



DPC: 24 / 30431543 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: 18 June 2024

Origin: International

Latest date for receipt of comments: 7 August 2024

Project No. 2020/03430

Responsible committee: PEL/69 Electric vehicles

Interested committees:

Title: BS EN IEC 61980-4 Interoperability and safety of high power wireless power transfer (H-WPT) for electric vehicles

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if 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 7 August 2024**

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 <http://standardsdevelopment.bsigroup.com>

Responsible Committee Secretary: **Ms Andreea Vieru (BSI)**
Direct tel: **0208 996 7432**
E-mail: **andreea.vieru@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	Commend (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.	



69/966/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 61980-4 ED1

DATE OF CIRCULATION:

2024-06-14

CLOSING DATE FOR COMMENTS:

2024-09-06

SUPERSEDES DOCUMENTS:

69/724/NP, 69/744/RVN

IEC TC 69 : ELECTRICAL POWER/ENERGY TRANSFER SYSTEMS FOR ELECTRICALLY PROPELLED ROAD VEHICLES AND INDUSTRIAL TRUCKS

SECRETARIAT:

Belgium

SECRETARY:

Mr Peter Van den Bossche

OF INTEREST TO THE FOLLOWING COMMITTEES:

PROPOSED HORIZONTAL STANDARD:

☐

Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☒ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☒ SAFETY

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:

Interoperability and safety of high power wireless power transfer (H-WPT) for electric vehicles

NOTE FROM TC/SC OFFICERS:

Copyright © 2024 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

Contents

1			
2	FOREWORD		4
3	1 Scope		7
4	2 Normative references		7
5	3 Terms and definitions		8
6	4 Abbreviated terms		8
7	5 General		8
8	6 Classification		9
9	6.1 Compatibility classes		9
10	6.2 Classification with power capacity in high-power wireless power transfer for electric vehicles		9
11	6.3 Installation		9
12	7 General supply device requirements		11
13	7.1 General architecture		11
14	7.2 Power transfer requirements		12
15	7.2.1 Frequency requirements		12
16	7.2.2 Input voltage and kVA levels		13
17	7.2.3 Output voltage levels		13
18	7.2.4 Output power levels		13
19	7.2.5 Dynamic performance		13
20	7.3 Power transfer efficiency		14
21	7.4 Alignment		14
22	7.4.1 Alignment tolerance area for supply device		14
23	7.4.2 Secondary device ground clearance and range for supply device		14
24	8 Communication		15
25	9 Power transfer interoperability		15
26	10 Protection against electric shock		15
27	11 Specific requirements for WPT systems		15
28	12 Power cable requirements		15
29	13 Constructional requirements		16
30	14 Strength of materials and parts		16
31	15 Service and test conditions		16
32	16 Electromagnetic compatibility (EMC)		16
33	17 Marking and instructions		18
34	Annex A (informative) DDQ reference EVPCs for MF-MPT4/5		19
35	A.1 DDQ reference EVPCs for MF-WPT4		19
36	A.1.1 General		19
37	A.1.2 MF-WPT4/Z1 reference EVPC		19
38	A.1.3 MF-WPT4/Z2 reference EVPC		22
39	A.1.4 MF-WPT4/Z3 reference EVPC		24
40	A.2 DDQ reference EVPCs for MF-WPT5		28
41	A.2.1 General		28
42	A.2.2 MF-WPT5/Z1 reference EVPC		28
43	A.2.3 MF-WPT5/Z2 reference EVPC		31
44	A.2.4 MF-WPT5/Z3 reference EVPC		33
45			

