



BSI Standards Publication

Road vehicles — Vehicle to grid communication interface

Part 21: Common 2nd generation network layer and
application layer requirements conformance test plan

National foreword

This British Standard is the UK implementation of EN ISO 15118-21:2025. It is identical to ISO 15118-21:2025.

The UK participation in its preparation was entrusted to Technical Committee PEL/69, Electric vehicles.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2025

ISBN 978 0 539 21095 8
ICS 43.120

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2025.

Amendments/corrigenda issued since publication

Date	Text affected

English Version

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

Véhicules routiers - Interface de communication entre
véhicule et réseau électrique - Partie 21: Plan de test de
conformité aux exigences communes de la couche
réseau et de la couche application de 2ème génération
(ISO 15118-21:2025)

Straßenfahrzeuge - Kommunikationsschnittstelle
zwischen Fahrzeug und Ladestation - Teil 21:
Allgemeiner Konformitätsprüfplan für 2. Generation
Anforderungen an das Netzwerk- und
Anwendungsprotokoll (ISO 15118-21:2025)

This European Standard was approved by CEN on 24 July 2025.

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European foreword

This document (EN ISO 15118-21:2025) has been prepared by Technical Committee ISO/TC 22 "Road vehicles " in collaboration with 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of an identical text or by endorsement, at the latest by April 2026, and conflicting national standards shall be withdrawn at the latest by April 2026.

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The text of ISO 15118-21:2025 has been approved by CEN as EN ISO 15118-21:2025 without any modification.

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Abbreviated terms	6
5 Conventions	7
5.1 Requirement structure	7
5.2 Test system (TS) description	8
6 Test architecture reference model	8
6.1 General information	8
6.2 Platform adapter	8
6.3 SUT adapters	9
6.3.1 General information	9
6.3.2 IEC 61851-1 SUT adapter	9
6.3.3 ISO 15118-20 SUT adapter	10
6.3.4 ISO 15118-3 SUT adapter	11
6.3.5 ISO 15118-8 SUT adapter	11
6.4 Codecs	11
6.5 Test system (TS) timer handling	12
6.5.1 Definition of test system (TS) timers and timeouts	12
6.5.2 Test system timer scenarios for SUT SECC	13
6.5.3 Test system timer scenarios for SUT EVCC	14
7 Test suite conventions	17
7.1 General information	17
7.2 Test suite structure (TSS)	17
7.3 Test profiles	18
7.3.1 General information	18
7.3.2 Test configurations	19
7.3.3 Protocol implementation conformance statement (PICS) definition	19
7.3.4 Protocol implementation extra information for testing (PIXIT) definition	22
7.3.5 Test control	24
7.3.6 TS template messages	24
7.4 Test suite identifiers	24
7.4.1 General information	24
7.4.2 Test case identifiers	24
7.4.3 PICS/PIXIT identifiers	25
7.4.4 Verdict types	25
7.5 Test case specification	26
8 Test case specification for common ISO 15118-20 requirements	27
8.1 General information	27
8.2 Test cases for SUT SECC	27
8.2.1 SECC SDP test case specifications	27
8.2.2 SECC V2GTP test case specifications	30
8.2.3 SECC common V2G message flow test case specifications	46
8.3 Test cases for SUT EVCC	150
8.3.1 EVCC SDP test case specifications	150
8.3.2 EVCC V2GTP test case specifications	151
8.3.3 EVCC common V2G message flow test case specifications	165
Annex A (informative) Test suite coverage	262
Annex B (normative) TS template messages for SUT type EVCC	299

Annex C (normative) Test system template messages for SUT type SECC	307
Annex D (normative) Test system functions for dynamic data elements in template messages	315
Bibliography	321

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).

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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*, and with the European Committee for Standardization (CEN) Technical Committee CEN/TC 301, *Road vehicles*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Introduction

Resulting from the 2nd generation network layer and application layer requirements for the vehicle to grid communication interface specified in ISO 15118-20, a corresponding set of abstract test cases is necessary to verify the conformance of implementations. Hence, this document specifies 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 also involve the actual application logic of an implementation, such tests are beyond the scope of this document (see NOTE 1). 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 with reference to ISO 15118-20 is shown in [Figure 1](#). The complete set of relevant conformance test documents per charging type is composed of all the documents within its column according to [Figure 1](#).

Charging Type	AC	DC	ACDP	WPT
ServiceID: ServiceName	1: AC 5: AC_BPT	2: DC 6: DC_BPT	4: DC_ACDP 7: DC_ACDP_BPT	3: WPT
Common test plans	Test plan for common network & application layer requirements (ISO 15118-21)			
	Test plan for common security requirements			
Specific test plans	Test plan for AC-/DC-specific network & application layer requirements			Test plan for WPT-specific network & application layer requirements
			Test plan for ACDP-specific network & application layer requirements	

Figure 1 — Overview of relevant conformance test plans for ISO 15118-20 per charging type

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

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

NOTE 1 Practical limitations make it impossible to specify 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 a conforming 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 15118-21:2025(en)

NOTE 3 This document has some interdependencies to the conformance tests specified in ISO 15118-5 and ISO 15118-9 which result from ISO/OSI cross layer dependencies in the underlying protocol specification (e.g. for sleep mode).

Road vehicles — Vehicle to grid communication interface —

Part 21:

Common 2nd generation network layer and application layer requirements conformance test plan

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 common requirements specified in ISO 15118-20 that are independent of a particular charging type (AC, DC, ACD, WPT charging). 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 specified 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 specified in ISO 15118-20 and within the capabilities of the SUT.

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 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 additionally refers 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, or the environment of the protocol implementation. Furthermore, the abstract test cases specified in this document only consider the communication protocol and the system's behaviour specified in ISO 15118-20. Power flow between the EVSE and the EV is no 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 15118-3, *Road vehicles — Vehicle to grid communication interface — Part 3: Physical and data link layer requirements*

ISO 15118-5:2018, *Road vehicles — Vehicle to grid communication interface — Part 5: Physical layer and data link layer conformance test*

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

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

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

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

IEC 61851-23, *Electric vehicle conductive charging system — Part 23: DC electric vehicle charging station*

ETSI ES 201 873-5 V4.9.1¹⁾, *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 V4.13.1²⁾, *Methods for Testing and Specification (MTS) — The Testing and Test Control Notation version 3 — Part 6: TTCN-3 Control Interface (TCI) (April 2022)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15118-1, ISO 15118-3, 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)

Note 1 to entry: See ITU-T X.290.

Note 2 to entry: This specification is 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 can involve one or more consecutive or concurrent connections.

Note 3 to entry: The specification is 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 4 to entry: The specification is independent in the sense that it is possible to execute the derived *executable test case* (3.7) in isolation from other such test cases (i.e. the specification always includes the possibility of starting and finishing in the “idle” state).

3.2

abstract test suite

ATS

collection of *abstract test cases* (3.1) with reference to a given requirement specification

Note 1 to entry: See ITU-T X.290.

3.3

black box testing

method of testing that examines the behaviour of an *system under test (SUT)* (3.20) without considering the internal implementation and structure of the SUT, thus relying on the SUT's open interface for testing

1) Available at 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.

3.4

conformance requirement

requirement for implementation of a real open system which is claimed to conform to the relevant specification(s) that can be validated by *black box testing* (3.3)

Note 1 to entry: The set of conformance requirements together define the behaviour of the system and its communication. Conformance of a real open system is, therefore, expressed at two levels, conformance to each individual requirement and conformance to the set. In this document, applicable conformance tests include requirements as far as they can be validated by black box testing.

Note 2 to entry: See also *static conformance requirements* (3.19) and *dynamic conformance requirements* (3.6).

Note 3 to entry: The requirements for this conformance specification are specified in ISO 15118-20.

3.5

conforming implementation

system under test (3.20) which satisfies both *static conformance requirements* (3.19) and *dynamic conformance requirements* (3.6), consistent with the capabilities stated in the *protocol implementation conformance statements* (3.16)

Note 1 to entry: See ITU-T X.290.

3.6

dynamic conformance requirement

requirement which specifies what observable behaviour is permitted by the relevant specification(s) in instances of communication

Note 1 to entry: See ITU-T X.290.

Note 2 to entry: The requirements for this conformance specification are specified in ISO 15118-20.

3.7

executable test case

realization of an *abstract test case* (3.1)

Note 1 to entry: See ITU-T X.290.

3.8

expected behaviour

exact response of the *system under test* (3.20) according to the underlying protocol specification to the stimulus defined in the *test behaviour* (3.21)

3.9

implementation conformance statement

ICS

statement made by the supplier of a *system under test* (3.20) claimed to conform to a given specification, stating which capabilities have been implemented

Note 1 to entry: See ITU-T X.290.

Note 2 to entry: The given document for this conformance specification is ISO 15118-20.

3.10

implementation extra information for testing

IXIT

statement made by a supplier or implementer of a *system under test (SUT)* (3.20) which contains or references all information [in addition to that given in the *implementation conformance statement* (3.9)] related to the SUT and its testing environment, which enables the test laboratory to run an appropriate test suite against the SUT

Note 1 to entry: See ITU-T X.290.

3.11

implementation under test

IUT

implementation of one or more open system interconnection protocols in an adjacent user/provider relationship, being part of a real open system, which is to be studied by testing

Note 1 to entry: See ITU-T X.290.

3.12

main test component

MTC

single test component in a test component configuration responsible for creating and controlling *parallel test components* (3.13) and computing and assigning the *test verdict* (3.29)

Note 1 to entry: See ITU-T X.292.

3.13

parallel test component

PTC

test component created by the *main test component* (3.12)

Note 1 to entry: See ITU-T X.292.

3.14

post-condition

test steps needed to define the path from the end of the *test behaviour* (3.21) up to the finishing stable state for the *abstract test case* (3.1)

3.15

pre-condition

test steps needed to define the path from the starting stable state of the *abstract test case* (3.1) up to the initial state from which the *test behaviour* (3.21) starts

3.16

protocol implementation conformance statement

PICS

implementation conformance statement (3.9) for an implementation or system claimed to conform to a given protocol specification

Note 1 to entry: See ITU-T X.290.

Note 2 to entry: The given protocol document for this conformance specification is ISO 15118-20.

3.17

protocol implementation extra information for testing

PIXIT

implementation extra information for testing (3.10) related to testing for conformance to a given protocol specification

Note 1 to entry: See ITU-T X.290.

Note 2 to entry: The given protocol document for this conformance specification is ISO 15118-20.

3.18

runtime environment

environment that describes the operating system and corresponding platform requirements of a system

3.19

static conformance requirement

requirement that specifies the limitations on the combinations of implemented capabilities permitted in a real open system which is claimed to conform to the relevant specification(s)

Note 1 to entry: See ITU-T X.290.

