Draft ETSI EN 303 446-1 V1.2.0 (2019-03)

ElectroMagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 1: Requirements for equipment intended to be used in residential, commercial and light industry locations

Reference

REN/ERM-EMC-398

Keywords

EMC, emission, immunity

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 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

Contents

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 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 is part 1 of a multi-part deliverable covering ElectroMagnetic Compatibility (EMC) for combined and/or integrated equipment, as identified below:

Part 1: "Requirements for equipment intended to be used in residential, commercial and light industry locations";

Part 2: "Requirements for equipment intended to be used in industrial locations".

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):	6 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 present document is not intended for citation under any new approach Directive.

The present document is based on the principles given in ETSI EG 203 367 [i.3] "Guide to the application of harmonised standards covering articles 3.1(b) and 3.2 of the Directive 2014/53/EU (RED) to multi-radio and combined radio and non-radio equipment".

The present document contains the measurements, emission limits and performance criteria that are necessary for the assessment of a combination of a non-radio and a radio product (which is called "Δ" in ETSI EG 203 367 [i.3]).

1 Scope

The present document defines requirements in respect of ElectroMagnetic Compatibility (EMC) for combined and/or integrated equipment intended to be used within residential, commercial and light industry locations.

The present document is only applicable to combined and/or integrated equipment where the radio function is within the scope of one or more of the standards listed in clause 2.1.2 (covering references [1] to [7]) and where the non-radio function is within the scope of one or more of the standards listed in clause 2.1.3 (covering references [8] to [39]).

Requirements applicable to the antenna port specifically related to the efficient use of radio spectrum are not included in the present document.

NOTE: These requirements are generally found in the applicable product standard(s) for the effective use of the radio spectrum.

2 References

2.1 Normative references

2.1.1 General

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 1: 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.

In addition, within the present document, some references are non-specific. The applicable version listed in the OJEU under the Directives 2014/53/EU [i.1] or 2014/30/EU [i.2] may be used.

NOTE 2: Before the date of withdrawal, a preceding version may be used (see clause 2.4 of the Technical Working Procedures in the ETSI Directives).

2.1.2 Radio EMC standards

[1] ETSI EN 301 489-1: "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 301 489-3: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz".

[3] ETSI EN 301 489-5: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 5: Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech) and Terrestrial Trunked Radio (TETRA) Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU".

[4] ETSI EN 301 489-6: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 6: Specific conditions for Digital Enhanced Cordless Telecommunications (DECT) equipment; Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU".

[5] 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".

[6] ETSI EN 301 489-19: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications".

[7] ETSI EN 301 489-33: "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".

2.1.3 Non-radio EMC standards

[8] CENELEC EN 50065-1: "Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 1: General requirements, frequency bands and electromagnetic disturbances".

[9] CENELEC EN 50065-2-1: "Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 2-1: Immunity requirements for mains communications equipment and systems operating in the range of frequencies 95 kHz to 148,5 kHz and intended for use in residential, commercial and light industrial environments".

[10] CENELEC EN 50065-2-3: "Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 2-3: Immunity requirements for mains communications equipment and systems operating in the range of frequencies 3 kHz to 95 kHz and intended for use by electricity suppliers and distributors".

[11] CENELEC EN 50130-4: "Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems".

[12] CENELEC EN 50412-2-1: "Power line communication apparatus and systems used in low-voltage installations in the frequency range 1,6 MHz to 30 MHz - Part 2-1: Residential, commercial and industrial environment - Immunity requirements".

[13] CENELEC EN 50491-5-1: "General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 5-1: EMC requirements, conditions and test set-up".

[14] CENELEC EN 50491-5-2: "General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light industry environment".

[15] CENELEC EN 50561-1: "Power line communication apparatus used in low-voltage installations - Radio disturbance characteristics - Limits and methods of measurement - Part 1: Apparatus for in-home use".

[16] CENELEC EN 50561-3: "Power line communication apparatus used in low-voltage installations - Radio disturbance characteristics - Limits and methods of measurement - Part 3: Apparatus operating above 30 MHz".

[17] CENELEC EN 55011: "Industrial, scientific and medical equipment. Radio-frequency disturbance characteristics. Limits and methods of measurement".

[18] CENELEC EN 55014-1: "Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission".

[19] CENELEC EN 55014-2: "Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard".

[20] CENELEC EN 55015: "Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment".

[21] CENELEC EN 55020: "Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement".

[22] CENELEC EN 55024: "Information technology equipment - Immunity characteristics - Limits and methods of measurement".

[23] CENELEC EN 55032: "Electromagnetic compatibility of multimedia equipment - Emission Requirements".

NOTE: CENELEC EN 55032 also covers broadcast receivers.

[24] CENELEC EN 55035: "Electromagnetic compatibility of multimedia equipment - Immunity requirements".

[25] CENELEC EN 55103-2: "Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 2: Immunity".

