



SLOVENSKI STANDARD

oSIST prEN IEC 63652-1:2026

01-september-2026

Specifikacije NFC Foruma - 1. del: Brežžično polnjenje NFC

NFC Forum Specifications - Part 1: NFC Wireless Charging

NFC Forum Festlegungen – Teil 1: NFC Drahtloses Laden

Ta slovenski standard je istoveten z: prEN IEC 63652-1:2026

ICS:

33.160.60	Večpredstavni (multimedijski) sistemi in oprema za telekonference	Multimedia systems and teleconferencing equipment
-----------	---	---

oSIST prEN IEC 63652-1:2026

en,fr,de

Sample Document

get full document from standards.iteh.ai

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN IEC 63652-1

July 2026

ICS 33.160.60

English Version

**NFC Forum Specifications - Part 1: NFC Wireless Charging
(IEC 63652-1:2026)**

To be completed
(IEC 63652-1:2026)

NFC Forum Festlegungen - Teil 1: NFC Drahtloses Laden
(IEC 63652-1:2026)

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2026-10-23.

The text of this draft consists of the text of IEC 63652-1:2026.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German).
A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

© 2026 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Project: 83779

Ref. No. prEN IEC 63652-1:2026 E

European foreword

This document (prEN IEC 63652-1:2026) consists of the text of document IEC 63652-1:2026, prepared by IEC/TC 100 "Audio, video and multimedia systems and equipment".

This document is currently submitted to the Enquiry.

The following dates are proposed:

- latest date by which the existence of this document (doa) dav + 6 months
has to be announced at national level
- latest date by which this document has to be (dop) dav + 12 months
implemented at national level by publication of an
identical national standard or by endorsement
- latest date by which the national standards (dow) dav + 36 months
conflicting with this document have to be withdrawn
(to be confirmed or
modified when voting)

This document has been prepared under a standardisation request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

Sample Document

get full document from standards.iteh.ai



IEC 63652-1

Edition 1.0 2026-02

INTERNATIONAL STANDARD

**NFC Forum Specifications -
Part 1: NFC Wireless Charging**

Sample Document

get full document from standards.iteh.ai

INTERNATIONAL ELECTROTECHNICAL COMMISSION

NFC Forum Specifications - Part 1: NFC Wireless Charging

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.

IEC 63652-1 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 Wireless Charging Technical Specification Version 2.0 and was submitted as a Fast-Track document.

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

Draft	Report on voting
100/4399/FDIS	100/4434/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.

NOTE In accordance with ISO/IEC Directives, Part 1, IEC PASs are automatically withdrawn after 4 years.

Sample Document

get full document from standards.iteh.ai



Wireless Charging

Technical Specification

Version 2.0

2021-08-19

[WLC]

NFC Forum™

Copyright © 2018-2021 NFC Forum

Contents

1	Introduction.....	9
1.1	Objectives.....	9
1.2	Applicable Documents or References	9
1.3	Administration.....	10
1.4	Trademark and Logo Usage	10
1.5	Intellectual Property.....	10
1.6	Special Word Usage.....	10
1.7	Requirement Numbering	10
1.8	Notational Conventions.....	11
1.8.1	Notations	11
1.8.2	Values of Parameters	12
1.9	Abbreviations	13
1.10	Glossary.....	14
2	Wireless Charging User Experience	18
2.1	User Experience Model Overview.....	18
3	WLC System Overview.....	19
3.1	Sequence Overview	21
3.2	Functions Properly.....	21
3.3	Wireless Charging Operating Volume	22
3.4	Generic Wireless Charging Support Specifications.....	22
4	Radio Frequency (RF) Interface	24
4.1	Analog Interface	24
4.2	WLC-L Specification Context.....	26
4.3	WLC-P Specification Context Load Modulation Listener to Poller using class 7 WLC-L.....	26
5	Static WPT Power Definition.....	28
6	Negotiated WPT Power Definition.....	29
6.1	Power of a WLC-P.....	29
6.1.1	Specification Purpose.....	29
6.1.2	Specification Context.....	29
6.2	WLC-L Sustainability	30
6.2.1	Specification Purpose.....	31
6.2.2	Specification Context.....	31
7	Reference Equipment.....	34
7.1	The Purpose of the NFC Forum Reference Equipment.....	34
7.2	Reference Wireless Charging Poller	35
7.2.1	Specification Purpose.....	35
7.2.2	Specification Context.....	35
7.3	Reference Wireless Charging Listener.....	37
7.3.1	Specification Purpose.....	37
7.3.2	Specification Context.....	37
8	Foreign Object Detection	39
8.1	Introduction	39
8.2	Types of Foreign Objects	39
8.3	Foreign Object Detection Mechanisms	39

