

Draft **ETSI EN 301 489-4** V3.3.0 (2020-03)



ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 4: Specific conditions for fixed radio links
and ancillary equipment;
Harmonised Standard for electromagnetic compatibility

PRE-REVIEW
<https://standards.iteh.ai/standards/etsi/EN-301-489-4-v3-3-0-2020-03-4349-a66f-c079a45006d2/>

Reference

REN/ERM-EMC-403

KeywordsEMC, FWA, harmonised standard, point-to-point,
radio, regulation, RLL, WLL**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 noticeThe 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 prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

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.

© ETSI 2020.
All rights reserved.

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

oneM2M™ logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	5
Foreword.....	5
Modal verbs terminology.....	5
Introduction	6
1 Scope	7
2 References	7
2.1 Normative references	7
2.2 Informative references.....	7
3 Definition of terms, symbols and abbreviations.....	8
3.1 Terms.....	8
3.2 Symbols.....	8
3.3 Abbreviations	8
4 Test conditions	9
4.1 General	9
4.1.1 Introduction.....	9
4.1.2 Test conditions and configurations	9
4.1.3 Emission tests	10
4.1.4 Immunity tests	10
4.2 Arrangements for test signals.....	11
4.2.1 Arrangements for test signals at the input of the transmitter.....	11
4.2.2 Arrangements for test signals at the output of the transmitter.....	12
4.2.3 Arrangements for test signals at the input of the receiver.....	12
4.2.4 Arrangements for test signals at the output of the receiver.....	12
4.3 Exclusion bands.....	12
4.3.1 Exclusion bands for receivers.....	12
4.3.2 Exclusion bands for transmitters.....	12
5 Performance assessment.....	13
5.1 Equipment which can provide a communications link.....	13
5.2 Ancillary equipment.....	13
5.3 Equipment classification	13
6 Performance criteria	13
6.0 Introduction	13
6.1 Performance criterion for Continuous phenomena applied to Transmitters (CT) and Receivers (CR).....	13
6.2 Performance criterion for Transient phenomena applied to Transmitters (TT) and Receivers (TR).....	13
6.3 Specific performance criteria	13
6.3.1 Digital signal ports.....	13
6.3.1.0 General performance criteria.....	13
6.3.1.1 Performance criterion for continuous phenomena	14
6.3.1.2 Performance criterion for transient phenomena	14
6.3.2 Analogue voice frequency signal ports.....	14
6.3.2.1 Performance criterion for continuous phenomena	14
6.3.2.2 Performance criterion for transient phenomena	14
6.3.3 Ethernet and packet-data interfaces	14
6.3.3.0 Introduction.....	14
6.3.3.1 Performance criterion for continuous phenomena	14
6.3.3.2 Performance criterion for transient phenomena	15
6.3.4 Service and maintenance interfaces	15
6.3.5 Synchronization interfaces.....	15
6.3.5.0 Introduction.....	15
6.3.5.1 Performance criterion for continuous phenomena	15
6.3.5.2 Performance criteria for transient phenomena	15
6.3.6 Remote alarm interfaces	15

6.3.6.1	Performance criterion for continuous phenomena	15
6.3.6.2	Performance criterion for transient phenomena	15
6.4	Performance criteria for ancillary equipment tested on a stand alone basis	15
7	Applicability overview tables.....	15
7.1	Emission.....	15
7.1.1	General.....	15
7.1.2	Special conditions.....	16
7.2	Immunity	16
7.2.1	General.....	16
7.2.2	Special conditions.....	17
Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	18
Annex B (informative):	Examples of Fixed Radio Link equipment within the scope of the present document.....	20
B.1	Fixed Radio Systems; Point-to-Point equipment; intended for operation in the frequency bands from 1,3 GHz to 86 GHz.....	20
B.2	Fixed Radio Systems; Point-to-Multipoint equipment; intended for operation in the frequency band below 1 GHz and in frequency bands from 1 GHz to 40 GHz.....	20
Annex C (informative):	Change history	21
History		22

!Teh STANDARD PREVIEW
 (standards.iteh.ai)
 Full standard d:
<https://standards.iteh.ai/catalog/standards/sist/ee0b6019-9921-4349-a66f-e079a4500fd2/etsi-en-301-489-4-v3.3.0-2020-03>

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables 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.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

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.11] 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 4 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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The structure of the ETSI EN 301 489 series has been changed for use under the RED from that used under the R&TTED. The following text briefly explains this new format:

- The product specific part would contain in clause 7 two new tables similar to that currently in ETSI EN 301 489-1 [1] clause 7.1 for emissions and clause 7.2 for immunity. These would inform the reader whether the requirements, etc. are to be found in ETSI EN 301 489-1 [1] or further in the product specific part.

