IEC 61000-6-8

Edition 1.0 2020-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

GENERIC EMC STANDARD
NORME GÉNÉRIQUE EN CEM

Electromagnetic compatibility (EMC) – Part 6-8: Generic standards – Emission standard for professional equipment in commercial and light-industrial locations

Compatibilité électromagnétique (CEM) – Partie 6-8: Normes génériques – Norme d'émission pour les matériels professionnels utilisés dans des environnements commerciaux et de l'industrie légère

IEC 61000-6-8:2020-07(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 33.100.10

ISBN 978-2-8322-8662-3

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 6-8: Generic standards – Emission standard for professional equipment in commercial and light-industrial locations

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61000-6-8 has been prepared by CISPR subcommittee H: Limits for the protection of radio services.

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

CDV	Report on voting
CIS/H/401/CDV	CIS/H/414/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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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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).

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 6-8: Generic standards – Emission standard for professional equipment in commercial and light-industrial locations

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 in commercial and light-industrial (see 3.1.3) locations. This document applies to equipment that satisfy the following restrictions of use:

- is defined as professional equipment (see 3.1.13),
- is professionally installed and maintained (see 3.1.14 and Clause 6),
- is not intended to be used in residential locations (see 3.1.16).

IEC 61000-6-3 applies to electrical and electronic equipment intended for use at commercial and light-industrial locations that do not satisfy these restrictions.

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.

Emission requirements within the frequency range 0 Hz to 400 GHz are covered.

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, employ special mitigation measures to reduce any impact.

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

NOTE 4 Equipment which complies with IEC 61000-6-3 are suitable for use within these defined locations.

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*

IEC 61000-6-3, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for equipment in residential environments* [1]

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*

1 Under preparation. Stage at the time of publication: IEC DECPUB 61000-6-3:2020.

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
antenna port
port, other than a broadcast receiver tuner port (3.1.2), for connection of an antenna used for intentional transmission and/or reception of radiated RF energy

3.1.2
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.

3.1.3
commercial and light-industrial location
location which are not residential in accordance with 3.1.16, where the mains supply is directly connected to the low-voltage public network or connected to a dedicated DC source which is intended to interface between the equipment and the low-voltage public mains network.

Note 1 to entry: Examples of commercial or light-industrial locations are:

- retail outlets,
- business premises,
- areas of public entertainment,
- places of worship,
- outdoor locations,
- general public locations,
- hospitals, educational institutions,
- public traffic area, railway stations, and public areas of an airport,
- specific common area of buildings, such as basements, control rooms, electrical service areas,
- workshops, laboratories, service centres.

Note 2 to entry: Within these locations it is expected to operate a radio receiver within a distance of 30 m from the equipment. The risk of interference will be minimized by following the instructions defined in Clause 5.

3.1.4
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.

3.1.5
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.

3.1.6
enclosure port
physical boundary of the equipment which electromagnetic fields may radiate through or impinge on

3.1.7
highest internal frequency
F_x

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

3.1.8
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 1 500 V.

3.1.9
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

3.1.10
optical fibre port
port at which an optical fibre is connected to an equipment

3.1.11
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.

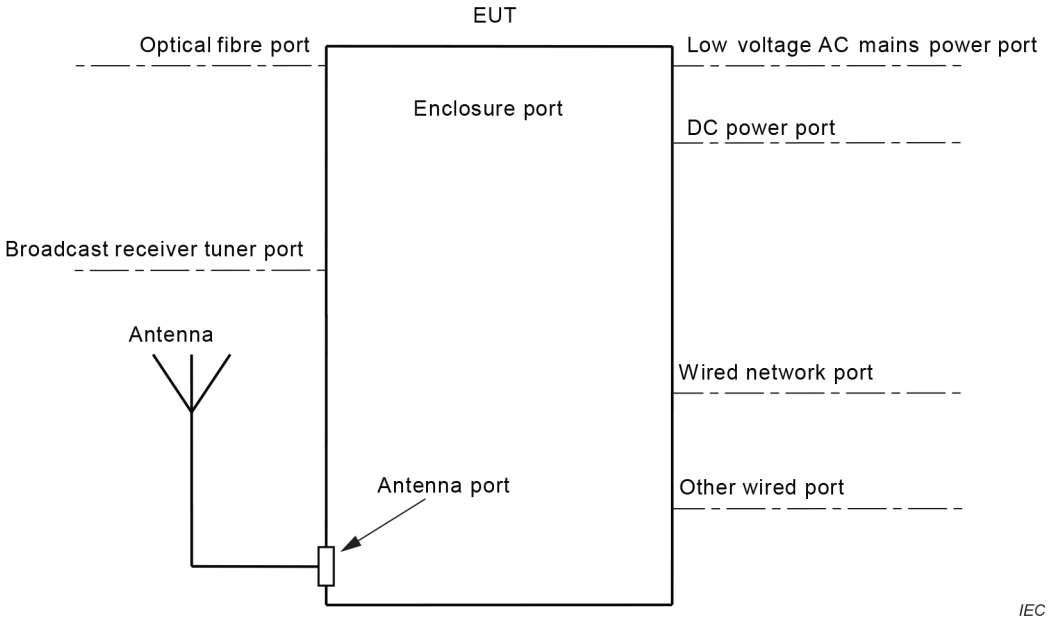

Figure 1 – Example of ports

3.1.12
power port
port for the connection of the equipment to its primary electrical power supply

3.1.13
professional equipment
equipment for use in trades, professions, or industries which is not intended for sale to the general public

3.1.14
professional installation
installation and maintenance of equipment by professional(s) with sufficient knowledge to employ EMC mitigation measures according to the installation instructions

3.1.15
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

3.1.16
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.

3.1.17
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.

3.1.18
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 wired 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 many product standards, this port was defined as a telecommunications or network port.

3.2 Abbreviated terms

AAN	Asymmetric Artificial Network
AC	Alternating Current
V-AMN	Artificial Mains V-Network
V-AN	Artificial V-Network
CAT	Category
CATV	Cable TV network
CM	Common Mode
DC	Direct Current
DSL	Digital Subscriber Line
EMI	ElectroMagnetic Interference
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
RF	Radio Frequency
PSTN	Public Switched Telephone Network
SAC	Semi Anechoic Chamber
TEM	Transverse Electromagnetic Mode
TN-C	Grounding system defined in IEC 60364-1
TV	Television
UPS	Uninterruptible Power Supply

USB	Universal Serial Bus
VCR	Video Cassette Recorder
xDSL	Generic term for all types of DSL technology
Δ-AN	Artificial Δ-Network (‘Δ’ is pronounced ‘delta’)

4 Classification of equipment

This document applies to equipment intended to be used within commercial and light-industrial (see 3.1.3) locations that satisfies all the restrictions of use defined within the scope (see Clause 1). For this equipment, the requirements of Table 3 to Table 6 apply.

These requirements are not intended to offer adequate protection to radio services and applications within the residential environment.

NOTE Examples of the emission classification of equipment and mapping to the immunity standard 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, which are 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.

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 can 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 similar measures, these measures shall be applied during the measurements.

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