46	Annex B (informative) Multi-phase coil reference EVPCs for MF-WPT4/5.....	36
47	B.1 Multi-phase coil reference EVPCs for MF-WPT4	36
48	B.1.1 General	36
49	B.1.2 MF-WPT4/Z1 reference EVPC	36
50	B.1.3 MF-WPT4/Z2 reference EVPC	39
51	B.1.4 MF-WPT4/Z3 reference EVPC	42
52	B.2 Multi-phase coil reference EVPCs for MF-WPT5	45
53	B.2.1 General	45
54	B.2.2 MF-WPT5/Z1 reference EVPC	45
55	B.2.3 MF-WPT5/Z2 reference EVPC	48
56	B.2.4 MF-WPT5/Z3 reference EVPC	51
57	Annex C (informative) Modular WPT system for EVPCs with a rated output power level	
58	of ≤ 50 kW (WPT5) & ≤ 75 kW.....	54
59	C.1 General.....	54
60	C.2 Mechanical design of the primary device.....	54
61	C.3 Electrical design of the reference supply power circuit	55
62	C.4 Mechanical design of the secondary device, Z2	55
63	C.5 Electrical design of the reference EVPC, Z2.....	56
64	C.6 Mechanical design of the secondary device, Z3	57
65	C.7 Electrical design of the reference EVPC, Z	57
66	C.8 Coupling and inductance information	58
67	C.9 Power Scaling with WPT Modules	59
68		
69		
70	Figure 1 – Surface mounting	10
71	Figure 2 – Flush mounting.....	10
72	Figure 3 - Embedded mounting.....	11
73	Figure 4 – Example of an M-WPT system	12
74	Figure 5 – Example of an vehicle test setup	17
75	Figure 6 – Example of measurement in situ.....	17
76	Figure 7 – In situ measurement procedure.....	18
77		
78	Table 1 - Capacity of input power at primary devices in High-Power wireless power transfer	
79	for electric vehicles.....	9
80	Table 2 - Minimum power transfer efficiency with supply device and EV device of same	
81	power class.....	14
82	Table 3 - Minimum power transfer efficiency with different power classes.....	14
83	Table 4 - Alignment tolerance of a primary device.....	14

ELECTRIC VEHICLE WIRELESS POWER TRANSFER (WPT) SYSTEMS

Part 4: Interoperability and safety of high-power wireless power transfer (H-WPT) for electric vehicles

Edition 1.0 2024-06

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 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.

A PAS is an intermediate specification made available to the public and needing a lower level of consensus than an International Standard to be approved by vote (simple majority).

IEC PAS 61980-4 has been prepared by IEC technical committee 69: Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks. It is a Publicly Available Specification.

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

Draft	Report on voting
XX/XX/DPAS	XX/XX/RVD

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

This PAS shall remain valid for an initial maximum period of 2 years starting from the publication date. The validity may be extended for a single period up to a maximum of 2 years, at the end of which it shall be transformed, with or without changes, into another type of normative document, or shall be withdrawn.

INTRODUCTION

The IEC 61980 series is published in separate parts according to the following structure:

- IEC 61980-1 covers general requirements for electric road vehicle (EV) wireless power transfer (WPT) systems including general background and definitions (e.g. efficiency, electrical safety, EMC, EMF);
- IEC 61980-2 applies to magnetic field wireless power transfer (MF-WPT) for electric road vehicles (EV) and covers specific requirements for system activities and communication between the electric road vehicle side and the off-board side, including general background and definitions;
- IEC 61980-3 covers specific power transfer requirements for the off-board side of magnetic field wireless power transfer systems for electric road vehicles (e.g. efficiency, electrical safety, EMC, EMF);
- IEC 61980-4 covers specific power transfer requirements for the off-board side of magnetic field high power wireless power transfer (H-WPT) systems for electric road vehicles (e.g. efficiency, electrical safety, EMC, EMF). IEC 61980-4 is under development as PAS.
- IEC 61980-5 covers specific power transfer requirements for the off-board side of magnetic field dynamic wireless power transfer (MF-D-WPT) systems for electric road vehicles (e.g. efficiency, electrical safety, EMC, EMF). This document is IEC 61980-5 and is under development as PAS.
- IEC 61980-6 applies to magnetic field dynamic wireless power transfer for electric road vehicles (EV) and covers specific requirements for system activities and communication between the electric road vehicle side and the off-board side, including general background and definitions. IEC 61980-6 is under development as PAS.

