Publicly Available Specification

ISO/PAS 15118-23

First edition
2026-04

Road vehicles — Vehicle to grid communication interface —

Part 23: Second generation network layer and application layer requirements conformance test plan for DC charging

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

Partie 23: Plan de test de conformité aux exigences de la couche réseau et de la couche application de deuxième génération pour la charge en courant continu

Reference number
ISO/PAS 15118-23:2026(en)

© ISO 2026



COPYRIGHT PROTECTED DOCUMENT

© ISO 2026

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
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **2**
4 Abbreviated terms ... **2**
5 Conventions ... **3**
5.1 Requirement structure ... 3
5.2 Test system description ... 3
6 Test architecture reference model ... **3**
6.1 General information ... 3
6.2 Platform adapter ... 3
6.3 SUT adapters ... 3
6.3.1 General information ... 3
6.3.2 IEC 61851-1 SUT adapter ... 3
6.3.3 ISO 15118-20 SUT adapter ... 4
6.3.4 ISO 15118-3 SUT adapter ... 4
6.4 Codecs ... 4
6.5 Test system timer handling ... 4
6.5.1 Definition of test system timers and timeouts ... 4
6.5.2 Test system timer scenarios for SUT SECC ... 4
6.5.3 Test system timer scenarios for SUT EVCC ... 4
7 Test suite conventions ... **5**
7.1 General information ... 5
7.2 Test suite structure (TSS) ... 5
7.3 Test profiles ... 5
7.3.1 General information ... 5
7.3.2 Test configurations ... 5
7.3.3 Protocol implementation conformance statement (PICS) definition ... 6
7.3.4 Protocol implementation extra information for testing (PIXIT) definition ... 6
7.3.5 Test control ... 6
7.3.6 Test system template messages ... 7
7.4 Test suite identifiers ... 7
7.4.1 General information ... 7
7.4.2 Test case identifiers ... 7
7.4.3 PICS/PIXIT identifiers ... 7
7.4.4 Verdict types ... 7
7.5 Test case specification ... 7
8 Test case specification for DC charging ISO 15118-20 requirements ... **7**
8.1 General information ... 7
8.2 Test cases for SUT SECC ... 8
8.2.1 SECC V2GTP test case specifications ... 8
8.2.2 SECC common message flow test case specifications ... 15
8.2.3 SECC DC message flow test case specifications ... 21
8.3 Test cases for SUT EVCC ... 48
8.3.1 EVCC V2GTP test case specifications ... 48
8.3.2 EVCC common message flow test case specifications ... 53
8.3.3 EVCC DC message flow test case specifications ... 58
Annex A (informative) **Test suite coverage** ... **92**
Bibliography ... **98**

© ISO 2026 – All rights reserved

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 or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take 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, ISO and 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 www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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. In the IEC, see 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 and IEC websites.

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 and www.iec.ch/national-committees.

© ISO 2026 – All rights reserved

Introduction

Resulting from the 2nd generation network layer and application layer requirements defined in ISO 15118-20, 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 2nd generation network layer and application layer protocols to derive a common basis for conformance tests. The resulting test suite is a prerequisite for downstream interoperability tests. Since interoperability tests furthermore involve the actual application logic of an implementation, such tests are beyond the scope of this document (see NOTE 1 in the Introduction). Therefore, this document focuses on the communication interface aspects and the corresponding requirements given in ISO 15118-20 only.

The layered structure of the conformance test documents for ISO 15118-20 is shown in Figure 1. The complete set of relevant conformance test documents per charging type is composed of all documents within its column according to Figure 1.

