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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

BASIC EMC PUBLICATION
PUBLICATION FONDAMENTALE EN CEM

Electromagnetic compatibility (EMC) – Part 2-2: Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems

Compatibilité électromagnétique (CEM) – Partie 2-2: Environnement – Niveaux de compatibilité pour les perturbations conduites à basse fréquence et la transmission des signaux sur les réseaux publics d'alimentation basse tension

IEC 61000-2-2:2002-03+AMD1:2017-06 CSV(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 2-2: Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems

FOREWORD

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IEC 61000-2-2 edition 2.1 contains the second edition (2002-03) [documents 77A/367/FDIS and 77A/376/RVD] and its amendment 1 (2017-06) [documents 77A/958/FDIS and 77A/962/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 61000-2-2 has been prepared by subcommittee 77A: Low frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility. It has the status of a basic EMC publication in accordance with IEC guide 107.

This second edition constitutes a technical revision.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes A and B are for information only.

The committee has decided that the contents of the base publication and its amendment 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- withdrawn,
- 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 (in so far as they do not fall under the responsibility of the product committees)

Part 4: Testing and measurement 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 completed by a second number identifying the subdivision (example: 61000-6-1).

Detailed information on the various types of disturbances that can be expected on public power supply systems can be found in IEC 61000-2-1.

INTRODUCTION to Amendment 1

This amendment is related to compatibility levels in the frequency range from 2 kHz to 150 kHz. It contains:

– compatibility levels for signals from mains communicating systems up to 150 kHz;
– compatibility levels for non-intentional emissions between 2 kHz and 30 kHz.

A second amendment is expected soon, containing:

– compatibility levels for non-intentional emissions between 30 kHz and 150 kHz.

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 2-2 : Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems

1 Scope and object

This ~~standard~~ part of IEC 61000 is concerned with conducted electromagnetic phenomena (disturbances and signals from mains communicating systems) in the frequency range from 0 kHz to ~~9~~ 150 kHz~~, with an extension up to 148,5 kHz specifically for mains signalling systems~~. It gives compatibility levels for public low voltage a.c. distribution systems having a nominal voltage up to 420 V, single-phase, or 690 V, three-phase, and a nominal frequency of 50 Hz or 60 Hz.

The compatibility levels specified in this ~~standard~~ document apply at the point of common coupling. At the power input terminals of equipment receiving its supply from the above systems the ~~severity~~ levels of the conducted electromagnetic disturbances can, for the most part, be taken to be the same as the levels at the point of common coupling. In some situations this is not so, particularly in the case of a long line dedicated to the supply of a particular installation, or in the case of ~~a disturbance~~ an electromagnetic phenomenon generated or amplified within the installation of which the equipment forms a part.

Compatibility levels are specified for conducted electromagnetic ~~disturbances~~ phenomena of the types which can be expected in public low voltage power supply systems, for guidance in the definition of:

- the limits to be set for ~~disturbance~~ conducted emissions into public power supply systems (including the planning levels defined in 3.1.5).
- the immunity limits to be set by product committees and others for the equipment exposed to the conducted ~~disturbances~~ electromagnetic phenomena present in public power supply systems.

NOTE More information on compatibility levels and other main basic EMC concepts is given in IEC TR 61000-1-1.

The ~~disturbance~~ electromagnetic phenomena considered are:

- voltage fluctuations and flicker;
- harmonics up to and including order ~~50~~ 40;
- interharmonics up to the ~~50~~ 40th harmonic;
- voltage distortion~~s~~ in differential mode at higher frequencies (above the ~~50~~ 40th harmonic up to 150 kHz);
- voltage dips and short supply interruptions;
- voltage unbalance;
- transient overvoltages;
- power frequency variation;
- d.c. components;
- signals from mains ~~signalling~~ communicating systems (MCS).

Most of these phenomena are described in IEC TR 61000-2-1. In cases where it is not yet possible to establish compatibility levels, some information is provided in Annex B.

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 60050-101, *International Electrotechnical Vocabulary (IEV) – Part 101: Mathematics*

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

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC/TR3 61000-2-1, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 1: Description of the environment – Electromagnetic environment for low-frequency conducted disturbances and signalling in public power supply systems*

IEC 61000-3-3, *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A*

IEC 61000-3-8, *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 8: Signalling on low-voltage electrical installations – Emission levels, frequency bands and electromagnetic disturbance levels*

IEC 61000-4-7, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 7: General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*

IEC 61000-4-15, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 15: Flickermeter – Functional and design specifications*

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

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

3 Definitions

For the purposes of this part of IEC 61000, the definitions given in IEC 60050-101, IEC 60050-161 and its amendments 1 and 2, as well as the following, apply.

3.1 General definitions

3.1.1
(electromagnetic) disturbance
any electromagnetic phenomenon which, by being present in the electromagnetic environment, can cause electrical equipment to depart from its intended performance

[IEV 161-01-05, modified]

3.1.2
disturbance level
the amount or magnitude of an electromagnetic disturbance, measured and evaluated in a specified way

[IEV 161-03-01, modified]

3.1.3
electromagnetic compatibility
EMC (abbreviation)
the ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

NOTE 1 Electromagnetic compatibility is a condition of the electromagnetic environment such that, for every phenomenon, the disturbance emission level is sufficiently low and immunity levels are sufficiently high so that all devices, equipment and systems operate as intended.

NOTE 2 Electromagnetic compatibility is achieved only if emission and immunity levels are controlled such that the immunity levels of the devices equipment and systems at any location are not exceeded by the disturbance level at that location resulting from the cumulative emissions of all sources and other factors such as circuit impedances. Conventionally, compatibility is said to exist if the probability of the departure from intended performance is sufficiently low. See 61000-2-1 clause 4.

NOTE 3 Where the context requires it, compatibility may be understood to refer to a single disturbance or class of disturbances.

NOTE 4 Electromagnetic compatibility is a term used also to describe the field of study of the adverse electromagnetic effects which devices, equipment and systems undergo from each other or from electromagnetic phenomena.

[IEV 161-01-07, modified]

3.1.4
(electromagnetic) compatibility level
the specified electromagnetic disturbance level used as a reference level in a specified environment for co-ordination in the setting of emission and immunity limits

NOTE By convention, the compatibility level is chosen so that there is only a small probability that it will be exceeded by the actual disturbance level.

[IEV 161-03-10, modified]

3.1.5
planning level
a level of a particular disturbance in a particular environment, adopted as a reference value for the limits to be set for the emissions from large loads and installations, in order to co-ordinate those limits with all the limits adopted for equipment intended to be connected to the power supply system

NOTE The planning level is locally specific, and is adopted by those responsible for planning and operating the power supply network in the relevant area. For further information, see Annex A.

3.1.6
point of common coupling
PCC (abbreviation)
the point on a public power supply network, electrically nearest to a particular load, at which other loads are, or could be, connected

[IEV 161-07-15 modified]