IEC 61000-6-3

Edition 4.0 2026-04

Corrected version
2026-11

INTERNATIONAL STANDARD

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

HORIZONTAL PUBLICATION

GENERIC EMC STANDARD

Electromagnetic compatibility (EMC) -
Part 6-3: Generic standards - Emission standard for equipment in residential locations

ICS 33.100.10

ISBN 978-2-8327-1165-1

CONTENTS

FOREWORD 5
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms, definitions and abbreviated terms 10
3.1 Terms and definitions 10
3.2 Abbreviated terms 14
4 Classification of equipment 16
5 Measurements and conditions during testing 16
6 Documentation for the user 17
7 Applicability 17
8 Requirements 18
9 Measurement uncertainty 18
10 Compliance with this document 18
11 Emission test details 18
11.1 General 18
11.2 Setting test frequency ranges 24
11.3 Additional requirements for devices with a radio function 25
Annex A (informative) Classification of equipment and mapping to the immunity standards 27
Annex B (normative) Testing of DC powered systems 28
Annex C (informative) Rationale for alternative requirements at the DC power port 30
C.1 General 30
C.2 Necessity of alternative test methods in generic standards 30
C.3 Limit justification in table clause 5.2 30
C.3.1 Proportional relation approach 30
C.3.2 Current-to-voltage conversion approach 31
C.3.3 Setting the final limit 32
Annex D (informative) Alternative average detectors 33
D.1 General 33
D.2 Changes implemented in CISPR 16-1-1:2019 33
D.3 Conclusion 34
Annex E (informative) Background information on the normative limits in the frequency range 9 kHz to 150 kHz 35
E.1 Derivation of the normative limits 35
E.2 Radio protection analysis 37
E.2.1 General 37
E.2.2 Radio protection analysis for common mode disturbance injections 37
E.2.3 Radio protection analysis for differential mode disturbance injections 44
Annex F (informative) Spectral density of non-intentional emissions (NIE) in the frequency range 9 kHz to 150 kHz 51
F.1 Introduction of Integral Voltage Levels (IVL) for the limitation of the spectral density of NIE 51
F.2 Recommended maximum IVL for NIE 52
F.3 Rationale for the recommendation of additional limitations on the spectral density of non-intentional emissions 52

F.3.1 Rationale 52
F.3.2 Relationship between MCE performances and Integral Voltage Levels 53
Annex G (informative) Rationale for radiated magnetic field emissions requirements 58
Annex H (informative) Possible limits for radiated magnetic field emissions for EUT with the potential to produce disturbing electromagnetic fields 59
Annex I (informative) The conversion factor for magnetic emissions limits below 30 MHz 61
I.1 General 61
I.2 Considerations 63
I.3 Summary 66
Annex J (informative) Magnetic field emission limit correction based upon power 68
J.1 General 68
J.2 Limits 68
Bibliography 69

Figure 1 – Example of ports 12
Figure 2 – Basic WPT configuration 14
Figure 3 – Illustration of F_{TX} and F_X 26
Figure 4 – Excluded band 26
Figure C.1 – Equivalent circuit of test set up for measurement of disturbance voltages 31
Figure D.1 – Typical filter responses 33
Figure E.1 – Example of a V-AMN 36
Figure E.2 – Worst case common mode radiator for residential locations 37
Figure E.3 – Simulation results for the coupling factor for both field types 39
Figure E.4 – Worst case disturbance field strength at 10 m distance 40
Figure E.5 – Proposed field strengths limits compared to protection needs of radio applications 44
Figure E.6 – Worst-case differential mode radiator for residential locations 45
Figure E.7 – Simulation results for the coupling factor for differently sized loops 46
Figure E.8 – Properties of a V-AMN 47
Figure E.9 – Proposed field strengths limits compared to protection needs of radio applications 50
Figure F.1 – Example of a multi-carrier MCE spectrum 53
Figure F.2 – Laboratory test setup for the evaluation of the relationship between MCE performances and Integral Voltage Levels 54
Figure F.3 – Example of broadband noise produced by the NIE source used in the test 55
Figure F.4 – Spectral noise from device A, lower disturbing effect 56
Figure F.5 – Spectral noise from device B, higher disturbing effect 56
Figure I.1 – Example measurement of a real EUT at measurement distances (d) of 3 m and 10 m 62
Figure I.2 – Qualitative magnetic field lines in xz-plane of a horizontal loop and vertical dipole over infinite perfectly conducting ground 62
Figure I.3 – The six fundamental field source configurations 63
Figure I.4 – Absolute field strengths generated by 60 cm loops in all orientations at different distances 64

Figure I.5 – Absolute field strengths generated by 80 cm dipoles in all orientations at different distances 64
Figure I.6 – Conversion factors for dominant coupling 65
Figure I.7 – Derivation of the final conversion factor using dominant coupling for EUTs described in I.1 66
Figure I.8 – Conversion factor from a distance of 3 m to 10 m, in the frequency range 150 kHz to 30 MHz ($CF_{3\ m\ to\ 10\ m}$) 67

