

INTERNATIONAL STANDARD

NORME INTERNATIONALE



INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE
COMITÉ INTERNATIONAL SPÉCIAL DES PERTURBATIONS RADIOÉLECTRIQUES

GENERIC EMC STANDARD
NORME GÉNÉRIQUE EN CEM

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Electromagnetic compatibility (EMC)–

Part 6-3: Generic standards – Emission standard for equipment in residential environments

IEC 61000-6-3:2020
<https://standards.iteh.ai/catalog/standards/sist/49d63457-cad5-4ebd-870c-d3d18bc8640a/iec-61000-6-3-2020>

Compatibilité électromagnétique (CEM)–

Partie 6-3: Normes génériques – Norme sur l'émission relative aux appareils utilisés dans les environnements résidentiels



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Partie 6-3: Normes génériques – Norme sur l'émission relative aux appareils utilisés dans les environnements résidentiels

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –**Part 6-3: Generic standards –
Emission standard for equipment in residential environments****FOREWORD**

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International Standard IEC 61000-6-3 has been prepared by CISPR subcommittee H: Limits for the protection of radio services.

This third edition cancels and replaces the second edition published in 2006 and its Amendment 1:2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) alternative method for measuring conducted emissions on DC ports;
- b) limits and requirements applicable only to equipment intended to be used in residential locations;
- c) more stringent limits for DC power ports.

The text of this document is based on the following documents:

CDV	Report on voting
CIS/H/400/CDV	CIS/H/413/RVC

Full information on the voting for the approval of this document can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61000 series, published under the general title *Electromagnetic compatibility (EMC)*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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INTRODUCTION

IEC 61000 is published in separate parts according to the following structure:

Part 1: General

General considerations (introduction, fundamental principles)

Definitions, terminology

Part 2: Environment

Description of the environment

Classification of the environment

Compatibility levels

Part 3: Limits

Emission limits

Immunity limits (insofar as they do not fall under the responsibility of the product committees)

Part 4: Testing and measurement techniques

Measurement techniques

Testing techniques

Part 5: Installation and mitigation guidelines

Installation guidelines

Mitigation methods and devices

Part 6: Generic standards

Part 9: Miscellaneous

Each part is further subdivided into several parts published either as International Standards or technical reports/specifications, some of which have already been published as sections. Others will be published with the part number followed by a dash and a second number identifying the subdivision (example: IEC 61000-6-1).

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 6-3: Generic standards – Emission standard for equipment in residential environments

1 Scope

This generic EMC emission standard is applicable only if no relevant dedicated product or product family EMC emission standard has been published.

This part of IEC 61000 for emission requirements applies to electrical and electronic equipment intended for use at residential (see 3.1.14) locations. This part of IEC 61000 also applies to electrical and electronic equipment intended for use at other locations that do not fall within the scope of IEC 61000-6-8 or IEC 61000-6-4.

The intention is that all equipment used in the residential, commercial and light-industrial environments are covered by IEC 61000-6-3 or IEC 61000-6-8. If there is any doubt the requirements in IEC 61000-6-3 apply.

The conducted and radiated emission requirements in the frequency range up to 400 GHz are considered essential and have been selected to provide an adequate level of protection of radio reception in the defined electromagnetic environment. Not all disturbance phenomena have been included for testing purposes but only those considered relevant for the equipment intended to operate within the locations included within this document.

The emission requirements in this document are not intended to be applicable to the intentional transmissions and their harmonics from a radio transmitter as defined by the ITU.

NOTE 1 Safety considerations are not covered by this document.

NOTE 2 In special cases, situations will arise where the levels specified in this document will not offer adequate protection; for example where a sensitive receiver is used in close proximity to an equipment. In these instances, special mitigation measures can be employed.

NOTE 3 Disturbances generated in fault conditions of equipment are not covered by this document.

