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**Road vehicles — Vehicle to grid  
communication interface —**

**Part 4:  
Network and application protocol  
conformance test**

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

*Partie 4: Essai de conformité du protocole d'application et du réseau*





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<b>Contents</b>	<b>Page</b>
Foreword.....	vii
Introduction.....	viii
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>2</b>
<b>3 Terms and definitions.....</b>	<b>2</b>
<b>4 Symbols (and abbreviated terms) .....</b>	<b>7</b>
<b>5 Conventions .....</b>	<b>8</b>
<b>5.1 Requirement structure.....</b>	<b>8</b>
<b>5.2 Test system description .....</b>	<b>9</b>
<b>6 Test architecture reference model.....</b>	<b>9</b>
<b>6.1 General information .....</b>	<b>9</b>
<b>6.2 Platform adapter interface.....</b>	<b>10</b>
<b>6.3 SUT adapter interfaces .....</b>	<b>10</b>
<b>6.4 Codecs .....</b>	<b>11</b>
<b>7 Test suite conventions .....</b>	<b>11</b>
<b>7.1 General information .....</b>	<b>11</b>
<b>7.2 Test suite structure (TSS).....</b>	<b>11</b>
<b>7.3 Test profiles.....</b>	<b>13</b>
<b>7.4 Test suite identifiers.....</b>	<b>62</b>
<b>7.5 Test suite coverage .....</b>	<b>67</b>
<b>7.6 Test case description.....</b>	<b>184</b>
<b>7.7 Test case specification .....</b>	<b>185</b>
<b>8 Test case descriptions for 15118-2 V2GTP .....</b>	<b>198</b>
<b>8.1 General information .....</b>	<b>198</b>
<b>8.2 SECC test cases .....</b>	<b>198</b>
<b>8.3 EVCC test cases.....</b>	<b>202</b>
<b>9 Test case descriptions for 15118-2 SDP messages.....</b>	<b>208</b>
<b>9.1 General information .....</b>	<b>208</b>
<b>9.2 SECC test cases .....</b>	<b>208</b>
<b>9.3 EVCC test cases.....</b>	<b>211</b>
<b>10 Test case descriptions for 15118-2 V2G application layer messages.....</b>	<b>236</b>
<b>10.1 General information .....</b>	<b>236</b>
<b>10.2 SECC test cases .....</b>	<b>236</b>
<b>10.3 EVCC test cases.....</b>	<b>405</b>
<b>Annex A (normative) Configuration specifications .....</b>	<b>671</b>
<b>A.1 Timer configuration .....</b>	<b>671</b>
<b>A.2 PICS configuration.....</b>	<b>671</b>

