CISPR 14-2

Edition 3.0 2020-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

PRODUCT FAMILY EMC STANDARD
NORME DE FAMILLE DE PRODUITS EN CEM

Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 2: Immunity – Product family standard

Compatibilité électromagnétique – Exigences relatives aux appareils électrodomestiques, aux outils électriques et aux appareils analogues – Partie 2: Immunité – Norme de famille de produits

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Part 2: Immunity – Product family standard

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 CISPR 14-2 has been prepared by CISPR subcommittee F: Interference relating to household appliances tools, lighting equipment and similar apparatus.

This third edition cancels and replaces the second edition published in 2015. This edition constitutes a technical revision.

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

a) extension of the frequency range for radiated immunity above 1 GHz;
b) an advanced categorisation of equipment;
c) revision of general test conditions and addition of new specific test conditions (e.g. for robotic equipment);
d) clarification of requirements applicable to equipment incorporating radio functions;

e) addition of requirements for wired network ports;

f) revision of definitions and addition of new ones;

g) delete requirements referring to statistical evaluation;

h) alignment with CISPR 14-1, where applicable.

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

FDIS	Report on voting
CIS/F/795/FDIS	CIS/F/797/RVD

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

A list of all parts in the CISPR 14 series, published under the general title *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus*, can be found on the IEC website.

This document has the status of a product family standard.

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

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- withdrawn,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

INTRODUCTION

The intention of this document is to establish uniform requirements for the electromagnetic immunity of the equipment mentioned in the scope, to fix test specifications of immunity, to refer to basic standards for methods of testing, and to standardize operating conditions, performance criteria and interpretation of results.

Keywords: Immunity, household appliances, electric apparatus, electromagnetic compatibility.

ELECTROMAGNETIC COMPATIBILITY – REQUIREMENTS FOR HOUSEHOLD APPLIANCES, ELECTRIC TOOLS AND SIMILAR APPARATUS –

Part 2: Immunity – Product family standard

1 Scope

This part of CISPR 14 specifies the electromagnetic immunity requirements in the frequency range 0 Hz to 400 GHz that apply to appliances, electric tools and similar apparatus as specified below, whether powered by AC or DC (including a battery).

This document specifies immunity requirements for continuous and transient electromagnetic disturbances, both conducted and radiated.

Unless otherwise specified, this document is applicable to all equipment in the scope of CISPR 14-1, namely:

- household appliances or similar apparatus;

  NOTE 1 Examples are equipment used:

  – for typical housekeeping functions in the household environment, which includes the dwelling and its associated buildings, the garden, etc.;
  – for typical housekeeping functions in shops, offices, commercial and other similar working environments;
  – on farms;
  – by clients in hotels and other residential type environments;
  – for induction cooking or air conditioning, either in residential or commercial environments.

- electric tools;

  NOTE 2 Examples of electric tools include electric motor-operated or electromagnetically driven hand-held tools, transportable tools, lawn and garden machinery.

- similar apparatus;

  NOTE 3 Examples are:

  – external power controllers using semiconductor devices;
  – motor-driven electro-medical equipment;
  – electric/electronic toys;
  – personal care and beauty care appliances;
  – automatic goods-dispensing machines;
  – entertainment machines;
  – cine or slide projectors;
  – battery chargers and external power supplies for use with products under the scope of this document;
  – electric fence energisers.

Included in the scope of this document are also microwave ovens for domestic use or catering.

Equipment which incorporate radio transmit/receive functions are included in the scope of this document.

NOTE 4 For handling cases where equipment under the scope of this document is combined with transmit and/or receive radio functions, see Clause 8.

Excluded from the scope of this document are:

– equipment for which all electromagnetic immunity requirements are explicitly formulated in other CISPR or IEC standards;

NOTE 5 Examples are:

- luminaires, including portable luminaires for children, discharge lamps, LED lamps and other lighting devices under the scope of IEC 61547 (but see 8.7);
- multimedia equipment under the scope of CISPR 35;
- mains communication devices, as well as baby surveillance systems;
- arc welding equipment.

