

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Safety of transformers, reactors, power supply units and combinations thereof –
EMC requirements**

**Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des
combinaisons de ces éléments –
Exigences CEM**



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CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions	6
4 Classification	8
5 Test specifications.....	8
5.1 Immunity	8
5.1.1 Immunity against disturbances	8
5.1.2 Test levels	10
5.2 Emission.....	14
5.2.1 Categories	14
5.2.2 Test levels.....	15
6 Specification of environment.....	17
Bibliography	18
Figure 1 – Example of ports	7
Table 1 – Electrostatic discharges – Test levels at enclosure.....	10
Table 2 – Radiated, radio frequency electromagnetic field – Test levels at enclosure	11
Table 3 – Electrical fast transient/burst – Test levels at signal port	11
Table 4 – Electrical fast transient/burst – Test levels at input and output DC power ports	12
Table 5 – Electrical fast transient/burst – Test levels at input and output AC power ports	12
Table 6 – Conducted disturbances, induced by radio-frequency fields – Test levels at signal ports ^a and input and output at DC and AC power ports.....	13
Table 7 – Surge – Test levels at signal ports	13
Table 8 – Surge – Test levels at input and output DC power ports.....	13
Table 9 – Surge – Test levels at input and output AC power ports.....	14
Table 10 – Voltage dips – Test levels at input AC power ports	14
Table 11 – Voltage interruptions – Test levels at input AC power ports.....	14
Table 12 – Harmonics and flicker – Test levels at low voltage AC mains ports	15
Table 13 – Conducted radio disturbances – Test levels at signal ports (telecommunications/network ports)	16
Table 14 – Conducted radio disturbances – Test levels at DC power ports).....	16
Table 15 – Conducted radio disturbances – Test levels at low voltage AC mains ports	16
Table 16 – Radiated radio disturbances – Test levels at enclosure port.....	17

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF TRANSFORMERS, REACTORS,
POWER SUPPLY UNITS AND COMBINATIONS THEREOF –****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 62041 has been prepared by Technical Committee 96: Transformers, reactors, power supply units and combinations thereof.

This second edition cancels and replaces the first edition published in 2003. It constitutes a technical revision.

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

- the frequency range for tests according to IEC 61000-4-3 has been extended above 1 GHz according to technologies used in this frequency area;
- the testing requirements according to IEC 61000-4-11 have been amended significantly;
- the inclusion of a clause on tests in series production;
- the inclusion of a new clause on measurement uncertainty, and
- the inclusion of requirements on DC **power ports** and telecommunication **ports**.

It has the status of a product family EMC standard in accordance with IEC Guide 107:2009, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications*.

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

FDIS	Report on voting
96/358/FDIS	96/367/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.

This standard is to be used in conjunction with IEC 61558 series.

In this standard, the following print types are used:

- requirements proper: in roman type;
- *test specifications: in italic type;*
- explanatory matter: in smaller roman type.

In the text of this publication, the words in **bold** are defined in Clause 3 of this standard and in the IEC 61558 series.

The committee has decided that the contents of this publication 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.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months from the date of publication.

SAFETY OF TRANSFORMERS, REACTORS, POWER SUPPLY UNITS AND COMBINATIONS THEREOF –

EMC REQUIREMENTS

1 Scope

This international product family standard applies to **transformers, reactors, power supply** units and combinations thereof covered by the IEC 61558 series of standards. This standard deals with the electromagnetic compatibility requirements for emission and immunity within the frequency range 0 Hz - 400 GHz. No measurement needs to be performed at frequencies where no requirement is specified.

Transformers, reactors, power supply units and combinations thereof delivered with or incorporated in an appliance or equipment should follow the relevant EMC standard applicable to that appliance or equipment. However, this standard may be used as a guide to test the **transformers, reactors, power supply** units and combinations thereof separately before incorporating them in the appliance or equipment.

This EMC standard covers performance only. Other operations of the **transformers, reactors** and **power supply** units (e.g. simulated faults in the electric circuitry for testing purposes or functional safety due to the effects of the electromagnetic phenomena, or evaluation of human being for exposure to electromagnetic fields (EMF)) have not been taken into consideration in this standard.

NOTE When **EUT** (Equipment under Test) is used, it covers **transformers, reactors, power supply** units and combinations thereof where applicable.

This standard does not apply to:

- uninterruptible **power supplies** (UPS) covered by IEC 62040 series;
- **power supply** units covered by IEC 61204-3,
(i.e. DC-DC converters, DC power and distribution equipment and **power supply** units for use in applications covered by IEC 60950-1, IEC 61010-1, IEC 60601-1, IEC 60065 and IEC 62368-1);
- **power supplies** and converters for use with or in products covered by IEC 61347-1.

2 Normative references

The following referenced documents are indispensable for the application 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, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-3-3, *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 61000-3-11, *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, *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 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-6-3, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments*

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

IEC 61558 (all parts), *Safety of power transformers, power supplies, reactors and similar products*

CISPR 14-1:2005, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 16-1-2:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Conducted disturbances*

CISPR 16-2-1:2008, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*

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

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

environment 1

residential, commercial and light-industrial locations, both indoor and outdoor