



DPC: 25/30510965 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 21 July 2025

Origin: International

Latest date for receipt of comments: 27 August 2025

Project No. 2025/00715

Responsible committee: PEL/22 Power electronics

Interested committees:

Title: Draft BS EN 62909-3 Ed.1.0 BS EN 62909-3 Bi-directional grid connected power converters. Part 3: EMC requirements and test methods.

Please notify admin.start@bsigroup.com if you are aware of any keywords that might assist in clarifying or identifying the standard or of the content of this standard:

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 27 August 2025

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



22E/294/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 62909-3 ED1

DATE OF CIRCULATION:

2025-07-18

CLOSING DATE FOR COMMENTS:

2025-09-26

SUPERSEDES DOCUMENTS:

22E/278/NP, 22E/285A/RVN

IEC SC 22E : STABILIZED POWER SUPPLIES

SECRETARIAT:

Germany

SECRETARY:

Mr Clemens Klemm

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 64, TC 69, TC 77, TC 82, CIS/B

HORIZONTAL FUNCTION(S):

ASPECTS CONCERNED:

Electromagnetic Compatibility

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Bi-directional grid connected power converters - Part 3: EMC requirements and test methods

NOTE FROM TC/SC OFFICERS:

Link to Committee Draft (CD) online document:

<https://osd.iec.ch/#/editor/archive/388b5637-1b0c-c3ef-e063-b912000a5143/en/CD/1>

How to access

This link leads you to the Online Standards Development (OSD) platform for National Mirror Committee's (NMC) comments. The project draft may be found further down this document.

Resource materials

We recommend NCs to review the available materials to better understand the member commenting on the OSD platform. This includes the:

- [OSD NC roles overview](#)
- [How to add and submit comments to the IEC](#)

Contact

Should you require any assistance, please contact the [IEC IT Helpdesk](#).

CONTENTS

FOREWORD	7
INTRODUCTION	9
1 Scope	10
2 Normative references	10
3 Terms, definitions	13
3.1 Terms and definitions	14
3.2 Figures and Tables	19
4 Classification of GCPCs	19
4.1 Division into classes	19
4.2 Information for users	20
5 Measurement and test setup	20
5.1 General	20
5.2 Configuration of test setups	21
5.2.1 General	21
5.2.2 Setups for immunity requirement test	21
5.2.3 Setups for low frequency emission requirement test	22
5.2.4 Setups for high frequency emission requirement test	22
6 Operating conditions during testing	23
6.1 General	23
6.2 Operating conditions for immunity requirement test	23
6.2.1 General	23
6.2.2 Operating conditions for immunity requirement test for GCPC with EV section	24
6.3 Operating conditions for emission requirement test	24
6.3.1 Operating conditions for low frequency emission requirement test	24
6.3.2 Operating conditions for high frequency emission requirement test	24
6.3.3 Operating conditions for emission requirement test for GCPC with EV section	24
7 Immunity requirements	24
7.1 General	24
7.2 Performance criteria	27
8 Emission requirements	28
8.1 Low frequency range	28
8.2 High frequency range	28
8.2.1 Disturbance voltage limits at the AC power port (150 kHz to 30 MHz)	28
8.2.2 Disturbance voltage limits at the DC power port (150 kHz to 30 MHz)	30
8.2.3 Disturbance voltage limits at the CPT port (150 kHz to 30 MHz)	31
8.2.4 Disturbance voltage limits at the wired network port (150 kHz to 30 MHz)	31
8.2.5 Radiated emission limits at Enclosure port (above 30 MHz)	32
8.2.6 Radiated emission limits at Enclosure port (above 1 GHz)	34
8.2.7 Radiated emission limits at Enclosure port (2kHz to 185kHz) with the EV section	35
8.2.8 Voltage transient disturbances with the EV section	35
9 Test results and test report	35
Annex A (informative) Examples of GCPC	37
A.1 General	37

