

---

**Cestna vozila - Komunikacijski vmesnik med vozilom in omrežjem - 9. del: Preskus skladnosti fizične in podatkovne povezovalne plasti za brezžično komunikacijsko omrežje (ISO 15118-9:2022)**

Road vehicles - Vehicle to grid communication interface - Part 9: Physical and data link layer conformance test for wireless communication (ISO 15118-9:2022)

Straßenfahrzeuge - Kommunikationsschnittstelle zwischen Fahrzeug und Ladestation - Teil 9: Konformitätsprüfungen für die Bitübertragungs- und Sicherungsschicht für drahtlose Kommunikation (ISO 15118-9:2022)

Véhicules routiers - Interface de communication entre véhicule et réseau électrique - Partie 9: Essai de conformité relatif à la couche physique et à la couche liaison de données pour la communication sans-fil (ISO 15118-9:2022)

<https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023>

**Ta slovenski standard je istoveten z: EN ISO 15118-9:2023**

---

**ICS:**

35.100.05	Večslojne uporabniške rešitve	Multilayer applications
43.040.15	Avtomobilska informatika. Vgrajeni računalniški sistemi	Car informatics. On board computer systems

**SIST EN ISO 15118-9:2023**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 15118-9**

October 2023

ICS 43.120

English Version

**Road vehicles - Vehicle to grid communication interface -  
Part 9: Physical and data link layer conformance test for  
wireless communication (ISO 15118-9:2022)**

Véhicules routiers - Interface de communication entre  
véhicule et réseau électrique - Partie 9: Essai de  
conformité relatif à la couche physique et à la couche  
liaison de données pour la communication sans-fil (ISO  
15118-9:2022)

Straßenfahrzeuge - Kommunikationsschnittstelle  
zwischen Fahrzeug und Ladestation - Teil 9:  
Konformitätsprüfungen der Bitübertragungs- und  
Sicherheitsschicht für die drahtlose Kommunikation  
(ISO 15118-9:2022)

This European Standard was approved by CEN on 8 October 2023.

CEN 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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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

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

[SIST EN ISO 15118-9:2023](https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023)

<https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023>



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Contents	Page
European foreword.....	3

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[SIST EN ISO 15118-9:2023](https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023)

<https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023>

## European foreword

The text of ISO 15118-9:2022 has been prepared by Technical Committee ISO/TC 22 "Road vehicles" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 15118-9:2023 by Technical Committee CEN/TC 301 "Road vehicles" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2024, and conflicting national standards shall be withdrawn at the latest by April 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## Endorsement notice

The text of ISO 15118-9:2022 has been approved by CEN as EN ISO 15118-9:2023 without any modification.

[SIST EN ISO 15118-9:2023](https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023)

<https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023>



# INTERNATIONAL STANDARD

# ISO 15118-9

First edition  
2022-11

---

---

## Road vehicles — Vehicle to grid communication interface —

### Part 9: Physical and data link layer conformance test for wireless communication

*Véhicules routiers — Interface de communication entre véhicule et  
réseau électrique —*

*Partie 9: Essai de conformité relatif à la couche physique et à la  
couche liaison de données pour la communication sans-fil*

Document Preview

[SIST EN ISO 15118-9:2023](https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023)

<https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023>



Reference number  
ISO 15118-9:2022(E)

© ISO 2022

ISO 15118-9:2022(E)

# iTeh Standards (<https://standards.iteh.ai>) Document Preview

[SIST EN ISO 15118-9:2023](https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023)

