IEC 61000-6-1

Edition 3.0 2016-08
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

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

IEC 61000-6-1:2016-08 RLV(en)

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –

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

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

This third edition cancels and replaces the second edition published in 2005. This edition constitutes a technical revision.

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

a) improvement of the environmental description;
b) extension of the frequency range for the radio-frequency electromagnetic field test according to IEC 61000-4-3;
c) amended test levels at particular frequencies for the radio-frequency electromagnetic field test according to IEC 61000-4-3;
d) change of the repetition frequency for the fast transients immunity test according to IEC 61000-4-4;
e) introduction of requirements according to IEC 61000-4-34;
f) revision of the test levels;
g) consideration of measurement uncertainty;
h) addition of Annex A.

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

FDIS	Report on voting
77/520/FDIS	77/522/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.

This publication 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 publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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: IEC 61000-6-1).

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

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

1 Scope ~~and object~~

This part of IEC 61000 for EMC immunity requirements applies to electrical and electronic ~~apparatus~~ equipment intended for use in residential, commercial, public and light-industrial ~~environments~~ locations. 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 to electrical and electronic equipment intended to be operated in

- residential locations, as defined in 3.8, both indoor and outdoor,
- commercial, public and light industrial locations, as defined in 3.9, both indoor and outdoor.

This standard applies also to ~~apparatus~~ equipment which is battery operated or is powered by a non-public, but non-industrial, low voltage power distribution system if this ~~apparatus~~ equipment is intended to be used in the locations ~~described below~~ defined in 3.8 or 3.9.

~~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~~ defines the immunity test requirements for ~~apparatus~~ equipment 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~~ equipment operating within residential, commercial, public 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

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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. They are specified for each port considered.

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

~~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~~ equipment. In these instances, special mitigation measures may have to be employed.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 – Part 161: Electromagnetic compatibility* (available at: www.electropedia.org)

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

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

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 61000-4-21:2011, *Electromagnetic compatibility (EMC) – Part 4-21: Testing and measurement techniques – Reverberation chamber test methods*

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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)*

IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase*
IEC 61000-4-34:2005/AMD1:2009

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-161 as well as the following 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~~ equipment which couples this equipment with or is influenced by the external electromagnetic environment ~~(see Figure 1)~~

Note 1 to entry: ~~In some cases different ports may be combined.~~ Examples of ports of interest are shown in Figure 1. The enclosure port is the physical boundary of the equipment (e.g. enclosure). The enclosure port provides for radiated and electrostatic discharge (ESD) energy transfer, whereas the other ports provide for conducted energy transfer, either by direct injection or by induction.

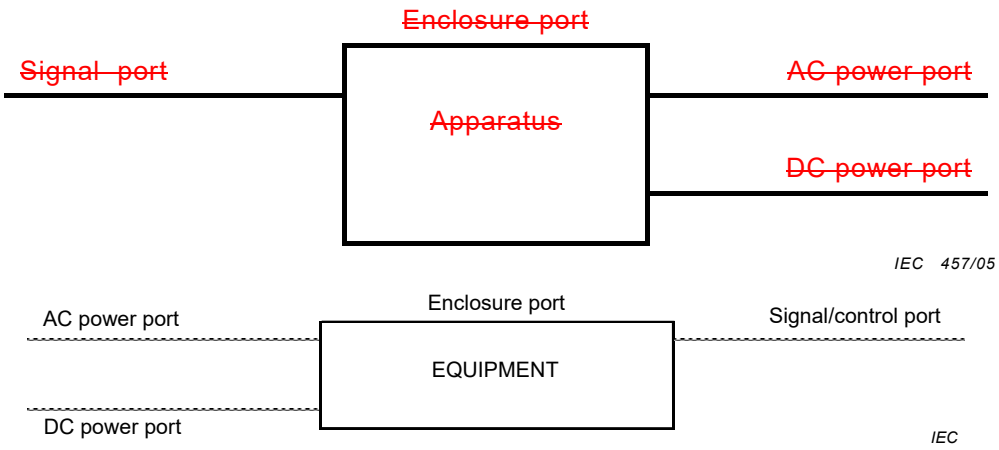

Figure 1 – ~~Example of~~ Equipment ports

3.2
enclosure port
physical boundary of the ~~apparatus~~ equipment through which electromagnetic fields may radiate ~~through~~ or on which they may 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.~~

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3.3
signal/control port
port at which a conductor or cable intended to carry signals is connected to the ~~apparatus~~ equipment

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

3.4
power port
port at which a conductor or cable, carrying the ~~primary~~ electrical input/output power needed for the operation (functioning) ~~of an apparatus or associated apparatus~~ is connected to the ~~apparatus~~ equipment

3.5
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

3.6
long distance line~~s~~
line~~s~~ connected to a signal/control port and which inside a building ~~are~~ is longer than 30 m, or which leaves the building (including ~~lines of outdoor installations~~ a line installed outdoors)

3.7
low voltage
voltage having a value below a conventionally adopted limit

Note 1 to entry: Low voltage is typically considered as a set of voltage levels used for the distribution of electricity and whose upper limit is generally accepted to be 1 000 V AC or 1 500 V DC.