<b>A.3</b>	<b>PIXIT configuration</b> .....	<b>673</b>
<b>Annex B (normative) Control part specification</b> .....		<b>675</b>
<b>B.1</b>	<b>SECC control parts</b> .....	<b>675</b>
<b>B.1.1</b>	<b>AC specific control parts</b> .....	<b>675</b>
<b>B.1.2</b>	<b>DC specific control parts</b> .....	<b>675</b>
<b>B.2</b>	<b>EVCC control parts</b> .....	<b>688</b>
<b>B.2.1</b>	<b>AC specific control parts</b> .....	<b>702</b>
<b>B.2.2</b>	<b>DC specific control parts</b> .....	<b>702</b>
<b>Annex C (normative) Test-case specifications for 15118-2 V2GTP</b> .....		<b>745</b>
<b>C.1</b>	<b>SECC test cases</b> .....	<b>745</b>
<b>C.2</b>	<b>EVCC test cases</b> .....	<b>745</b>
<b>Annex D (normative) Test-case specifications for 15118-2 SDP messages</b> .....		<b>752</b>
<b>D.1</b>	<b>SECC test cases</b> .....	<b>752</b>
<b>D.2</b>	<b>EVCC test cases</b> .....	<b>752</b>
<b>Annex E (normative) Test-case specifications for 15118-2 V2G application layer messages</b> .....		<b>773</b>
<b>E.1</b>	<b>SECC test cases</b> .....	<b>773</b>
<b>E.1.1</b>	<b>V2G protocol handshake</b> .....	<b>773</b>
<b>E.1.1.1</b>	<b>SECC test cases for SupportedAppProtocol</b> .....	<b>773</b>
<b>E.1.2</b>	<b>V2G messages</b> .....	<b>773</b>
<b>E.1.2.1</b>	<b>SECC test cases for SessionSetup</b> .....	<b>775</b>
<b>E.1.2.2</b>	<b>SECC test cases for ServiceDiscovery</b> .....	<b>775</b>
<b>E.1.2.3</b>	<b>SECC test cases for ServiceDetail</b> .....	<b>782</b>
<b>E.1.2.4</b>	<b>SECC test cases for PaymentServiceSelection</b> .....	<b>784</b>
<b>E.1.2.5</b>	<b>SECC test cases for PaymentDetails</b> .....	<b>788</b>
<b>E.1.2.6</b>	<b>SECC test cases for Authorization</b> .....	<b>794</b>
<b>E.1.2.7</b>	<b>SECC test cases for ChargeParameterDiscovery</b> .....	<b>794</b>
<b>E.1.2.8</b>	<b>SECC test cases for PowerDelivery</b> .....	<b>799</b>
<b>E.1.2.9</b>	<b>SECC test cases for CertificateUpdate</b> .....	<b>824</b>
<b>E.1.2.10</b>	<b>SECC test cases for CertificateInstallation</b> .....	<b>839</b>
<b>E.1.2.11</b>	<b>SECC test cases for SessionStop</b> .....	<b>839</b>
<b>E.1.2.12</b>	<b>SECC test cases for ChargingStatus</b> .....	<b>842</b>
<b>E.1.2.13</b>	<b>SECC test cases for MeteringReceipt</b> .....	<b>846</b>
<b>E.1.2.14</b>	<b>SECC test cases for CableCheck</b> .....	<b>848</b>
<b>E.1.2.15</b>	<b>SECC test cases for PreCharge</b> .....	<b>852</b>
<b>E.1.2.16</b>	<b>SECC test cases for CurrentDemand</b> .....	<b>855</b>
<b>E.1.2.17</b>	<b>SECC test cases for WeldingDetection</b> .....	<b>859</b>
<b>E.2</b>	<b>EVCC test cases</b> .....	<b>860</b>
<b>Annex F (normative) Function specifications for supporting test execution</b> .....		<b>1009</b>