8.4	Foreign Object Detection Requirements	40
8.5	WLC-P Impedance Change Detection	40
8.5.1	Specification Purpose.....	42
8.5.2	Specification Context.....	42
8.5.3	Impedance Change Definition	43
9	WLC-L WPT Stop Request and WLC-P WPT Stop Detection	44
9.1	WPT Stop Request.....	44
10	NFC Link Establishment	47
10.1	WLC-P	47
10.2	WLC-L	48
11	WLC Control Protocol Messages	49
11.1	Protocol Overview	49
11.1.1	Control Protocol Messages.....	49
11.1.2	WLC-L System Level Integration Overview	50
11.1.3	Power Adjustment Generic Timing Requirements	52
11.2	WLC Capability Message (WLC_CAP)	54
11.2.1	Message Overview.....	54
11.2.2	WLC Capability Record.....	55
11.2.4	JiFOD Method Record	71
11.3	WLC Poll Information (WLCP_INFO)	74
11.3.1	Message Overview.....	74
11.3.2	WLC Poll Information Record	74
11.4	WLC Listen Control (WLCL_CTL)	80
11.4.1	Message Overview.....	80
11.4.2	WLC Listen Control Record	81
11.5	WLC Protocol Error.....	90
12	WLC Procedure Flowcharts.....	91
12.1	WLC Procedure Flowchart for the WLC-P.....	91
12.2	WLC Procedure Flowchart for the WLC-L.....	100
A.	Exhibit A.....	106
B.	Parameter Values	107
B.1	WLC OV Parameters	107
B.2	Specification Parameters	107
B.3	Calibration Procedure for the Reference WLC-P	110
B.4	Calibration Procedure for the Reference WLC-L	112
B.5	Orientation and Alignment of NFC Forum Reference Equipment	114
C.	Design Information for NFC Forum Reference Equipment	115
C.1	Reference WLC-P	115
C.1.1	PCB Design of the Reference WLC-Ps.....	115
C.1.2	Reference WLC-P - Bill Of Materials	117
C.1.3	Mechanical Dimensions	119
C.1.4	Reference WLC-P Printed Circuit Board (PCB) Construction	121
C.2	Reference WLC-L.....	121
C.2.1	PCB Design of the Reference WLC-L6 and Reference WLC-L7	121
C.2.2	Reference WLC-L - Bill Of Materials	123
C.2.3	Mechanical Dimensions	125
C.2.4	Reference WLC-L Printed Circuit Board (PCB) Construction	127

C.2.5	Relay Settings of the Reference WLC-Ls	127
C.2.6	Power Class Settings of the Reference WLC-Ls	128
D.	FOD Design Guideline (Informative)	129
D.1	FOD Scenarios.....	129
D.2	JiFOD-A Implementation Guideline (Informative)	130
D.2.1	Record definition for JiFOD-A Method.....	131
D.2.2	WLC-L JiFOD-A Method Record in the WLC_CAP Message	131
D.2.3	WLC-P JiFOD-A Method Record in the WLCP_INFO Message	131
D.2.4	WLC-L JiFOD-A Method Record in the WLCL_CTL Message	133
D.2.5	WLC-P Definitions.....	134
D.2.6	JiFOD-A Operations	134
E.	Revision History	138

Sample Document

get full document from standards.iteh.ai

Figures

Figure 1: NFC Wireless Charging Device User Scenario	18
Figure 2: NFC Wireless Charging System Flowchart.....	20
Figure 3: Example of WLCS Timing Diagram – Negotiated Mode	21
Figure 4: Wireless Charging Operating Volume (WLC OV)	22
Figure 5: Reference WLC-P6 PCB	35
Figure 6: Reference WLC-P7 PCB.....	36
Figure 7: Simplified Reference WLC-Ls Circuit.....	37
Figure 8: Reference WLC-L6 PCB.....	38
Figure 9: Reference WLC-L7 PCB.....	38
Figure 10: Impedance Change Example with Increased Impedance.....	41
Figure 11: Impedance Change Example with Decreased Impedance	41
Figure 12: Example of a Short Time Impedance Change with a Duration of $t_{S,PULSE}$	42
Figure 13: Positive and Negative Impedance Change Cases of the WPT Stop Request	45
Figure 14: WPT Stop Request Section with Detailed Timing Definitions	46
Figure 15: Protocol Architecture.....	49
Figure 16: Message Exchanges for Different WLC-L Implementation Options	52
Figure 17: Operation Field Adjustment Timing Definition.....	53
Figure 18: WLC_CAP Format.....	54
Figure 19: WLCP_INFO Format	74
Figure 20: WLCL_CTL Format.....	80
Figure 21: WLC Procedure – WLC-P Flowchart	92
Figure 22: WLC Procedure – WLC-L Flowchart	100
Figure 23: Calibration Plane of SMA Plug and Socket.....	110
Figure 24: Example of VNA Display while Tuning a Reference WLC-P6.....	111
Figure 25: Example of VNA Display while Tuning a Reference WLC-P7.....	112
Figure 26: Example of VNA Display while Tuning a Reference WLC-L6	113
Figure 27: Example of VNA Display while Tuning a Reference WLC-L7	114
Figure 28: Circuit for the Reference WLC-P6 and Reference WLC-P7	115
Figure 29: PCB Layout for the Reference WLC-P6	115
Figure 30: PCB Layout for the Reference WLC-P7	116
Figure 31: Reference WLC-P6 Top Layer	119
Figure 32: Reference WLC-P6 Bottom Layer	119
Figure 33: Reference WLC-P7 Top Layer	120