[26] CENELEC EN 50270: "Electromagnetic compatibility. Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen".

[27] CENELEC EN 60730-1: "Automatic electrical controls - Part 1: General requirements".

[28] CENELEC EN 60974-10: "Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements".

[29] CENELEC EN 61000-6-1: "Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments".

[30] CENELEC EN 61000-6-3: "Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments".

[31] CENELEC EN 61326-1: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements".

[32] CENELEC EN 61326-2-2: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-2: Particular requirements - Test configurations, operational conditions and performance criteria for portable test, measuring and monitoring equipment used in low-voltage distribution systems".

[33] CENELEC EN 61326-2-3: "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".

[34] CENELEC EN 61326-2-4 (2013): "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-4: Particular requirements - Test configurations, operational conditions and performance criteria for insulation monitoring devices according to IEC 61557-8 and for equipment for insulation fault location according to IEC 61557-9".

[35] CENELEC EN 61326-2-5: "Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-5: Particular requirements - Test configurations, operational conditions and performance criteria for devices with field bus interfaces according to IEC 61784-1".

[36] CENELEC EN 61547: "Equipment for general lighting purposes - EMC immunity requirements".

[37] CENELEC EN 61800-3: "Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods".

[38] CENELEC EN 62135-2: "Resistance welding equipment - Part 2: Electromagnetic compatibility (EMC) requirements".

[39] ETSI EN 300 386: "Telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements; Harmonised Standard covering the essential requirements of the Directive 2014/30/EU".

2.1.4 Other EMC standards

[40] CENELEC EN 61000-3-2 (2014): "Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)".

[41] CENELEC EN 61000-3-3 (2013): "Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection".

[42] CENELEC EN 61000-3-11 (2000): "Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current <= 75 A and subject to conditional connection".

[43] CENELEC EN 61000-3-12 (2011): "Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and <= 75 A per phase".

[44] CENELEC EN 61000-6-3 (2007) and A1 (2011): "Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments".

[45] CENELEC EN 55032 (2015) and AC (2016): "Electromagnetic compatibility of multimedia equipment - Emission requirements".

NOTE: The standards referenced in clause 2.1.4 do not define the scope of the present document. They are only referenced in the sense of a basic standard for a specific measurement.

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] Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast).

[i.3] ETSI EG 203 367: "Guide to the application of harmonised standards covering articles 3.1b and 3.2 of the Directive 2014/53/EU (RED) to multi-radio and combined radio and non-radio equipment".

[i.4] Recommendation ITU-R SM.329: "Unwanted emissions in the spurious domain".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

AC mains power port: port that connects to the low voltage AC mains power network for the sole purpose of supplying electrical energy to the EUT

antenna port: port, for connection of an antenna used for intentional transmission and/or reception of radiated RF energy

auxiliary equipment: equipment needed to exercise and/or monitor the operation of the EUT

NOTE 1: Auxiliary equipment may be either local (within the measurement or test area) or remote.

NOTE 2: This is also known as associated equipment in other standards (e.g. CENELEC EN 55032 [45]).

combined equipment: equipment consisting of two or more products, at least one of which is radio communication or radio determination equipment and at least one of which is non-radio equipment

EXAMPLE: A radio enabled washing machine, where the radio functionality is embedded by incorporating a radio module, which may be assessed separated from the host.

commercial, public and light-industrial location: Location exemplified by areas of the city centre, offices, public transport systems (road/train/underground), and modern business centres containing a concentration of office automation equipment (PCs, fax machines, photocopiers, telephones, etc.), and characterized by the fact that equipment is directly connected to a low-voltage public mains network or connected to a dedicated DC source which is intended to interface between the equipment and the low-voltage mains network.

Examples of commercial, public or light-industrial locations are:

- retail outlets, for example shops, supermarkets;
- business premises, for example offices, banks, hotels, data centres;
- areas of public entertainment, for example cinemas, public bars, dance halls;
- places of worship, for example temples, churches, mosques, synagogues;
- outdoor locations, for example petrol stations, car parks, amusement and sports centres;
- general public locations for example park, amusement facilities, public offices;
- hospitals, educational institutions, for example schools, universities, colleges;
- public traffic area, railway stations, and public areas of an airport;
- light-industrial locations, for example workshops, laboratories, service centres.

conditional connection: Connection of equipment under specific conditions, as explained in CENELEC EN 61000-3-11 [42].

configuration: operational conditions of the EUT and AE, consisting of the set of hardware elements selected to comprise the EUT and AE, mode of operation used to exercise the EUT and arrangement of the EUT and AE

DC distribution network: local supply network in the infrastructure of a site or building intended for use by one or more different types of equipment and providing power independent of the public mains network

NOTE: Connection to a remote local battery is not regarded as a DC distribution network, if such a link comprises only power supply for a single piece of equipment.

DC power port: port used to connect to a low voltage DC power generating system, energy storage or DC distribution network to power the equipment