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PUBLICLY AVAILABLE SPECIFICATION

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INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Electromagnetic compatibility (EMC) – Conducted emission requirements on the low voltage AC mains port in the frequency range 9 kHz to 150 kHz for equipment intended to operate in residential environments

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CONTENTS

FOREWORD 4
INTRODUCTION 6
1 Scope 7
2 Normative references 7
3 Terms, definitions and abbreviated terms 8
3.1 Terms and definitions 8
3.2 Abbreviated terms 8
4 General 9
5 Documentation for the user 9
6 Emission test details 9
Annex A (informative) Background information on the normative limits in the frequency range 9 kHz to 150 kHz 11
A.1 Derivation of the normative limits 11
A.2 Radio protection analysis 13
A.2.1 General 13
A.2.2 Radio protection analysis for common mode disturbance injections 13
A.2.3 Radio protection analysis for differential mode disturbance injections 20
Annex B (informative) Spectral density of non-intentional emissions (NIE) in the frequency range 9 kHz to 150 kHz 28
B.1 Introduction of Integral Voltage Levels (IVL) for the limitation of the spectral density of NIE 28
B.2 Recommended maximum IVL for NIE 29
B.3 Rationale for the recommendation of additional limitations on the spectral density of non-intentional emissions 29
B.3.1 Rationale 29
B.3.2 Relationship between MCE performances and Integral Voltage Levels 30
Bibliography 35

Figure A.1 – Example of a V-AMN 12
Figure A.2 – Worst case common mode radiator for residential environment 14
Figure A.3 – Simulation results for the coupling factor for both field types 15
Figure A.4 – Worst case disturbance field strength at 10 m distance 16
Figure A.5 – Proposed field strengths limits compared to protection needs of radio applications 20
Figure A.6 – Worst case differential mode radiator for residential environment 21
Figure A.7 – Simulation results for the coupling factor for differently sized loops 22
Figure A.8 – Properties of a V-AMN 23
Figure A.9 – Proposed field strengths limits compared to protection needs of radio applications 27
Figure B.1 – Example of a multi-carrier MCE spectrum 30
Figure B.2 – Laboratory test setup for the evaluation of the relationship between MCE performances and Integral Voltage Levels 31
Figure B.3 – Example of broadband noise produced by the NIE source used in the test 33

Table 1 – Requirements for conducted emissions, low voltage AC mains port in the frequency range 9 kHz to 150 kHz 10

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Document Sharing Hub
Full document details: CISPR PAS 39 2024

Table A.1 – Simulation results for the coupling factor for both field types 14
Table A.2 – Worst case disturbance field strength at 10 m distance 15
Table A.3 – Probability factors and respective rationales 17
Table A.4 – Calculations of the required field strength limit 19
Table A.5 – Calculations of the required field strength limit 22
Table A.6 – Conversion from voltage limit to current limit for injection 24
Table A.7 – Disturbance field strength calculation for 20 cm and 50 cm loops 25
Table A.8 – Disturbance field strength calculation for 100 cm loop 26
Table B.1 – Recommended maximum Integral Voltage Levels 29
Table B.2 – Recommended maximum Integral Voltage Levels for equipment covered by footnote [a] to Table 1 29
Table B.3 – Correlation between MCE's noise assessment and Integral Voltage Levels computed in the MCE's operating frequency ranges 32
Table B.4 – Correlation between IVLs and MCE communication performance 34

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Conducted emission requirements on the low voltage AC mains port in the frequency range 9 kHz to 150 kHz for equipment intended to operate in residential environments

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CISPR 39 has been prepared by CISPR subcommittee H: Limits for the protection of radio services. It is a Publicly Available Specification.

The text of this Publicly Available Specification is based on the following documents:

Draft	Report on voting
CIS/H/505/DPAS	CIS/H/517/RVDPAS

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

The language used for the development of this Publicly Available Specification is English.

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INTRODUCTION

This PAS complements IEC 61000-6-3:2020 by the addition of the following:

- addition of normative requirements for conducted emissions at the low voltage AC mains port in the frequency range 9 kHz to 150 kHz;
- addition of an informative annex providing background information on the normative limits;
- addition of an informative annex with recommendations to limit the spectral density of non-intentional emissions (NIE).

The technical content of this PAS was derived from a fragment of the maintenance of IEC 61000-6-3 and, as CIS/H/459/CDV, this fragment received 100 % support from the National Committees.

This PAS is published due to the urgent market needs for these requirements.

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Conducted emission requirements on the low voltage AC mains port in the frequency range 9 kHz to 150 kHz for equipment intended to operate in residential environments

1 Scope

This document is applicable to electrical and electronic equipment within the scope of IEC 61000-6-3:2020, for which no relevant dedicated product or product family EMC emission standard has been published.