A.2	Examples of GCPC within the scope of this document	37
A.3	Examples of GCPC where other standards apply	38
Annex B (informative)	Overview of requirements	40
B.1	General.....	40
B.2	Immunity requirements.....	40
B.3	Conducted emission requirements	40
B.4	Radiated emission requirements	41
Annex C (informative)	EV section EMC requirements and test methods	42
C.1	Operating conditions during testing	42
C.1.1	General	42
C.2	Operating conditions for immunity requirement test.....	42
C.2.1	General	42
C.2.2	Operating conditions for immunity requirement test for GCPC with EV section.....	42
C.3	Operating conditions for emission requirement test	42
C.3.1	Operating conditions for low frequency emission requirement test	42
C.3.2	Operating conditions for high frequency emission requirement test.....	42
C.3.3	Operating conditions for emission requirement test for GCPC with EV section.....	42
C.4	Immunity requirements.....	43
C.4.1	General	43
C.4.2	Performance criteria	46
C.5	Emission requirements.....	46
C.5.1	Low frequency range	46
C.5.2	High frequency range	46
Annex D (normative)	Example test setups.....	49
Annex E (informative)	Radiated disturbance test for keyless entry	53
E.1	General.....	53
E.2	Test setup.....	53
E.3	Test method.....	53
E.4	Limits for radiated disturbances keyless entry (2 kHz to 185 kHz)	54
Annex F (informative)	Termination of ports	55
F.1	General.....	55
F.2	Termination of communication lines - asymmetric artificial network (AAN).....	55
F.2.1	General	55
F.2.2	Symmetric communication lines (e.g. CAN)	55
F.2.3	Coupling devices for PLC on power lines	56
F.2.4	PLC (technology) on control pilot	57
F.3	Coupling and termination devices for other communication and signalling lines.....	58
Annex G (normative)	Voltage transient disturbances from DC charging equipment	60
Annex H (normative)	Voltage surge test setup for DC charging EUT	62
Annex I (informative)	Transient immunity test for DC charging EUT	63
Bibliography.....		64
Figure 1 – Example of ports		19
Figure 2 – Examples of installation of a GCPC		20
Figure A.1 – Multiport GCPC with battery, PV and CPT ports.....		37

Figure A.2 – Multiport GCPC with battery and CPT ports	37
Figure A.3 – Multiport GCPC with battery and CPT ports which is a product system variant of the GCPC in Figure A.2 but cannot connect to EV	38
Figure A.4 – Multiport GCPC with battery and CPT ports which is a product system variant of the GCPC in Figure A.2 but cannot connect to EV and without DC/DC converter for EV	38
Figure A.5 – Equipment in scope of IEC 62920:2017 multiport GCPC with PV and battery ports	38
Figure A.6 – Equipment in scope of IEC 61851-21-2:2018: GCPC with a CPT port	38
Figure A.7 – Multiport GCPC with multiple CPT ports	39
Figure B.1 – Overview on port related immunity requirements	40
Figure B.2 – Overview on port related conducted emission	40
Figure B.3 – Overview on radiated emission	41
Figure D.1 – Example test setup for floor standing equipment for radiated and conducted emission and immunity	50
Figure D.2 – Example test setup for table top and wall mounted equipment for emission and immunity	52
Figure E.1 – Example of a test setup for measurement of radiated disturbances to keyless entry (layout and spacing for the loop sensor)	54
Figure F.1 – Example of an impedance stabilization network for symmetric communication lines	56
Figure F.2 – Example of a circuit for emission tests of PLC on AC or DC power lines	57
Figure F.3 – Example of a circuit for immunity tests of PLC on AC or DC power lines	57
Figure F.4 – Example of a circuit for emission tests of PLC on control pilot line	58
Figure F.5 – Example of a circuit for immunity tests of PLC on control pilot line	58
Figure F.6 – Example of a termination circuit for testing of system A	59
Figure G.1 – Voltage transient of DC charging EUT	60
Figure G.2 – Voltage transient measurement equipment	61
Table 1 – Alphabetical list of terms	14
Table 2 – Immunity requirements for class B GCPC	25
Table 3 – Immunity requirements for class A GCPC	26
Table 4 – Performance criteria for immunity tests	27
Table 5 – References for evaluation of low frequency (LF) phenomena	28
Table 6 – Disturbance voltage limits for class A GCPC measured on a test site (AC mains power port)	29
Table 7 – Disturbance voltage limits for class B GCPC measured on a test site (AC mains power port)	29
Table 8 – Limits for conducted disturbances of class A GCPC measured on a test site (DC power port)	30
Table 9 – Disturbance voltage limits for class B GCPC measured on a test site (DC power port)	30
Table 10 – Applicability of measurements at DC power ports	31
Table 11 – Limits of conducted common mode (asymmetric mode) disturbance at the wired network port for class A GCPC	32
Table 12 – Limits of conducted common mode (asymmetric mode) disturbance at the wired network port for class B GCPC	32