Note 2 to entry: The requirements for this conformance specification are specified in ISO 15118-20.

3.20
system under test
SUT

real open system in which the *implementation under test* ([3.11](#)) resides

Note 1 to entry: See ITU-T X.290.

3.21
test behaviour

set of test steps (test body) to achieve the *test purpose* ([3.25](#)) and assign *verdicts* ([3.29](#)) to the possible outcomes

3.22
test control interface
TCI

four interfaces that define the interaction of the TTCN-3 executable with the test management, the coding and decoding, the test component handling and the logging in a *test system* ([3.26](#))

Note 1 to entry: See ETSI ES 201 873-6 V4.13.1.

3.23
test execution
TE

interpretation or execution of an *abstract test suite* ([3.2](#))

Note 1 to entry: Conceptually, the test execution can be decomposed into three interacting entities: an executable test suite, a *test framework* ([3.24](#)) and an optional internal encoding/decoding system entity.

Note 2 to entry: See ETSI ES 201 873-5 V4.9.1.

3.24
test framework
TFW

entity to perform all actions of *executable test cases* ([3.7](#)) or functions

Note 1 to entry: The test framework interacts with the test management, system under test adaptor and platform adaptor entities via *test control interface* ([3.22](#)) and *test runtime interface* ([3.27](#)). It also manages the executable test suite (ETS) and the encoding/decoding system (EDS) entities. The test framework initializes adaptors as well as ETS and EDS entities. This entity performs all the actions necessary to properly start the execution of a test case or function with parameters in the ETS entity. It queries the test management entity for module parameter values required by the ETS and sends logging information to it. It also collects and resolves associated *verdicts* ([3.29](#)) returned by the ETS entity.

Note 2 to entry: See also ETSI ES 201 873-5 V4.9.1.

Note 3 to entry: In this document, the test framework TTCN-3 runtime system is used to explain a test framework functionality.

3.25
test purpose

prose description of a well-defined objective of testing, focusing on a single *static conformance requirement* ([3.19](#)) or *dynamic conformance requirement* ([3.6](#)) or a set as specified in the appropriate OSI specification

Note 1 to entry: See ITU-T X.290.

EXAMPLE Verifying the support of a specific value of a specific parameter.

3.26**test system**

real system combining the *test framework* (3.24), *abstract test suite* (3.2), *test execution* (3.23) and adapters as well as codecs

Note 1 to entry: The test system typically also contains a common *runtime environment* (3.18) based on an operating system.

3.27**test runtime interface****TRI**

two interfaces that define the interaction of the TTCN-3 executable between the *system under test* (3.20) and the platform adapter and the system adapter in a *test system* (3.26)

Note 1 to entry: See ETSI ES 201 873-6 V4.13.1.

3.28**test system interface****TSI**

test component that provides a mapping of the ports available in the (abstract) TTCN-3 *test system* (3.26) to those offered by a real test system

Note 1 to entry: See ETSI ES 201 873-6 V4.13.1.

3.29**verdict****test verdict**

statement of “pass”, “fail” or “inconclusive”, as specified in an *abstract test case* (3.1), concerning conformance of a *system under test* (3.20) with respect to that test case when it is executed

Note 1 to entry: See ITU-T X.290.

4 Abbreviated terms

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

AP	(wireless) access point
APUT	access point under test
ATS	abstract test suite
CP	control pilot
ETT	energy transfer types
EV	electric vehicle
EVCC	electric vehicle communication controller
EVSE	electric vehicle supply equipment
EXI	efficient XML interchange
HAL	hardware abstraction layer
HPGP	Homeplug Green PHY
ICS	implementation conformance statement
IUT	implementation under test

IXIT	implementation extra information for testing
MTC	main test component
PICS	protocol implementation conformance statement
PIXIT	protocol implementation extra information for testing
PLC	powerline communication
PP	proximity pilot
PTC	parallel test component
SDP	session description protocol
SECC	supply equipment communication controller
STA	(wireless) station
STAUT	station under test
SUT	system under test
TC	test case
TCI	test control interface
TCI-CD	TCI-coding and decoding
TE	test execution
TRI	TTCN-3 runtime interface
TS	test system
TSS	test suite structure
TTCN-3	testing and test control notation version 3
UDP	user data protocol
V2G	vehicle-to-grid
WLAN	wireless local area network

5 Conventions

5.1 Requirement structure

This document uses unique number identifiers for each individual requirement. This requirement structure allows for easier requirement tracking and management. The following format is used throughout this document:

'[V2G'Y'-'XXX']' requirement text

Where:

- 'V2G' represents the ISO 15118 series;
- Y represents the document part of the ISO 15118 series, for this document Y = 21;

- XXX represents the individual requirement number;
- 'requirement text' includes the actual text of the requirement.

5.2 Test system (TS) description

TTCN-3 is used in this document to specify the TS architecture and the conventions for the abstract test suite. TTCN-3 is, however, not mandatory for the implementation of a conformance TS according to this document.

[V2G21-001] The implementers of conformance tests shall verify that the test purposes implemented in their executable test cases are identical to the abstract test cases described in this document.

NOTE In this document, test cases are not programmatically specified in TTNC-3 core language.

6 Test architecture reference model

6.1 General information

Figure 2 provides an overview of the test architecture for this document. Subclauses 6.2, 6.3 and 6.4 specify the interface requirements Figure 2 for platform adapters and SUT adapters and all applicable codecs.

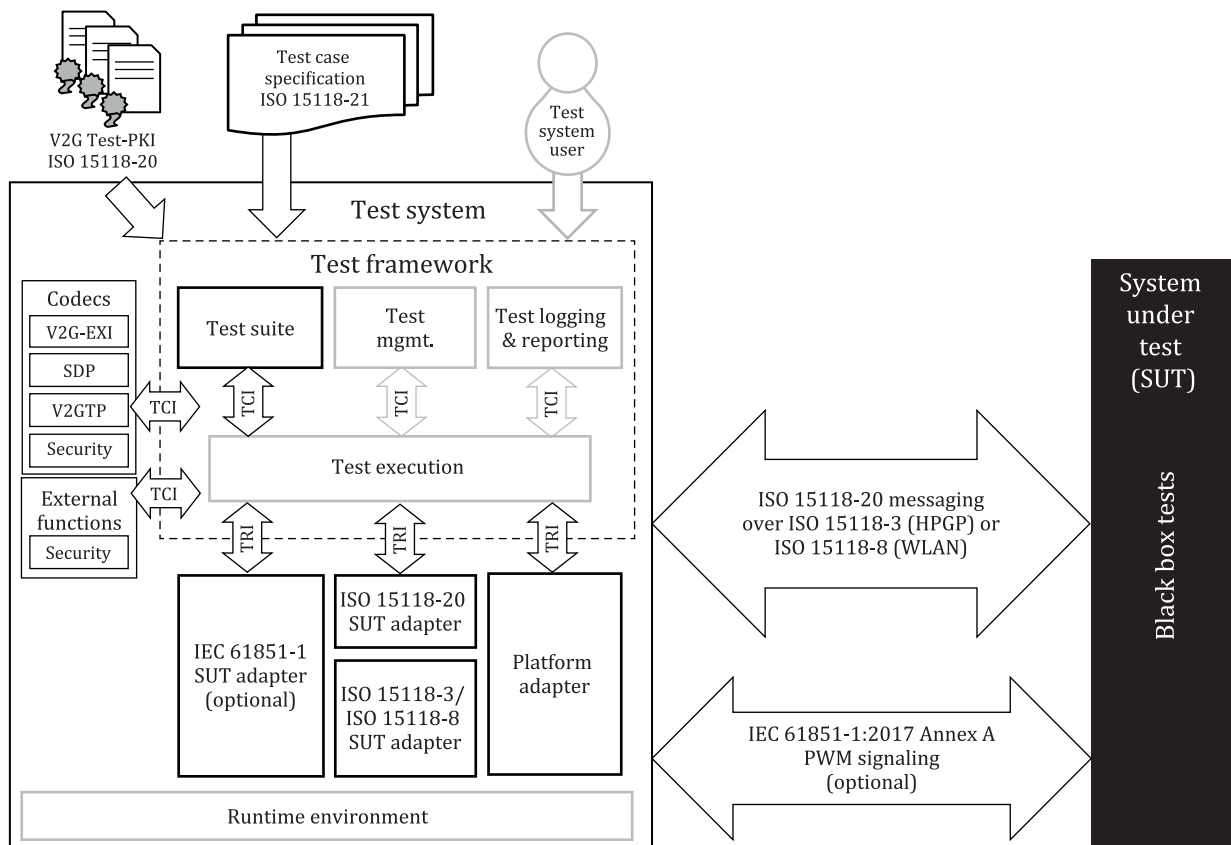


Figure 2 — Test architecture reference model

6.2 Platform adapter

The platform adapter within the TS is responsible for timers and external functions. Besides means for timers, which are typically provided as part of the test framework, no external functions are specified for this document.

[V2G21-002] The platform adapter of the TS shall follow the principles of the TriPlatformPA and the TriPlatformTE interfaces (see TRI in [Figure 2](#)) as specified in ETSI ES 201 873-5 V4.9.1:2022, 6.5.3.

6.3 SUT adapters

6.3.1 General information

The SUT adapter within the TS adapts the TTCN-3 communication operations to the SUT based on an abstract TS interface and implements the real TS interface. It is responsible to propagate message requests and procedure-based calls from the test execution (see [Figure 2](#)) to the SUT, and to notify the test execution of any received test events.

[V2G21-003] Any SUT adapter of the TS shall implement the TriCommunicationSA and the TriCommunicationTE interfaces (see TRI in [Figure 2](#)) as specified in ETSI ES 201 873-5 V4.9.1:2022, 6.5.2.

NOTE The actual implementation of these adapters is beyond the scope of this document.

6.3.2 IEC 61851-1 SUT adapter

The IEC 61851-1 SUT adapter implements a parallel test component (PTC) for the control pilot (CP) and proximity pilot (PP) signalling specified in IEC 61851-1:2017 Annex A. It continuously controls and/or observes the positive voltage (state), frequency, duty cycle and the proximity resistor value during the entire test case execution in accordance with the specified valid range of values as specified in IEC 61851-1:2017, Annex A.

[V2G21-004] The IEC 61851-1 SUT adapter as shown in [Figure 2](#) shall adapt the functions as specified in [subclauses 6.3.2.1](#) to [6.3.2.3](#) to the CP or PP signal

NOTE 1 The IEC 61851-1 SUT adapter involves a hardware component for these adaptations. The corresponding electrical requirements on the CP or PP line, such as accuracy, resolution, or measurement bandwidth, etc. are beyond the scope of this document. For further information on such requirements refer to IEC 61851-1:2017 Annex A and Reference [\[3\]](#).

