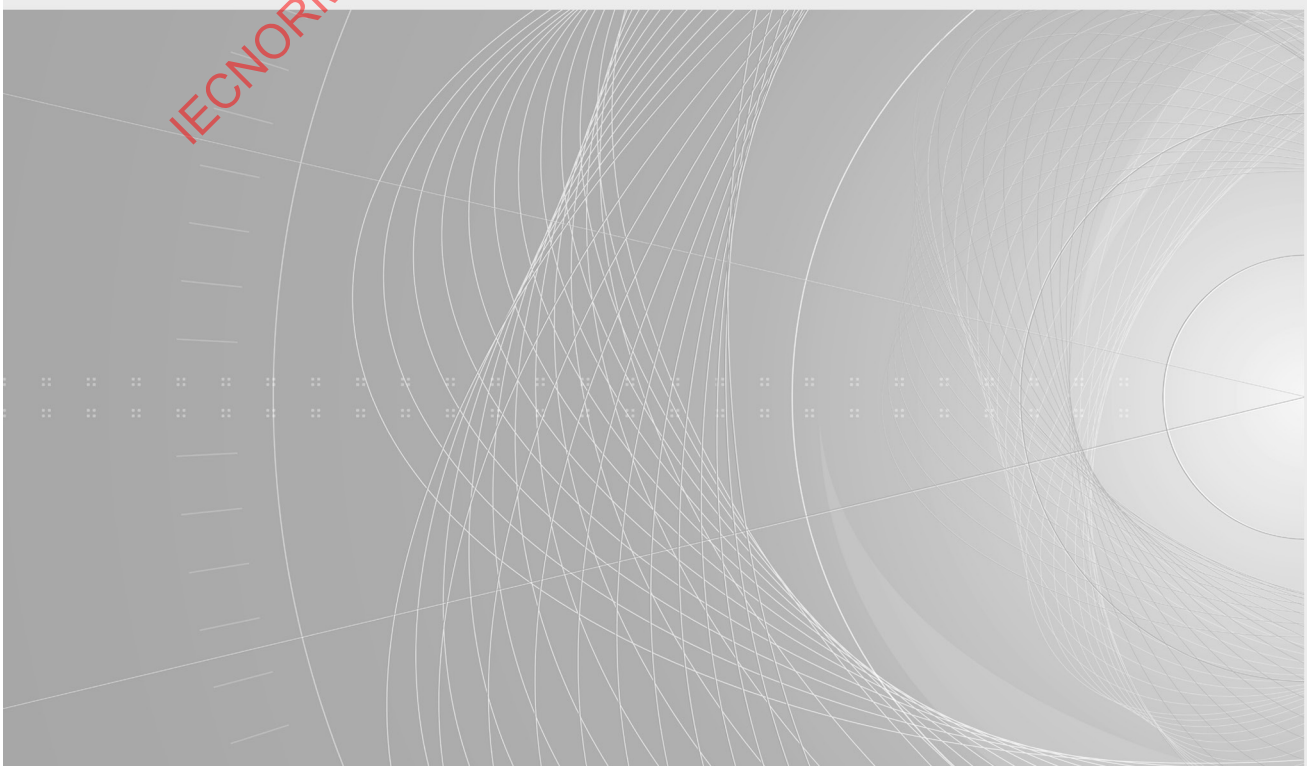
IEC 63563-3

Edition 1.0 2025-02

INTERNATIONAL STANDARD

Qi Specification version 2.0 – Part 3: Mechanical, Thermal, and User Interface



IEC 63563-3:2025-02(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 29.240.99; 35.240.99

ISBN 978-2-8327-0186-7

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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QI SPECIFICATION VERSION 2.0 –

Part 3: Mechanical, Thermal, and User Interface

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IEC 63563-3 has been prepared by technical area 15: Wireless Power Transfer, of IEC technical committee 100: Audio, video and multimedia systems and equipment. It is an International Standard.

It is based on *Qi Specification version 2.0, Mechanical, Thermal, and User Interface* and was submitted as a Fast-Track document.

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

Draft	Report on voting
100/4256/FDIS	100/4278/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.

The structure and editorial rules used in this publication reflect the practice of the organization which submitted it.

This document was 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.

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- withdrawn, or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.

WIRELESS POWER CONSORTIUM

Qi Specification

Mechanical, Thermal, and User Interface

Version 2.0

April 2023

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RELEASE HISTORY

Specification Version	Release Date	Description
2.0	April 2023	Initial release of the v2.0 Qi Specification.

Table of Contents

1 General

The Wireless Power Consortium (WPC) is a worldwide organization that aims to develop and promote global standards for wireless power transfer in various application areas. A first application area comprises flat-surface devices such as mobile phones and chargers in the Baseline Power Profile (up to 5 W) and Extended Power Profile (above 5 W).