– equipment intended to be part of the fixed electrical installation of buildings (e.g. fuses, circuit breakers, cables and switches);

– medical electrical equipment, including those in the scope of CISPR 14-1;

– equipment used only in industrial environment;

– equipment intended to be used exclusively in locations where special electromagnetic conditions exist (e.g. high electromagnetic fields nearby broadcast transmitting stations or high energy pulses nearby power generation stations);

– equipment intended to be used exclusively on a vehicle, ship, boat or aircraft;

– the effects of electromagnetic phenomena relating to the safety of apparatus (see IEC 60335 series);

Also excluded from the scope of this document is AC single-phase equipment with a rated voltage higher than 250 V between phase and neutral and AC multi-phase equipment with rated voltage higher than 480 V.

Abnormal operation of the equipment, such as simulated faults in the electric circuitry for testing purposes, is not taken into consideration.

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 60050-161, *International Electrotechnical Vocabulary (IEV) – Part 161: Electromagnetic compatibility*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*
IEC 61000-4-3:2006/AMD1:2007
IEC 61000-4-3:2006/AMD2:2010

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*
IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 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) waveguides*

IEC 61000-4-22:2010, *Electromagnetic compatibility (EMC) – Part 4-22: Testing and measurement techniques – Radiated emissions and immunity measurements in fully anechoic rooms (FARs)*

CISPR 14-1:2020, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

3 Terms, definitions and abbreviated terms

3.1 General

For the purposes of this document, the terms and definitions given in IEC 60050-161, as well as the following apply.

NOTE Within this document wherever the term “equipment” is used it includes the more specific terms “appliance”, “household or similar appliances”, “electric tool”, “toys” and “apparatus”.

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

3.2 General terms and definitions

3.2.1
radio frequency
RF
frequency of the electromagnetic spectrum that is between the audio-frequency portion and the infrared portion

Note 1 to entry: The RF spectrum is generally accepted to be from 9 kHz to 3 000 GHz.

3.2.2
equipment under test
EUT
equipment being evaluated according to the requirements of this document

3.2.3
system under test
EUT and auxiliary equipment which are tested together in accordance with the requirements of this document

Note 1 to entry: The system under test can be made by one or more EUTs, and can also include auxiliary equipment (see 3.2.7).

3.2.4
test system
combination of instruments, ancillary equipment, associated equipment and test environment used to test the system under test according to the specifications of a test method

Note 1 to entry: Examples of elements part of the test system are disturbance generators and amplifiers, coupling and decoupling networks, coupling planes, test chambers and monitoring devices.

3.2.5
ancillary equipment
transducer connected to a measuring receiver or (test) signal generator and used in the disturbance signal transfer between the EUT and the measuring or test equipment

EXAMPLE Coupling and decoupling networks, attenuators and antennas.

[SOURCE: CISPR 16-2-3:2016, 3.1.2, modified – Definition rephrased and example added.]

3.2.6
associated equipment
AE
equipment that is not part of the system under test but needed to exercise and/or monitor the EUT

EXAMPLE A control unit exchanging data and/or transferring power to the EUT through a wired interface (e.g. via Ethernet or USB), a data logger or an audio/video system.

Note 1 to entry: AE may be either local (within the test system) or remote.

[SOURCE: CISPR 16-2-3:2016, 3.1.5, modified – Definition rephrased and example and Note added.]

3.2.7
auxiliary equipment
AuxEq
peripheral equipment that is part of the system under test

EXAMPLE An accessory providing additional functions to a piece of equipment, a wired remote control, an external battery, an external power supply or a laptop providing a compatible USB power port.

Note 1 to entry: Certain auxiliary equipment is used to achieve the normal operating conditions of the EUT during testing but it is not provided or specified for use with the EUT. Accordingly, whilst part of the system under test, such auxiliary equipment is not part of the EUT.

[SOURCE: CISPR 16-2-3:2016, 3.1.6, modified – Example and note added.]

3.2.8
mains operated equipment
equipment which is not battery operated equipment

3.2.9
battery operated equipment
equipment which is operated only from batteries and cannot perform its intended function when connected to the mains supply, either directly or via an external power supply (EPS) unit

3.2.10
mains operation
condition where the equipment is powered from the mains supply either directly or via a dedicated external power supply to perform its intended function(s)

Note 1 to entry: Charging batteries from the mains supply is mains operation.