It defines low voltage AC mains conducted emission requirements in the frequency range 9 kHz to 150 kHz which are considered essential and have been selected to provide an adequate level of protection to both radio reception and Mains Communicating Systems (MCS) in the defined electromagnetic environment.

The emission requirements in this document are not intended to be applicable to the intentional transmissions and their harmonics from a radio transmitter as defined by the ITU.

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.

NOTE The normative references in this clause are identical to those published in IEC 61000-6-3:2020.

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 16-1-2:2014, *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/AMD 1:2017

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/A1:2017

IEC 61000-6-3:2020, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for equipment in residential environments*

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3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61000-6-3:2020 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
primary function
any function of an EUT considered essential for the user or for the majority of users

Note 1 to entry: An EUT can have more than one primary function. For example, the primary functions of a basic television set include broadcast reception, audio reproduction and display.

3.1.2
UPS function
power supply function, that provides power during unintentional AC mains power supply interruptions

3.1.3
adjustable speed electric power drive function
a power drive system function that provides adjustable speed AC or DC motor drives and can convert input and/or output voltages (line-to-line voltage).

3.2 Abbreviated terms

For the purposes of this document, the abbreviated terms given in IEC 61000-6-3:2020 and the following apply.

AC	Alternating Current
ACEC	Advisory Committee on Electromagnetic Compatibility
AMN	Artificial Mains Network
AP	Allowance Probability
AV	Average
BPSK	Binary Phase-Shift Keying
CF	Coupling Factor
CF(E)	Electric field Coupling Factor
CF(H)	Magnetic field Coupling Factor
CISPR	International Special Committee on Radio Interference
CM	Common Mode
DC	Direct Current
DM	Differential Mode
EMC	Electro-Magnetic Compatibility
EUT	Equipment Under Test
FS	Field Strength
FSFI	Free Space Field Impedance
FSK	Frequency-Shift Keying

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H-Field	Magnetic Field
IEC	International Electrotechnical Commission
ISO	International Standards Organization
IVL	Integral Voltage Level
LED	Light Emitting Diode
LF	Low Frequency
MCE	Mains Communicating Equipment
MCS	Mains Communicating System
NEC2	Numerical Electromagnetics Code 2
NIE	Non-Intentional Emission
OFDM	Orthogonal Frequency-Division Multiplexing
RFI	Radio Frequency Interference
PR	Protection Ratio
QP	Quasi-Peak
UPS	Uninterruptible Power Systems
V-AMN	Artificial Mains V-Network
VLF	Very Low Frequency

4 General

The requirements specified in this document are applicable to an equipment intended to operate in the residential environment. For any additional information needed to assess emissions according to Table 1, refer to IEC 61000-6-3:2020.

5 Documentation for the user

In addition to the requirements specified in Clause 6 of IEC 61000-6-3:2020, the instructions for use of the equipment shall include, where relevant, the notification required by footnote [a] to Table 1.

6 Emission test details

The requirements in Table 1 shall apply.

The following shall be taken into account during the application of the measurements defined in Table 1:

- At transitional frequencies, the lower limit applies.
- Where the limit value varies over a given frequency range, it changes linearly with respect to the logarithm of the frequency.

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Table 1 – Requirements for conducted emissions, low voltage AC mains port in the frequency range 9 kHz to 150 kHz

Measurement network	Frequency range MHz	Limits dB(µV)	Measurement specifications	Limitations and restrictions
		Detector		
V-AMN	0,009 to 0,05	120,5 to 110 Quasi-peak	Instrumentation, CISPR 16-1-1:2019, Clauses 4, 5 and 7 Networks, CISPR 16-1-2:2014 and CISPR 16-1-2:2014/AMD1:2017, Clause 4 Method, CISPR 16-2-1:2014 and CISPR 16-2-1:2014/AMD1:2017, Clause 7 Set-up, CISPR 16-2-1:2014 and CISPR 16-2-1:2014/AMD1:2017, Clause 7	None
	0,05 to 0,15	104 to 80 [a] Quasi-peak		

NOTE See Annex A for background information about the normative limits, including recommendations related to the limit application in the frequency range 9 kHz to 150 kHz, and Annex B for recommendations to improve compatibility with MCE by additional assessments.

[a] For equipment with a primary function according to 3.1.2 (UPS function) or 3.1.3 (adjustable speed electric power drive function), the following limits can be applied: 110 dB(µV) to 82,5 dB(µV). When these relaxed limits are applied, it shall be recorded in the test report and a notification shall be added in the user manual of the equipment. The notification shall state that such equipment has a higher risk of interference, and specific measures might be required for its installation and operation, or it can be necessary to disconnect the equipment.

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