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BASIC EMC PUBLICATION

**Electromagnetic compatibility (EMC) –
Part 4-36: Testing and measurement techniques – IEMI immunity test methods
for equipment and systems**

Document Preview

[IEC 61000-4-36:2020](#)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 4-36: Testing and measurement techniques – IEMI immunity test methods for equipment and systems

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International Standard IEC 61000-4-36 has been prepared by subcommittee 77C: High power transient phenomena, of IEC technical committee 77: Electromagnetic compatibility.

It forms part 4-36 of IEC 61000. It has the status of a basic EMC publication in accordance with IEC Guide 107.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

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

- a) addition of a hyperband and mesoband radiated transients immunity test method in Annex H;
- b) addition of a calibration method of sensors for radiated hyperband and mesoband transient fields and measurement uncertainty in Annex I.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
77C/295/FDIS	77C/299/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,
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- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 (in so far 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).

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 4-36: Testing and measurement techniques – IEMI immunity test methods for equipment and systems

1 Scope

This part of IEC 61000 provides methods to determine test levels for the assessment of the immunity of equipment and systems to intentional electromagnetic interference (IEMI) sources. It introduces the general IEMI problem, IEMI source parameters, derivation of test limits and summarises practical test methods.

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

~~IEC 61000-4-12, *Electromagnetic compatibility (EMC) – Part 4-12: Testing and measurement techniques – Ring wave immunity test*~~

~~IEC 61000-4-18, *Electromagnetic compatibility (EMC) – Part 4-18: Testing and measurement techniques – Damped oscillatory wave immunity test*~~ 2020

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms, definitions and abbreviated terms 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 Terms and definitions

3.1.1

attenuation

reduction in magnitude (as a result of absorption and/or scattering) of an electric or magnetic field or a current or voltage, usually expressed in decibels

[SOURCE: IEC 61000-2-13:2005 [3]¹, 3.1]

¹ Numbers in square brackets refer to the Bibliography.

**3.1.2
bandratio**

~~br~~

ratio of the high and low frequencies between which there is 90 % of the energy

Note 1 to entry: If the spectrum has a large DC content, the lower limit is nominally defined as 1 Hz (see IEC 61000-2-13 [3] for further details).

[SOURCE: IEC 61000-2-13:2005 [3], 3.2, modified – The second part of the definition has been made into a note.]

**3.1.3
bandratio decades**

~~brd~~

bandratio expressed in decades as: bandratio decades = $\log_{10}(\text{bandratio})$

[SOURCE: IEC 61000-2-13:2005 [3], 3.3]

**3.1.4
burst**

~~time frame in which a series of pulses occurs with a given repetition rate-~~
sequence of a limited number of distinct pulses or oscillations of limited duration

Note 1 to entry: When multiple bursts occur, the time between bursts is usually defined.

SOURCE: [IEC 60050-161:1990 [19], 161-02-07, modified – The note has been added.]

**3.1.5
conducted HPEM environment**

high-power electromagnetic currents and voltages that are either coupled or directly injected to cables and wires with voltage levels that typically exceed 1 kV

[SOURCE: IEC 61000-2-13:2005 [3], 3.5]

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**3.1.6
continuous wave**

CW

time waveform that has a fixed frequency and is continuous

[SOURCE: IEC 61000-2-13:2005 [3], 3.6]

**3.1.7
electromagnetic compatibility**

EMC

ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

[SOURCE: IEC 60050-161:2018, 161-01-07.]

**3.1.8
electromagnetic disturbance**

any electromagnetic phenomenon which ~~may~~ can degrade the performance of a device, equipment or system

[SOURCE: IEC 60050-161:2018, [19] 161-01-05, modified – The last part of the definition, "or adversely affect living or inert matter", has been removed.]

**3.1.9
electromagnetic interference
EMI**

degradation of the performance of a device, transmission channel or system caused by an electromagnetic disturbance

Note 1 to entry: Disturbance and interference are respectively cause and effect.

[SOURCE: IEC 60050-161:2018 [19], 161-01-06, modified – Notes 1 and 2 have been removed and a new Note 1 has been added.]

**3.1.10
shield**

<electromagnetic> electrically continuous housing for a facility, area, or component used to attenuate incident electric and magnetic fields by both absorption and reflection

**3.1.11
(electromagnetic) susceptibility**

~~inability~~ possibility of degradation to the performance of a device, equipment or system ~~to perform without degradation~~ in the presence of an electromagnetic ~~disturbance~~ field

Note 1 to entry: Susceptibility is a lack of immunity.

~~**3.1.12
equipment under test
EUT**~~

~~equipment being subjected to the test~~

**3.1.12
high-altitude electromagnetic pulse
HEMP**

electromagnetic pulse produced by a nuclear explosion outside the earth's atmosphere

Note 1 to entry: Typically above an altitude of 30 km.

[SOURCE: IEC 61000-2-13:2005 [3], 3.12]

**3.1.13
high-power microwave
HPM**

narrowband signals, nominally with peak power in a pulse, in excess of 100 MW at the source

Note 1 to entry: This is a historical definition that depended on the strength of the source. The interest in this document is mainly on the EM field incident on an electronic system.

[SOURCE: IEC 61000-2-13:2005 [3], 3.13]

**3.1.14
hyperband signal**

signal or waveform with a pbw (see 3.1.19) value between 163,4 % and 200 % or a bandratio > 10

[SOURCE: IEC 61000-2-13:2005 [3], 3.14]

**3.1.15
hypoband signal**

narrowband signal or waveform with a pbw (see 3.1.19) of < 1 % or a bandratio < 1,01