3.2.11
battery operation
condition where the equipment is powered only from batteries and there is no provision for the equipment to perform its intended function(s) when connected to the mains supply, either directly or via an external power supply (EPS) unit

3.2.12
port
physical interface of the system under test through which electromagnetic energy propagates

Note 1 to entry: See Figure 1.

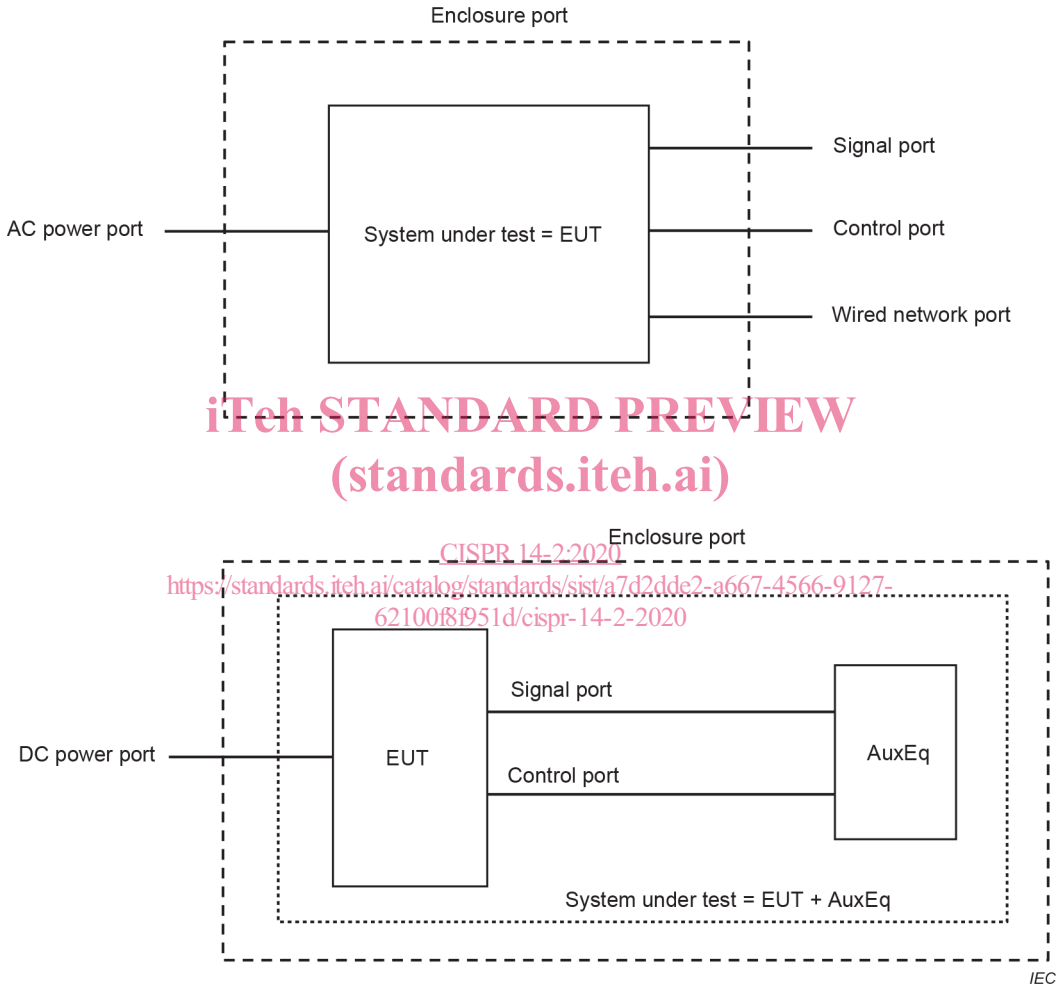

Figure 1 – Examples of ports

3.2.13
enclosure port
physical boundary of the system under test through which electromagnetic fields may radiate or impinge

3.2.14
power port
port at which a conductor or cable, carrying the electrical input/output power needed for the operation (functioning), is connected to the equipment

Note 1 to entry: A power port may supply either AC or DC current.