1.1 Structure of the Qi Specification

General documents

- Introduction
- Glossary, Acronyms, and Symbols

System description documents

- Mechanical, Thermal, and User Interface
- Power Delivery
- Communications Physical Layer
- Communications Protocol
- Foreign Object Detection
- NFC Tag Protection
- Authentication Protocol

1.2 Scope

The *Qi Specification, Mechanical, Thermal, and User Interface* (this document) identifies basic physical design requirements and guidelines for Power Transmitter and Power Receiver Products, including product and system dimensions, alignment of the products, surface temperature rise, and indications to the user.

1.3 Compliance

All provisions in the *Qi Specification* are mandatory, unless specifically indicated as recommended, optional, note, example, or informative. Verbal expression of provisions in this Specification follow the rules provided in ISO/IEC Directives, Part 2.

Table 1: Verbal forms for expressions of provisions

Provision	Verbal form
requirement	“shall” or “shall not”
recommendation	“should” or “should not”
permission	“may” or “may not”
capability	“can” or “cannot”

1.4 References

For undated references, the most recently published document applies. The most recent WPC publications can be downloaded from http://www.wirelesspowerconsortium.com.

1.5 Conventions

1.5.1 Notation of numbers

- Real numbers use the digits 0 to 9, a decimal point, and optionally an exponential part.
- Integer numbers in decimal notation use the digits 0 to 9.
- Integer numbers in hexadecimal notation use the hexadecimal digits 0 to 9 and A to F, and are prefixed by "0x" unless explicitly indicated otherwise.
- Single bit values use the words ZERO and ONE.

1.5.2 Tolerances

Unless indicated otherwise, all numeric values in the *Qi Specification* are exactly as specified and do not have any implied tolerance.

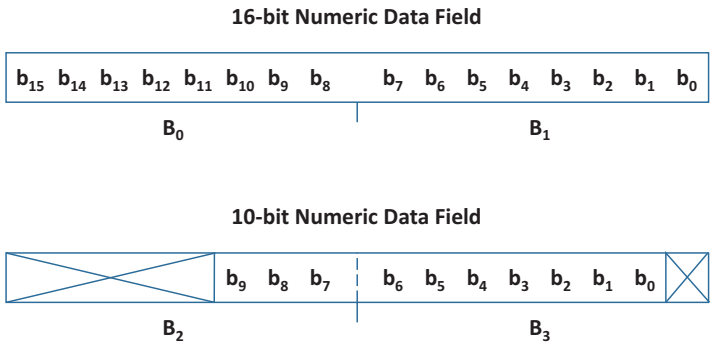
1.5.3 Fields in a data packet

A numeric value stored in a field of a data packet uses a big-endian format. Bits that are more significant are stored at a lower byte offset than bits that are less significant. Table 2 and Figure 1 provide examples of the interpretation of such fields.

Table 2: Example of fields in a data packet

	b_7	b_6	b_5	b_4	b_3	b_2	b_1	b_0
B_0	(msb) 16-bit Numeric Data Field							
B_1								(lsb)
B_2	Other Field					(msb)		
B_3	10-bit Numeric Data Field						(lsb)	Field

Figure 1. Examples of fields in a data packet



1.5.4 Notation of text strings

Text strings consist of a sequence of printable ASCII characters (i.e. in the range of 0x20 to 0x7E) enclosed in double quotes ("). Text strings are stored in fields of data structures with the first character of the string at the lowest byte offset, and are padded with ASCII NUL (0x00) characters to the end of the field where necessary.

EXAMPLE: The text string “WPC” is stored in a six-byte fields as the sequence of characters 'W', 'P', 'C', NUL, NUL, and NUL. The text string “M:4D3A” is stored in a six-byte field as the sequence 'M', ':', '4', 'D', '3', and 'A'.

1.5.5 Short-hand notation for data packets

In many instances, the *Qi Specification* refers to a data packet using the following shorthand notation:

<MNEMONIC>/<modifier>

In this notation, <MNEMONIC> refers to the data packet's mnemonic defined in the *Qi Specification, Communications Protocol*, and <modifier> refers to a particular value in a field of the data packet. The definitions of the data packets in the *Qi Specification, Communications Protocol*, list the meanings of the modifiers.

For example, EPT/cc refers to an End Power Transfer data packet having its End Power Transfer code field set to 0x01.

1.6 Power Profiles

A Power Profile determines the level of compatibility between a Power Transmitter and a Power Receiver. Table 3 defines the available Power Profiles.

- *BPP PTx*: A Baseline Power Profile Power Transmitter.
- *EPP5 PTx*: An Extended Power Profile Power Transmitter having a restricted power transfer capability, i.e. $P_{L}^{(pot)}$ = 5 W.
- *EPP PTx*: An Extended Power Profile Power Transmitter.
- *BPP PRx*: A Baseline Power Profile Power Receiver.
- *EPP PRx*: An Extended Power Profile Power Receiver.