**Interoperability and safety
of high-power power transfer (H-WPT) for electric vehicles**

1 Scope

This part of IEC 61980 applies to the off-board supply equipment for high-power wireless power transfer (H-WPT) via magnetic field (MF-WPT) to electric road vehicles for purposes of supplying electric energy to the RESS (rechargeable energy storage system) and/or other on-board electrical systems.

The MF-WPT system operates at standard supply voltage ratings per IEC 60038 up to 1 000 V AC and up to 1 500 V DC from the supply network. The power transfer takes place while the electric vehicle (EV) is stationary.

The aspects covered in this document include

- the characteristics and operating conditions,
- specific power transfer requirements for the off-board side of magnetic field high-power wireless power transfer systems for electric road vehicles
- the required level of electrical safety,
- requirements for basic communication for safety and process matters if required by a MF WPT system,
- requirements for positioning to assure efficient and safe MF-WPT power transfer, and
- specific EMC requirements for MF-WPT systems

This document does not apply to

- safety aspects related to maintenance, and
- trolley buses, rail vehicles and vehicles designed primarily for use off-road

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 61980-1:2020 Electric vehicle wireless power transfer (WPT) systems – Part 1: General requirements

IEC 61980-2:2023 Electric vehicle wireless power transfer (WPT) systems – Part 2: Specific requirements for communication between electric road vehicle (EV) and infrastructure with respect to wireless power transfer (WPT) systems

IEC 61980-3:2022 Electric vehicle wireless power transfer (WPT) systems – Part 3: Specific requirements for the magnetic field wireless power transfer systems

ICNIRP Guidelines 2010, ICNIRP guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz – 100 kHz), International commission on non-ionizing radiation protection, published in: Health Physics 99(6):818-836; 2010

ISO 5474-4:2024 Electrically propelled road vehicles – Functional requirements and safety requirements for power transfer — Part 4: Magnetic field wireless power transfer — Safety and interoperability requirements

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

ISO PAS CD 5474-6:2023, Electrically propelled road vehicles — Functional requirements and safety requirements for power transfer — Part 6: Magnetic field wireless power transfer — Safety and interoperability requirements for heavy-duty vehicles

3 Terms and definitions

In addition to the following, refer to the definitions of terms in IEC 61980-1 and IEC 61980-3.

3.1

embedded depth

ZRS

distance between the road surface and the top of housing in the primary device

3.2

embedded mounting

mounting of a primary device in such a manner that the top covering of the primary device is buried(embedded) in the pavement.

3.3

High-power wireless power transfer (H-WPT)

MF-WPT for electric vehicle with the capacity above 22kW.

3.4

in situ

in position, at the location where the equipment is installed and used or intended to be used, with the equipment arranged, configured and operational in the same manner as for its subsequent, final use

3.5

magnetic gap

the vertical(z-direction) distance between the coil of the primary device and the coil of the secondary device

4 Abbreviated terms

In addition to the following, refer to the abbreviated terms in IEC 61980-3.

5 General

The supply device (see Figure 4) shall be rated for one or a range of standard nominal voltages and frequencies as listed in IEC 60038.

The supply device shall be designed and constructed that, in normal use, it “connects” (without a galvanic connection) to the EV device in a manner that assures that wireless power transfer functions safely and that its performance is reliable and minimizes the risk of danger to the use or surroundings.

6 Classification

6.1 Compatibility classes

The supply device is classified according to the compatibility class:

- Compatibility class A: Supply devices of this class are intended for interoperable application and are required to meet a set of safety and performance requirements.
- Compatibility class B: Supply devices of this class are not intended for interoperable application but still are required to meet the set of safety requirements.; Performance requirements may be different than those of compatibility class A. Supply devices of this class are tested with class B EV device.

6.2 Classification with power capacity in high-power wireless power transfer for electric vehicles

Supply devices in High-Power wireless power transfer(H-WPT) for electric vehicles are classified with the capacity of input power as in Table 1.

The manufacturer shall specify the rated input power of the supply power circuit.