[SOURCE: IEC 60050-151:2001, 151-15-03]

3.8
residential location
location which exists as an area of land designated for the construction of domestic dwellings, and is characterized by the fact that equipment is directly connected to a low-voltage public mains network or connected to a dedicated DC source which is intended to interface between the equipment and the low-voltage mains network

EXAMPLE Examples of residential locations are: houses, apartments, farm buildings used for living.

Note 1 to entry: The function of a domestic dwelling is to provide a place for one or more people to live. A dwelling can be a single, separate building (as in a detached house) or a separate section of a larger building (as in an apartment in an apartment block).

Note 2 to entry: The connection between location and electromagnetic environment is given in 3.11.

3.9
commercial, public and light-industrial location
location exemplified by areas of the city centre, offices, public transport systems (road/train/underground), and modern business centres containing a concentration of office automation equipment (PCs, fax machines, photocopiers, telephones, etc.), and characterized by the fact that equipment is directly connected to a low-voltage public mains network or connected to a dedicated DC source which is intended to interface between the equipment and the low-voltage mains network

EXAMPLE Examples of commercial, public or light-industrial locations are:

- retail outlets, for example shops, supermarkets;
- business premises, for example offices, banks, hotels, data centres;
- areas of public entertainment, for example cinemas, public bars, dance halls;

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- places of worship, for example temples, churches, mosques, synagogues;
- outdoor locations, for example petrol stations, car parks, amusement and sports centres;
- general public locations, for example parks, amusement facilities, public offices;
- hospitals, educational institutions, for example schools, universities, colleges;
- public traffic area, railway stations, and public areas of an airport;
- light-industrial locations, for example workshops, laboratories, service centres.

Note 1 to entry: The connection between location and electromagnetic environment is given in 3.11.

3.10
DC distribution network
local DC electricity supply network in the infrastructure of a certain site or building intended for flexible use by one or more different types of equipment and ensuring continuous power supply independently from the conditions 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.

3.11
electromagnetic environment
totality of electromagnetic phenomena existing at a given location

Note 1 to entry: In general, the electromagnetic environment is time-dependent and its description may need a statistical approach.

Note 2 to entry: It is very important not to confuse the electromagnetic environment and the location itself.

[SOURCE: IEC 60050-161:1990, 161-01-01, modified – Note 2 to entry has been added.]

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 the equipment under test's (EUT) specific performance criteria, during or as a consequence of~~ the EMC~~ immunity testing, shall be provided by the manufacturer and noted in the test report~~, based on~~. They shall be consistent with one of the following general criteria for each test as specified in Table 1 to Table 4:

a) Performance criterion A: The~~ apparatus~~ EUT 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~~ EUT 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~~ this may be derived from the product description and documentation and what the user may reasonably expect from the~~ apparatus~~ equipment if used as intended.

b) Performance criterion B: The~~ apparatus~~ EUT 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~~ EUT is used as intended. The performance level may be replaced by a permissible loss of performance. However, during the test degradation of performance is allowed but 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~~ equipment if used as intended.

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

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

5 Conditions during testing

The equipment under test (EUT) shall be tested in the expected most susceptible operating mode, for example 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. The configuration and mode of operation during the tests shall be precisely noted in the test report.

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

In cases where a manufacturer's specification requires external protection devices or measures which are clearly specified in the user's manual, the test requirements of this standard shall be applied with the external protection devices or measures in place.

~~The configuration and mode of operation during the tests shall be precisely noted in the test report. It is not always possible to test every function of the apparatus; in such cases the most critical mode(s) of operation shall be selected.~~

If the ~~apparatus~~ equipment 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. Justification for the selection of the tested ports shall be included in the test report.

The tests 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.

6 Product documentation

If the manufacturer is using his own specification for an acceptable level of EMC performance or degradation of EMC performance during or after the testing required by this standard, this fact shall be stated in the user documentation. This specification itself shall be made available upon request.

7 Applicability

The application of tests for evaluation of immunity depends on the particular ~~apparatus~~ equipment, its configuration, its ports, its technology and its operating conditions.