<https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023>



## **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland



# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Abbreviated terms</b> .....	<b>6</b>
<b>5 Conventions</b> .....	<b>7</b>
5.1 Requirement structure.....	7
5.2 Test system description.....	8
<b>6 Test architecture reference model</b> .....	<b>8</b>
6.1 General information.....	8
6.2 Platform adapter interface.....	8
6.3 SUT adapter interfaces.....	9
6.4 Codecs.....	9
<b>7 Test suite conventions</b> .....	<b>10</b>
7.1 General information.....	10
7.2 Test suite structure (TSS).....	10
7.3 Test profiles.....	11
7.3.1 Test configurations.....	12
7.3.2 Components and ports.....	12
7.3.3 Protocol implementation conformance statement (PICS) definition.....	14
7.3.4 Protocol implementation extra information for testing (PIXIT) definition.....	14
7.3.5 Test control.....	15
7.4 Test suite identifiers.....	15
7.4.1 Module identifiers.....	15
7.4.2 Test case identifiers.....	16
7.4.3 Template identifiers.....	16
7.4.4 Function identifiers.....	17
7.4.5 Timer identifiers.....	18
7.4.6 PICS/PIXIT identifiers.....	18
7.4.7 Verdict identifiers.....	19
7.5 Test suite coverage.....	19
7.6 Test case description.....	22
<b>8 Test case descriptions for ISO 15118-8 requirements</b> .....	<b>23</b>
8.1 General information.....	23
8.2 SECC test cases.....	23
8.3 EVCC test cases.....	43
<b>Bibliography</b> .....	<b>72</b>

## ISO 15118-9:2022(E)

### Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives) or [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)) or the IEC list of patent declarations received (see <https://patents.iec.ch>).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html). In the IEC, see [www.iec.ch/understanding-standards](http://www.iec.ch/understanding-standards).

This document was prepared jointly by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*, and Technical Committee IEC/TC 69, *Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks*.

A list of all parts in the ISO 15118 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html) and [www.iec.ch/national-committees](http://www.iec.ch/national-committees).

## Introduction

Resulting from the wireless physical and data link layer requirements defined in ISO 15118-8, a corresponding set of abstract test cases is necessary to verify the conformance of implementations. This document, therefore, defines a conformance test suite for the wireless physical and data link layer protocols in order to derive a common and agreed basis for conformance tests. The resulting test suite is a prerequisite for downstream interoperability tests. Since interoperability furthermore involves the actual application logic of an implementation, those tests are beyond the scope of this document. Hence, this document focuses on the interface aspects and the corresponding requirements given in ISO 15118-8 only.

# iTeh Standards (<https://standards.iteh.ai>) Document Preview

[SIST EN ISO 15118-9:2023](https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023)

<https://standards.iteh.ai/catalog/standards/sist/2953ff7b-cb03-4917-bb1e-c450f4c62fa6/sist-en-iso-15118-9-2023>



# Road vehicles — Vehicle to grid communication interface —

## Part 9:

# Physical and data link layer conformance test for wireless communication

## 1 Scope

This document specifies conformance tests in the form of an abstract test suite (ATS) for a system under test (SUT) implementing an electric-vehicle or supply-equipment communication controller (EVCC or SECC) with support for WLAN-based high-level communication (HLC) according to ISO 15118-8 and against the background of ISO 15118-1. These conformance tests specify the testing of capabilities and behaviours of an SUT, as well as checking what is observed against the conformance requirements specified in ISO 15118-8 and against what the implementer states the SUT implementation's capabilities are.

The capability tests within the ATS check that the observable capabilities of the SUT are in accordance with the static conformance requirements defined in ISO 15118-8. The behaviour tests of the ATS examine an implementation as thoroughly as practical over the full range of dynamic conformance requirements defined in ISO 15118-8 and within the capabilities of the SUT (see NOTE below).

A test architecture is described in correspondence to the ATS. The abstract test cases in this document are described leveraging this test architecture and are specified in descriptive tabular format for the ISO/OSI physical and data link layers (layers 1 and 2).