Table 1 - Capacity of input power at primary devices in High-Power wireless power transfer for electric vehicles

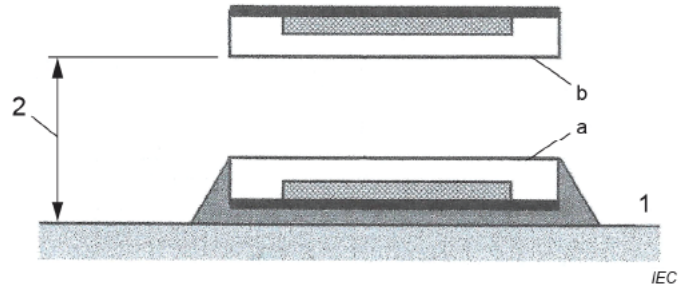
MF-WPT Class	Rated input
Class 4	11 kW < power ≤ 20 kW
Class 5	20 kW < power ≤ 50 kW
Class 6	50 kW < power ≤ 100 kW
Class 7	100 kW < power ≤ 150 kW
Class 8	150 kW < power ≤ 250 kW
Class 9	250 kW < power ≤ 500 kW

6.3 Installation

The primary device is classified according to the type of mounting:

- Surface mounting (Figure 1)

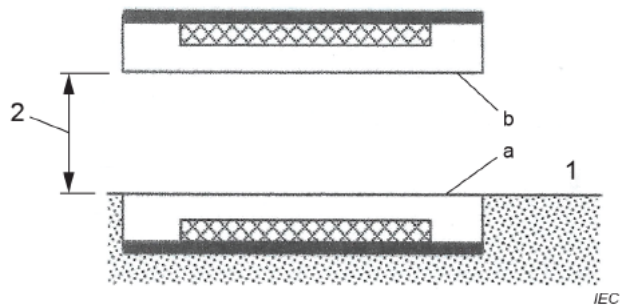
- 353 - Flush mounting (Figure 2)
- 354 - Embedded mounting (Figure 3)
- 355
- 356



Key

- a primary device
- b secondary device
- 1 top of road surface
- 2 secondary device ground clearance

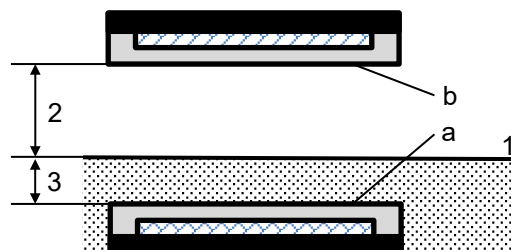
Figure 1 – Surface mounting



Key

- a primary device
- b secondary device
- 1 top of road surface
- 2 secondary device ground clearance

Figure 2 – Flush mounting



371

372

373 Key

374 a primary device

375 b secondary device

376 1 top of road surface

377 2 secondary device ground clearance (Z)

378 3 embedded depth (Z_{RS})

379

380

Figure 3 - Embedded mounting

382

383

384 In the embedded mounting, the Magnetic Gap is the vertical (z-direction) distance between the
385 coil of the primary device and the coil of the secondary device