Tests shall be applied to the relevant ports of the ~~apparatus~~ equipment according to Table 1 to Table 4. Tests shall only be carried out where the relevant ports exist.

It may be determined from consideration of the electrical characteristics and usage of particular ~~apparatus~~ equipment that some of the tests are inappropriate and therefore unnecessary. In such a case, ~~it is required that~~ the decision and justification not to test shall be recorded in the test report.

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8 Measurement uncertainty

Where guidance for the assessment of the instrumentation uncertainty of an immunity test is specified in IEC TR 61000-1-6 or in the corresponding basic standard, this should be followed.

9 Immunity test requirements

The immunity test requirements for ~~apparatus~~ equipment covered by this standard are given on a port by port basis and listed in Table 1 to Table 4.

Tests shall be conducted in a well-defined and reproducible manner.

The tests shall be carried out individually as single tests ~~in sequence~~. The tests may be performed in any order. Identical units may be used for testing in parallel, and this information shall be recorded in the test report.

The description of the test, relevant generator, appropriate methods, and the set-up to be used are given in basic standards, which are referred to in Table 1 to Table 4.

The contents of these basic standards are not repeated here, however modifications or additional information needed for the practical application of the tests are given in this standard.

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Table 1 – Immunity requirements – Enclosure port

	Environmental phenomena		Test specifications	Units	Basic standards	Remarks	Performance criterion
1.1	Power-frequency magnetic field		50, 60 3	Hz A/m	IEC 61000-4-8	Applicable only to equipment containing devices susceptible to magnetic fields. The test shall be carried out at the frequencies appropriate to the power supply frequency. Equipment intended for use in areas supplied only at one of these frequencies need only be tested at that frequency. [a]	A [~~b~~]
1.2	Radio-frequency electromagnetic field. Amplitude modulated		80 to 1 000 3 [d] 80	MHz V/m % AM (1 kHz)	IEC 61000-4-3 [a,b,c]	The test level specified is the r.m.s. value of the unmodulated carrier.	A
1.3	Radio-frequency electromagnetic field. Amplitude modulated		1,4 to ~~2,0~~ 6,0 3 [d] 80	GHz V/m % AM (1 kHz)	IEC 61000-4-3 [a,b,c]	The test level specified is the r.m.s. value of the unmodulated carrier. [~~d~~]	A
~~1.4~~	~~Radio-frequency electromagnetic field. Amplitude modulated~~		~~2,0 to 2,7~~ ~~1~~ ~~80~~	~~GHz~~ ~~V/m~~ ~~% AM (1 kHz)~~	~~IEC 61000-4-3 [c]~~	~~The test level specified is the r.m.s. value of the unmodulated carrier. [d]~~	~~A~~
1.5	Electrostatic discharge	Contact discharge	±4 (charge voltage)	kV	IEC 61000-4-2	See the basic standard for applicability of contact and/or air discharge test.	B
		Air discharge	±8 (charge voltage)	kV			B

~~[a] Applicable only to apparatus containing devices susceptible to magnetic fields.~~

~~[b] For CRTs, the acceptable jitter depends upon the character size and is calculated for a test level of 1 A/m as follows:~~

$$\cancel{J \leq \frac{(3C+1)}{40}}$$

~~where jitter J and character size C are in millimetres.~~

~~As jitter is linearly proportional to the magnetic field strength, tests can be carried out at other test levels extrapolating the maximum jitter level appropriately.~~

[a] IEC 61000-4-20 may be used for small EUTs as defined in IEC 61000-4-20~~, subclause 6.1~~.

~~[d] The frequency range has been selected to cover the frequencies with the highest potential risk of a disturbance.~~

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[b] A fully anechoic room (FAR) as described in IEC 61000-4-22 may also be used as a test site for radio-frequency immunity test.

[c] A reverberation chamber (RVC) as described in IEC 61000-4-21 may also be used. The forward power injected into a reverberation chamber P_{input} is given by the required test electric-field strength E_{test} as follows:

$$P_{\text{input}} = \left[\frac{E_{\text{test}}}{\left\langle \ddot{E} \right\rangle_{24\text{or}9} \times \sqrt{CLF(f)}} \right]^2$$

where $CLF(f)$ is the chamber loading factor (dimensionless) at frequency f, and $\left\langle \ddot{E} \right\rangle_{24\text{or}9}$ is the average of the normalized E-field (in (V/m)/W^{0,5}), obtained from the empty chamber validation (see Annexes B and D of IEC 61000-4-21:2011).