Table 13 – Electromagnetic radiation disturbance limits for Class A GCPC section measured on a test site	32
Table 14 – Electromagnetic radiation disturbance limits for Class B GCPC measured on a test site	33
Table 15 – Required highest frequency for radiated measurement	34
Table 16 – Requirements for radiated emissions at frequencies above 1 GHz for class A GCPC	34
Table 17 – Requirements for radiated emissions at frequencies above 1 GHz for class B GCPC	35
Table C.1 – Immunity requirements for class B GCPC with EV section(s)	43
Table C.2 – Immunity requirements for class A GCPC with EV section(s)	45
Table C.3 – Disturbance voltage limits equipment for DC CPT port	47
Table C.4 – Limit values of radiated disturbances (2 kHz to 185 kHz)	47
Table C.5 – Voltage transient limit of EUT	48
Table F.1 – Termination of ports	55
Table H.1 – Maximum voltage to be measured on the CPT	62

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Bi-directional grid connected power converters -
Part 3: EMC requirements and test methods**

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/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 62909-3 has been prepared by subcommittee 22E: Stabilized power supplies, of IEC technical committee 22: Power electronic systems and equipment. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
22E/XX/FDIS	22E/XX/RVD

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 International Standard is English.

This document was drafted in accordance with 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 62909 series, published under the general title *Bi-directional grid connected power converters*, 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.

INTRODUCTION

In order to optimize power consumption, for example within the home power management, it is important to optimally combine electricity generation with rechargeable energy storage. This optimization is accomplished, in part, by providing an efficient transfer between DC and AC electricity to accommodate storage batteries. The IEC 62909 series standards describe a bidirectional grid-connected power converter (GCPC) connected, for example, to sources of power generation and energy storage.

IEC 62909-1:2017 defines common general requirements, independent from the special characteristics of individual applications. [IEC 62909-2 \[1\]](#) defines the additional requirements necessary for interfacing particular types of distributed energy resources to a GCPC. This document presents the EMC requirements for GCPC.

GCPCs can be connected to multiple kinds of distributed energy resources. While there are EMC requirements for power electronic converters for single distributed energy resources, for example solar systems or battery storage systems, those requirements are in some cases different from each other. Hence, it is important to clarify which requirements should be applied to the various types of GCPCs.

1 Scope

This part of IEC 62909 specifies electromagnetic immunity and emission requirements of bi-directional grid-connected power converters (GCPCs) consisting of one or more AC ports and two or more DC power ports with system voltages not exceeding 1 000 V AC or 1 500 V DC.

This document can also be used for special cases of GCPCs with only one DC power port, where

- GCPC with multiple physical DC power ports is used in an application requiring only one DC power port, or
- no dedicated product standard for such a single DC power port GCPC is available.

This document considers GCPCs in both residential and non-residential environments.

This document does not cover

- uninterruptible power supply (UPS) systems covered by IEC 620402,
- power conversion equipment (PCE) covered by IEC 62920:2017, i.e. GCPCs for use in photovoltaic power systems with or without DC-coupled electrical energy storage devices, and
- power converters to charge batteries within electric vehicles (EVs) covered by IEC 61851-21-2:2018, and
- Energy Storage Power Converter for use in Electrical Energy Storage Systems (EESS) covered by in a future part of the IEC 63285 series.

NOTE 1 [Annex A](#) provides examples of GCPCs covered and not covered by this document.

NOTE 2 In [Annex B](#), an overview on the EMC requirements for each port is provided.

NOTE 3 In [Annex C](#), an overview on the EMC requirements for the conductive power transfer port is provided.

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) - Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

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

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

IEC 61000-2-4:2024, *Electromagnetic compatibility (EMC) - Environment - Compatibility levels in industrial locations for low-frequency conducted disturbances*

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, *Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

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

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, *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/AMD2:2021, *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 TR 61000-3-6:2008, *Electromagnetic compatibility (EMC) - Part 3-6: Limits - Assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems*

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 TR 61000-3-14:2011, *Electromagnetic compatibility (EMC) - Part 3-14: Assessment of emission limits for harmonics, interharmonics, voltage fluctuations and unbalance for the connection of disturbing installations to LV power systems*

IEC TR 61000-3-15:2011, *Limits - Assessment of low frequency electromagnetic immunity and emission requirements for dispersed generation systems in LV network*