386

387

388

389 7 General supply device requirements

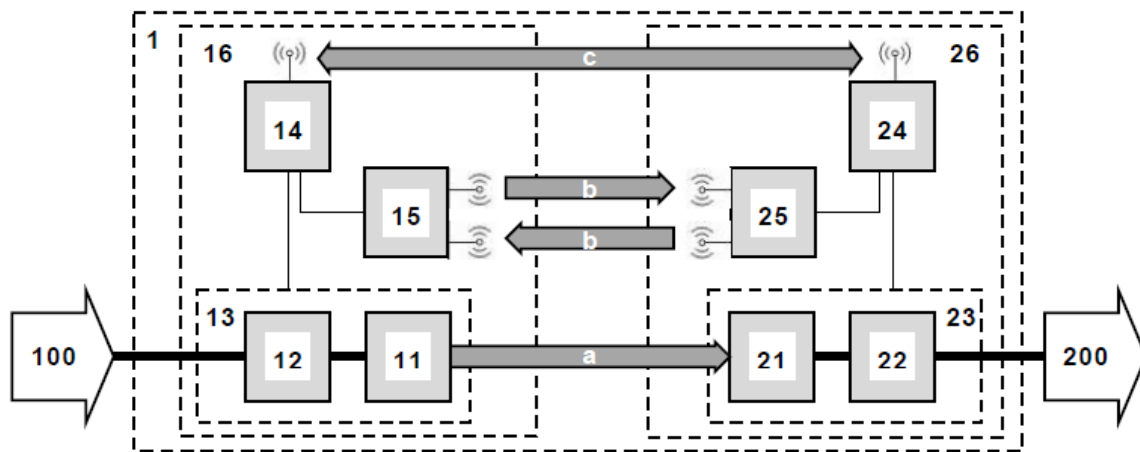
390

391 7.1 General architecture

392

393 Figure 4 shows a representation for the structure of the components referred to throughout this
394 document. Additional communication and signalling architectures to support MF-WPT activities
395 apply according to IEC 61980-2.

396



Key	Name	Key	Name
1	MF-WPT system	21	Secondary device
11	Primary device	22	EV power electronics
12	Supply power electronics	23	EV power circuit (EVPC)
13	Supply power circuit (SPC)	24	EV communication controller (EVCC)*
14	Supply equipment communication controller (SECC)*	25	EV device P2PS controller*
15	Supply device P2PS controller*	26	EV device
16	Supply device	200	RESS
100	Supply network	b	Wireless signaling*
a	Wireless power flow	c	Wireless communication*

Note: *See IEC 61980-2 for details regarding items 14, 15, 24, 25, b and c

Figure 4 – Example of an M-WPT system

7.2 Power transfer requirements

7.2.1 Frequency requirements

The following frequency requirements apply to both compatibility class A supply devices and compatibility class B supply devices.

For compatibility class A, the supply device shall operate within the fundamental frequency range of 79 kHz to 90 kHz in accordance with ITU-R Recommendation SM.2110.1.

For compatibility class B, the supply device shall operate within the fundamental frequency range of 79 kHz to 90 kHz or 19kHz to 21kHz. Only the fundamental frequency is permitted to be used for power transfer.

For a given charging session, the operating frequency may be selected at low power to be any frequency within the system frequency range; the operating frequency shall remain fixed within $\pm 0,050$ kHz for the duration of that charging session unless the power level is reduced to meet the low power requirement.

For this purpose, low power is a power level less than or equal to 25 % of full power for the specific combination of supply device and EV device, determined as the lower of maximum input (kVA) into the supply device or the rated power out of the EVPC.

NOTE. Will refer the result of decision by ITU-R regarding 22kHz to 25kHz.

7.2.2 Input voltage and kVA levels

The manufacturer shall specify the input voltage range of operation and the rated input kVA.

7.2.3 Output voltage levels

7.2.3.1 Compatibility class A supply device

For a compatibility class A supply device, the reference EVPCs shall provide output voltages at maximum power levels.

7.2.3.2 Compatibility class B supply device

For a compatibility class B supply device, the minimum and maximum output voltages of the EVPC(s) are specified by the manufacturer.

– V_{min} is the minimum output voltage.

– V_{max} is the maximum output voltage.

– V_{range} is equal to $(V_{max} - V_{min})$.

7.2.4 Output power levels

7.2.4.1 Compatibility class A supply device

When the WPT power class of the reference EVPC is the same as or higher than the supply device power class, the maximum power delivered occurs when the input to the supply device is the rated kVA.

When the WPT power class of the reference EVPC is lower than the supply device power class, the maximum power delivered occurs when output of the EVPC is at the EVPC rated power level.

7.2.4.2 Compatibility class B supply device

Supply device shall be able to deliver the rated output power to the EVPC(s) specified by the manufacturer.

7.2.5 Dynamic performance

For the supply device, the following times for shutdown are required.

In the event of an emergency shutdown condition, the supply device shall ramp down its primary device coil current and stop power transfer within 1 s of the identification of emergency shutdown.

In the case of loss of communication between the EVPC and SECC, power shall be reduced to a level that is low enough to meet EMF requirements within 4 s of the loss of communication, including up to 2 s for detection of loss of communication to trigger shutdown. Power shall continue decreasing to zero watts.

