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BASIC EMC PUBLICATION

**Electromagnetic compatibility (EMC) –
Part 6-4: Generic standards – Emission standard for industrial environments**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –Part 6-4: Generic standards –
Emission standard for 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
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- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the 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 61000-6-4 has been prepared by CISPR subcommittee H: Limits for the protection of radio services.

This third edition cancels and replaces the second edition published in 2006 and Amendment 1:2010. This edition constitutes a technical revision.

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

- a) possible future requirements on DC ports;
- b) possible future radiated polarity specific emission limits within a FAR;
- c) the definition of which average detector is used for emission measurements at frequencies above 1GHz and that results using a peak detector are acceptable for all measurements;
- d) the definition of different EUT test arrangements.

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

FDIS	Report on voting
CIS/H/339A/FDIS	CIS/H/350/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

It forms Part 6-4 of the IEC 61000 series of standards. It has the status of a basic EMC publication in accordance with IEC Guide 107.

A list of all parts in the CISPR 61000 series, published under the general title *Electromagnetic compatibility*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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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 (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 technical reports/specifications, 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 6-4: Generic standards – Emission standard for industrial environments

1 ~~Scope and object~~

~~This part of IEC 61000 for EMC emission requirements applies to electrical and electronic apparatus intended for use in industrial environments as described below.~~

~~Emission requirements in the frequency range 0 Hz to 400 GHz are covered. No measurement needs to be performed at frequencies where no requirement is specified.~~

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

~~This standard applies to a apparatus intended to be connected to a power network supplied from a high or medium voltage transformer dedicated to the supply of an installation feeding manufacturing or similar plant, and intended to operate in or in proximity to industrial locations, as described below. This standard applies also to apparatus, which is battery operated and intended to be used in industrial locations.~~

~~The environments encompassed by this standard are industrial, both indoor and outdoor.~~

~~Industrial locations are in addition characterised by the existence of one or more of the following examples:~~

- ~~— industrial, scientific and medical (ISM)¹⁾ apparatus;~~
- ~~— heavy inductive or capacitive loads that are frequently switched;~~
- ~~— high currents and associated magnetic fields.~~

~~The object of this standard is to define the emission test requirements for apparatus defined in the scope in relation to continuous and transient, conducted and radiated disturbances.~~

~~The emission requirements have been selected so as to ensure that disturbances generated by apparatus operating normally in industrial locations do not exceed a level that could prevent other apparatus from operating as intended. Fault conditions of apparatus are not taken into account. 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 requirements represent essential electromagnetic compatibility emission requirements.~~

This part of IEC 61000 for emission requirements applies to electrical and electronic equipment intended for use within the environment existing at industrial (see 3.1.12) locations.

This document does not apply to equipment that fall within the scope of IEC 61000-6-3.

The environments encompassed by this document cover both indoor and outdoor locations.

¹⁾ As defined in CISPR 11.

Emission requirements in the frequency range 9 kHz to 400 GHz are covered in this document and have been selected to provide an adequate level of protection of radio reception in the defined electromagnetic environment. No measurement needs to be performed at frequencies where no requirement is specified. These requirements are considered essential to provide an adequate level of protection to radio services.

Not all disturbance phenomena have been included for testing purposes but only those considered relevant for the equipment intended to operate within the environments included within this document.

Requirements are specified for each port considered.

This generic EMC emission standard is to be used where no applicable product or product-family EMC emission standard is available.

NOTE 1 Safety considerations are not covered by this document.

NOTE 2 In special cases, situations will arise where the levels specified in this document will not offer adequate protection; for example where a sensitive receiver is used in close proximity to an ~~apparatus~~ equipment. In these instances, special mitigation measures may have to be employed.

NOTE 3 Disturbances generated in fault conditions of equipment are not covered by this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 – Chapter 161: Electromagnetic compatibility*

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

CISPR 11:2015, *Industrial, scientific and medical ~~(ISM) radio-frequency~~ equipment – ~~Electro-magnetic~~ Radio-frequency disturbance characteristics – Limits and methods of measurement*
CISPR 11:2015/AMD1:2016

CISPR 14-1:2016, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 16-1-1:2015, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

CISPR 16-1-2:~~2003~~ 2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – ~~Ancillary equipment~~ Coupling devices for conducted disturbances ~~s~~ measurements*

CISPR 16-1-4:2010, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements*

CISPR 16-1-4:2010/AMD1:2012

CISPR 16-1-4:2010/AMD2:2017

CISPR 16-1-6:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-6: Radio disturbance and immunity measuring apparatus – EMC antenna calibration*

CISPR 16-1-6:2014/AMD1:2017

CISPR 16-2-1:~~2003~~ 2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*

CISPR 16-2-1:2014/AMD1:2017

CISPR 16-2-3:2016, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements*

CISPR 16-4-2:2011, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – ~~Uncertainty in EMC measurements~~ Measurement instrumentation uncertainty*

CISPR 16-4-2:2011/AMD1:2014

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

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

INTERNATIONAL STANDARD

NORME INTERNATIONALE



BASIC EMC PUBLICATION

PUBLICATION FONDAMENTALE EN CEM

**Electromagnetic compatibility (EMC) –
Part 6-4: Generic standards – Emission standard for industrial environments**

**Compatibilité électromagnétique (CEM) –
Partie 6-4: Normes génériques – Norme sur l'émission pour les environnements
industriels**

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CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

COMPATIBILITÉ ÉLECTROMAGNÉTIQUE (CEM) –

Partie 6-4: Normes génériques – Norme sur l'émission pour les environnements industriels

AVANT-PROPOS

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La Norme internationale IEC 61000-6-4 a été établie par le sous-comité H du CISPR: Limites pour la protection des services radioélectriques.