NOTE 2 For AC charging systems, the underlying application requirements for CP and PP considered in this document are specified in IEC 61851-1.

NOTE 3 For DC charging systems, the underlying application requirements for CP and PP considered in this document are specified in IEC 61851-1 and IEC 61851-23.

NOTE 4 Applicability of IEC 61851-1 SUT adapter depends on underlying test configuration as specified in [subclause 7.3.2](#)

6.3.2.1 Requirements of IEC 61851-1 SUT adapter for SECC or EVCC testing

[V2G21-005] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a function to get the current CP state or associated voltage level.

[V2G21-006] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a call-back function via the PTC which reports change events of the current CP state or associated voltage level.

[V2G21-007] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a function to set the PP on the SUT side.

[V2G21-008] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a function to get the PP resistor value from the SUT side.

[V2G21-009] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a call-back function via the PTC)which reports change events of the resistor value of the PP from the SUT side.

- [V2G21-010] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a function to get the CP duty cycle in percentage.
- [V2G21-011] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a call-back function via the PTC which reports changes of the CP duty cycle in percentage.
- [V2G21-012] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a function to get the CP frequency in hertz.
- [V2G21-013] The IEC 61851-1 SUT adapter for SECC or EVCC testing shall provide a call-back function via the PTC which reports change events of the CP frequency in hertz.

6.3.2.2 Requirements of IEC 61851-1 SUT adapter for SECC testing

- [V2G21-014] The IEC 61851-1 SUT adapter for SECC testing shall provide a function to set the current CP state or associated voltage level. States B, C and D or the associated voltage level shall be supported. Other voltage levels are optional.

6.3.2.3 Requirements of IEC 61851-1 SUT adapter for EVCC testing

- [V2G21-015] The IEC 61851-1 SUT adapter for EVCC testing shall provide a function to set the current CP state or associated voltage level. States E and F or the associated voltage level shall be supported. Other voltage levels are optional.
- [V2G21-016] The IEC 61851-1 SUT adapter for EVCC testing shall provide a function to set the current CP duty cycle in percentage. The values 5 %, and 7 %–98 % shall be supported. Other values are optional.
- [V2G21-017] The IEC 61851-1 SUT adapter for EVCC testing shall provide a function to set current CP frequency in hertz [Hz]. A value of 1 000 Hz ± 5 % shall be supported. Other values are optional.
- [V2G21-018] The IEC 61851-1 SUT adapter for EVCC testing shall provide a function to switch on/off the CP line to simulate an un-plug or plug-in for the SUT. State A or the associated voltage level shall be supported. Another voltage level is optional.

6.3.3 ISO 15118-20 SUT adapter

- [V2G21-019] The ISO 15118-20 SUT adapter as shown in [Figure 2](#) shall send/receive the encoded SDP requests/responses through UDP messages to/from the SUT as specified in ISO 15118-20.
- [V2G21-020] The ISO 15118-20 SUT as shown in [Figure 2](#) adapter shall send/receive the encoded V2G messages through a TLS connection to/from the SUT as specified in ISO 15118-20.
- [V2G21-021] The ISO 15118-20 SUT adapter as shown in [Figure 2](#) shall support internal control messages for TLS connection management.

NOTE 1 The TCP/TLS connection management includes the following functionalities:

- a) control for TCP/TLS port disconnection handling;
- b) control for receiving information / status on a given TCP/TLS connection;
- c) notification of TCP connection status events;
- d) notification of TLS Handshake status events.

- [V2G21-022] The ISO 15118-20 SUT adapter as shown in [Figure 2](#) shall provide additional parameters for TCP and TLS connection configuration.

NOTE 2 The TCP/TLS connection configuration includes the following functionalities:

- a) configuration for IP address and port;
- b) configuration for usage of security (TCP/TLS);
- c) configuration for cipherSuite;
- d) configuration for TLS protocol version;
- e) configuration for TLS certificate.

6.3.4 ISO 15118-3 SUT adapter

[V2G21-023] For an HPGP-based SUT the ISO 15118-3 SUT adapter as shown in [Figure 2](#) shall be implemented in accordance with ISO 15118-5:2018, 6.3.

NOTE 1 Applicability of ISO 15118-3 SUT adapter depends on underlying test configuration as specified in [subclause 7.3.2](#)

6.3.5 ISO 15118-8 SUT adapter

[V2G21-024] For a WLAN-based SUT the ISO 15118-8 SUT adapter as shown in [Figure 2](#) shall be implemented in accordance with ISO 15118-9:2022, 6.3.

NOTE 1 Applicability of ISO 15118-8 SUT adapter depends on underlying test configuration as specified in [subclause 7.3.2](#)

6.4 Codecs

A codec is responsible for the external encoding and decoding of the TS's internal data representation into bit strings suitable to be sent to the SUT. The test execution (TE) determines which codec shall be used and passes the TS's data representation into the appropriate encoder to obtain the encoded data. Received data is decoded in this entity by using the appropriate decoder, which translates the received data into TS's data representation that can be matched against expected values or templates.

[V2G21-025] All codecs in this document shall follow the principles of the TCI-CD interface as specified in ETSI ES 201 873-6 V4.13.1:2022, 7.3.2.

NOTE 1 For conformance testing in this document, the V2G-EXI, SDP, V2GTP, and security codecs (see [Figure 2](#)) are used to encode or decode messages consumable by the tester into bit strings/signals consumable by the SUT.

NOTE 2 The exact implementation of these codecs is beyond the scope of this document.

[V2G21-026] The V2G-EXI codec shall encode message values of the TS into corresponding EXI streams in accordance with ISO 15118-20:2022, 7.9.1.

[V2G21-027] The security codec shall encode message values of the TS for X.509 Certificates into a corresponding Base64 representation suitable for EXI streams in accordance with ISO 15118-20:2022, 7.9.2.

[V2G21-028] The V2G-EXI codec shall decode EXI streams in accordance with ISO 15118-20:2022, 7.9.1 into message values of the TS.

[V2G21-029] The V2G-EXI codec shall validate decoded EXI streams for correct grammar according to the XML schema specified in ISO 15118-20 and indicate a fault if a decoded EXI stream is not well-formed.

[V2G21-030] The security codec shall decode Base64 representation of X.509 certificates from EXI streams and decode DER representation in accordance with ISO 15118-20:2022, 7.9.2 into message values of the TS for X.509 certificates.

- [V2G21-031] The SDP codec shall encode message values of the TS into corresponding SDP requests/responses in accordance with ISO 15118-20:2022, 7.10.1.
- [V2G21-032] The SDP codec shall decode SDP requests/responses in accordance with ISO 15118-20:2022, 7.10.1 into message values of the TS.
- [V2G21-033] The SDP codec shall validate decoded SDP messages for correct format in accordance with ISO 15118-20:2022, 7.10.1 and indicate a fault if a decoded SDP message is not well-formed.
- [V2G21-034] The V2GTP codec shall encode message values of the TS into corresponding V2GTP envelopes in accordance with ISO 15118-20:2022, 7.8.
- [V2G21-035] The V2GTP codec shall decode V2GTP envelopes in accordance with ISO 15118-2:2022, 7.8 into message values of the TS.
- [V2G21-036] The V2GTP codec shall validate decoded V2GTP messages for correct format in accordance with ISO 15118-20:2022, 7.8 and indicate a fault if a decoded V2GTP message is not well-formed.

6.5 Test system (TS) timer handling

6.5.1 Definition of test system (TS) timers and timeouts

For test control and verdict building on timer related test cases, the TS uses internal timers that are specified in this subclause. [Table 1](#) lists all relevant TS specific observation and termination timers in this document.

Table 1 — ISO 15118-21 Test system timers

Time/timeout	Description
SDP_Msg_Observation_Timer	SDP message observation timer in the EVCC
SDP_Sequence_Observation_Timer	SDP sequence observation timer in the SECC
V2G_EVCC_Msg_Observation_Timer	V2G message observation timer in the EVCC
V2G_SECC_CommunicationSetup_Observation_Timer	V2G CommunicationSetup observation timer in the SECC
V2G_SECC_Sequence_Observation_Timer	V2G sequence observation timer in the SECC
V2G_SECC_NotificationMaxDelay_Observation_Timer	V2G NotificationMaxDelay observation timer in the SECC
V2G_EVCC_Ongoing_Observation_Timer	V2G Ongoing observation timer in the EVCC
V2G_SECC_CommunicationSetup_Termination_Timer	V2G CommunicationSetup termination timer in the SECC
V2G_SECC_Sequence_Termination_Timer	V2G sequence termination timer in the SECC
V2G_EVCC_Msg_Termination_Timer	V2G message termination timer in the EVCC
TLS_Connection_Termination_Timer	Common TLS connection termination timer
T_match_leave_Termination_Timer	Common data link connection termination timer

[Table 2](#) lists all relevant TS specific timeouts in this document.

Table 2 — ISO 15118-21 Test system timings and timeouts

Time/timeout	Value [s]	Description
V2G_SECC_NotificationMaxDelay_Timeout	5	Timeout for EVCC reaction to messages containing EVSENotification according to the format specified in [V2G20-1338].
TLS_Connection_Termination_Timeout	5	Timeout for the TLS connection termination
T_match_leave_Termination_Timeout	25	Timeout for the data link termination
SDP_Msg_Timeout	0,25	Timeout for receipt of SDP response message after SDP request message
SDP_Sequence_Timeout	20	Timeout for receipt of SDP request message after data link detection

6.5.2 Test system timer scenarios for SUT SECC

This subclause specifies relevant timer handling scenarios for test systems of SUT SECC with reference to the test system timers and timeouts specified in 6.5.1.

Figure 3 shows the TS timer handling for EVCC message timeout scenarios for SUT SECC.