IEC TS 61000-3-16:2023, *Electromagnetic compatibility (EMC) - Part 3-16: Limits - Limits for harmonic currents produced by the inverter of inverter-type electrical energy-supplying equipment + with a reference current less than or equal to 75 A per phase + connected to public low-voltage systems*

IEC TR 61000-3-18:2024, *Electromagnetic compatibility (EMC) - Part 3-18: Limits - Assessment of network characteristics for the application of harmonic emission limits - Equipment connected to LV distribution systems not covered by IEC 61000-3-2 and IEC 61000-3-12*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test*

IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test*

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

IEC 61000-4-5:2014/AMD1:2017, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test*

IEC 61000-4-6:2023, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signalling at a.c. power port + low frequency immunity tests*

IEC 61000-4-13:2002/AMD1:2009, *Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signalling at a.c. power port + low frequency immunity tests*

IEC 61000-4-13:2002/AMD2:2015, *Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signalling at a.c. power port + low frequency immunity tests*

IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase*

IEC 61000-4-34:2005/AMD1:2009, *Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase*

IEC 61300-3-12:2011/AMD1:2021, *Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current $> 16\text{ A}$ and $\leq 75\text{ A}$ per phase*

IEC 61851-1:2017, *Electric vehicle conductive charging system - Part 1: General requirements*

IEC 61851-21-2:2018, *Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems*

IEC 62909-1:2017, *Bi-directional grid connected power converters - Part 1: General requirements*

IEC 62920:2017, *Photovoltaic power generating systems - EMC requirements and test methods for power conversion equipment*

IEC 62920:2017/ADM1:2021, *Photovoltaic power generating systems - EMC requirements and test methods for power conversion equipment*

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

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, *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 16-1-4:2019, *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, *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 16-1-4:2020/AMD2:2023, *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 16-2-1:2014, *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, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements*

CISPR 16-2-3:2016, *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, *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/AMD2:2023, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements*

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

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

3 Terms, definitions

For the purposes of this document, the following terms and definitions 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>

Table 1 provides an alphabetical cross-reference listing of terms.

Table 1 – Alphabetical list of terms

Term	Term number	Term	Term number	Term	Term number
AC mains power port (3.1.7)	3.7 (3.1.7)	distributed energy resources (3.1.17)	3.17 (3.1.17)	port (3.1.4)	3.4 (3.1.4)
AE (3.1.2)	3.2 (3.1.2)	enclosure port (3.1.6)	3.6 (3.1.6)	port, <in electromagnetic compatibility>	3.5 (3.1.5)
AMN (3.1.21)	3.21 (3.1.21)			powerline communication (3.1.14)	3.14 (3.1.14)
associated equipment (3.1.2)	3.2 (3.1.2)			powerline telecommunication (3.1.14)	3.15 (3.1.15)
artificial DC network (3.1.22)	3.22 (3.1.22)	DC power port (3.1.9)	3.9 (3.1.9)	photovoltaic (3.1.20)	3.20 (3.1.20)
artificial mains network (3.1.21)	3.21 (3.1.21)			PV (3.1.20)	3.20 (3.1.20)
auxiliary AC power port (3.1.8)	3.8 (3.1.8)	EV section (3.1.13)	3.13 (3.1.13)	residential location (3.1.3)	3.3 (3.1.3)
auxiliary DC power port (3.1.10)	3.10 (3.1.10)	GCPC (3.1.1)	3.1 (3.1.1)	signal/control port (3.1.11)	3.11 (3.1.11)
bi-directional grid-connected power converter (3.1.1)	3.1 (3.1.1)	grid-connected power converter (3.1.1)	3.1 (3.1.1)	wired network port (3.1.12)	3.12 (3.1.12)
conductive power transfer port (3.1.15)	3.15 (3.1.15)	high power electronic systems and equipment	3.18 (3.1.18)		
CPT port (3.1.15)	3.15 (3.1.15)	LV (3.1.19)	3.19 (3.1.19)		
DC-AN (3.1.22)	3.22 (3.1.22)	low voltage (3.1.19)	3.19 (3.1.19)		
DC artificial network	3.22 (3.1.22)	PLC (3.1.14)	3.14 (3.1.14)		
DC-connection interface (3.1.23)	3.23 (3.1.23)	PLT (3.1.14)	3.14 (3.1.14)		
DC/DC converter (3.1.16)	3.16 (3.1.16)				

3.1 Terms and definitions

3.1.1

bi-directional grid-connected power converter

grid-connected power converter

GCPC

power converter with multiple DC power ports connected to an AC mains power distribution network or other AC mains installation and used in a power generating system

Note 1 to entry: In special cases, [GCPC \(3.1.1\)](#) may have only one DC power port connected.

