

REDLINE VERSION



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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope and object	6
2 Normative references.....	7
3 Terms and definitions	8
4 Performance criteria	10
5 Conditions during testing	11
6 Product documentation	11
7 Applicability.....	11
8 Measurement uncertainty.....	12
9 Immunity test requirements.....	12
Annex A (informative) Guidance for product committees	16
Bibliography	18
Figure 1 – Example of Equipment ports	8
Table 1 – Immunity requirements – Enclosure port	13
Table 2 – Immunity requirements – Signal/control ports	15
Table 3 – Immunity requirements – Input and output DC power ports	16
Table 4 – Immunity requirements – Input and output AC power ports	17
Table A.1 – Immunity tests and test levels to be considered in future or for particular product families	17

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –

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

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This Redline version is not an official IEC Standard and is intended only to provide the user with an indication of what changes have been made to the previous version. Only the current version of the standard is to be considered the official document.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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.

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 publication 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 (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).

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

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*

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IEC 61000-4-20:2010, *Electromagnetic compatibility (EMC) – Part 4-20: Testing and measurement techniques – Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

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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~~

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

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

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	7
4 Performance criteria	9
5 Conditions during testing	10
6 Product documentation	10
7 Applicability.....	10
8 Measurement uncertainty.....	11
9 Immunity test requirements.....	11
Annex A (informative) Guidance for product committees	16
Bibliography	18
Figure 1 – Equipment ports	8
Table 1 – Immunity requirements – Enclosure port	12
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Table A.1 – Immunity tests and test levels to be considered in future or for particular product families	17

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

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IEC 61000-4-34:2005/AMD1:2009

SOMMAIRE

AVANT-PROPOS.....	21
INTRODUCTION.....	23
1 Domaine d'application.....	24
2 Références normatives	25
3 Termes et définitions	25
4 Critères d'aptitude à la fonction.....	28
5 Conditions pendant l'essai	28
6 Documentation du produit	29
7 Applicabilité.....	29
8 Incertitude de mesure	29
9 Exigences pour les essais d'immunité	29
Annexe A (informative) Guide à l'intention des comités de produits.....	34
Bibliographie	36
Figure 1 – Accès d'équipement	26
Tableau 1 – Exigences d'immunité – Accès par l'enveloppe	30
Tableau 2 – Exigences d'immunité – Accès signal/commande.....	31
Tableau 3 – Exigences d'immunité – Accès par les bornes de puissance d'entrée et de sortie en courant continu.....	32
Tableau 4 – Exigences d'immunité – Accès par les bornes de puissance d'entrée et de sortie en courant alternatif	33
Tableau A.1 – Essais d'immunité et niveaux d'essai à prendre en compte pour l'avenir ou pour des familles de produits particulières	35

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

COMPATIBILITÉ ÉLECTROMAGNÉTIQUE (CEM) –**Partie 6-1: Normes génériques –
Norme d'immunité pour les environnements
résidentiels, commerciaux et de l'industrie légère****AVANT-PROPOS**

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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La Norme internationale IEC 61000-6-1 a été établie par le comité d'études 77 de l'IEC: Compatibilité électromagnétique.

Cette troisième édition annule et remplace la deuxième édition parue en 2005. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) amélioration de la description de l'environnement;

- b) extension de la plage de fréquences pour l'essai aux champs électromagnétiques aux fréquences radioélectriques conformément à l'IEC 61000-4-3;
- c) modification des niveaux d'essai à des fréquences particulières pour l'essai aux champs électromagnétiques aux fréquences radioélectriques conformément à l'IEC 61000-4-3;
- d) modification de la fréquence de répétition pour l'essai d'immunité aux transitoires rapides conformément à l'IEC 61000-4-4;
- e) présentation des exigences conformément à l'IEC 61000-4-34;
- f) révision des niveaux d'essai;
- g) prise en compte de l'incertitude de mesure;
- h) ajout de l'Annexe A.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
77/520/FDIS	77/522/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 61000, publiées sous le titre général *Compatibilité électromagnétique (CEM)*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "<http://webstore.iec.ch>" dans les données relatives à la publication recherchée. À cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

INTRODUCTION

L'IEC 61000 est publiée sous forme de plusieurs parties conformément à la structure suivante:

Partie 1: Généralités

Considérations générales (introduction, principes fondamentaux)

Définitions, terminologie

Partie 2: Environnement

Description de l'environnement

Classification de l'environnement

Niveaux de compatibilité

Partie 3: Limites

Limites d'émission

Limites d'immunité (dans la mesure où elles ne relèvent pas des comités de produits)

Partie 4: Techniques d'essai et de mesure

Techniques de mesure

Techniques d'essai

Partie 5: Guide d'installation et d'atténuation

Guide d'installation

Méthodes et dispositifs d'atténuation

Partie 6: Normes génériques

Partie 9: Divers

Chaque partie est à son tour subdivisée en plusieurs parties, publiées soit comme Normes internationales soit comme Spécifications techniques ou Rapports techniques, dont certaines ont déjà été publiées comme sections. D'autres seront publiées avec le numéro de partie, suivi d'un tiret et complété d'un second numéro identifiant la subdivision (exemple: IEC 61000-6-1).