<b>F.1</b>	<b>Configuration functions</b> .....	<b>1009</b>
<b>F.2</b>	<b>Pre-condition functions</b> .....	<b>1009</b>
<b>F.2.1</b>	<b>SECC functions</b> .....	<b>1011</b>
<b>F.2.2</b>	<b>EVCC functions</b> .....	<b>1027</b>
<b>F.3</b>	<b>Post-condition functions</b> .....	<b>1027</b>
<b>F.3.1</b>	<b>SECC functions</b> .....	<b>1038</b>
<b>F.3.2</b>	<b>EVCC functions</b> .....	<b>1038</b>
<b>F.4</b>	<b>Common behavior functions</b> .....	<b>1039</b>
<b>F.4.1</b>	<b>SECC functions</b> .....	<b>1040</b>
<b>F.4.2</b>	<b>EVCC functions</b> .....	<b>1042</b>
<b>F.5</b>	<b>Library functions</b> .....	<b>1044</b>
<b>Annex G (normative) Function specifications for 15118-2 V2GTP</b> .....		<b>1051</b>
<b>G.1</b>	<b>SECC functions</b> .....	<b>1051</b>
<b>G.2</b>	<b>EVCC functions</b> .....	<b>1053</b>
<b>Annex H (normative) Function specifications for 15118-2 SDP messages</b> .....		<b>1056</b>
<b>H.1</b>	<b>SECC functions</b> .....	<b>1056</b>
<b>H.2</b>	<b>EVCC functions</b> .....	<b>1057</b>
<b>Annex I (normative) Function specifications for 15118-2 V2G application layer messages</b> ....		<b>1061</b>
<b>I.1</b>	<b>SECC functions</b> .....	<b>1061</b>
<b>I.1.1</b>	<b>V2G protocol handshake</b> .....	<b>1061</b>
<b>I.1.1.1</b>	<b>SECC functions for SupportedAppProtocol</b> .....	<b>1061</b>
<b>I.1.2</b>	<b>V2G messages</b> .....	<b>1063</b>
<b>I.1.2.1</b>	<b>SECC functions for SessionSetup</b> .....	<b>1063</b>
<b>I.1.2.2</b>	<b>SECC functions for ServiceDiscovery</b> .....	<b>1064</b>
<b>I.1.2.3</b>	<b>SECC functions for ServiceDetail</b> .....	<b>1072</b>
<b>I.1.2.4</b>	<b>SECC functions for PaymentServiceSelection</b> .....	<b>1080</b>
<b>I.1.2.5</b>	<b>SECC functions for PaymentDetails</b> .....	<b>1087</b>
<b>I.1.2.6</b>	<b>SECC functions for Authorization</b> .....	<b>1091</b>
<b>I.1.2.7</b>	<b>SECC functions for ChargeParameterDiscovery</b> .....	<b>1104</b>
<b>I.1.2.8</b>	<b>SECC functions for PowerDelivery</b> .....	<b>1140</b>
<b>I.1.2.9</b>	<b>SECC functions for CertificateUpdate</b> .....	<b>1154</b>
<b>I.1.2.10</b>	<b>SECC functions for CertificateInstallation</b> .....	<b>1167</b>
<b>I.1.2.11</b>	<b>SECC functions for SessionStop</b> .....	<b>1176</b>
<b>I.1.2.12</b>	<b>SECC functions for ChargingStatus</b> .....	<b>1176</b>
<b>I.1.2.13</b>	<b>SECC functions for MeteringReceipt</b> .....	<b>1185</b>
<b>I.1.2.14</b>	<b>SECC functions for CableCheck</b> .....	<b>1197</b>
<b>I.1.2.15</b>	<b>SECC functions for PreCharge</b> .....	<b>1203</b>
<b>I.1.2.16</b>	<b>SECC functions for CurrentDemand</b> .....	<b>1207</b>

I.1.2.17	SECC functions for WeldingDetection.....	1213
I.2	EVCC functions.....	1217
Annex J (normative) Template specifications for V2G TCP/TLS Port Control .....		1373
Annex K (normative) Template specifications for 15118-2 V2GTP.....		1375
K.1	Common templates.....	1375
Annex L (normative) Template specifications for 15118-2 SDP messages.....		1376
L.1	Common templates.....	1376
Annex M (normative) Template specifications for 15118-2 V2G application layer messages		1377
M.1	Common templates.....	1377
M.1.1	V2G protocol handshake .....	1378
M.1.1.1	CMN templates for SupportedAppProtocol .....	1378
M.1.2	V2G messages .....	1378
M.1.2.1	CMN templates for SessionSetup.....	1378
M.1.2.2	CMN templates for ServiceDiscovery.....	1378
M.1.2.3	CMN templates for Authorization .....	1381
M.1.2.4	CMN templates for PowerDelivery .....	1381
M.1.2.5	CMN templates for SessionStop .....	1383
M.1.2.6	CMN templates for ChargingStatus.....	1384
M.1.2.7	CMN templates for CableCheck.....	1384
M.1.2.8	CMN templates for PreCharge .....	1385
M.1.2.9	CMN templates for CurrentDemand.....	1385
M.1.2.10	CMN templates for WeldingDetection .....	1387
M.2	SECC templates.....	1387
M.3	EVCC templates .....	1397
Annex N (normative) Template specifications for Security.....		1430
N.1	Common templates.....	1430
Annex O (normative) Data type definitions.....		1434
O.1	Data types for PICS.....	1434
O.2	Data types for PIXIT .....	1434
O.3	Data types for V2G TCP/TLS Port Control .....	1436
O.4	Data types for V2GTP .....	1437
O.5	Data types for SDP messages.....	1438
O.6	Data types for V2G messages .....	1438
O.7	Data types for Security .....	1457

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 ISO documents 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)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO 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)).