When power transfer is set to 0 W or is otherwise stopped, the current in the primary device coil shall be such that all EMF requirements herein are met.

7.3 Power transfer efficiency

Supply device shall support the minimum power transfer efficiency according to Table 2 when operating with a reference EVPC of the same WPT power class at its rated input kVA.

Table 2 - Minimum power transfer efficiency with supply device and EV device of same power class

Alignment	Minimum power transfer efficiency
Center alignment point	85 %
Within alignment tolerance	80 %

Since supply devices might be rated at a WPT power level that is different from that of the EVPC to which it is being asked to provide power, provision for that power level difference is provided in the efficiency requirements as shown in Table 3.

When the supply device is the same power class or is a lower power class than the EVPC the efficiency requirements of Table 3 apply when the supply device is operated at its rated input kVA.

When the supply device is a higher power class than the EVPC the efficiency requirements of Table apply when the output of the EVPC is the maximum rated output.

Table 3 - Minimum power transfer efficiency with different power classes

	Power class difference between supply device and EV device
Alignment	One power class
At center alignment point	82 %
Within alignment tolerance range	77 %

7.4 Alignment

7.4.1 Alignment tolerance area for supply device

The alignment tolerance area relative to the center alignment point for the primary device of a supply device is a rectangle as specified in Table 4.

Table 4 - Alignment tolerance of a primary device

Axis	Alignment tolerance range (mm)
X	(+/-)75
Y	(+/-)100

7.4.2 Secondary device ground clearance and range for supply device

The supply device shall be able to meet the performance requirements as a class Z3 supply device per Table 2.

8 Communication

The communication between the supply device and the EV device exchanges information necessary to start, control and terminate the process of WPT.

The communication and control concept for both compatibility class A supply devices and compatibility class B supply devices are described in IEC 61980-2.

The communication and control requirements for compatibility class A supply devices are described in IEC 61980-2.

The hardware to support the communication as described in IEC 61980-2 between the EVCC and SECC is not specified in this document. See IEC 61980-2 for details.

9 Power transfer interoperability

Interoperability refers to WPT between a supply device and an EV device that were not specifically designed with each other, for example, WPT between devices from different vendors or devices of different power classes.

10 Protection against electric shock

Clause 10 of IEC 61980-1:2020 and IEC 61980-3 is applicable. Specific requirements for H-WPT are under consideration.

11 Specific requirements for WPT systems

Clause 11 of IEC 61980-1:2020 is applicable.

12 Power cable requirements

Clause 11 of IEC 61980-1:2020 is applicable, except as follows:

536

537 The power supply cable should be installed as a litz wire cable in consideration of the rated
538 frequency in the kHz band.

539

540 Insulation resistance and dielectric strength of power cable needs to be measured.

541

542

543 **13 Constructional requirements**

544

545 Clause 13 of IEC 61980-1:2020 is applicable.

546

547

548 **14 Strength of materials and parts**

549

550 Clause 14 of IEC 61980-1:2020 is applicable.

551

552 **15 Service and test conditions**

553

554 Clause 15 of IEC 61980-1:2020 is applicable.

555

556 **16 Electromagnetic compatibility (EMC)**

557

558 Clause 16 of IEC 61980-1:2020, IEC61980-3:2022 is applicable, except as follows:

559

560 Figure 5 shows top views of the recommended vehicle (passenger car) test setup for radiated
561 emissions testing. Within the figures, the following acronyms are used.