Table 1 – Test arrangements of EUT 17
Table 2 – Requirements for radiated electric field emissions, enclosure port 20
Table 3 – Requirements for radiated magnetic field emissions, enclosure port 21
Table 4 – Requirements for conducted emissions, low-voltage AC mains port 22
Table 5 – Requirements for conducted emissions, DC power port 23
Table 6 – Requirements for conducted emissions, other wired ports 24
Table 7 – Required highest frequency for radiated electric field emission measurements for EUT containing at least one active radio transmitter that is transmitting 25
Table 8 – Required highest frequency for radiated electric field emission measurements for EUT not containing at least one active radio transmitter that is transmitting 25
Table A.1 – Examples of emission and immunity requirements against product type and intended use 27
Table B.1 – Conducted emission requirements of DC powered equipment 28
Table B.2 – Conditional requirements for the start frequency of test at DC power ports for tests defined in table clause B1.4 to B1.7 29
Table C.1 – DC power port, terminal disturbance voltage limits for class B GCPCs, measured on a test site, proportion relation approach 31
Table C.2 – DC power port, terminal disturbance voltage limits for class B GCPCs, measured on a test site, current-to-voltage conversion approach 32
Table D.1 – Updated tolerances 33
Table E.1 – Simulation results for the coupling factor for both field types 38
Table E.2 – Worst case disturbance field strength at 10 m distance 40
Table E.3 – Probability factors and respective rationales 41
Table E.4 – Calculations of the required field strength limit 43
Table E.5 – Calculations of the required field strength limit 46
Table E.6 – Conversion from voltage limit to current limit for injection 47
Table E.7 – Disturbance field strength calculation for 20 cm and 50 cm loops 48
Table E.8 – Disturbance field strength calculation for 100 cm loop 49
Table F.1 – Recommended maximum Integral Voltage Levels 52
Table F.2 – Recommended maximum Integral Voltage Levels for equipment covered by footnote [a] to Table 4 52
Table F.3 – Correlation between MCE's noise assessment and Integral Voltage Levels computed in the MCE's operating frequency ranges 55
Table F.4 – Correlation between IVLs and MCE communication performance 56
Table H.1 – Proposed limits for radiated magnetic field emissions, enclosure port 60
Table I.1 – Conversion factor from a distance of 3 m to 10 m in the frequency range 150 kHz to 30 MHz ($CF_{3\ m\ to\ 10\ m}$) 67

Table J.1 – Proposed reduction to the limits 68

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential locations

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.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61000-6-3 has been prepared by CISPR subcommittee H: Limits for the protection of radio services. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2020. This edition constitutes a technical revision.

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

a) the addition of magnetic field emission requirements, including the measurement of WPT function;
b) the extension of low-voltage AC mains power requirements to cover the range 9 kHz to 150 kHz;
c) products with a radio function have been added to the scope;

d) limits in a FAR for rack mounted equipment have been added.

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

Draft	Report on voting
CIS/H/547/FDIS	CIS/H/557/RVD

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

The language used for the development of this International Standard is English.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

The content of the corrigendum 1 (2026-11) has been included in this copy.

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, technical reports or technical specifications. These are 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).

1 Scope

This generic EMC emission standard is applicable only if no relevant dedicated product or product family EMC emission standard has been published.

This part of IEC 61000 for emission requirements applies to electrical and electronic equipment intended for use at residential (see 3.1.21) locations. This part of IEC 61000 also applies to electrical and electronic equipment intended for use at other locations that do not fall within the scope of IEC 61000-6-8 or IEC 61000-6-4.

The intention is that all equipment used in the residential, commercial and light-industrial locations are covered by IEC 61000-6-3 or IEC 61000-6-8. If there is any doubt the requirements in IEC 61000-6-3 apply.

Equipment that have a radio function (3.1.20) are included in the scope of this document. However, the emission requirements in this document are not intended to be applicable to the intentional transmissions from these radio transmitters, their harmonics and their out of band emissions.

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

The objectives of this document are:

a) to establish requirements that provide an adequate level of protection of radio reception in the frequency range 9 kHz to 400 GHz;

b) to establish requirements that provide an adequate level of protection against conducted and radiated electromagnetic disturbances emitted by equipment in the scope of this document;

c) to support the reproducibility of measurement and the repeatability of results.

NOTE 1 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 equipment. In these instances, special mitigation measures can be employed.

NOTE 2 Disturbances generated in fault conditions of equipment are not covered by this document.

NOTE 3 The requirements in this document are more stringent or equivalent to the requirements specified in IEC 61000-6-4 and IEC 61000-6-8.