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For an explanation on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html)

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Electrical and electronic equipment*, and Technical Committee IEC/TC 69 *Electric road vehicles and electric industrial trucks*. The draft was circulated for voting to the national bodies of both ISO and IEC.

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

## Introduction

The first three parts of ISO 15118 describe the use cases and the technical specification of the Vehicle-to-Grid Communication Interface which is intended for the optimized use of energy resources so that electric road vehicles can recharge in the most economic or most energy efficient way. It is furthermore required to develop efficient and convenient billing systems in order to cover the resulting micro-payments. The necessary communication channel may serve in the future to contribute to the stabilization of the electrical grid as well as to support additional information services required to operate electric vehicles efficiently and economically.

The complexity resulting from the network and application protocol requirements defined in the second part of the standard requires a considerable amount of testing in order to enable interoperability between independent implementations. This document therefore defines a conformance test suite for the network and application layer protocols in order to derive a common and agreed basis for conformance tests. The resulting test suite is a necessary 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 part two only.



# Road vehicles — Vehicle to grid communication interface — Part 4: Network and application protocol conformance test

## 1 Scope

This document specifies conformance tests in the form of an Abstract Test Suite (ATS) for a System Under Test (SUT) implementing an EVCC or SECC according to ISO 15118-2. These conformance tests specify the testing of capabilities and behaviors of an SUT as well as checking what is observed against the conformance requirements specified in ISO 15118-2 and against what the supplier 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 15118-2. The behavior tests of the ATS examine an implementation as thoroughly as is practical over the full range of dynamic conformance requirements defined in ISO 15118-2 and within the capabilities of the SUT (see NOTE).

A test architecture is described in correspondence to the ATS. The conformance test cases in this document are described leveraging this test architecture and are specified in TTCN-3 Core Language for ISO/OSI Network Layer (Layer 3) and above. The conformance test cases for the Data Link Layer (Layer 2) and Physical Layer (Layer 1) are described in ISO 15118-5. Test cases with overlapping scopes are explicitly detailed.

This document does not include specific tests of other standards referenced within ISO 15118-2, e.g. IETF RFCs. 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 test cases defined in this document only consider the communication protocol defined ISO 15118-2. Power flow between the EVSE and the EV is not considered.

**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. What it does do is give confidence that an implementation has the required capabilities and that its behavior conforms consistently in representative instances of communication.

**NOTE 2** This document has some interdependencies to the conformance tests defined in ISO 15118-5 which result from ISO/OSI cross layer dependencies in the underlying protocol specification (e.g. for sleep mode)

## 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 61851-1:2017, *Electric vehicle conductive charging system — Part 1: General requirements*

ISO 15118-1:2013, *Road vehicles — Vehicle to grid communication interface — Part 1: General information and use-case definition*

ISO 15118-2:2014, *Road vehicles — Vehicle-to-Grid Communication Interface — Part 2: Network and application protocol requirements*

ISO 15118-3:2015, *Road vehicles — Vehicle-to-Grid Communication Interface — Part 3: Physical and data link layer requirements*

ETSI ES 201 873-5 V4.6.1, *TTCN-3: TTCN-3 Runtime Interface (June 2014)*

ETSI ES 201 873-6 V4.6.1, *TTCN-3: TTCN-3 Control Interface (June 2014)*

NOTE 1 Even though the technical specification ISO 15118-2:2014, which is the baseline for this conformance test document, explicitly references IEC 61851-1:2011, this document references IEC 61851-1:2017 because of applicability on the market.