[d] For information regarding situations with a high concentration of mobile transmitters, see for example IEC TR 61000-2-5:2011 , 9.3.

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Table 2 – Immunity requirements – Signal/control ports

	Environmental phenomena	Test specifications	Units	Basic standards	Remarks	Performance criterion
2.1	Radio-frequency common mode	0,15 to 80 3 80	MHz V % AM (1 kHz)	IEC 61000-4-6	The test level specified is the r.m.s. value of the unmodulated carrier. [a, b]	A
2.2	Surges line-to-earth	1,2/50 (8/20) ±1	T_r/T_d µs kV (open circuit test voltage)	IEC 61000-4-5	[c, d]	B
2.3	Fast transients	±0,5 5/50 5 or 100	kV (open circuit test voltage) ~~Tr/Th~~ t_r/t_w ns Repetition frequency kHz	IEC 61000-4-4	Capacitive clamp used. [b, e]	B

[a] The test level can also be defined as the equivalent current into a 150 Ω load.

[b] Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3 m.

[c] Applicable only to ports interfacing with long distance lines (see 3.6).

[d] Where the normal functioning cannot be achieved because of the impact of the coupling/decoupling network (CDN) on the EUT, the test shall be done with the reduced functionality. A rationale shall be given in the test report for doing so. After the test and the removal of the CDN, the normal function shall not be affected.

[e] The test may be performed at one or at both repetition frequencies. The use of 5 kHz repetition frequency is traditional; however, 100 kHz is closer to reality.

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Table 3 – Immunity requirements – Input and output DC power ports

	Environmental phenomena	Test specifications	Units	Basic standards	Remarks	Performance criterion
3.1	Radio-frequency common mode	0,15 to 80 3 80	MHz V % AM (1 kHz)	IEC 61000-4-6	The test level specified is the r.m.s. value of the unmodulated carrier [a, b]	A
3.2	Surges line-to-earth line-to-line	1,2/50 (8/20) ±~~0,5~~ 1 ±0,5	~~Tr/Th~~ T_r/T_d µs kV (open circuit test voltage) kV (open circuit test voltage)	IEC 61000-4-5	~~For application to input ports~~ [c,f,g]	B
3.3	Fast transients	±0,5 5/50 5 or 100	kV (open circuit test voltage) ~~Tr/Th~~ t_r/t_w ns Repetition frequency kHz	IEC 61000-4-4	~~For application to input ports~~ [d,e,h]	B
DC ports which are not intended to be connected to a DC distribution network shall be tested as signal ports.						

[a] The test level can also be defined as the equivalent current into a 150 Ω load.

[b] Applicable only to ports interfacing with cables whose total length according to the manufacturers functional specification may exceed 3 m.

[c] Applicable only to ports interfacing with long distance lines; not applicable to input ports intended for connection to a battery or a rechargeable battery which shall be removed or disconnected from the equipment for recharging.

[d] Not applicable to input ports intended for connection to a battery or a rechargeable battery which ~~must~~ shall be removed or disconnected from the ~~apparatus~~ equipment for recharging. ~~Apparatus with a DC power input port intended for use with an AC - DC power adaptor shall be tested on the AC power input of the AC- DC power adaptor specified by the manufacturer or, where none is so specified, using a typical AC - DC power adaptor. DC ports which are not intended to be connected to a DC distribution network are treated as signal ports.~~

~~[d] Not applicable to input ports intended for connection to a battery or a rechargeable battery which must be removed or disconnected from the apparatus for recharging. Apparatus with a DC power input port intended for use with an AC - DC power adaptor shall be tested on the AC power input of the AC- DC power adaptor specified by the manufacturer or, where none is so specified, using a typical AC - DC power adaptor. The test is applicable to DC power input ports intended to be connected permanently to cables longer than 3 m.~~

[e] Equipment with a DC power input port intended for use with a dedicated AC–DC power adaptor shall be tested on the AC power input of the AC–DC power adaptor specified by the manufacturer (see test level of Table 4). Where no adaptor is specified the test shall be done on the DC power port using the test level of Table 4. Where an adaptor is specified the test is applicable to DC power input ports only when intended to be connected permanently to cables longer than 3 m.

[f] Equipment with a DC power input port intended for use with an AC–DC power adaptor shall be tested on the AC power input of the AC–DC power adaptor specified by the manufacturer or, where no adaptor is specified, the test shall be done on the DC power port using the test levels of this table.

[g] For supply voltages where no test equipment is commercially available (e.g. CDNs), this test is not required.

[h] The test may be performed at one or at both repetition frequencies. The use of 5 kHz repetition frequency is traditional; however, 100 kHz is closer to reality.

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