As an example; the assessment of a Wi-Fi router would use ETSI EN 301 489-17 [i.12] which would normatively reference ETSI EN 301 489-1 [1] for certain aspects. Consequently:

- Changes to ETSI EN 301 489-1:
No references to product specific parts.
- Changes to product specific parts, e.g. the present document:

Two new tables, one for emissions in clause 7.1, and one for immunity in clause 7.2 that will point the reader to the location of the requirements, i.e. ETSI EN 301 489-1 [1] or the present document.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/ee0b6019-9931-4349-a66f-c079a45006d2/etsi-en-301-489-4-v3.3.0-2020-03>

1 Scope

The present document specifies technical characteristics and methods of measurement for Analogue and Digital Fixed Radio Links operating as fixed Point-to-Point, and Point-to-Multipoint systems as defined in annex B, including the associated ancillary equipment.

NOTE 1: Technical specifications related to the antenna 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 processing and protection switch, (de)modulator, transmitter, receiver, RF filters, branching networks and feeders are covered by the present document. The multiplexing and/or de-multiplexing elements are covered if they form part of the transmitter, receiver and/or transceiver.

NOTE 2: The relationship between the present document and essential requirements of article 3.1b of Directive 2014/53/EU [i.1] is given 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.

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.
- [i.3] Void.
- [i.4] Void.

- [i.5] ETSI EN 302 217-2: "Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2: Digital systems operating in frequency bands from 1 GHz to 86 GHz; Harmonised Standard for access to radio spectrum".
- [i.6] Void.
- [i.7] ETSI EN 302 326-2: "Fixed Radio Systems; Multipoint Equipment and Antennas; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Digital Multipoint Radio Equipment".
- [i.8] Void.
- [i.9] Void.
- [i.10] Void.
- [i.11] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.
- [i.12] ETSI EN 301 489-17: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

Base Station (BS): alternative name for Central Station

Central Station (CS): two units comprising of:

- the exchange unit, also called Central Controller Station (CCS) - (interface to the local switch); and
- the radio unit, also called Central Radio Station (CRS) - (central base band/radio transceiver)

NOTE: In some deployments the term Base Station is also used in place of Central Station. For the purposes of the present standard either terms are assumed and are completely interchangeable.

operating frequency range: range(s) of radio frequencies covered by the Equipment Under Test (EUT) without any change of units

Repeater Station (RS): radio repeater outstations with or without subscriber interfaces

Terminal station (TS): outstations with subscriber interfaces

3.2 Symbols

Void.

3.3 Abbreviations

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

BER	Bit Error Ratio
BS	Base Station
CCS	Central Controller Station

CR	Continuous phenomena applied to Receivers
CRS	Central Radio Station
CS	Central Station
CT	Continuous phenomena applied to Transmitters
RS	Repeater Station
TR	Transient phenomena applied to Receivers
TS	Terminal Station
TT	Transient phenomena applied to Transmitters

4 Test conditions

4.1 General

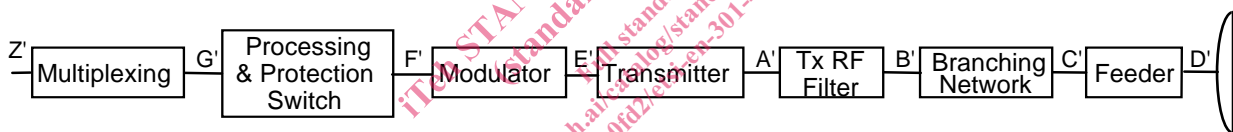
4.1.1 Introduction

The test configuration and mode of operation shall represent the intended use and shall be recorded in the test report.

