BS EN 61000-4-5:2014+A1:2017



BSI Standards Publication

Electromagnetic compatibility (EMC)

Part 4-5: Testing and measurement techniques – Surge immunity test

bsi.

National foreword

This British Standard is the UK implementation of EN 61000-4-5:2014 +A1:2017. It is identical to IEC 61000-4-5:2014, incorporating amendment 1:2017. It supersedes BS EN 61000-4-5:2014 which remains current until 8 September 2020.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by [A1] 〈A1〉.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61000-4-5:2014 +A1

ICS 33.100.20

English Version

Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test (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 61000-4-5:2014)

Elektromagnetische Verträglichkeit (EMV) — Teil 4-5: Prüf- und Messverfahren — Prüfung der Störfestigkeit gegen Stoßspannungen (IEC 61000-4-5:2014)

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European foreword

The text of document 77B/711/FDIS, future edition 3 of IEC 61000-4-5, prepared by SC 77B "High frequency phenomena", of IEC/TC 77 "Electromagnetic compatibility" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61000-4-5:2014.

The following dates are fixed:

— latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-03-19
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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60060-2	NOTE Harmonized as EN 60060-2.
IEC 60364-4-44	NOTE Harmonized as HD 60364-4-442 and HD 60364-4-444.
IEC 60664-1	NOTE Harmonized as EN 60664-1.
IEC 60664-4-4	NOTE Harmonized as EN 61000-4-4.
IEC 61643	NOTE Harmonized as EN 61643 series and in CLC/TS 61643 series (partly modified) .
IEC 61643-11	NOTE Harmonized as EN 61643-11.
IEC 61643-12	NOTE Harmonized as CLC/TS 61643-12.
IEC 61643-21:2000	NOTE Harmonized as 61643-21:2000 (not modified).
+ A1:2008	+ A1:2009 (modified)
+ A2:2012	+ A2:2013 (not modified)
IEC 62305-1	NOTE Harmonized as EN 62305-1.

Foreword to amendment A1

The text of document 77B/762/CDV, future IEC 61000-4-5:2014/A1, prepared by SC 77B "High frequency phenomena" of IEC/TC 77 "Electromagnetic compatibility" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61000-4-5:2014/A1:2017.

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- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-06-08
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-09-08

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60050	Series	International Electrotechnical Vocabulary (IEV)	-	-

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FOREWORD

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International Standard IEC 61000-4-5 has been prepared by subcommittee 77B: High frequency phenomena, of IEC technical Committee 77: Electromagnetic compatibility.

It forms Part 4-5 of IEC 61000. It has the status of a basic EMC publication in accordance with IEC Guide 107.

This third edition constitutes a technical revision.

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

a) new Annex E on mathematical modelling of surge waveforms;

b) new Annex F on measurement uncertainty;

c) new Annex G on method of calibration of impulse measuring systems;

d) new Annex H on coupling/decoupling surges to lines rated above 200 A;

e) moreover while surge test for ports connected to outside telecommunication lines was addressed in 6.2 of the second edition (IEC 61000-4-5:2005), in this third edition (IEC 61000-4-5:2014) the normative Annex A is fully dedicated to this topic. In particular it gives the specifications of the 10/700 µs combined wave generator.

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 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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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).

This part is an International Standard which gives immunity requirements and test procedures related to surge voltages and surge currents.

A1 INTRODUCTION to the amendment

Rationale:

The method for testing DC products in the current revision of IEC61000-4-5 is causing many field related problems for test labs and manufacturers. Many products will not power up through the power CDN in the standard and in some cases may be damaged by the inductance that is necessary to apply the surge (see 77B/734/DC for further information).

The DC./DC converter problem is related to the switching of the converter which produces a voltage drop at the decoupling inductors on one hand and oscillations produced by the EUT impedance in combination with the source on the other hand. Measurements were performed using different brands of CDNs with a device known to show that problem as an EUT. The result shows different oscillations and signal forms of the voltage at the EUT for different CDNs. According to the outcome, the use of a CDN with a higher current rating (i.e. smaller decoupling inductivity) can solve the problem. At the meeting of SC77B/MT12 in Akishima, Japan on August 26, 2016, it was decided to add a statement into 7.3 allowing surge tests with higher current rated CDNs and to add a new Annex I to explain the problem in detail. A1

Electromagnetic compatibility (EMC) —

Part 4-5: Testing and measurement techniques – Surge immunity test

1 Scope and object

This part of IEC 61000 relates to the immunity requirements, test methods, and range of recommended test levels for equipment with regard to unidirectional surges caused by overvoltages from switching and lightning transients. Several test levels are defined which relate to different environment and installation conditions. These requirements are developed for and are applicable to electrical and electronic equipment.

The object of this standard is to establish a common reference for evaluating the immunity of electrical and electronic equipment when subjected to surges. The test method documented in this part of IEC 61000 describes a consistent method to assess the immunity of an equipment or system against a defined phenomenon.

NOTE As described in IEC Guide 107, this is a basic EMC publication for use by product committees of the IEC. As also stated in Guide 107, the IEC product committees are responsible for determining whether this immunity test standard is applied or not, and if applied, they are responsible for determining the appropriate test levels and performance criteria. TC 77 and its sub-committees are prepared to co-operate with product committees in the evaluation of the value of particular immunity test levels for their products.

This standard defines:

— a range of test levels;

— test equipment;

— test setups;

— test procedures.

The task of the described laboratory test is to find the reaction of the equipment under test (EUT) under specified operational conditions to surge voltages caused by switching and lightning effects.

It is not intended to test the capability of the EUT's insulation to withstand high-voltage stress. Direct injections of lightning currents, i.e. direct lightning strikes, are not considered in this standard.

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 (all parts), *International Electrotechnical Vocabulary (IEV) (available at www.electropedia.org)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050 as well as the following apply.