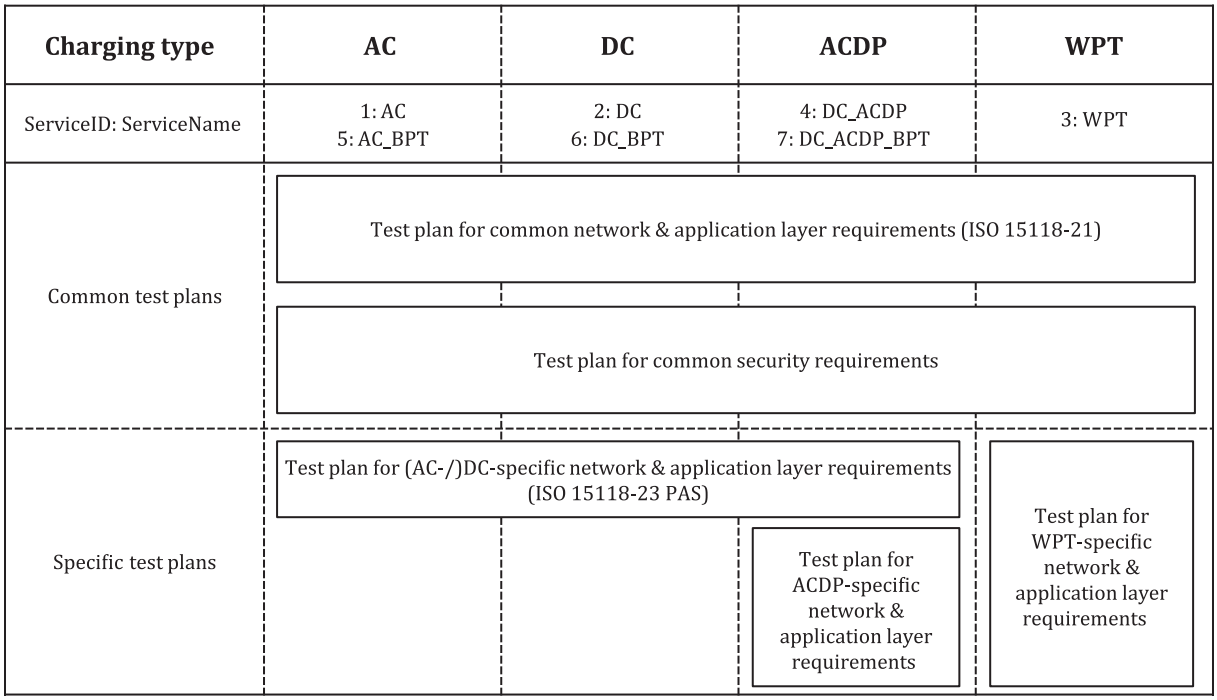


Figure 1 — Overview of mandatory set of conformance test plan documents per charging type

EXAMPLE For a SUT supporting DC-charging the following conformance test plan documents apply:

— test plan for common network & application layer requirements;

— test plan for common security requirements;

— test plan for AC-/DC-specific network and application layer requirements (only DC-specific subset applies, this document).

NOTE 1 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.

NOTE 2 This document generally refers to SUT instead of implementation under test (IUT), due to the black box testing paradigm adopted in this document and related certification processes.

© ISO 2026 – All rights reserved

Road vehicles — Vehicle to grid communication interface —

Part 23:
Second generation network layer and application layer requirements conformance test plan for DC charging

1 Scope

This document specifies conformance tests in the form of an abstract test suite (ATS) for a system under test (SUT) that implements an electric-vehicle communication controller (EVCC) or a supply-equipment communication controller (SECC) for all direct current (DC)-specific requirements specified in ISO 15118-20 that are associated to the DC charging type. 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 15118-20 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 15118-20. The behaviour tests of the ATS examine an implementation as thoroughly as practical over the full range of dynamic conformance requirements defined in ISO 15118-20 and within the capabilities of the SUT.

The test architecture for this document is inherited from the test architecture specified in ISO 15118-21. If further aspects for DC-specific requirements are necessary, they extend this architecture and are specified in this document. The abstract test cases in this document are described leveraging this test architecture and are specified in descriptive tabular format covering the ISO/OSI layer 3 to 7 (network to application layers).

In terms of coverage, this document only covers normative sections and requirements in ISO 15118-20. This document can additionally refer to specific tests for requirements on referenced standards (e.g. IETF RFCs, W3C Recommendation, etc.) if they are relevant in terms of conformance for implementations according to ISO 15118-20. 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 15118-20. 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 15118-20. Power flow between the EVSE and the EV is not a prerequisite for the test cases specified in this document.

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

ISO 15118-20:2022, *Road vehicles — Vehicle to grid communication interface — Part 20: 2nd generation network layer and application layer requirements*

© ISO 2026 – All rights reserved

ISO 15118-21:2025, *Road vehicles — Vehicle to grid communication interface — Part 21: Common 2nd generation network layer and application layer requirements conformance test plan*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15118-1, ISO 15118-20 and ISO 15118-21 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/

4 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply:

ATS	abstract test suite
CP	control pilot
ETT	energy transfer types
EV	electric vehicle
EVCC	electric vehicle communication controller
EVSE	electric vehicle supply equipment
IUT	implementation under test
MTC	maint test component
PICS	protocol implementation conformance statement
PIXIT	protocol implementation extra information for testing
PLC	powerline communication
PTC	parallel test component
SECC	supply equipment communication controller
SUT	system under test
TC	test case
TCP	transport control protocol
TS	test system
TSS	test suite structure
TTCN-3	testing and test control notation version 3
V2G	vehicle-to-grid

© ISO 2026 – All rights reserved