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Edition 2.0 2005-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Withdrawn

Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments

Compatibilité électromagnétique (CEM) – Partie 6-1: Normes génériques – Immunité pour les environnements résidentiels, commerciaux et de l'industrie légère

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments

FOREWORD

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International Standard IEC 61000-6-1 has been prepared by IEC technical committee 77: Electromagnetic compatibility.

This second edition cancels and replaces the first edition published in 1997. It constitutes a technical revision. Specific technical changes have been introduced to Tables 1 to 4. The frequency range for tests according to IEC 61000-4-3 has been extended above 1 GHz according to technologies used in this frequency area. The use of TEM waveguide testing according to IEC 61000-4-20 has been introduced for certain products and the testing requirements according to IEC 61000-4-11 have been amended significantly.

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

FDIS	Report on voting
77/294A/FDIS	77/300/RVD

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

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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- withdrawn;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.

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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 as technical specifications or technical reports, 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).

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments

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1 Scope and object

This part of IEC 61000 for EMC immunity requirements applies to electrical and electronic apparatus intended for use in residential, commercial and light-industrial environments. Immunity requirements in the frequency range 0 Hz to 400 GHz are covered. No tests need to be performed at frequencies where no requirements are specified.

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

This standard applies to apparatus intended to be directly connected to a low-voltage public mains network or connected to a dedicated DC source which is intended to interface between the apparatus and the low-voltage public mains network. This standard applies also to apparatus which is battery operated or is powered by a non-public, but non-industrial, low-voltage power distribution system if this apparatus is intended to be used in the locations described below.

The environments encompassed by this standard are residential, commercial and light-industrial locations, both indoor and outdoor. The following list, although not comprehensive, gives an indication of locations which are included:

– residential properties, for example houses, apartments;
– retail outlets, for example shops, supermarkets;
– business premises, for example offices, banks;
– areas of public entertainment, for example cinemas, public bars, dance halls;
– outdoor locations, for example petrol stations, car parks, amusement and sports centres;
– light-industrial locations, for example workshops, laboratories, service centres.

Locations which are characterised by being supplied directly at low voltage from the public mains network are considered to be residential, commercial or light-industrial.

The object of this standard is to define the immunity test requirements for apparatus specified in the scope in relation to continuous and transient, conducted and radiated disturbances including electrostatic discharges.

The immunity requirements have been selected to ensure an adequate level of immunity for apparatus at residential, commercial and light-industrial locations. The levels do not, however, cover extreme cases, which may occur at any location, but with an extremely low probability of occurrence. 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 test requirements represent essential electromagnetic compatibility immunity requirements.

NOTE 1 Information on other disturbance phenomena is given in IEC 61000-4-1.

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Test requirements are specified for each port considered.

NOTE 2 Safety considerations are not covered by this standard.

NOTE 3 In special cases, situations will arise where the levels of disturbances may exceed the test levels specified in this standard; for example where a hand-held transmitter is used in proximity to an apparatus. In these instances, special mitigation measures may have to be employed.

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 (IEV) – Chapter 161: Electromagnetic compatibility*

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

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency, electromagnetic field immunity test*

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

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

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

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 8: Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

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

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3 Terms and definitions

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

NOTE Additional definitions related to EMC and to relevant phenomena are given in other IEC and CISPR publications.

3.1
port
particular interface of the specified apparatus with the external electromagnetic environment (see Figure 1)

NOTE In some cases different ports may be combined.

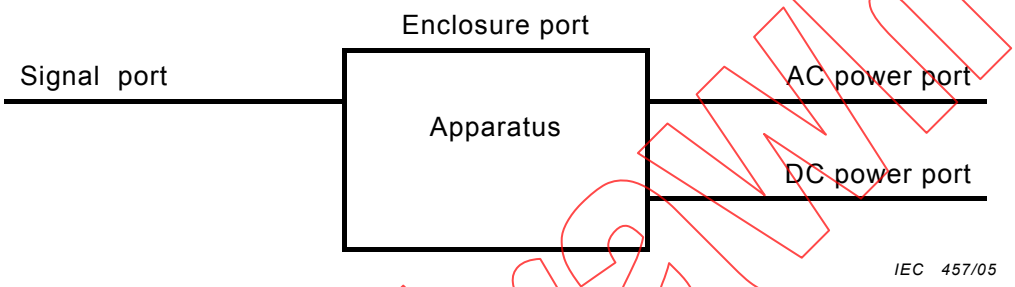

Figure 1 – Examples of ports

3.2
enclosure port
physical boundary of the apparatus which electromagnetic fields may radiate through or impinge on

3.3
cable port
port at which a conductor or a cable is connected to the apparatus

NOTE Examples are signal and power ports.

3.4
signal port
port at which a conductor or cable intended to carry signals is connected to the apparatus

NOTE Examples are analog inputs, outputs and control lines; data busses; communication networks etc.

3.5
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
public mains network
electricity lines to which all categories of consumers have access and which are operated by an electrical power supply and/or distribution organization for the purpose of supplying electrical energy

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3.7
long distance lines
lines connected to a signal port and which inside a building are longer than 30 m, or which leave the building (including lines of outdoor installations)

3.8
low voltage
voltage having a value below a conventionally adopted limit

(see IEV 151-15-03)

4 Performance criteria

The variety and the diversity of the apparatus within the scope of this standard makes it difficult to define precise criteria for the evaluation of the immunity test results.

If, as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe, the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on one of the following criteria for each test as specified in Tables 1 to 4.

a) **Performance criterion A:** The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

b) **Performance criterion B:** The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

c) **Performance criterion C:** Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

5 Conditions during testing

The equipment under test (EUT) shall be tested in the expected most susceptible operating mode e.g. identified by performing limited pre-tests. This mode shall be consistent with normal applications. The configuration of the test sample shall be varied to achieve maximum susceptibility consistent with typical applications and installation practice.

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