

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

**Electromagnetic compatibility (EMC) –
Part 6-4: Generic standards – Emission standard for industrial environments**

**Compatibilité électromagnétique (CEM) –
Partie 6-4: Normes génériques – Norme sur l'émission pour les environnements
industriels**

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INTERNATIONAL
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ELECTROTECHNIQUE
INTERNATIONALE

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 6-4: Generic standards – Emission standard for industrial environments

INTERPRETATION SHEET

This interpretation sheet has been prepared by CISPR subcommittee H: Limits for the protection of radio services, of IEC technical committee CISPR: International special committee on radio interference.

The text of this interpretation sheet is based on the following documents:

FDIS	Report on voting
CISPR/H/218/FDIS	CISPR/H/223/RVD

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

Interpretation

The requirement in Clause 8 “Measurement uncertainty” of IEC 61000-6-4 Amend. 1 ed. 2.0:

8 Measurement uncertainty

The measurement instrumentation uncertainty shall be determined according to CISPR 16-4-2, where applicable.

NOTE For a given test method, the actual value of U_{lab} has only to be recorded in the test report if the value is greater than U_{CISPR} .

shall be interpreted as follows:

The measurement instrumentation uncertainty shall be calculated and compared with the budgets defined in CISPR 16-4-2. For each applicable test method, whose instrumentation uncertainty budgets are higher than those defined in CISPR 16-4-2, compliance with the limits has to be determined according to CISPR 16-4-2 methodology. This requirement is only applicable for tests where an uncertainty budget is defined in CISPR 16-4-2.

The additional note was further clarification that there is no need to state in the test report the laboratory uncertainty budget U_{lab} if this is less than or equal to the U_{CISPR} defined in CISPR 16-4-2. However, it has to be mentioned in the test report that the instrumentation measurement uncertainty is determined according to CISPR 16-4-2.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

ELECTROMAGNETIC COMPATIBILITY (EMC) –

**Part 6-4: Generic standards – Emission standard
for industrial environments**

FOREWORD

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This consolidated version of IEC 61000-6-4 consists of the second edition (2006) [documents CISPR/H/122/FDIS and CISPR/H/125/RVD] and its amendment 1 (2010) [documents CISPR/H/205/FDIS and CISPR/H/209/RVD]. It bears the edition number 2.1.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

International Standard IEC 61000-6-4 has been prepared by CISPR subcommittee H: Limits for the protection of radio services.

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

The committee has decided that the contents of the base publication and its amendments 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

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WITHDRAWN

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: 61000-6-1).

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 6-4: Generic standards – Emission standard for industrial environments

1 Scope and object

This part of IEC 61000 for EMC emission requirements applies to electrical and electronic apparatus intended for use in industrial environments as described below.

Emission requirements in the frequency range 0 Hz to 400 GHz are covered. No measurement needs to be performed at frequencies where no requirement is specified.

This generic EMC emission standard is applicable if no relevant dedicated product or product-family EMC emission standard exists.

This standard applies to a apparatus intended to be connected to a power network supplied from a high or medium voltage transformer dedicated to the supply of an installation feeding manufacturing or similar plant, and intended to operate in or in proximity to industrial locations, as described below. This standard applies also to apparatus, which is battery operated and intended to be used in industrial locations.

The environments encompassed by this standard are industrial, both indoor and outdoor.

Industrial locations are in addition characterised by the existence of one or more of the following examples:

- industrial, scientific and medical (ISM)¹⁾ apparatus;
- heavy inductive or capacitive loads that are frequently switched;
- high currents and associated magnetic fields.

The object of this standard is to define the emission test requirements for apparatus defined in the scope in relation to continuous and transient, conducted and radiated disturbances.

The emission requirements have been selected so as to ensure that disturbances generated by apparatus operating normally in industrial locations do not exceed a level that could prevent other apparatus from operating as intended. Fault conditions of apparatus are not taken into account. Not all disturbance phenomena have been included for testing purposes in this standard but only those considered as relevant for the equipment covered by this standard. These requirements represent essential electromagnetic compatibility emission requirements.

Requirements are specified for each port considered.

NOTE 1 Safety considerations are not covered by this standard.

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

¹⁾ As defined in CISPR 11.