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 61000-3-2:2018, *Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*
IEC 61000-3-2:2018/AMD1:2020
IEC 61000-3-2:2018/AMD2:2024

IEC 61000-3-3:2013, *Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*
IEC 61000-3-3:2013/AMD1:2017
IEC 61000-3-3:2013/AMD2:2021

IEC 61000-3-11:2017, *Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-3-12:2011, *Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*
IEC 61000-3-12:2011/AMD1:2021

IEC 61000-4-20:2022, *Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

CISPR 14-1:2020, *Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission*

CISPR 16-1-1:2019, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus*

CISPR 16-1-1:2010, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus*[1]
CISPR 16-1-1:2010/AMD1:2010
CISPR 16-1-1:2010/AMD2:2014

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements*
CISPR 16-1-2:2014/AMD1:2017

CISPR 16-1-4:2019, *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 16-1-4:2019/AMD1:2020
CISPR 16-1-4:2019/AMD2:2023

CISPR 16-1-5:2014, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-5: Radio disturbance and immunity measuring apparatus - Antenna calibration sites and reference test sites for 5 MHz to 18 GHz*
CISPR 16-1-5:2014/AMD1:2016

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 16-1-6:2014/AMD2:2022

CISPR 16-2-1:2014, *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

---

1 This version has been superseded.

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 16-2-3:2016/AMD1:2019
CISPR 16-2-3:2016/AMD2:2023

CISPR 16-4-2:2011, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit modelling - Measurement instrumentation uncertainty*
CISPR 16-4-2:2011/AMD1:2014
CISPR 16-4-2:2011/AMD2:2018

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment - Emission requirements*
CISPR 32:2015/AMD1:2019

Bibliography

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

IEC 60050-601:1985, *International Electrotechnical Vocabulary (IEV) - Part 601: Generation, transmission and distribution of electricity - General*

IEC 61000-2-2:2002, *Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*
IEC 61000-2-2:2002/AMD1:2017
IEC 61000-2-2:2002/AMD2:2018

IEC 61000-6-1, *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments*

IEC 61000-6-4, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments*

IEC 61000-6-8, *Electromagnetic compatibility (EMC) - Part 6-8: Generic standards - Emission standard for professional equipment in commercial and light-industrial locations*

IEC 61158-1:2023, *Industrial communication networks – Fieldbus specifications – Part 1: Overview and guidance for the IEC 61158 and IEC 61784 series*

IEC 61800-3:2022*, Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods for PDS and machine tools*

IEC 62040-2:2016*, Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements*

IEC PAS 62825:2013, *Methods of measurement and limits for radiated disturbances from plasma display panel TVs in the frequency range 150 kHz to 30 MHz*[3]

IEC TS 62578:2015*, Power electronics systems and equipment - Operation conditions and characteristics of active infeed converter (AIC) applications including design recommendations for their emission values below 150 kHz*

IEC Guide 107, *Electromagnetic compatibility - Guide to the drafting of electromagnetic compatibility publications*

CISPR Guide, *Guidance for users of the CISPR Standards*
(available at
https://assets.iec.ch/further_informations/1298/CISPR%20Guide%202024.pdf?1119T09
[viewed 2025-09-16])

CISPR 11:2024, *Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement*

[3] This publication was withdrawn.

CISPR 14-2, *Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard*

CISPR 15:2018, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*
CISPR 15:2018/AMD1:2024

CISPR 16 (all parts), *Specification for radio disturbance and immunity measuring apparatus and methods*

CISPR TR 16-4-4:2007, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-4: Uncertainties, statistics and limit modelling - Statistics of complaints and a model for the calculation of limits for the protection of radio services*
CISPR TR 16-4-4:2007/AMD1:2017
CISPR TR 16-4-4:2007/AMD2:2020

CISPR TR 16-4-5, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-5: Uncertainties, statistics and limit modelling - Conditions for the use of alternative test methods*

CISPR 35, *Electromagnetic compatibility of multimedia equipment - Immunity requirements*

CISPR/SC H, Radio Services Database
(available at https://iectest.iec.ch/emc/radio-services-database [viewed 2025-09-16])

CENELEC EN 50065-2-3:2003, *Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 2-3: Immunity requirements for mains communications equipment and systems operating in the range of frequencies 3 kHz to 95 kHz and intended for use by electricity suppliers and distributors*
CENELEC EN 50065-2-3:2003/AMD1:2005

IEEE Std 1284, *Standard Signaling Method for a Bidirectional Parallel Peripheral Interface for Personal Computers*

IEEE Std 1394, *IEEE Standard for a High-Performance Serial Bus*

ITU Radio Regulations Volume 1, Edition of 2020
(available at https://search.itu.int/history/HistoryDigitalCollectionDocLibrary/1.44.48.en.101.pdf, [viewed 2025-09-16])

ITU-R SM.1541-6:2015, *Unwanted emissions in the out-of-band domain*

ITU-T Recommendation V.11, *Data communication over the telephone network - Interfaces and voiceband modems - Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s*

ITU-T Recommendation V.28, *Data communication over the telephone network - Electrical characteristics for unbalanced double-current interchange circuits*

———————