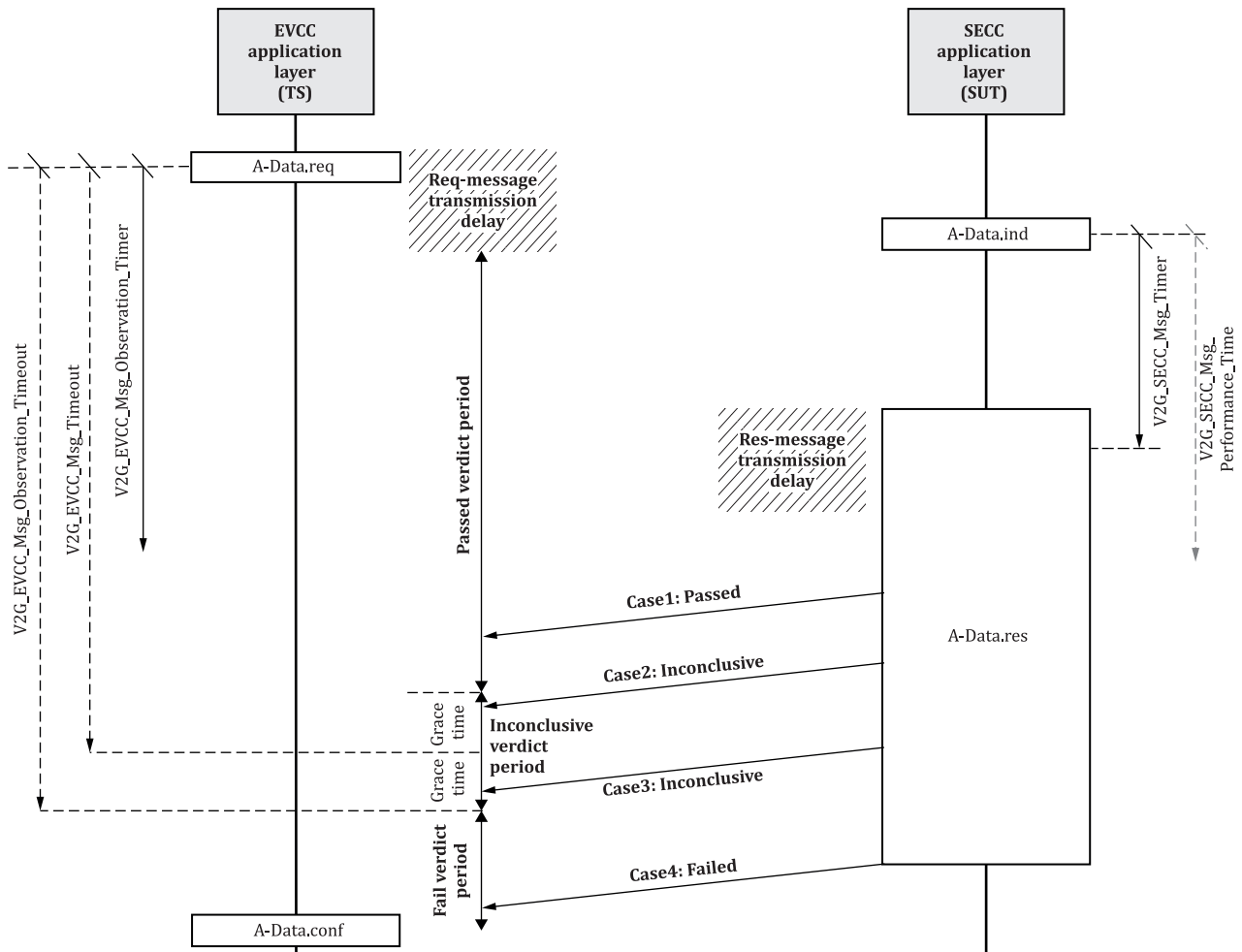


Figure 3 — Test system timer handling for EVCC message timeout scenarios for SUT SECC

Figure 4 shows the TS timer handling for SECC sequence timeout scenarios triggered by the SUT (SECC).

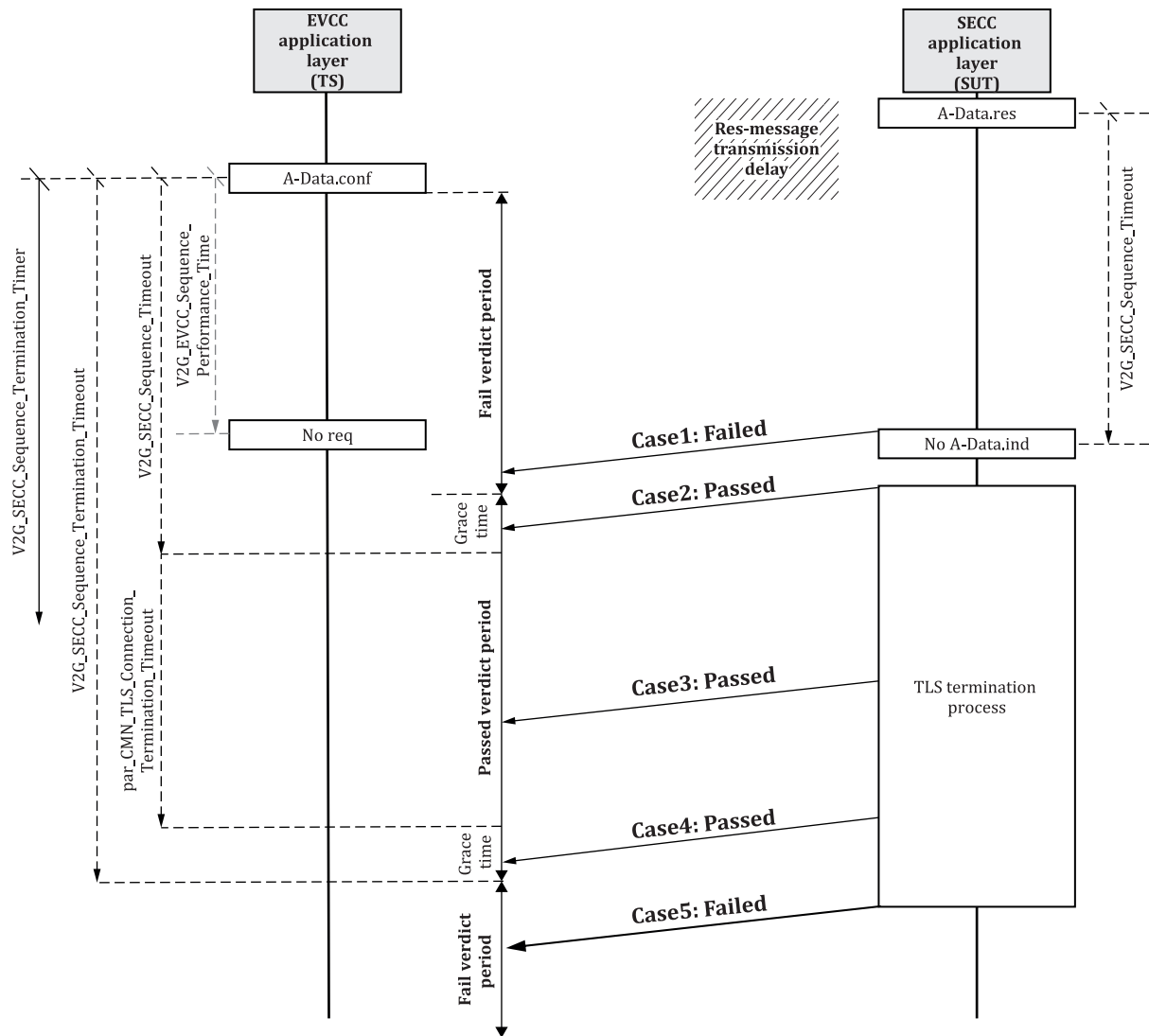


Figure 4 — Test system timer handling for SECC sequence timeout scenarios (triggered by SECC timeout)

6.5.3 Test system timer scenarios for SUT EVCC

This subclause specifies relevant timer handling scenarios for test systems of SUT EVCC with reference to the test system timers and timeouts specified in [6.5.1](#).

[Figure 5](#) shows the TS timer handling for SECC sequence timeout scenarios for SUT EVCC.

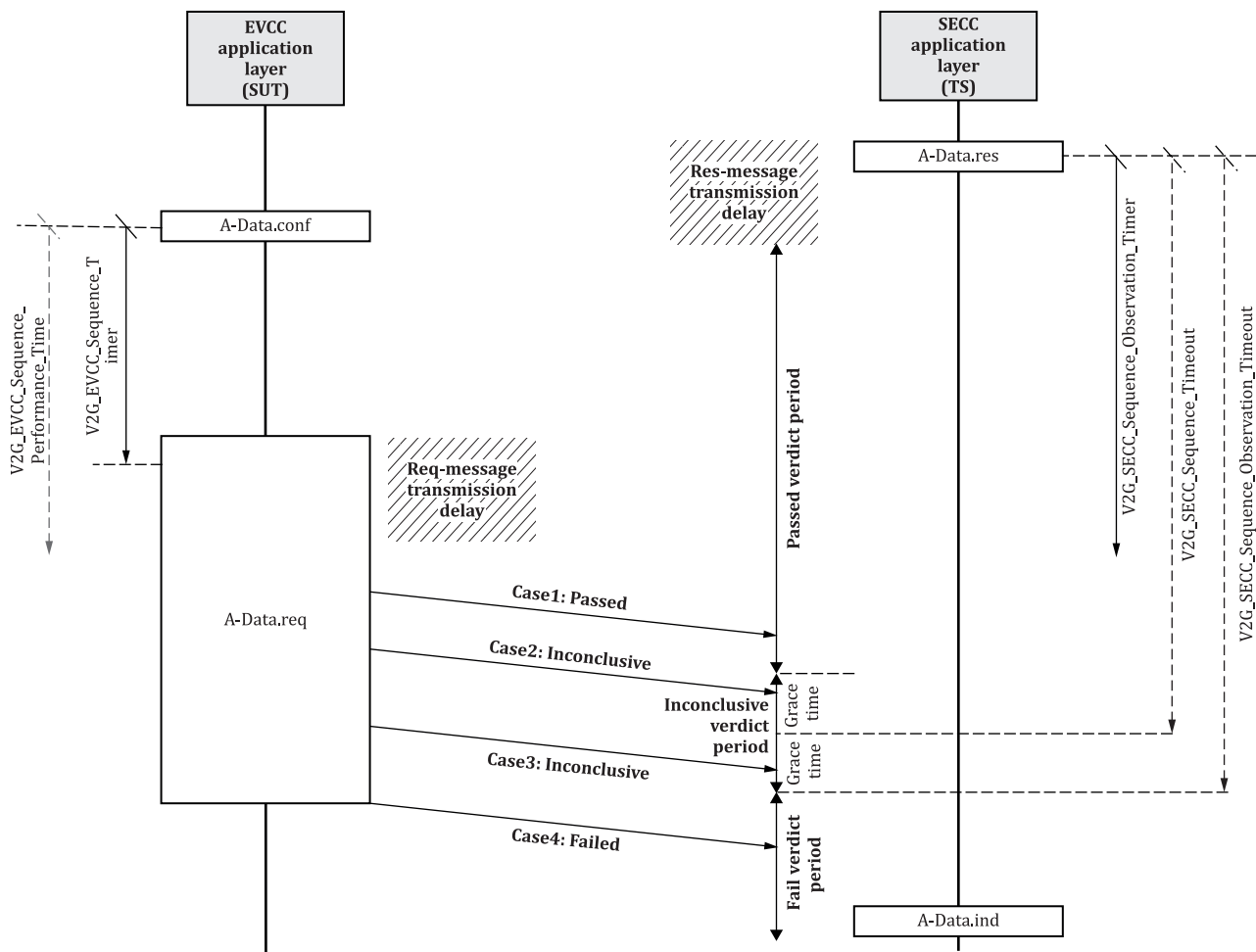


Figure 5 — Test system timer handling for SECC sequence timeout scenarios for SUT EVCC

Figure 6 shows the TS timer handling for EVCC message timeout scenarios triggered by the SUT (EVCC).