NOTE 4 As the requirements in this document are more stringent or equivalent to those requirements in IEC 61000-6-4 and IEC 61000-6-8, equipment fulfilling the requirements of this document comply with the requirements of IEC 61000-6-4 and IEC 61000-6-8.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61000-3-2:2018, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 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*
IEC 61000-3-3:2013/AMD1:2017

IEC 61000-3-11:2017, *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*

IEC 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*

IEC 61000-4-20:2010, *Electromagnetic compatibility (EMC) – Part 4-20: Testing and measurement techniques – Emission and immunity testing in transverse electromagnetic (TEM) waveguide*

CISPR 14-1:2016, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 16-1-1:2019, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements*
CISPR 16-1-2:2014/AMD1:2017

CISPR 16-1-4:2019, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements*

CISPR 16-1-5:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration sites and reference test sites for 5 MHz to 18 GHz*
CISPR 16-1-5:2014/AMD1:2016

CISPR 16-1-6:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-6: Radio disturbance and immunity measuring apparatus – EMC antenna calibration*
CISPR 16-1-6:2014/AMD1:2017

CISPR 16-2-1:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*
CISPR 16-2-1:2014/AMD1:2017

CISPR 16-2-3:2016, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements*

CISPR 16-4-2:2011, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Measurement instrumentation uncertainty*
CISPR 16-4-2:2011/AMD1:2014
CISPR 16-4-2:2011/AMD2:2018

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

port

physical interface of the specified equipment with the external electromagnetic environment

Note 1 to entry: See Figure 1.

Note 2 to entry: Other wired port shown in Figure 1 is referenced in Table 6.

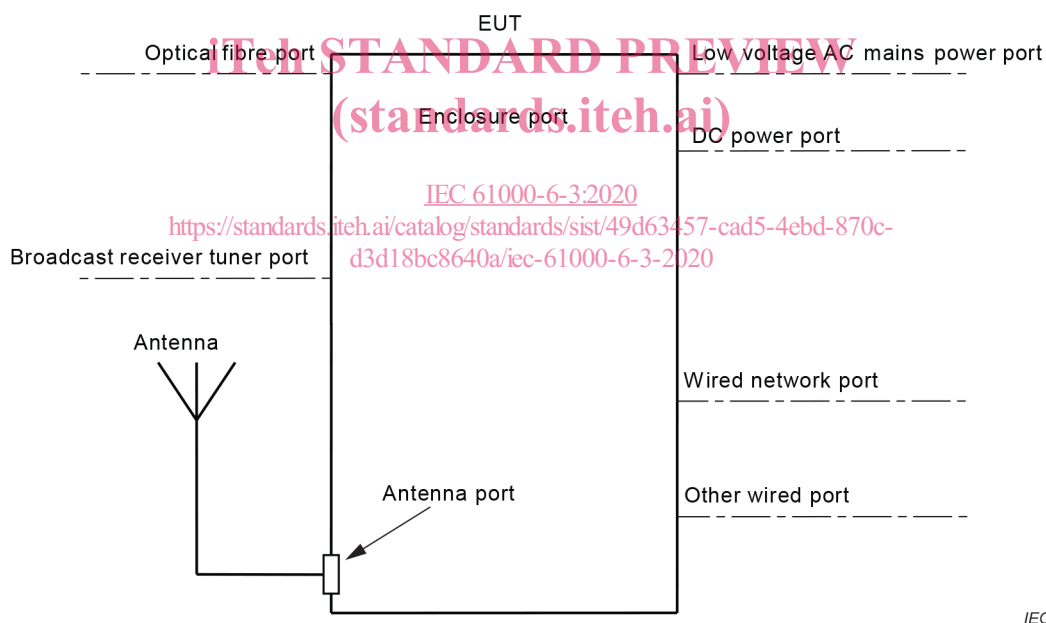


Figure 1 – Example of ports

3.1.2

enclosure port

physical boundary of the equipment which electromagnetic fields may radiate through or impinge on

3.1.3

wired network port

port for the connection of communication intended to interconnect widely dispersed systems by direct connection to a single-user or multi-user network

Note 1 to entry: Examples of communication through the network include voice, data and signalling transfers.

Note 2 to entry: Examples of these networks include CATV, PSTN, ISDN, xDSL, LAN and similar.

Note 3 to entry: These ports may support screened or unscreened cables and may also carry AC or DC power where this is an integral part of the telecommunication specification.

Note 4 to entry: A port generally intended for interconnection of components of a system under test (e.g. RS-232 (defined in ITU-T V.28), RS-485 (defined in ITU-T V.11), field buses in the scope of IEC 61158-1, IEEE Standard 1284 (parallel printer), Universal Serial Bus (USB), IEEE Standard 1394 ("Fire Wire"), etc.) and used in accordance with its functional specifications (e.g. for the maximum length of cable connected to it), is not considered to be a wired network port.

Note 5 to entry: In previous editions of this document and many product standards, this port was defined as a telecommunications or network port.