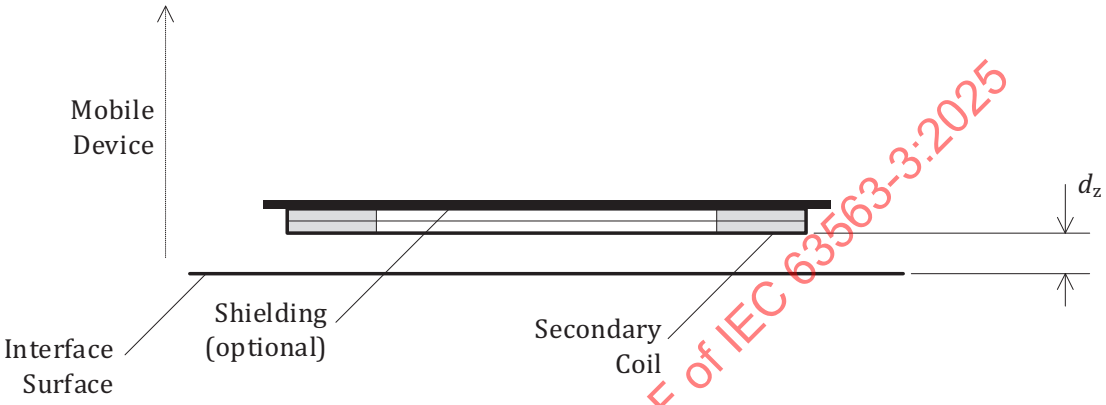
Table 3: Capabilities included in a Power Profile

Feature	BPP PTx	EPP5 PTx	EPP PTx	BPP PRx	EPP PRx
A*x* or B*x* design	Yes	Yes	No	N/A	N/A
MP-A*x* or MP-B*x* design	No	No	Yes	N/A	N/A
Baseline Protocol	Yes	Yes	Yes	Yes	Yes
Extended Protocol	No	Yes	Yes	No	Yes
Authentication	N/A	Optional	Yes	N/A	Optional

2 Power Receiver design requirements

A Power Receiver design shall include a Secondary Coil and an Interface Surface (see Figure 2). The distance from the Secondary Coil to the Interface Surface of the Power Receiver Product shall not exceed d_z = 2.5 mm across the bottom face of the Secondary Coil.

Figure 2. Secondary Coil assembly



3 Mechanical design guidelines (Informative)

3.1 Power Transmitter Product

For the best user experience with respect to wireless power transfer, it is recommended that:

- The Power Transmitter Product Interface Surface extends higher than its surroundings, or has a size of at least 107 mm × 177 mm for the Baseline Power Profile.

For the Extended Power Profile, the recommended Power Transmitter Product Interface Surface dimensions is at least 439 × 329 mm^2.

- The Power Transmitter Product Interface Surface is marked to indicate the location of its Active Area(s)—e.g. by means of the logo or other visual marking, lighting, etc.
- In the case of stand-alone Power Transmitter Products, the Active Area is centered within the Power Transmitter Product Interface Surface.

3.2 Power Receiver Product

The overall shape and size of a Power Receiver Product is dictated by its primary application. For example, cell phones, headsets, and digital (still) cameras, all have substantially different form factors. For the best user experience with respect to wireless power transfer, it is recommended that the mechanical design of a Power Receiver Product follows the guidelines listed below to the extent possible in relation to the primary application of the Power Receiver Product:

- The Power Receiver Product X, Y dimensions do not exceed 107 mm × 177 mm for the Baseline Power Profile.

For the Extended Power Profile, Power Receiver Product X, Y dimensions do not exceed 439 × 329 mm^2.

- The Power Receiver Product Interface Surface is flat.
- The Power Receiver Product Interface Surface is marked to indicate the location of its Active Area, e.g. by means of the logo or other visual marking.
- The location of the Active Area is centered within the Power Receiver Product Interface Surface.

3.3 Power Transmitter Product Alignment Aid

In order to ensure proper coupling between a Power Transmitter Product and a Power Receiver Product, it is recommended that the Power Transmitter Product employs one or more of the following Alignment Aids:

- A movable Active Area.
- A fixed visual marking of the Active Area on Interface Surface.
- Lighting that guides the user to align the Power Receiver Product.
- An audible signal that indicates when alignment is achieved.
- Tactile feedback that indicates when alignment is achieved.

3.4 Power Receiver Product Alignment Aid

In order to ensure proper coupling between a Power Transmitter Product and a Power Receiver Product, it is recommended that the Power Receiver Product employs one or more of the following Alignment Aids:

- An audible signal when alignment is achieved.
- Tactile feedback that indicates when alignment is achieved.
- A visual Response; e.g. a screen lighting up within 200 ms to indicate that power is received.
- An indication of wireless charging.

4 Interface Surface temperature rise

The Power Transmitter Product shall limit the top surface temperature of the thermal Test Power Receiver (TPR-THERMAL-5W or TPR-THERMAL-15W) to at most 12 °C above the ambient temperature, while the Test Power Receiver is operating at its desired Control Point for 1 hour in an environment that is shielded against spurious thermal contributions due to air flow, radiation, etc. It is recommended that the Power Transmitter Product limits the Interface Surface temperature to at most 5 °C above the ambient temperature, while powering the Test Power Receiver for 1 hour.