COMPATIBILITÉ ÉLECTROMAGNÉTIQUE (CEM) –

Partie 6-1: Normes génériques – Norme d'immunité pour les environnements résidentiels, commerciaux et de l'industrie légère

1 Domaine d'application

La présente partie de l'IEC 61000 concernant les exigences d'immunité en matière de compatibilité électromagnétique s'applique aux équipements électriques et électroniques destinés à être utilisés dans des sites résidentiels, commerciaux, publics et de l'industrie légère. La présente partie couvre les exigences d'immunité dans la plage de fréquences de 0 Hz à 400 GHz. Il n'est pas nécessaire de réaliser des essais aux fréquences pour lesquelles aucune exigence n'est spécifiée.

Cette norme générique d'immunité CEM s'applique en l'absence de norme d'immunité CEM applicable, spécifique à un produit ou à une famille de produits.

La présente norme s'applique aux équipements électriques et électroniques destinés à être utilisés dans

- des sites résidentiels, comme décrit en 3.8, à la fois à l'intérieur et à l'extérieur,
- des sites commerciaux, publics et de l'industrie légère, comme décrit en 3.9, à la fois à l'intérieur et à l'extérieur.

La présente norme s'applique également aux équipements alimentés par piles ou batteries ou par un système de distribution basse tension non public, mais non industriel, lorsque ces équipements sont destinés à être utilisés dans les sites décrits en 3.8 ou 3.9.

La présente norme définit les exigences des essais d'immunité aux perturbations continues et transitoires, conduites et rayonnées, y compris aux décharges électrostatiques, pour les équipements spécifiés dans le domaine d'application.

Les exigences d'immunité ont été choisies pour assurer un niveau adéquat d'immunité pour les équipements utilisés dans des sites résidentiels, commerciaux, publics et de l'industrie légère. Ces niveaux ne couvrent cependant pas les cas extrêmes qui peuvent apparaître, mais avec une très faible probabilité, sur un site quelconque. La présente norme ne comporte pas, pour les besoins des essais, tous les phénomènes perturbateurs mais uniquement ceux qui sont considérés comme applicables aux équipements couverts par la norme. Ces exigences d'essai représentent les exigences essentielles de compatibilité électromagnétique concernant l'immunité. Elles sont spécifiées pour chaque accès considéré.

NOTE 1 Des informations sur d'autres phénomènes perturbateurs sont fournies dans l'IEC TR 61000-4-1.

NOTE 2 La présente norme ne traite pas des aspects de sécurité.

NOTE 3 Dans des cas spéciaux, des situations peuvent apparaître dans lesquelles les niveaux de perturbation peuvent dépasser les niveaux d'essai spécifiés dans la présente norme, par exemple lorsqu'un émetteur portatif est utilisé à proximité d'un équipement. Dans ces circonstances, des mesures particulières d'atténuation peuvent devoir être employées.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60050-161, *Vocabulaire Électrotechnique International – Partie 161: Compatibilité électromagnétique* (disponible sous: www.electropedia.org)

IEC 61000-4-2:2008, *Compatibilité électromagnétique (CEM) – Partie 4-2: Techniques d'essai et de mesure – Essai d'immunité aux décharges électrostatiques*

IEC 61000-4-3:2006, *Compatibilité électromagnétique (CEM) – Partie 4-3: Techniques d'essai et de mesure – Essai d'immunité aux champs électromagnétiques rayonnés aux fréquences radioélectriques*

IEC 61000-4-3:2006/AMD1:2007

IEC 61000-4-3:2006/AMD2:2010

IEC 61000-4-4:2012, *Compatibilité électromagnétique (CEM) – Partie 4-4: Techniques d'essai et de mesure – Essai d'immunité aux transitoires électriques rapides en salves*

IEC 61000-4-5:2014, *Compatibilité électromagnétique (CEM) – Partie 4-5: Techniques d'essai et de mesure – Essai d'immunité aux ondes de choc*

IEC 61000-4-6:2013, *Compatibilité électromagnétique (CEM) – Partie 4-6: Techniques d'essai et de mesure – Immunité aux perturbations conduites, induites par les champs radioélectriques*

IEC 61000-4-8:2009, *Compatibilité électromagnétique (CEM) – Partie 4-8: Techniques d'essai et de mesure – Essai d'immunité au champ magnétique à la fréquence du réseau*

IEC 61000-4-11:2004, *Compatibilité électromagnétique (CEM) – Partie 4-11: Techniques d'essai et de mesure – Essais d'immunité aux creux de tension, coupures brèves et variations de tension*

IEC 61000-4-20:2010, *Compatibilité électromagnétique (CEM) – Partie 4-20: Techniques d'essai et de mesure – Essais d'émission et d'immunité dans les guides d'onde TEM*

IEC 61000-4-21:2011, *Compatibilité électromagnétique (CEM) – Partie 4-21: Techniques d'essai et de mesure – Méthodes d'essai en chambre réverbérante*

IEC 61000-4-22:2010, *Compatibilité électromagnétique (CEM) – Partie 4-22: Techniques d'essai et de mesure – Mesures de l'immunité et des émissions rayonnées dans des enceintes complètement anéchoïques (FAR)*

IEC 61000-4-34:2005, *Compatibilité électromagnétique (CEM) – Partie 4-34: Techniques d'essai et de mesure – Essais d'immunité aux creux de tension, coupures brèves et variations de tension pour matériel ayant un courant d'alimentation de plus de 16 A par phase*

IEC 61000-4-34:2005/AMD1:2009