4.1.2 Test conditions and configurations

This clause defines the test conditions and configurations for the emission and immunity tests as follows:

- a transmitter shall, as a minimum, comprise the element between E' and A' of figure 1. Additionally the transmitter may comprise any of the other elements from the transmitter chain shown in figure 1. If these additional elements are part of the transmitter or system they shall also meet the requirements of the present document;

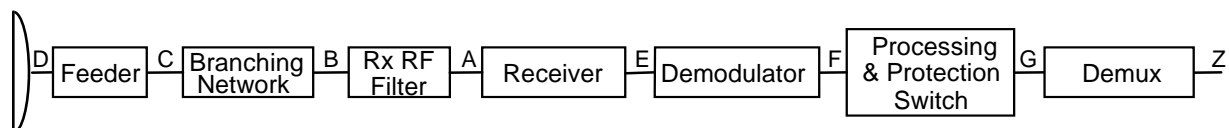


NOTE 1: For the purposes of defining the reference points, the branching network (B' to C') does not include a hybrid.

NOTE 2: Points B' and C' may coincide, dependent on the equipment configuration.

Figure 1: Elements of a transmitter

- a receiver shall, as a minimum, comprise the element between A and E of figure 2. Additionally the receiver may comprise any of the other elements from the receiver chain shown in figure 2. If these additional elements are part of the receiver or system they shall also meet the requirements of the present document;



NOTE 1: For the purposes of defining the reference points, the branching network (B to C) does not include a hybrid.

NOTE 2: Points B and C may coincide, dependent on the equipment configuration.

Figure 2: Elements of a receiver

- a transceiver shall comprise as a minimum the elements E' to A' and A to E shown in figures 1 and 2, and additionally it may comprise any combinations of the other elements. If these additional elements are part of the transceiver they shall also meet the requirements of the present document;

- the equipment shall be tested under conditions which are within the manufacturer's declared range of humidity, temperature and supply voltage;
- the test configuration shall be as close to normal intended use as possible;
- if the equipment is part of a system, or can be connected to ancillary equipment, then it shall be acceptable to test the equipment while connected to the minimum configuration of ancillary equipment necessary to exercise the ports;
- ports which in normal operation are connected to ancillary or other equipment shall be either connected to such equipment, or to a representative termination to simulate the input/output characteristics of the ancillary or other equipment. Radio Frequency (RF) input/output ports shall be correctly terminated;
- if the equipment has a large number of ports, then a sufficient number shall be selected to simulate actual operation conditions and to ensure that all the different types of termination are tested;
- ports which are not connected to cables during normal intended operation, e.g. service connectors, programming connectors, temporary connectors, etc. shall not be connected to any cables for the purpose of ElectroMagnetic Compatibility (EMC) testing. Where cables have to be connected to these ports, or interconnecting cables have to be extended in length in order to exercise the EUT, precautions shall be taken to ensure that the evaluation of the EUT is not affected by the addition or extension of these cables;
- the test conditions, test configuration and mode of operation shall be recorded in the test report.

4.1.3 Emission tests

For Point-to-Multipoint systems a communications link shall be established, which shall comprise of the Central Station and a minimum of one Terminal Station. These stations are tested separately.

4.1.4 Immunity tests

The test configuration shall for transmitters be in accordance with the principle of figure 3, and for receivers it shall be in accordance with the principle of figure 4, and for transceiver shall be in accordance with the principle of figure 5.

The measuring equipment shall be located outside the test environment. Adequate measures shall be taken to avoid any effects of the unwanted signals on the measuring equipment.

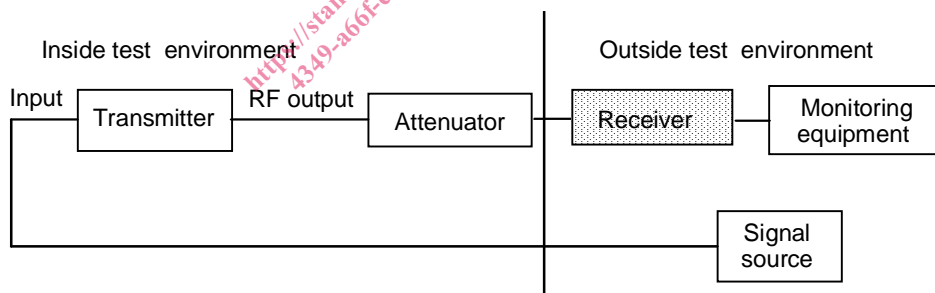


Figure 3: Test configuration for transmitters

During immunity tests the transmitter shall be operated at its rated output power. The input to the transmitter shall be in accordance with clause 4.2.1 (see figure 3). A communication link shall be established at the start of the test and be maintained during the test.