Cette troisième édition annule et remplace la seconde édition parue en 2016 et son Amendement 1:2010. Cette édition constitue une révision technique.

La présente édition inclut les modifications techniques suivantes par rapport à l'édition précédente:

- a) les exigences ultérieures possibles sur les accès en courant continu;
- b) les limites futures possibles d'émissions rayonnées spécifiques à la polarité dans une FAR;

- c) la définition du type de détecteur de valeur moyenne est utilisée pour les mesures des émissions à des fréquences supérieures à 1GHz et les résultats obtenus à l'aide d'un détecteur de crête sont acceptables pour tous les mesurages;
- d) la définition des différentes dispositions d'essais de l'EUT.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
CIS/H/339A/FDIS	CIS/H/350/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.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Il forme la Partie 6-4 de la série des normes IEC 61000. Il a le statut de publication fondamentale en CEM conformément au Guide 107 de l'IEC.

Une liste de toutes les parties de la série des normes CISPR IEC 61000 est publiée sous le titre général *Compatibilité électromagnétique*, est visible sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document 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 au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

IMPORTANT – Le logo "colour inside" qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

INTRODUCTION

L'IEC 61000 est publiée en 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 de la responsabilité 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 parties qui sont publiées soit comme Normes internationales, soit comme rapports techniques/spécifications techniques, certaines d'entre elles ayant déjà été publiées comme sections. D'autres seront publiées avec le numéro de la partie suivi d'un tiret et d'un second chiffre identifiant la subdivision (exemple: IEC 61000-6-1).

COMPATIBILITÉ ÉLECTROMAGNÉTIQUE (CEM) –

Partie 6-4: Normes génériques – Norme sur l'émission pour les environnements industriels

1 Domaine d'application

La présente partie de l'IEC 61000 concernant les exigences d'émissions s'applique aux appareils électriques et électroniques destinés à être utilisés dans des environnements existants (voir 3.1.12) sur des sites industriels.

Le présent document ne s'applique pas aux appareils entrant dans le domaine d'application de l'IEC 61000-6-3.

Les environnements couverts par le présent document sont les sites intérieurs et extérieurs.

Les exigences en matière d'émission dans la plage de fréquences comprises entre 9 kHz et 400 GHz sont couvertes dans le présent document et ont été choisies de manière à assurer un niveau adéquat de protection de la réception radioélectrique dans l'environnement électromagnétique défini. Il n'est pas nécessaire de réaliser des mesures aux fréquences pour lesquelles aucune exigence n'a été spécifiée. Ces exigences sont considérées comme étant essentielles à l'obtention d'un niveau adéquat de protection des services radioélectriques.

Tous les phénomènes perturbateurs n'ont pas été inclus pour les besoins de l'essai. Seuls l'ont été ceux considérés comme pertinents pour l'équipement destiné à fonctionner dans l'environnement couvert par le présent document.

Les exigences sont spécifiées pour chacun des accès considérés.

La présente Norme d'émission CEM générique doit être utilisée lorsqu'aucune norme d'émission CEM spécifique à un produit ou à une famille de produits n'est disponible.

NOTE 1 Le présent document ne traite pas des aspects de sécurité.

NOTE 2 Dans des cas particuliers, des situations apparaissent dans lesquelles les niveaux spécifiés dans le présent document ne peuvent offrir le niveau de protection adéquat (lorsqu'un récepteur sensible est utilisé à très grande proximité d'un appareil, par exemple). Dans de tels cas, des mesures particulières d'atténuation peuvent devoir être employées.

NOTE 3 Les perturbations générées dans les conditions de défaut de l'équipement ne sont pas couvertes par le présent document.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. 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 Electrotechnique International – Chapitre 161 – Compatibilité électromagnétique*

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*

CISPR 11:2015, *Appareils industriels, scientifiques et médicaux – Caractéristiques de perturbations radioélectriques – Limites et méthodes de mesure*
CISPR 11:2015/AMD 1:2016

CISPR 14-1:2016, *Compatibilité électromagnétique – Exigences pour les appareils électrodomestiques, outillages électriques et appareils analogues – Partie 1: Émission*

CISPR 16-1-1:2015, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 1-1: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Appareils de mesure*

CISPR 16-1-2:2014, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 1-2: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Dispositifs de couplage pour la mesure des perturbations conduites*

CISPR 16-1-4:2010, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 1-4: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Antennes et emplacements d'essai pour les mesures des perturbations rayonnées*

CISPR 16-1-4:2010/AMD1:2012

CISPR 16-1-4:2010/AMD2:2017

CISPR 16-1-6:2014, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 1-6: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Étalonnage des antennes CEM*

CISPR 16-1-6:2014/AMD1:2017

CISPR 16-2-1:2014, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 2-1: Méthodes de mesure des perturbations et de l'immunité – Mesures des perturbations conduites*

CISPR 16-2-1:2014/AMD1:2017

CISPR 16-2-3:2016, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 2-3: Méthodes de mesure des perturbations et de l'immunité – Mesurages des perturbations rayonnées*

CISPR 16-4-2:2011, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 4-2: Incertitudes, statistiques et modélisation des limites – Incertitudes de mesure de l'instrumentation*

CISPR 16-4-2:2011/AMD 1:2014

CISPR 32:2015, *Compatibilité électromagnétique des équipements multimédia – Exigences d'émission*