3.1.4

power port

port for the connection of the equipment to its primary electrical power supply

3.1.5

public mains network

electricity lines to which all categories of consumers have access and which are operated by a supply or distribution undertaking for the purpose of supplying electrical energy

3.1.6

low voltage

LV

voltage having a value below a conventionally adopted limit

Note 1 to entry: For the distribution of AC electric power, the upper limit is generally accepted to be 1 000 V. For the distribution of DC electric power, the upper limit is generally accepted to be 500 V.

3.1.7

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 1 to entry: 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.

3.1.8

low voltage AC mains port

port used to connect to the low voltage AC mains supply network to power the equipment

Note 1 to entry: Equipment with a DC power port is considered low voltage AC mains powered if it is powered from an AC/DC power converter.

Note 2 to entry: The low voltage AC mains supply could be public or non-public.

3.1.9

highest internal frequency

F_x

highest fundamental frequency generated or used within the EUT, or the highest frequency at which it operates

3.1.10

antenna port

port, other than a broadcast receiver tuner port (3.1.12), for connection of an antenna used for intentional transmission and/or reception of radiated RF energy

3.1.11

associated equipment

AE

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

Note 1 to entry: The AE can be either local (within the measurement or test area) or remote.

3.1.12**broadcast receiver tuner port**

port intended for the reception of a modulated RF signal carrying terrestrial, satellite and/or cable transmissions of audio and/or video broadcast and similar services

Note 1 to entry: This port may be connected to an antenna, a cable distribution system, a VCR or similar device.

3.1.13**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

Note 1 to entry: See Annex B.

3.1.14**residential location**

area of land designated for domestic dwellings where the mains power within these locations is directly connected to the low-voltage public mains network

Note 1 to entry: Examples of residential locations are: houses, apartments, farm buildings housing people.

Note 2 to entry: A dwelling can be a single building, separate building or a separate section of a larger building.

Note 3 to entry: Within these locations it is expected to operate a radio receiver within a distance of 10 m from the equipment.

Note 4 to entry: Domestic dwellings are places for one or more people to live.

3.1.15**small equipment**

equipment, either positioned on a table top or standing on the floor which, including its cables fits in a cylindrical test volume of 1,2 m in diameter and 1,5 m above the ground plane

Note 1 to entry: These dimensions are currently under discussion in CISPR.

3.1.16**optical fibre port**

port at which an optical fibre is connected to an equipment

3.2 Abbreviated terms

AE	Associated Equipment
AAN	Asymmetric Artificial Network
AC	Alternating Current
V-AMN	Artificial Mains V-Network
V-AN	Artificial V-Network
CATV	Cable TV network
CM	Common Mode
DC	Direct Current
DC-AN	Direct Current-Artificial Network
DSL	Digital Subscriber Line
DVR	Digital Video Recorder
EUT	Equipment Under Test
FAR	Fully Anechoic Room
FSOATS	Free Space Open Area Test Site
GCPC	Grid-Connected Power Converter

IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISDN	Integrated Services Digital Network
ISM	Industrial, Scientific and Medical
ITE	Information Technology Equipment
LAN	Local Area Network
MME	Multi Media Equipment
OATS	Open Area Test Site
PSTN	Public Switched Telephone Network
RF	Radio Frequency
SAC	Semi Anechoic Chamber
TEM	Transverse Electromagnetic Mode
TV	Television
USB	Universal Serial Bus
UPS	Uninterruptible Power Supply
xDSL	Generic term for all types of DSL technology
Δ -AN	Artificial Δ -Network (' Δ ' is pronounced 'delta')

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4 Classification of equipment (standards.iteh.ai)

For equipment within the scope of this document the requirements of Table 3 to Table 6 apply.

These requirements are intended to offer adequate protection to radio services within the residential environment.

NOTE Examples of the emission classification of equipment and mapping to the immunity standards is given in Annex A.

5 Measurements and conditions during testing

Measurements shall be conducted in a defined and reproducible manner.

The measurements may be performed in any order.

The description of the measurement, the measurement instrumentation, the measurement methods and the measurement set-up to be used are given in the standards, referred to in Table 3 to Table 6. The contents of these standards are not repeated here, however modifications or additional information needed for the practical application of the measurements are given in this document.

All aspects of testing the EUT shall be defined and documented in a test plan prior to testing. This requirement includes, but is not limited to, the following details: EUT configuration, EUT modes of operation, EUT highest internal frequency (see Table 2), EUT arrangement (see Table 1). These details as a minimum shall be included in the test report.