In terms of coverage, this document only covers normative sections and requirements in ISO 15118-8. This document can additionally refer to specific tests for requirements on referenced standards (e.g. IEEE, or industry consortia standards, like WiFi Alliance) as long as they are relevant in terms of conformance for implementations according to ISO 15118-8. However, it is explicitly not intended to widen the scope of this conformance specification to such external standards, if it is not technically necessary for the purpose of conformance testing for ISO 15118-8. Furthermore, the conformance tests specified in this document do not include the assessment of performance nor robustness or reliability of an implementation. They cannot provide judgments on the physical realization of abstract service primitives, how a system is implemented, how it provides any requested service, nor the environment of the protocol implementation. Furthermore, the abstract test cases defined in this document only consider the communication protocol and the system's behaviour defined ISO 15118-8. The power flow between the EVSE and the EV is not considered.

**NOTE** Practical limitations make it impossible to define an exhaustive test suite, and economic considerations can restrict testing even further. Hence, the purpose of this document is to increase the probability that different implementations are able to interwork. This is achieved by verifying them by means of a protocol test suite, thereby increasing the confidence that each implementation conforms to the protocol specification. However, the specified protocol test suite cannot guarantee conformance to the specification since it detects errors rather than their absence. Thus, conformance to a test suite alone cannot guarantee interworking. Instead, it gives confidence that an implementation has the required capabilities and that its behaviour conforms consistently in representative instances of communication.

## 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.

## ISO 15118-9:2022(E)

ISO 15118-1, *Road vehicles — Vehicle to grid communication interface — Part 1: General information and use-case definition*

ISO 15118-2, *Road vehicles — Vehicle-to-Grid Communication Interface — Part 2: Network and application protocol requirements*

ISO 15118-8:2020, *Road vehicles — Vehicle to grid communication interface — Part 8: Physical layer and data link layer requirements for wireless communication*

ISO 15118-20, *Road vehicles — Vehicle to grid communication interface — Part 20: 2nd generation network layer and application layer requirements*

ETSI ES 201 873-5 V4.9.1<sup>1)</sup>, *Methods for Testing and Specification (MTS) — The Testing and Test Control Notation version 3 — Part 5: TTCN-3 Runtime Interface (TRI) (April 2022)*

ETSI ES 201 873-6 V4.13.1<sup>2)</sup>, *Methods for Testing and Specification (MTS) — The Testing and Test Control Notation version 3 — Part 6: TTCN-3 Control Interface (TCI) (April 2022)*

IEEE 802.11-2012, *IEEE Standard for Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — specific requirements: Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15118-1, ISO 15118-2, ISO 15118-8, ISO 15118-20 and the following apply.

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

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

#### 3.1

##### **abstract test case**

complete and independent specification of the actions required to achieve a specific *test purpose* (3.25), defined at the level of abstraction of a particular abstract test method, starting in a stable testing state and ending in a stable testing state and optionally involves one or more consecutive or concurrent connections

Note 1 to entry: The specification should be complete in the sense that it is sufficient to enable a *test verdict* (3.29) to be assigned unambiguously to each potentially observable test outcome (i.e. sequence of test events).

Note 2 to entry: The specification should be independent in the sense that it should be possible to execute the derived *executable test case* (3.7) in isolation from other such test cases (i.e. the specification should always include the possibility of starting and finishing in the 'idle' state).

[SOURCE: ITU-T X.290:1995, 3.3.3].

#### 3.2

##### **ATS**

abstract test suite

test suite composed of *abstract test cases* (3.1)

[SOURCE: ITU-T X.290:1995, 3.3.6]

1) Available at [https://www.etsi.org/deliver/etsi\\_es/201800\\_201899/20187305/04.09.01\\_60/es\\_20187305v040901p.pdf](https://www.etsi.org/deliver/etsi_es/201800_201899/20187305/04.09.01_60/es_20187305v040901p.pdf).

2) Available at [https://www.etsi.org/deliver/etsi\\_es/201800\\_201899/20187306/04.13.01\\_60/es\\_20187306v041301p.pdf](https://www.etsi.org/deliver/etsi_es/201800_201899/20187306/04.13.01_60/es_20187306v041301p.pdf).