Figure 34: Reference WLC-P7 Bottom Layer	120
Figure 35: Circuit for the Reference WLC-L6 and Reference WLC-L7.....	121
Figure 36: PCB Layout for the Reference WLC-L6	122
Figure 37: PCB Layout for the Reference WLC-L7	122
Figure 38: Reference WLC-L6 Top Layer	125
Figure 39: Reference WLC-L6 Bottom Layer.....	125
Figure 40: Reference WLC-L7 Top Layer	126
Figure 41: Reference WLC-L7 Bottom Layer.....	126
Figure 42: FOD Scenarios	129
Figure 43: Initial FOD Timing Diagram	131
Figure 44: JiFOD Timing Definition	134
Figure 45: FOD Method using Impedance Change Monitoring	135
Figure 46: FOD Interval Scheme	135
Figure 47: Initial FOD Sequence – No FO Detection	136
Figure 48: Initial FOD Sequence – FO Detection.....	137

Sample Document

get full document from standards.iteh.ai

Tables

Table 1: Sample Requirement.....	10
Table 2: Notational Conventions	11
Table 3: Abbreviations	13
Table 4: Wireless Charging Control Messages.....	49
Table 5: WLC Capability Record Payload.....	55
Table 6: WLC_PROTOCOL_VER Format.....	55
Table 7: WLC_CONFIG Format	57
Table 8: CAP_WT_INT Format	58
Table 9: NDEF_RD_WT Values	60
Table 10: NDEF_WR_TO_INT Values	62
Table 11: NDEF_WR_WT_INT Values	63
Table 12 WLC Status and Info Record Payload	65
Table 13: CONTROL_BYTE_1 Format.....	66
Table 14: RECEIVE_POWER Field Values.....	67
Table 15: RECEIVE_VOLTAGE Field Values	68
Table 16: RECEIVE_CURRENT Field Values.....	68
Table 17: TEMPERATURE_BATTERY Field Values	69
Table 18: CONTROL_BYTE_2 Format.....	70
Table 19: BATTERY_VOLTAGE Field Values	70
Table 20: BATTERY_CURRENT Field Values	71
Table 21: JiFOD Method Record Payload.....	72
Table 22: WLC Poll Information Record Payload.....	75
Table 23: P_TX Values	75
Table 24: WLC_P Capability Definition.....	76
Table 25: WLC-P_POWER_CLASS Definition	77
Table 26: TOT_POWER_STEPS	77
Table 27: CUR_POWER_STEP.....	78
Table 28: Minimum Step for Power Increase - NEXT_MIN_STEP_INC	78
Table 29: Minimum Step for Power Decrease - NEXT_MIN_STEP_DEC.....	79
Table 30: WLC Listen Control Record Payload	81
Table 31: STATUS_INFO.....	82
Table 32: WPT_CONFIG.....	83
Table 33: POWER_ADJ_REQ Values	85

Table 34: BATTERY_LEVEL Values.....	86
Table 35: DVR_INFO	87
Table 36: HOLD_OFF_WT_INT Values.....	88
Table 37: ERROR_INFO	89
Table 38: Parameters for WLC OV.....	107
Table 39: Parameters for WLC	107
Table 40: Parameters for Reference Equipment Set Up.....	109
Table 41: Calibration values for Reference WLC-P6 and Reference WLC-P7.....	110
Table 42: Calibration Values for Reference WLC-L6 and Reference WLC-L7	113
Table 43: Reference WLC-P6 - Bill Of Materials	117
Table 44: Reference WLC-P7 - Bill Of Materials	118
Table 45: Antenna Relay Settings of the Reference WLC-L.....	127
Table 46: Short Plug Settings of the Reference WLC-L6 and Reference WLC-L7	128
Table 47: FOD Scenarios	129
Table 48: Format of the JiFOD Method Record	132
Table 49: JiFOD_REQ Format	132
Table 50: JiFOD_DURATION_P Values	132
Table 51: Format of the JiFOD Method Record	133
Table 52: JiFOD_DURATION Values	133
Table 53: Revision History	138