The EUT shall be tested in the operating mode producing the largest emission in the frequency band being assessed, consistent with intended use. The configuration of the test sample shall be varied to achieve maximum emission consistent with typical use and installation practice.

NOTE Pre-testing could be used to reduce test time.

If the EUT is part of a system, or can be connected to associated equipment, the EUT shall be tested while connected to the minimum representative configuration of associated apparatus necessary to exercise the ports in a similar manner to that described in CISPR 32. If the EUT has a large number of similar ports or ports with many similar connections, a sufficient number shall be selected to simulate actual operating conditions and to ensure that all the different types of termination are covered.

In cases where the equipment instructions requires external filtering, shielding devices or measures, these measures shall be applied during the measurements.

The EUT shall be arranged in accordance with the requirements of Table 1.

Table 1 – Test arrangements of EUT

Intended operational arrangement(s) of EUT	Test arrangement	Remarks
Table-top only	Table-top	
Floor-standing only	Floor-standing	See table clause 3.3 ¹ for testing in a FAR
Can be floor-standing or table-top	Table-top	
Rack mounted	In a rack or table-top	
Other, for example wall mounted, ceiling mounted, handheld, body worn	Table-top	With normal orientation If the equipment is designed to be mounted on a ceiling, the downward-facing portion of the EUT may be oriented facing upward.
If a physical hazard would be caused by testing the device on a table-top, then it may be tested as floor standing and the test report shall document the decision and justification.		

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The measurements shall be carried out at one single set of parameters within the operating ranges of temperature, humidity and atmospheric pressure specified for the product and at the rated supply voltage, unless otherwise indicated in the basic standard. The relevant conditions shall be recorded in the test report.

Where applicable, additional information on EUT configuration can be found in the CISPR 16-2-1, CISPR 16-2-3, CISPR 14-1 or CISPR 32 as referenced in Table 3 to Table 6.

6 Documentation for the user

The equipment instructions for use shall include the following:

- a statement that the equipment satisfies the requirements for use within a residential location,
- any special measures that have to be taken to achieve compliance.

EXAMPLE The instructions for use could require the use of shielded or special cables.

7 Applicability

The application of measurements for emission(s) depends on the particular equipment, its configuration, its ports, its technology and its operating conditions.

¹ In this document, table clauses are referenced using an x.y format, where x denotes the table and y denotes the referenced clause by row within the table. For example table clause 3.1 is Table 3, clause (row) 1.

Measurements shall be applied to the relevant ports of the equipment specified in Table 3 to Table 6. Measurements shall only be carried out where the relevant ports exist.

All tests defined in Table 3 to Table 6 shall be considered by the test plan, however, where it has been determined in the test plan, that one or more of the tests are not applicable, the decision and justification not to perform such tests shall be recorded in the test report. See examples.

EXAMPLE When considering a test plan for an EUT, which is always powered through a UPS, then conducted tests on the low voltage AC mains port are not necessary.

8 Requirements

The requirements are given in Table 3 to Table 6.

9 Measurement uncertainty

Where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in CISPR 16-4-2, this shall be followed. For these measurements the determination of compliance with the limits in this document shall take into consideration the measurement instrumentation uncertainty in accordance with CISPR 16-4-2. Calculations to determine the measurement result and any adjustment of the test result required when the test laboratory uncertainty is larger than the value for U_{CISPR} given in CISPR 16-4-2 shall be included in the test report.

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10 Compliance with this document

Where this document gives options for testing particular requirements with a choice of test methods, compliance can be shown against any of the relevant test methods, using the specified limits within the restrictions provided in the relevant table clauses. For example, floor standing equipment shall be assessed against table clause 3.1, considering table clause 3.2 is limited to small equipment and table clause 3.3 is limited to table top equipment.

In any situation where it is necessary to retest the equipment, the test method originally chosen shall be used in order to ensure consistency of the results.

The test report shall contain sufficient details to facilitate reproducibility of the measurements.

Equipment which fulfills the requirements across the frequency ranges specified in Table 3 to Table 6, in this document is deemed to fulfill the requirements in the entire frequency range up to 400 GHz.

Measurements do not need to be performed at frequencies where no limits are specified.

11 Emission test details

The following shall be taken into account during the application of the measurements defined in Table 3 to Table 6.

- At transitional frequencies, the lower limit applies.
- Where the limit value varies over a given frequency range, it changes linearly with respect to the logarithm of the frequency.
- The test site shall be validated for the measurement distance chosen.