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BSI Standards Publication

Uninterruptible power systems (UPS)

Part 2: Electromagnetic compatibility (EMC) requirements

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National foreword

This British Standard is the UK implementation of EN IEC 62040-2:2018. It is identical to IEC 62040-2:2016, including Interpretation Sheet 1:2018. It supersedes BS EN 62040-2:2006, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/22, Power electronics.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

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

Alimentations sans interruption (ASI) - Partie 2: Exigences
pour la compatibilité électromagnétique (CEM)
(IEC 62040-2:2016)

Unterbrechungsfreie Stromversorgungssysteme (USV) -
Teil 2: Anforderungen an die elektromagnetische
Verträglichkeit (EMV)
(IEC 62040-2:2016)

This European Standard was approved by CENELEC on 2018-07-09. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

The text of document 22H/232/FDIS, future edition 3 of IEC 62040-2, prepared by SC 22H "Uninterruptible power systems (UPS)" of IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62040-2:2018.

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) 2019-04-09
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-07-09

This document supersedes EN 62040-2:2006.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Endorsement notice

The text of the International Standard IEC 62040-2:2016 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61000-4 series	NOTE	Harmonized as EN 61000-4 series.
IEC 61204 series	NOTE	Harmonized as EN 61204 series.
CISPR 15:2013	NOTE	Harmonized as EN 55015:2013 (not modified).
CISPR 15:2013/A1:2015	NOTE	Harmonized as EN 55015:2013/A1:2015 (not modified).

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(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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	EN 61000-2-2	2002
IEC 61000-3-2	2014	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)	EN 61000-3-2	2014
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	EN 61000-3-12	2011
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2012
IEC 61000-4-5	2014	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2014
IEC 61000-4-6	2013	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2014

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IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	2010
IEC 62040-3	2011	Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements	EN 62040-3	2011
CISPR 11 (mod)	2015	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	2016
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	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	EN 55016-1-2	2014
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	EN 55016-1-4	2010
+A1	2012		+A1	2012
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	EN 55016-2-1	2014
CISPR 16-2-3	2010	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements	EN 55016-2-3 +AC	2010 2013
+A1	2010		+A1	2010
+A2	2014		+A2	2014
CISPR 22 (mod)	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022 +AC	2010 2011

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 62040-2
Edition 3.0 2016-11

UNINTERRUPTIBLE POWER SYSTEMS (UPS) –

Part 2: Electromagnetic compatibility (EMC) requirements

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by subcommittee 22H: Uninterruptible power systems (UPS), of IEC technical committee 22: Power electronic systems and equipment.

The text of this interpretation sheet is based on the following documents:

FDIS	Report on voting
22H/232/FDIS	22H/236/RVD

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

Interpretation of 5.3.2.4, Limits at the network ports

Introduction

Sub-clause 5.3.2.4 states that the **network port** limits applicable to **UPS** of **category C1, C2** and **C3** are located in Table 1, Table 2 and Annex C.

It was not clear whether 5.3.2.4 applies to **network ports** that originate and terminate within the **enclosure port** of the **UPS** (i.e. to **network ports** connected exclusively to circuits or devices forming an integral part of the **UPS**).

Interpretation

The **network port** limits in Table 1, Table 2 and Annex C apply only to **network ports** for which connection to circuits or devices external to the **enclosure port** of the **UPS** is allowed. This includes, without limitation, connection to PSTN, ISDN, xDSL and Ethernet networks. The limits in Table 1, Table 2 and Annex C do not apply to **network ports** that originate and terminate within the **enclosure port** of the **UPS** (i.e. to **network ports** connected exclusively to circuits or devices forming an integral part of the **UPS**).

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

UNINTERRUPTIBLE POWER SYSTEMS (UPS) –

Part 2: Electromagnetic compatibility (EMC) requirements

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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International Standard IEC 62040-2 has been prepared by subcommittee 22H: Uninterruptible power systems (UPS), of IEC technical committee 22: Power electronic systems and equipment.

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) the inclusion of **network port** limits in Table 1, Table 2 and Annex C for the sake of consistency with other standards;
- b) a change of quasi-peak limit for **category C3 UPS** in Table 2 for the sake of consistency with other standards;
- c) a clarification in Table 4 about the performance criteria for immunity tests;
- d) a revision of some test configurations in Annex A.

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

FDIS	Report on voting
22H/210/FDIS	22H/212/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.

In this document, the following print types are used:

- requirements proper and normative annexes: in roman type;
- compliance statements and test specifications: *in italic type*;
- notes and other informative matter: in smaller roman type;
- normative conditions within tables: in smaller roman type;
- terms that are defined in Clause 3: **bold**.

A list of all parts in the IEC 62040 series, published under the general title *Uninterruptible power systems (UPS)*, 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

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

The contents of the Interpretation sheet of June 2018 have been included in this copy.

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.

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UNINTERRUPTIBLE POWER SYSTEMS (UPS) –

Part 2: Electromagnetic compatibility (EMC) requirements

1 Scope

This part of IEC 62040 is a type test product standard for electromagnetic compatibility (EMC) and applies to movable, stationary, fixed or built-in, pluggable and permanently connected UPS for use in low-voltage distribution systems with an environment being either residential, commercial, light industrial or industrial, which deliver output voltage with **port** voltages not exceeding 1 500 V DC or 1 000 V AC and which include an energy storage device.

Subject to installing, operating and maintaining the UPS in the manner prescribed by the manufacturer, this standard defines emission limits, immunity levels, test methods and performance criteria for a complete UPS to comply with the essential EMC requirements necessary to avoid the UPS interfering with other apparatus, e.g. radio receivers, and to avoid the UPS being affected by external phenomena.

This standard does not address EMC phenomena produced by loads connected to the UPS or situations created by any apparatus external to the UPS other than as described in the immunity requirements.

This standard is harmonized with applicable IEC standards for electromagnetic emission limits and immunity levels. It contains additional requirements applicable to UPS.

This standard does not cover:

- a) low-voltage DC power supply devices covered by IEC 61204 standards;
- b) systems wherein the output voltage is derived from a rotating machine.

NOTE 1 UPS generally connect to their energy storage device through a DC link. A chemical battery is an example of an energy storage device. Alternative devices can be suitable, and as such, where "battery" appears in the text of this standard, this can be understood as "energy storage device".

NOTE 2 This type test-based product standard allows EMC conformity assessment of UPS included in one of categories C1, C2 and C3 before placing them on the market. It also provides guidance for conformity assessment of UPS included in category C4 (see Clause 4).

NOTE 3 The differing test conditions necessary to encompass the range of physical sizes and power ratings of a complete UPS are taken into account. A complete UPS can consist of one or more interconnected units. For UPS configuration details refer to IEC 62040-3:2011, Annex A.

NOTE 4 The requirements have been selected so as to permit an adequate level of EMC for UPS installed in residential, commercial, light industrial and industrial locations. The requirements are not always sufficient to cover situations with low probability of occurrence including UPS faults.

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