[SOURCE: IEC 61000-6-1:2016, 3.4, modified – Note added]

3.2.15
signal/control port
port at which a conductor or cable intended to carry signals is connected to the equipment

EXAMPLE Analog inputs, outputs and control lines; data buses; communication networks, etc.

[SOURCE: IEC 61000-6-1:2016, 3.3]

3.2.16
wired network port
port of connection for voice, data and signalling transfers intended to interconnect widely dispersed systems by direct connection to a single-user or multi-user communication network

Note 1 to entry: Examples of these include CATV, PSTN, ISDN, xDSL, LAN and similar networks.

Note 2 to entry: These ports are connected to screened or unscreened cables and may carry AC or DC power where this is an integral part of the telecommunication specification

[SOURCE: CISPR 32:2015, 3.1.32, modified – Note 2 to entry modified]

3.2.17
toy
product designed for, or clearly intended for use in play by children under 14 years old

Note 1 to entry: Toys can incorporate motors, heating elements, electronic circuits and their combination.

Note 2 to entry: The supply voltage of a toy can be provided by a battery or by means of an adapter or a transformer connected to the AC mains supply.

3.2.18
experimental kit
collection of electric or electronic components intended to be assembled in various combinations

Note 1 to entry: The main aim of an experimental set is to facilitate the acquiring of knowledge by experiment and research. It is not intended to create a toy or equipment for practical use.

3.2.19
video toy
toy consisting of a screen and activating means by which the child can play and interact with the picture shown on the screen

Note 1 to entry: All parts necessary for the operation of the video toy, such as control box, joy stick, key board, monitor and connections, are considered to be part of the toy.

3.2.20
external power supply
EPS
device having its own physical enclosure that converts power supplied by the AC mains into power at a different voltage

Note 1 to entry: The output voltage of the EPS can be either AC or DC.

3.2.21
representative load
load which is not provided (sold) with the equipment but it is used to exercise the EUT as specified in the relevant test conditions

Note 1 to entry: Examples are a resistive load or a battery used to load a battery charger output terminals, a resistive load connected to a secondary coil to exercise an inductive power transfer source or a real inductive power transfer client. It is common that a representative load is an apparatus commercially available or specified in the instructions for use.

3.2.22
representative source
apparatus which is not provided (sold) with the equipment but it is used to power the EUT at its rated voltage in order to obtain the relevant test conditions

Note 1 to entry: Examples are an EPS or an inductive power source.

Note 2 to entry: This is generally an apparatus commercially available or specified in the instructions for use.

3.2.23
robotic equipment
equipment capable of performing its intended use by changing its position or the position of its parts without human intervention

Note 1 to entry: The movements can be within a limited space, a pre-programmed space, or a space self-controlled by the equipment.

3.2.24
robotic cleaner
robotic equipment capable of performing the functions of a cleaner

EXAMPLE Robotic cleaners used to vacuum dust and dirt or to wash floors and windows.

Note 1 to entry: Robotic cleaners typically consist of two parts:

– a battery powered mobile part that performs the cleaning function (cleaning unit), and
– a stationary docking station which could, for example, provide battery charging, data processing and dust removal from the mobile cleaner.

3.2.25
radio transmitter
device producing radio-frequency energy intended to be radiated by an antenna, normally for the purpose of radio communication

[SOURCE: IEC 60050-713:1998, 713-08-01, 1, modified – "Apparatus" replaced by "device".]

3.2.26
radio receiver
device with associated antenna or including an antenna, used to select the desired radio-frequency signals from incident radio-frequency radiation, to amplify them, demodulate them and if necessary convert the recovered signals into a usable form by equipment in the scope of this document

3.2.27
extra low voltage
voltage that does not exceed 50 V between conductors and between conductors and earth, when the equipment is supplied at rated voltage

[SOURCE: IEC 60335-1:2010, 3.4.1, modified – Deletion of "supplied from a source within the appliance".]

3.2.28
clock frequency
fundamental frequency of any signal used in the EUT excluding those which are solely used inside integrated circuits (IC) and those used in radio transmitters or radio receivers

Note 1 to entry: High frequency signals are often generated inside integrated circuits (IC) by phase-locked-loop (PLL) circuits from lower clock oscillator frequencies outside the IC.