Note 2 to entry: For bi-directional [GCPC \(3.1.1\)](#), the energy flow can be from AC to DC or DC to AC.

[SOURCE: IEC 62909-1:2017, 3.8, modified - Note 1 to entry and Note 2 to entry added.]

3.1.2

associated equipment

AE

equipment needed to verify the functionality, to help exercise, and/or monitor the [GCPC \(3.1.1\)](#)

[SOURCE: IEC 61851-21-2:2018, 3.1, modified - Replacement of the words "exercise and/or monitor the operation of the EUT" with "verify the functionality, to help exercise, and/or monitor the GCPC".]

3.1.3

residential location

area of land designated for domestic dwellings where the mains power within these locations is directly connected to the low-voltage public mains network

Note 1 to entry: Examples of residential locations are: houses, apartments, farm buildings housing people.

Note 2 to entry: A dwelling can be a single building, separate building or a separate section of a larger building.

Note 3 to entry: Within these locations it is expected to operate a radio receiver within a distance of 10 m from the equipment.

Note 4 to entry: Domestic dwellings are places for one or more people to live.

[SOURCE: IEC 61000-6-3 [2], 3.1.14]

3.1.4

port

access to a device or network where electromagnetic energy or signals can be supplied or received or where the device or network variables may be observed or measured

[SOURCE: IEC 60050-131 [3], 131-12-60, modified - Deletion of the note; replacement of the word "may" has been replaced by "can".]

3.1.5

Port,

<in electromagnetic compatibility> physical interface of the GCPC (3.1.1) with the external electromagnetic environment

Note 1 to entry: See Figure 1.

[SOURCE: IEC 61000-6-3 [2], 3.1.1, modified - Replacement of the word "specified equipment" has been replaced by "GCPC"; delete of the note 2 to entry; the image in Figure 1 has been substituted.]

3.1.6

enclosure port

physical boundary of the GCPC (3.1.1) which electromagnetic fields can radiate through or impinge on

[SOURCE: IEC 61000-6-3 [2], 3.1.2, modified - Replacement of the word "equipment" has been replaced by "GCPC", and "may" has been replaced by "can".]

3.1.7

AC mains power port

port used to connect to a public low voltage AC mains power distribution network or other low voltage AC mains installation

[SOURCE: IEC 62920:2017 and IEC 62920:2017/ADM1:2021, 3.7]

3.1.8

auxiliary AC power port

additional low voltage AC power port required for purposes dedicated or essential loads

[SOURCE: IEC 62920:2017, 3.7, modified - Replacement of the words "other than feeding in AC power" with "dedicated or essential load"]

3.1.9**DC power port**

port used to connect to a low voltage DC power generating system or energy storage, or to another source/load

[SOURCE: CISPR 11:2024, 3.1.10, modified - Deletion of the note to entry.]

3.1.10**auxiliary DC power port**

additional low voltage DC power port for purposes other than supplying DC power for the DC to AC conversion or electrical energy storage devices

Note 1 to entry: Examples include DC load or DC control power input.

[SOURCE: IEC 62920:2017/ADM1:2021, 3.10]

3.1.11**signal/control port**

port intended for the interconnection of components of [GCPC \(3.1.1\)](#), or between [GCPC \(3.1.1\)](#) and local auxiliary equipment, and used in accordance with relevant functional specifications (for example for the maximum length of cable connected to it)

Note 1 to entry: Examples include, but is not limited to, RS-232, Universal Serial Bus (USB), High-Definition Multimedia Interface (HDMI), IEEE standard 1394 ("Fire Wire"), Controller Area Network (CAN), Power Line Communication ([PLC \(3.1.14\)](#)) and control pilot.

[SOURCE: CISPR 32:2015, 3.1.30, modified - Addition of the second term "signal and control port". Replacement of word "EUT" with "GCPC" in the definition; replacement of Note 1 to entry.]

3.1.12**wired network port**

port for the connection of communication intended to interconnect widely-dispersed systems by direct connection to a single-user or multi-user network

Note 1 to entry: Examples of communication through the network include voice, data and signalling transfers.

Note 2 to entry: Examples of wired network ports include CATV, PSTN, ISDN, xDSL, LAN and similar.