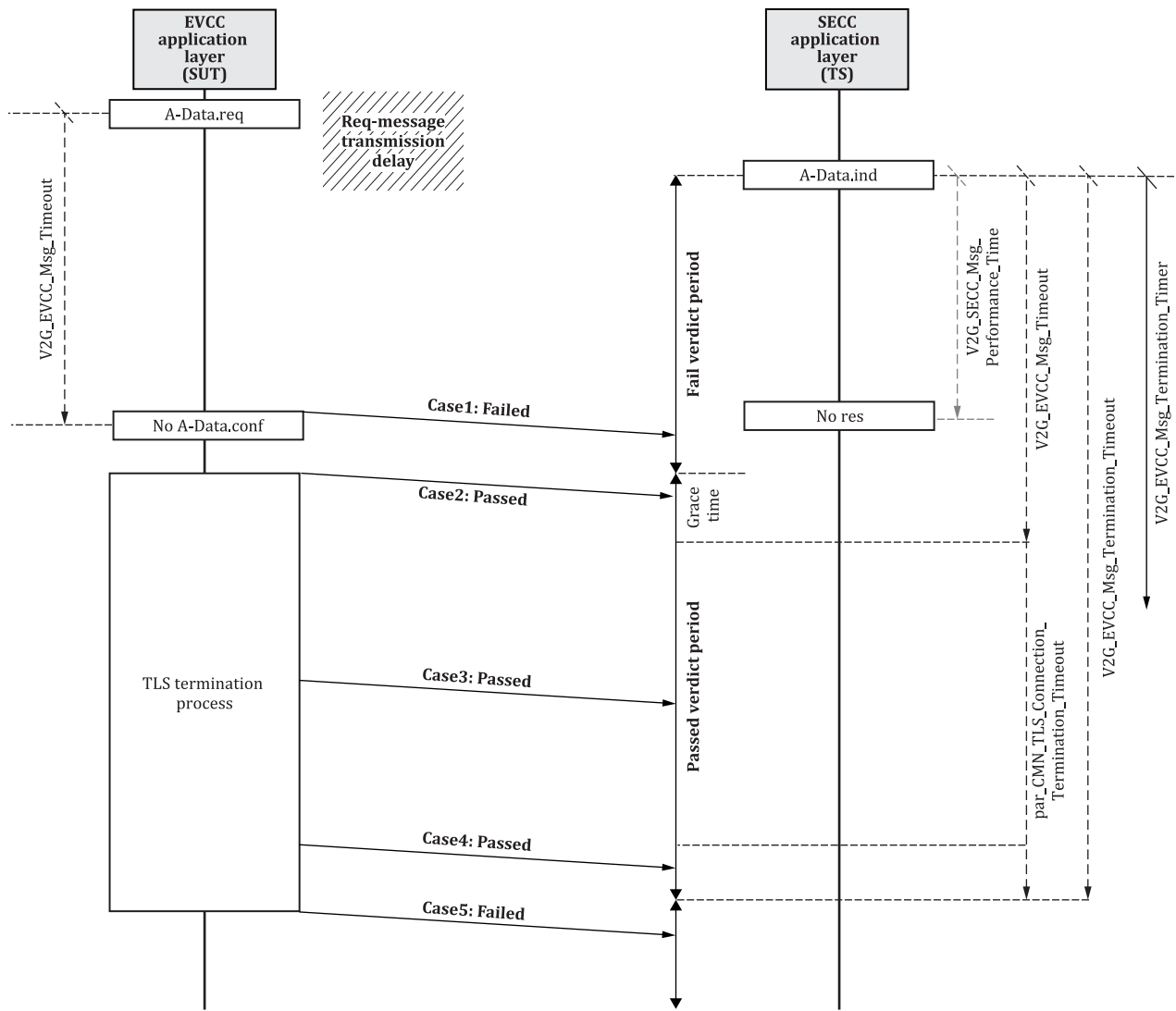


Figure 6 — Test system timer handling for EVCC message timeout scenarios (triggered by EVCC timeout)

[Figure 7](#) shows the TS timer handling for EVCC termination scenarios triggered by a test system stimulus.

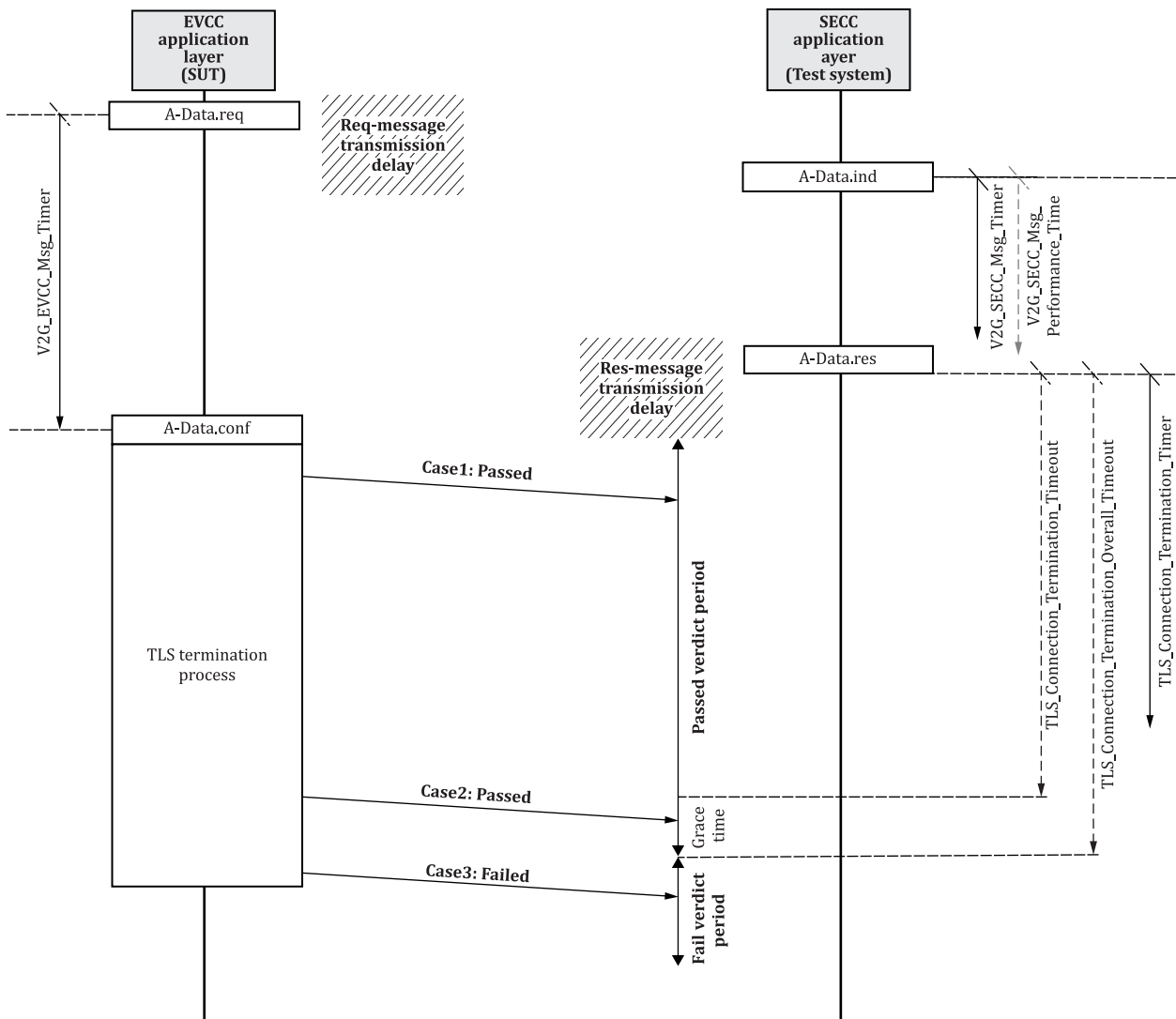


**Figure 7 — Test system timer handling for EVCC termination scenarios
(triggered by test system stimulus)**

7 Test suite conventions

7.1 General information

This clause specifies all conventions that are relevant for conformance tests of SUTs implementing ISO 15118-20.

7.2 Test suite structure (TSS)

An abstract test suite is a complete set of abstract test cases, possibly combined into groups or modules, that are necessary to perform conformance testing for a given SUT.

Each abstract test case specifies how the SUT is stimulated with specific inputs and specifies expected reaction(s) for verdict assignment. Depending on the test purpose, different pre-conditions and post-conditions are considered for the formulation of the test behaviour. The pre-conditions, post-conditions as well as test behaviours are encapsulated into individual functions and stored within separate modules. Thus, an abstract test case is composed by the actual test behaviour enveloped by pre- and post-conditions. The corresponding grouping of functions can therefore be assigned to the lowest abstract hierarchical level (see [Figure 8](#)). The abstract test cases are assigned to the second level.