562

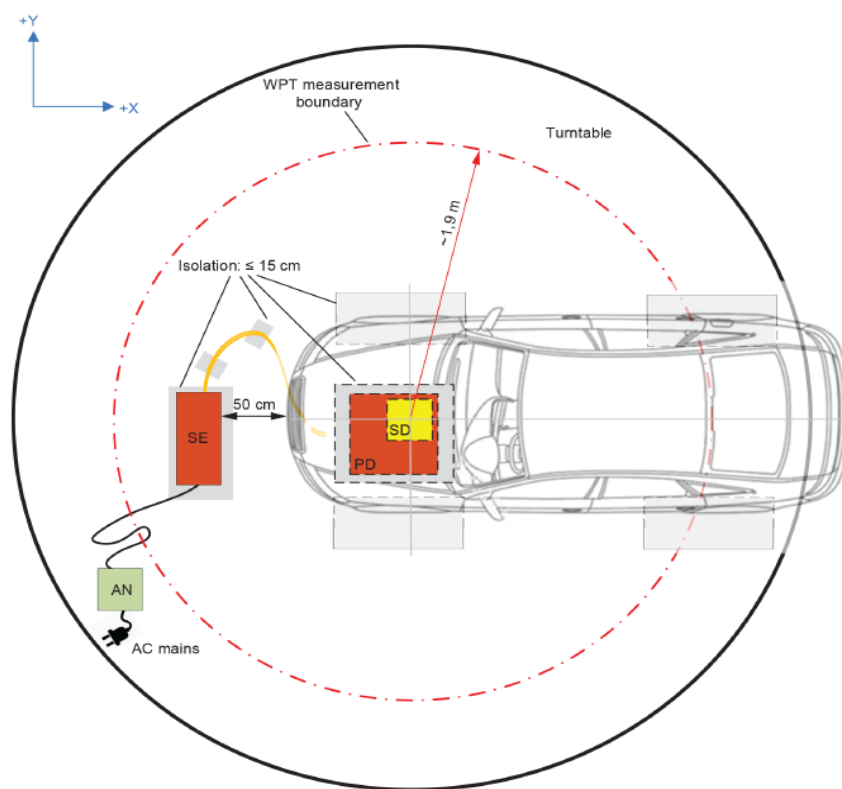
563 – PD – primary device;

564 – SD – secondary device;

565 – SE – supply electronics;

566 – AN – artificial mains network [and/or common mode absorption device (CMAD)].

567



IEC

Figure 5 – Example of an vehicle test setup

Figure 6 shows top views of the recommended vehicle (heavy-duty) test setup(final measurement) for radiated emissions testing in situ measurement.

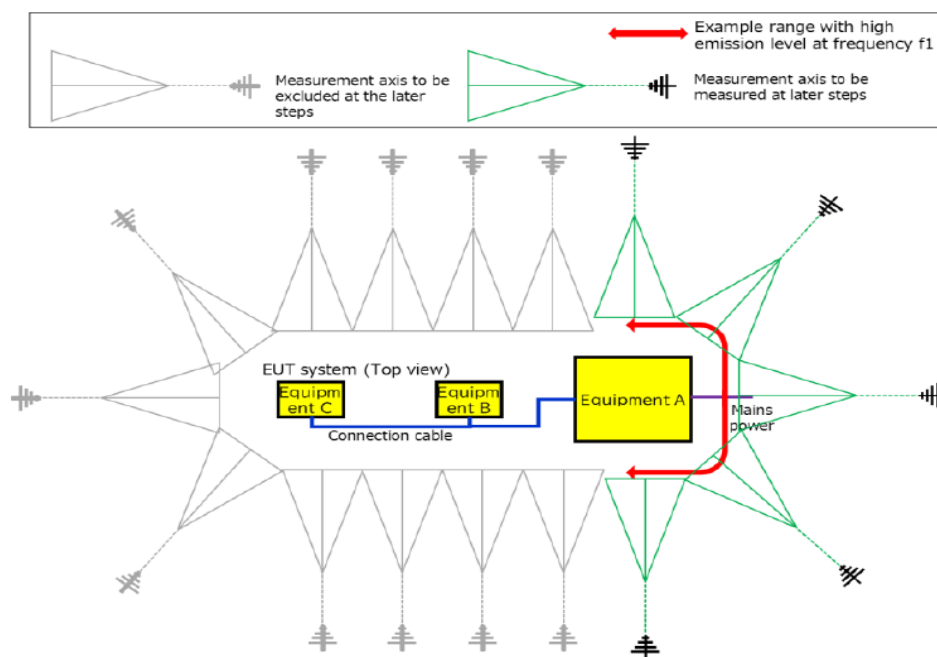


Figure 6 – Example of measurement in situ