Note 3 to entry: Wired network ports may support screened or unscreened cables and may also carry AC or DC power where this is an integral part of the telecommunication specification.

Note 4 to entry: A port generally intended for interconnection of components of a system under test (e.g. RS-232, RS-485, field buses in the scope of IEC 61158, IEEE Standard 1284 (parallel printer), Universal Serial Bus (USB), IEEE Standard 1394 ("Fire Wire"), etc.) and used in accordance with its functional specifications (e.g. for the maximum length of cable connected to it) is not considered to be a wired network port.

Note 5 to entry: In many product standards, a wired network port is defined as a telecommunications or network port.

[SOURCE: CISPR 32:2015, 3.1.32, modified - Replacement of words "voice, data and signalling transfers" with "communication" and deletion of "communication" in "communication network in the definition. Addition of Note 1, Note 4 and Note 5 to entry.]

3.1.13**EV section**

part of a [GCPC \(3.1.1\)](#) between the internal system DC bus and the CPT port

Note 1 to entry: The EV section has EV conductive charging function.

[SOURCE: [IEC 62909-2 \[1\]](#), 3.118, modified - Replacement of the words "DC-connection interface and an EV DC-port interface" with "internal system DC bus and the CPT port"; addition of the note to entry.]

3.1.14**powerline telecommunication**

PLT

powerline communication

PLC

signal transmission technology used for connection to a wire-line PSTN (public switched telephone network) or closed internet network via the [LV \(3.1.19\)](#) AC (or DC) mains grid

Note 1 to entry: [PLT \(3.1.14\)](#)/C is a transmission technology used for communications, data transfer, signaling/controlling and similar purposes in private and/or local area networks via a variety of types of power lines.

[SOURCE: IEC 61851-21-2:2018, 3.9, modified - Addition of the word "or closed internet network"; replacement of Note 1 to entry]

3.1.15**conductive power transfer port**

CPT port

power output port of charging equipment for electric vehicles serving conductive power transfer (CPT) of [LV \(3.1.19\)](#) AC or DC electrical energy to the secondary device of the charging system (i.e. to the load to be charged or supplied with power) and also providing all required signalling/controlling and/or communication functions, for example control pilot, CAN and private [PLT \(3.1.14\)](#)/C

Note 1 to entry: DC electrical energy is supplied from other distributed energy resources, such as a battery system.

[SOURCE: IEC 61851-21-2:2018, 3.7]

3.1.16**DC/DC converter**

equipment that converts one DC voltage to another DC voltage

[SOURCE: IEC 62909-1:2017, 3.6]

3.1.17**distributed energy resources**

DC power sources generating and/or storing electricity near the consuming area

Note 1 to entry: Examples of distributed energy resources include, but is not limited to, photovoltaic cells, fuel cells, wind and water power generators, primary batteries, accumulators (e.g. in electrical vehicles).

[SOURCE: IEC 62909-1:2017, 3.9]

3.1.18**high power electronic system and equipment**

one or more semiconductor power converters with a combined rated power greater than 75 kVA, or an equipment containing such converters

[SOURCE: CISPR 11:2024, 3.12, modified - Deletion of Note 1 to entry.]

3.1.19**low voltage**

LV

set of voltage levels used for the distribution of electricity and whose upper limit is generally accepted to be 1 000 V AC or 1 500 V DC

[SOURCE: IEC 60050-601:1985, 601-01-26, modified - Addition of the words "or 1 500 V DC".]

3.1.20

PV

photovoltaic

converting light directly into electrical energy

[SOURCE: IEC 62109-1:2010, 3.55]

3.1.21

artificial mains network

AMN

network that provides a defined impedance to the equipment under test at radio frequencies, couples the disturbance voltage to the measuring receiver and decouples the test circuit from the low voltage AC mains supply

[SOURCE: IEC 62920:2017, 3.22]

3.1.22

artificial DC network

DC-AN

network that provides a defined impedance to the equipment under test at radio frequencies, couples the disturbance voltage to the measuring receiver and decouples the test circuit from the low voltage DC power source

[SOURCE: IEC 62920:2017/ADM1:2021, 3.24, modified - Replacement of words "AC mains supply" with "DC power source".]

3.1.23

DC-connection interface

internal system DC bus between DC/DC converter and bi-directional inverter or, between DC power port and bi-directional inverter

[SOURCE: IEC 62909-1:2017, 3.2]