8 GHz band shall be:

- lower limit of exclusion band = lowest allocated band edge frequency -270 MHz, i.e. 5 455 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.

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

4.4 Void

4.5 Normal test modulation

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

5 Performance assessment

5.1 General

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

- the operating frequency range(s) of the equipment and, where applicable, band(s) of operation;