2 Normative references

The following referenced documents are indispensable for the application 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 – Chapter 161: Electromagnetic compatibility*

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 11:2009, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

CISPR 14-1:2005, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*
Amendment 1:2008

CISPR 16-1-1:2010, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus*

CISPR 16-1-2:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Conducted disturbances*

CISPR 16-1-4:2007, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Radiated disturbances*
Amendment 1:2007

CISPR 16-2-1:2008, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*

CISPR 16-2-3:2006, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements*

CISPR 16-4-2:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements*

CISPR 22:2008, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

3 Terms, definitions and abbreviations

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

~~NOTE Definitions related to EMC and to relevant phenomena are given in IEC 60050-161 and in other IEC and CISPR publications.~~

3.1 Terms and definitions

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

3.1.1

port

particular interface of the specified apparatus with the external electromagnetic environment (see Figure 1)

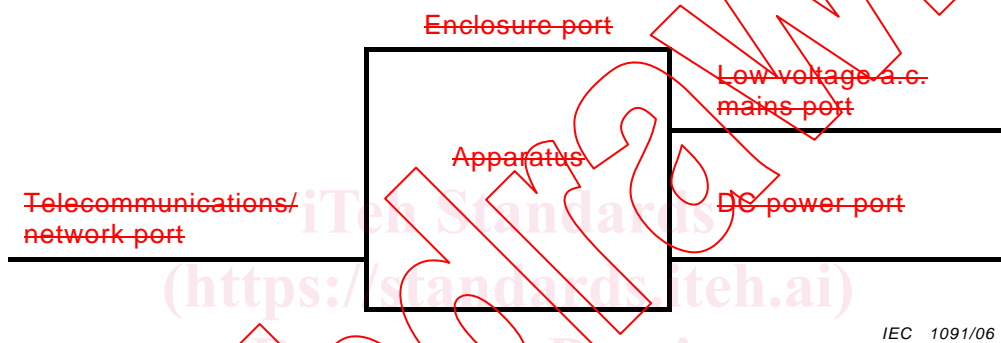


Figure 1 – Examples of ports

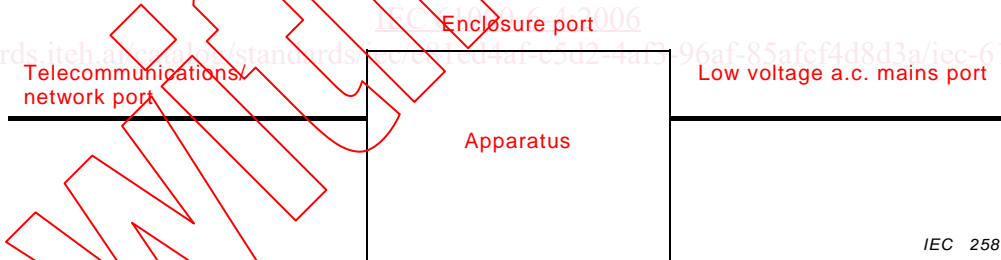


Figure 1 – Ports covered by Tables 1 to 3

3.2 3.1.2

enclosure port

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

3.3 3.1.3

cable port

port at which a conductor or a cable is connected to the apparatus

NOTE Examples are signal, control and power ports.

3.4 3.1.4

telecommunications/network port

point of connection for voice, data and signalling transfers intended to interconnect widely dispersed systems via such means as direct connection to multi-user telecommunications networks (e.g. public switched telecommunications networks (PSTN) integrated services

digital networks (ISDN), x-type digital subscriber lines (xDSL), etc.), local area networks (e.g. Ethernet, Token Ring, etc.) and similar networks)

NOTE A port generally intended for interconnection of components of an ITE system under test (e.g. RS-232, RS-485, field buses in the scope of IEC 61158, 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 telecommunications port.

3.5 3.1.5

power port

port at which a conductor or cable carrying the primary electrical power needed for the operation (functioning) of an apparatus or associated apparatus is connected to the apparatus

3.6 3.1.6

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

3.7 3.1.7

low voltage

LV

low tension

voltage having a value below a conventionally adopted limit

[IEV 601-01-26 modified]

NOTE For the distribution of AC electric power, the upper limit is generally accepted to be 1 000 V.

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

3.1.9

highest internal frequency

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

3.2 Abbreviations

FAR	Fully Anechoic Room
OATS	Open Area Test Site
SAC	Semi Anechoic Chamber
TEM	Transverse Electromagnetic Mode

4 Conditions during testing

The equipment under test (EUT) shall be tested in the operating mode producing the largest emission in the frequency band being investigated, e.g. based on limited pre-tests and consistent with normal applications. The configuration of the test sample shall be varied to achieve maximum emission consistent with typical applications and installation practice.

~~If the apparatus is part of a system, or can be connected to auxiliary apparatus, the apparatus shall be tested while connected to the minimum representative configuration of auxiliary apparatus necessary to exercise the ports in a similar manner to that described in CISPR 11 and CISPR 22.~~