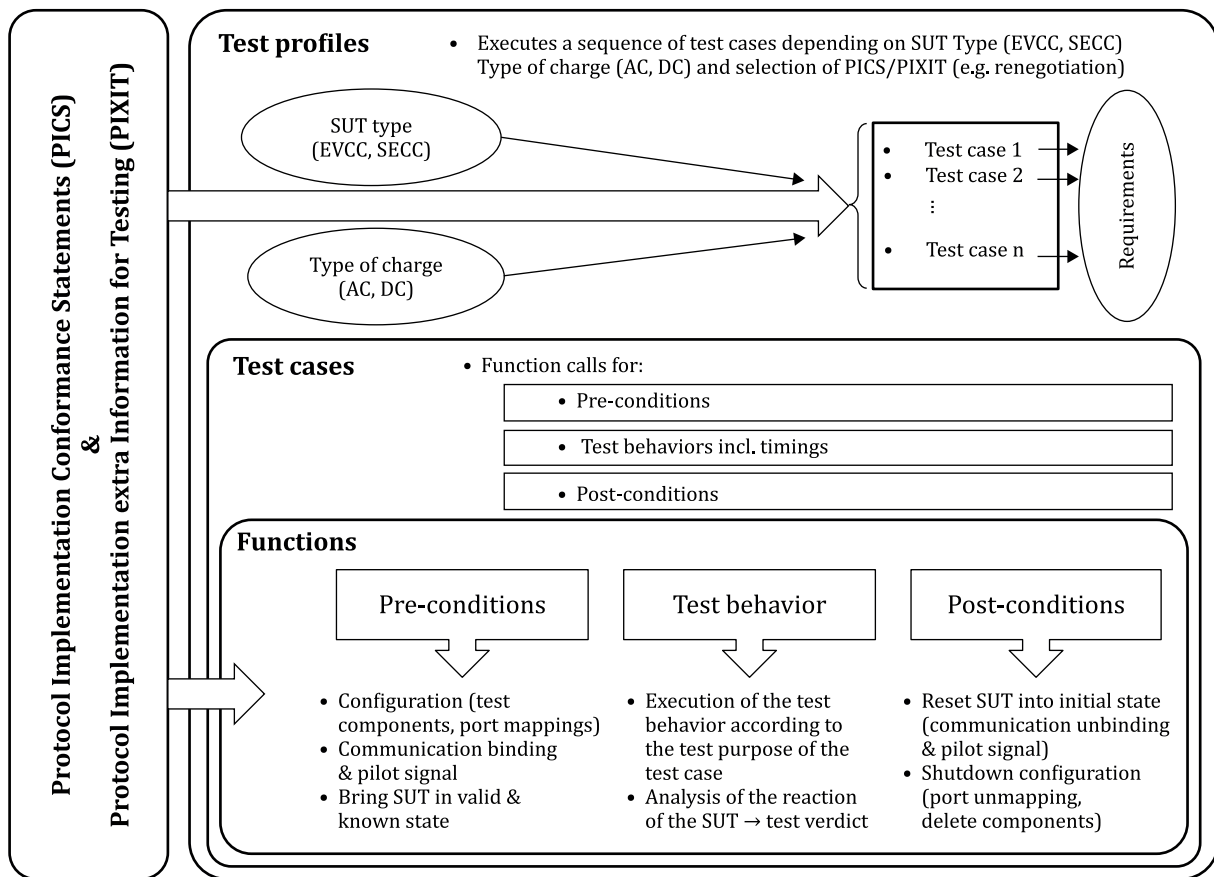


Figure 8 — General overview of the test suite structure (TSS)

The test profile is a collection of self-contained test cases as well as PICS (see 7.3.3) and PIXIT (see 7.3.4) in order to represent a given use case. The selection is based on the use cases of the ISO 15118 series and their corresponding requirements.

Hence, the abstract test suite structure (TSS) is segmented into subgroups for conformance testing according to the use cases specified in ISO 15118-1. Table 3 shows these subgroups, which are used for the organization of the abstract test case specifications as well as for the test suite identifiers (see 7.3 for details).

Table 3 — Identifiers within the test suite structure (TSS)

Identifiers	Values	Description
<sut>	EVCC	electric vehicle communication controller
	SECC	supply equipment communication controller
<ctx>	{fullname}	context (e.g. name of message pattern signal name according to standard)

7.3 Test profiles

7.3.1 General information

This subclause specifies test profiles for conformance with ISO 15118-20. A test profile consists of a test configuration as well as a selection and assignment of PICS/PIXIT. A set of test components and ports are specified depending on the test configuration. The test profile also includes a test group defining the set of relevant test cases and the sequence in which they are executed to perform a conformance test for a given use case.

7.3.2 Test configurations

A test configuration is composed of a combination of SUT with corresponding test entities assigned to a configuration IDs (CF_Part_ID). [Table 4](#) specifies applicable test configurations for this document.

Table 4 — Test configurations

CF_Part_ID	SUT	MTC	PTC
CF_21_001	SECC with ISO 15118-20 protocol support and ISO 15118-3 HPGP PLC communication interface and IEC 61851-1 signalling	EVCC with ISO 15118-20 SUT adapter ISO 15118-3 SUT adapter (HPGP)	PTC with IEC 61851-1 SUT adapter (CP, PP)
CF_21_002	EVCC with ISO 15118-20 protocol support and ISO 15118-3 HPGP PLC communication interface and IEC 61851-1 signalling	SECC with ISO 15118-20 SUT adapter ISO 15118-3 SUT adapter (HPGP)	PTC with IEC 61851-1 SUT adapter (CP, PP)
CF_21_003	SECC with ISO 15118-20 protocol support and ISO 15118-8 WLAN communication interface and and IEC 61851-1 signalling	EVCC with ISO 15118-20 SUT adapter ISO 15118-8 SUT adapter (WLAN)	PTC with IEC 61851-1 SUT adapter (CP, PP)
CF_21_004	EVCC with ISO 15118-20 protocol support and ISO 15118-8 WLAN communication interface and and IEC 61851-1 signalling	SECC with ISO 15118-20 SUT adapter ISO 15118-8 SUT adapter (WLAN)	PTC with IEC 61851-1 SUT adapter (CP, PP)
CF_21_005	SECC with ISO 15118-20 protocol support and ISO 15118-8 WLAN communication interface (AP/APUT)	EVCC with ISO 15118-20 SUT adapter ISO 15118-8 SUT adapter (WLAN)	None
CF_21_006	EVCC with ISO 15118-20 protocol support and ISO 15118-8 WLAN communication interface (STA/STAUT)	SECC with ISO 15118-20 SUT adapter ISO 15118-8 SUT adapter (WLAN)	None

7.3.3 Protocol implementation conformance statement (PICS) definition

To evaluate the conformance of a particular SUT, it is necessary to have a statement of the capabilities and options which have been implemented, and any features that have been omitted, so that the implementation can be tested for conformance against relevant requirements, and against those requirements only. Those capabilities and features are typically referred to as implementation conformance statements (ICS). In the context of a communication protocol as specified in ISO 15118-20 such statements are referred to as protocol implementation conformance statement (PICS).

All PICS specified in the ATS with reference to ISO 15118-20 are summarized in [Table 5](#) to [Table 7](#). These PICS specify capability criteria for an appropriate test case selection considering a given SUT (see column capability description in [Table 5](#) to [Table 7](#)). In addition, appropriate test parameters are derived from the PICS for a concrete instance of a test case (see column test parameter in [Table 5](#) to [Table 7](#)).

Table 5 — PICS for test system configurations CF_21_001 and CF_21_002 (SUT either SECC or EVCC)

PICS	Capability description	Test parameter
PICS_CMN_ETT	Specifies the list of all supported energy transfer types (ETT) by the SUT. Possible values contained in that list are: — AC; — DC; — WPT; — ACDP. Any combination of these values is allowed.	Test parameter <code>ett_value</code> indicates which energy transfer type is being tested. One of the following values can be assigned to <code>ett_value</code> : — AC; — DC; — WPT; — ACDP.
PICS_CMN_ControlMode	Specifies the list of all supported control modes by the SUT. Possible values contained in that list are: — Dynamic; — Scheduled. Any combination of these values is allowed.	Parameter <code>controlMode_value</code> indicates which control mode is being tested. One of the following values can be assigned to <code>controlMode_value</code> : — Dynamic; — Scheduled.
PICS_CMN_AuthorizationServices	Specifies the list of all supported authorization services supported by the SUT. Possible values contained in that list are: — EIM; — PNC. Any combination of these values is allowed.	Parameter <code>authorizationServices_value</code> indicates which authorization service is being tested. One of the following values can be assigned to <code>authorizationServices_value</code> : — EIM; — PNC.
PICS_CMN_CertificateInstallationService	Specifies whether the certification installation service is supported by the SUT. Possible values to choose from are: — True or False; — True; — False.	Parameter <code>certificationInstallationService_value</code> indicates if the certificate installation service is being tested. One of the following values can be assigned to <code>certificationInstallationService_value</code> : — True; — False.
PICS_CMN_Pause	Specifies whether charging pause is supported by the SUT. Possible values to choose from are: — True or False; — True; — False.	Parameter <code>pause_value</code> indicates if a paused session is being tested. One of the following values can be assigned to <code>pause_value</code> : — True; — False.
PICS_CMN_ACPlugType	Specifies the list of all supported AC plug types supported by the SUT. Possible values contained in that list are: — SinglePhase; — ThreePhase. Any combination of these values is allowed.	Parameter <code>acPlugtype_value</code> indicates which AC plug type is being tested. One of the following values can be assigned to <code>acPlugtype_value</code> : — SinglePhase; — ThreePhase.
PICS_CMN_BPT	Specifies whether BPT is supported by the SUT. Possible values to choose from are: — True or False; — True; — False.	Parameter <code>bpt_value</code> indicates if a BPT is being tested. One of the following values can be assigned to <code>bpt_value</code> : — True; — False.
PICS_CMN_MeteringConfirmationRequested	Specifies whether a metering confirmation initiation is supported by the SUT. Possible values to choose from are: — True or False; — True; — False.	Parameter <code>meteringConfirmationRequested_value</code> indicates if a metering confirmation message sequence is triggered by the SUT using EVSENotification set to 'MeteringConfirmation'. One of the following values can be assigned to <code>meteringConfirmationRequested_value</code> : — True; — False.

Table 5 (continued)

PICS	Capability description	Test parameter
PICS_CMN_MobilityNeedsMode	Specifies the list of all supported mobility needs modes. Possible values to choose from are: — 1: Mobility needs provided by EVCC; — 2: Mobility needs provided by SECC allowed. Any combination of these values is allowed.	Parameter <code>mobilityNeedsMode_value</code> indicates which <code>MobilityNeedsMode</code> is selected for testing. One of the following values can be assigned to <code>mobilityNeedsMode_value</code> : — 1: Mobility needs provided by EVCC; — 2: Mobility needs provided by SECC allowed.
PICS_CMN_DCPlugType	Specifies the list of all supported DC plug types supported by the SUT. Possible values contained in that list are: — 1: Core; — 2: Extended; — 3: Dual2; — 4: Dual4. Any combination of these values is allowed.	Parameter <code>dcPlugtype_value</code> indicates which DC plug type is being tested. One of the following values can be assigned to <code>dcPlugtype_value</code> : — 1: Core; — 2: Extended; — 3: Dual2; — 4: Dual4.
PICS_CMN_EVSENominalVoltage	Specifies the supported nominal AC voltage supported by the SUT. Possible values are: — 0 V to 500 V.	Parameter <code>eVSENominalVoltage_value</code> indicates which nominal AC voltage is being tested.
PICS_CMN_Pricing	Specifies the list of all supported pricing types supported by the SUT. Possible values contained in that list are: — 0: No pricing; — 1: Absolute Pricing; — 2: Price Levels. Any combination of these values is allowed.	Parameter <code>pricing_value</code> indicates which pricing type is being tested. One of the following values can be assigned to <code>pricing_value</code> : — 0: No pricing; — 1: Absolute Pricing; — 2: Price Levels.
PICS_CMN_BPTChannel	Specifies the list of all supported BPT channel types supported by the SUT. Possible values contained in that list are: — 1: Unified; — 2: Separated. Any combination of these values is allowed.	Parameter <code>bPTChannel_value</code> indicates which BPT channel type is being tested. One of the following values can be assigned to <code>bPTChannel_value</code> : — 1: Unified; — 2: Separated.
PICS_CMN_GeneratorMode	Specifies the list of all supported generator modes supported by the SUT. Possible values contained in that list are: — 1: GridFollowing; — 2: GridForming. Any combination of these values is allowed.	Parameter <code>generatorMode_value</code> indicates which generator mode is being tested. One of the following values can be assigned to <code>generatorMode_value</code>: — 1: GridFollowing; — 2: GridForming.
PICS_CMN_GridCodeIslandingDetectionMethod	Specifies the list of all supported islanding detection methods supported by the SUT. Possible values contained in that list are: — 1: ActiveDetection; — 2: PassiveDetection. Any combination of these values is allowed.	Parameter <code>gridCodeIslandingDetectionMethod_value</code> indicates which islanding detection method is being tested. One of the following values can be assigned to <code>gridCodeIslandingDetectionMethod_value</code> : — 1: ActiveDetection; — 2: PassiveDetection.

Table 6 — PICS for TS configuration CF_21_001 (SUT equals SECC)

PICS	Capability description	Test parameter
PICS_SECC_VAS	Specifies whether any VAS is supported by the SUT. Possible values to choose from are: — True or False; — True; — False.	Parameter <code>vas_value</code> indicates if any VAS is included in ServiceDiscoveryRes message. One of the following values can be assigned to <code>vas_value</code> : — True; — False.
PICS_SECC_ServiceRenegotiationSupported	Specifies whether ServiceRenegotiation is supported by the SUT. Possible values to choose from are: — True or False; — True; — False.	Parameter <code>serviceRenegotiation_value</code> indicates if ServiceRenegotiation is selected in ServiceSelectionRes message for testing. One of the following values can be assigned to <code>serviceRenegotiation_value</code> : — True; — False.
PICS_SECC_CertificateValidationCheck	Specifies whether the SUT (either on its own or via SA) supports the validity check of a any certificate with the current time. Possible values to choose from are: — True or False; — True; — False.	Parameter <code>certValidationCheck_value</code> indicates if a certificate validation is expected by the TS. One of the following values can be assigned to <code>certValidationCheck_value</code> : — True; — False.
PICS_SECC_legacyNamespaces	Specifies the list of supported legacy namespaces by the SUT — urn:iso:15118:2:2013:MsgDef; — urn:din:70121:2012:MsgDef. Any combination of these values is allowed.	Test parameter <code>legacyNamespaces_value</code> indicates which legacy namespace is used. One of the following values can be assigned to <code>legacyNamespaces_value</code> : — urn:iso:15118:2:2013:MsgDef; — urn:din:70121:2012:MsgDef.

Table 7 — PICS for TS configuration CF_21_002 (SUT equals EVCC)

PICS	Capability description	Test parameter
PICS_EVCC_PrioritizedEmaids	Specifies whether prioritized EMAIDs are supported by the SUT. Possible values to choose from are: — True or False; — True; — False.	Parameter <code>prioritizedEmaids_value</code> indicates if the PrioritizedEMAIDs is included in CertificateInstallationReq message. One of the following values can be assigned to <code>prioritizedEmaids_value</code> : — True; — False.

7.3.4 Protocol implementation extra information for testing (PIXIT) definition

Any additional information required for testing that is not covered in the form of an ICS/PICS, is specified in the form of implementation extra information for testing (IXIT). In the context of a communication protocol

as specified in ISO 15118-2 such statements are referred to as protocol implementation extra information for testing (PIXIT).

NOTE Due to the black box test paradigm in this document, it is not specified how to ensure that a corresponding PIXIT is set on the SUT side for a given test case execution.

All PIXIT specified in the ATS with reference to ISO 15118-20 are summarized in [Table 8](#) to [Table 10](#).

Table 8 — PIXIT for TS configurations CF_21_001 and CF_21_002

PIXIT	Description	Test parameter
PIXIT_CMN_MultipleContracts	Specifies whether multiple contract certificates are available or requested. Possible values to choose from are: — True; — False.	N/A
PIXIT_CMN_LoopCounter	Specifies the number of iterations in the V2G ChargeLoop.	Parameter <code>loopCounter_value</code> specifies the concrete number of iterations in the V2G ChargeLoop. Minimum value is 1. Default value is 100.

Table 9 — PIXIT for TS configuration CF_21_001 (SUT SECC)

PIXIT	Description	Test parameter
PIXIT_SECC_UnknownEMAID	Specifies whether the provided EMAID is registered at SA. Possible values to choose from are: — True; — False.	N/A
PIXIT_SECC_UnknownPCID	Specifies whether a contract is registered at SA for the provided PCID. Possible values to choose from are: — True; — False.	N/A
PIXIT_SECC_CommunicationToSA	Specifies whether the connection to the SA is established. Possible values to choose from are: — True; — False.	N/A
PIXIT_SECC_UserAuthorizationSuspended	Specifies whether the EIM authorization process by the user is suspended to enter ongoing loop. Possible values to choose from are: — True; — False.	N/A
PIXIT_SECC_ScheduleRetrievalSuspended	Specifies whether the retrieval of schedule parameters is suspended to enter ongoing loop. Possible values to choose from are: — True; — False.	N/A

Table 10 — PIXIT for TS configuration CF_21_002 (SUT EVCC)

PIXIT	Description	Test parameter
PIXIT_EVCC_StopRequired	Specifies whether a manual stop for a non-critical reason by user interaction is required during test execution. Possible values to choose from are: — True; — False.	N/A

7.3.5 Test control

For test control, the following requirements apply for this document:

- [V2G21-037] Test control shall execute all applicable test cases listed in [8.2](#) for SUT SECC under consideration of all PICS and PIXIT for that particular SUT.
- [V2G21-038] Test control shall execute all applicable test cases listed in [8.3](#) for SUT EVCC under consideration of all PICS and PIXIT for that particular SUT.
- [V2G21-039] Test control shall implement the test parameters derived from all PICS and PIXIT for a particular SUT as specified in [7.3.3](#) and [7.3.4](#).

7.3.6 TS template messages

TS template messages are specified to provide common parameterization values for all message elements used by the TS in send operations during test case execution (including pre-condition and test behaviour).

- [V2G21-040] A TS for SUT type EVCC shall use the template messages as specified in [Annex B](#) for default parametrization of the send operation during test case execution.
- [V2G21-041] A TS for SUT type SECC shall use the template messages as specified in [Annex C](#) for default parametrization of the send operation during test case execution.
- [V2G21-042] The test case specification may override the parametrization values from the template messages. In such a case, the TS shall use the parameterization from the test case specification.
- [V2G21-043] With reference to the template messages specified in [Annex B](#) and [Annex C](#), the TS for SUT type EVCC and SUT type SECC shall implement all functions listed in [Annex D](#) to determine any dynamic data elements during test case execution.

7.4 Test suite identifiers

7.4.1 General information

The selection of common naming conventions is one simple and often used mechanism to implement test suites which are consistent, maintainable and understandable for multiple users. Therefore, based on common ETSI naming conventions, more specific naming conventions for the ISO 15118 conformance test suite are specified.

7.4.2 Test case identifiers

The test case identifier for test cases specified in this document is specified as follows:

TC21_<sut>_<ctx>_<nnn>

The segments of this identifier are described in [Table 11](#).

Table 11 — ISO 15118 test suite naming convention for test case identifiers

Identifier	Values	Description
<prefix>	TC21	prefix for test cases in this document
<sut>	EVCC	electric vehicle communication controller
	SECC	supply equipment communication controller
<ctx>	{fullname}	context (e.g. name of message pattern, signal name, etc. according to ISO 15118-20)
<nnn>	{xxx}	sequential number from 001 to 999

An example for test case identifier is:

TC21_SECC_SupportedAppProtocolRes_001

7.4.3 PICS/PIXIT identifiers

The ISO 15118 test suite naming convention for PICS/PIXIT is specified as:

<pic>_<sut>_<ctx>

The segments of this identifier are described in [Table 12](#). An example for PICS/PIXIT identifier is:

PICS_CMN_ETT

Table 12 — ISO 15118 test suite naming convention for PICS/PIXIT identifiers

Identifier	Values	Description
<pic>	PICS	protocol implementation conformance statement
	PIXIT	protocol implementation extra information for testing
<sut>	EVCC	electric vehicle communication controller
	SECC	supply equipment communication controller
	CMN	common
<ctx>	{fullname}	context (e.g. name of message pattern, signal name according to ISO 15118-20)

7.4.4 Verdict types

This subclause specifies the conventions for test verdicts. The test verdicts specified in this document are listed in [Table 13](#).

Table 13 — ISO 15118 test suite conventions on verdict handling

Verdict type	TTCN-3 definition	ISO 15118 test suite
NONE	It is implicitly assigned at the beginning of every test case by default and is reported as a final verdict in the absence of any other verdict assignment during the test case execution.	No TSS specific definition (see TTCN-3 definition)
PASS	Means that everything is OK. A verdict given when the observed outcome satisfies the test purpose and is valid with respect to the relevant requirements and with respect to the PICS. See ITU-T X.290.	If when reviewing a requirement the SUT has a correct behaviour, then this verdict type shall be used.
INCONC	A verdict given when the observed outcome is valid with respect to the relevant requirements but prevents the test purpose from being accomplished. See ITU-T X.290.	Means that neither pass nor fail can be reliably assigned.
FAIL	A verdict given when the observed outcome is syntactically invalid or inopportune with respect to the relevant requirements or the PICS/PIXIT. See ITU-T X.290.	If when reviewing a requirement the SUT has a wrong behaviour, then this verdict type shall be used.

7.5 Test case specification

The abstract test case specification in this document is described according to the template shown in [Table 14](#).

Table 14 — Abstract test case specification template

TC Id	The TC Id is a unique identifier for a test case. It is specified according to the TC Id naming convention specified in 7.4.2 .
Test purpose	Short description of test purpose according to the requirements from the base standard (ISO 15118-20).
Pre-condition	Description of steps needed to bring the SUT and TS into the state before the actual test behaviour of the test cases is entered.
Test behaviour	Description of the steps needed execute the test behaviour and to derive a test verdict. The steps in the test behaviour typically involve sending one or more stimuli from the TS to the SUT and to match the SUT's expected behaviour with its actual response to the stimuli.
Document reference	The document reference indicates the subclauses of the reference standard specifications in which the conformance requirement(s) is/are expressed. The references are provided according to the following format: Document: ISO 15118-X:20XX:(IS FDIS) Section(s): x.x.x.x.x, y.y.y.y, ...
Referenced requirement(s)	The referenced requirement(s) refers to the subclauses of the referenced standard specification requirement(s). The requirements are referenced according to the format specified in ISO 15118-20: [V2G20-YYY-ZZZ], ...
Config Id	The Config Id references the ISO 15118-20 configuration selected for this TC according to 7.3.2 , e.g.: CF_21_001, ...
PICS	The PICS selection references the PICS statement(s) for this TC in accordance with 7.3.3 , e.g.: PICS_CMN_ETT
PIXIT	The PIXIT selection references the PIXIT statement(s) for this TC in accordance with 7.3.4 , e.g.: PIXIT_CMN_MultipleContracts

8 Test case specification for common ISO 15118-20 requirements

8.1 General information

[Subclause 8.2](#) (Tables 15 to 163) covers all test cases for SECC according to ISO 15118-20 while [subclause 8.3](#) (Tables 164 to 311) covers all test cases for EVCC according to ISO 15118-20. [Annex A](#) shows how the requirements in ISO 15118-20 are mapped against the test cases specified in [8.2](#) and [8.3](#)

8.2 Test cases for SUT SECC

8.2.1 SECC SDP test case specifications

Table 15 — Test case description for TC21_SECC_SDP_001

TC Id	TC21_SECC_SDP_001
Test purpose	This TC observes whether the SUT sends an SDP response message in time after receiving an SDP request message from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message with all elements and values from the default parameter set according to Annex C. For verdict 'pass' the TS then checks whether an SDP response message is received within the SDP_Msg_Timeout according to the TS timer handling as specified in 6.5 with the following format: <pre>SDP response := { SECC IP address := ? SECC port := ? Security := '00'H Transport protocol := '00'H }</pre> If no SDP response message is received within the SDP_Msg_Timeout, the TS restarts the SDP_Msg_Observation_Timer and sends another SDP request message. This message sequence is repeated until receipt of SDP response message or the maximum number of 50 SDP request messages is reached.
Document reference	ISO 15118-20:2022, 7.4, ISO 15118-20:2022, 7.10.1.3, ISO 15118-20:2022, 7.10.1.6
Referenced requirement(s)	[V2G20-027], [V2G20-123], [V2G20-624], [V2G20-144], [V2G20-150], [V2G20-154]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 16 — Test case description for TC21_SECC_SDP_002

TC Id	TC21_SECC_SDP_002
Test purpose	This TC observes whether the SUT sends an SDP response message whose UDP source port number is V2G_UDP_SDP_SERVER after receiving an SDP request message from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer after sending an SDP request message with UDP source port in the range of V2G_UDP_SDP_CLIENT and destination port of '15118' with elements and values from the default parameter set according to Annex C. For verdict 'pass' the TS then checks whether SDP response message with the used UDP source port of '15118' is received within the SDP_Msg_Timeout according to the TS timer handling. If no SDP response message is received within the SDP_Msg_Timeout, the TS restarts the SDP_Msg_Observation_Timer and sends another SDP request message. This message sequence is repeated until receipt of SDP response message or the maximum number of 50 SDP request messages is reached.
Document reference	ISO 15118-20:2022, 7.10.1.3, ISO 15118-20:2022, 7.10.1.6
Referenced requirement(s)	[V2G20-125], [V2G20-149]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 17 — Test case description for TC21_SECC_SDP_003

TC Id	TC21_SECC_SDP_003
Test purpose	This TC observes whether the SUT sends an SDP response message whose UDP destination port number is in the range of V2G_UDP_SDP_CLIENT port after receiving an SDP request message with equally assigned V2G_UDP_SDP_CLIENT port in the range of '49152-65535' from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message with V2G_UDP_SDP_CLIENT port assigned in the range of '49152-65535' and all elements and values from the default parameter set according to Annex C. The TS ignores any SDP response message and sends an SDP request message with the same V2G_UDP_SDP_CLIENT port again after waiting for SDP_Msg_Timeout. This message sequence is repeated until the maximum number of 50 SDP request messages is reached. For verdict 'pass' the TS then checks whether more than one SDP response messages are received on V2G_UDP_SDP_CLIENT port of SDP request messages previously sent by TS. Due to UDP characteristics, the number of SDP response messages may be less than 50 even if the TS sent 50 SDP request messages.
Document reference	ISO 15118-20:2022, 7.10.1.6
Referenced requirement(s)	[V2G20-151]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 18 — Test case description for TC21_SECC_SDP_004

TC Id	TC21_SECC_SDP_004
Test purpose	This TC observes whether the SUT sends an SDP response message to received V2G_UDP_SDP_CLIENT port after receiving an SDP request message with a differently assigned V2G_UDP_SDP_CLIENT port in the range of '49152-65535' from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message with V2G_UDP_SDP_CLIENT port assigned in the range of '49152-65535' and all elements and values from the default parameter set according to Annex C. The TS ignores any SDP response message and sends an SDP request message again with a different V2G_UDP_SDP_CLIENT port from the previous messages in the range of '49152-65535' after waiting for SDP_Msg_Timeout. This message sequence is repeated until the maximum number of 50 SDP request messages is reached. For verdict 'pass' the TS then checks whether more than one SDP response messages are received on V2G_UDP_SDP_CLIENT port of SDP request messages previously sent by TS. Due to UDP characteristics, the number of SDP response messages may be less than 50 even if the TS sent 50 SDP request messages.
Document reference	ISO 15118-20:2022, 7.10.1.6
Referenced requirement(s)	[V2G20-151]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

8.2.2 SECC V2GTP test case specifications

8.2.2.1 SECC V2GTP test case specifications with SDP payload

Table 19 — Test case description for TC21_SECC_V2GTPSDP_001

TC Id	TC21_SECC_V2GTPSDP_001
Test purpose	This TC observes whether the SUT sends an SDP response message with V2GTP header information ProtocolVersion set to '01'H, InvProtocolVersion set to 'FE'H and PayloadType set to '9001'H after receiving an SDP request message from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C. For verdict 'pass' the TS then checks whether an SDP response message with V2GTP header information is received within the SDP_Msg_Timeout according to the TS timer handling as specified in 6.5 with the following format: <pre>V2GTP := { Header := { ProtocolVersion := '01'H InvProtocolVersion := 'FE'H PayloadType := '9001'H PayloadLength := ? } Payload := SDP response := ? }</pre> If no SDP response message is received within the SDP_Msg_Timeout, the TS restarts the SDP_Msg_Observation_Timer and sends another SDP request message. This message sequence is repeated until receipt of SDP response message or the maximum number of 50 SDP request messages is reached.
Document reference	ISO 15118-20:2022, 7.8.3.1, ISO 15118-20:2022, 7.10.1.6, ISO 15118-20:2022, 7.10.1.1
Referenced requirement(s)	[V2G20-2307], [V2G20-1255], [V2G20-2275], [V2G20-2276]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 20 — Test case description for TC21_SECC_V2GTPSDP_002

TC Id	TC21_SECC_V2GTPSDP_002
Test purpose	This TC observes whether the SUT ignores an SDP request message with invalid V2GTP header information ProtocolVersion set to 'FF'H.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: ProtocolVersion := 'FF'H For verdict 'pass' the TS then checks whether the SUT does not respond to an SDP request message with invalid V2GTP header within the SDP_Msg_Timeout according to the TS timer handling as specified in 6.5. This process is repeated for the maximum number of 50 invalid SDP request messages.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 21 — Test case description for TC21_SECC_V2GTPSDP_003

TC Id	TC21_SECC_V2GTPSDP_003
Test purpose	This TC observes whether the SUT ignores an SDP request message with invalid V2GTP header information InvProtocolVersion set to 'FF'H.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: InvProtocolVersion := 'FF'H For verdict 'pass' the TS then checks whether the SUT does not respond to an SDP request message with invalid V2GTP header within the SDP_Msg_Timeout according to the TS timer handling as specified in 6.5. This process is repeated for the maximum number of 50 invalid SDP request messages.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 22 — Test case description for TC21_SECC_V2GTPSDP_004

TC Id	TC21_SECC_V2GTPSDP_004
Test purpose	This TC observes whether the SUT ignores an SDP request message with invalid V2GTP header information PayloadType set to '7001'H.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadType := '7001'H For verdict 'pass' the TS then checks whether the SUT does not respond to an SDP request message with invalid V2GTP header within the SDP_Msg_Timeout according to the TS timer handling as specified in 6.5. This process is repeated for the maximum number of 50 invalid SDP request messages.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 23 — Test case description for TC21_SECC_V2GTPSDP_005

TC Id	TC21_SECC_V2GTPSDP_005
Test purpose	This TC observes whether the SUT ignores an SDP request message with invalid V2GTP header information PayloadLength set to '00000000'H.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadLength := '00000000'H For verdict 'pass' the TS then checks whether the SUT does not respond to an SDP request message with invalid V2GTP header within the SDP_Msg_Timeout according to the TS timer handling as specified in 6.5. This process is repeated for the maximum number of 50 invalid SDP request messages.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 24 — Test case description for TC21_SECC_V2GTPSDP_006

TC Id	TC21_SECC_V2GTPSDP_006
Test purpose	This TC observes whether the SUT ignores an SDP request message with invalid V2GTP header information PayloadLength set to the result of function 'setSmallerV2GTPPayloadLength(payload_value)'.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadLength := setSmallerV2GTPPayloadLength(payload_value) For verdict 'pass' the TS then checks whether the SUT does not respond to an SDP request message with invalid V2GTP header within the SDP_Msg_Timeout according to the TS timer handling as specified in 6.5. This process is repeated for the maximum number of 50 invalid SDP request messages.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

Table 25 — Test case description for TC21_SECC_V2GTPSDP_007

TC Id	TC21_SECC_V2GTPSDP_007
Test purpose	This TC observes whether the SUT ignores an SDP request message with invalid V2GTP header information PayloadLength set to the result of function 'setLargerV2GTPPayloadLength(payload_value)'.
Pre-condition	The SUT and TS are initialized to a state where the data link is successfully established.
Test behaviour	The TS starts the SDP_Msg_Observation_Timer by sending an SDP request message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadLength := setLargerV2GTPPayloadLength(payload_value) For verdict 'pass' the TS then checks whether the SUT does not respond to an SDP request message with invalid V2GTP header within the SDP_Msg_Timeout according to the TS timer handling as specified in 6.5. This process is repeated for the maximum number of 50 invalid SDP request messages.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001
PICS	PICS_CMN_ETT contains (ett_value = AC DC)
PIXIT	-

8.2.2.2 SECC V2GTP test case specifications with SupportedAppProtocol payload

Table 26 — Test case description for TC21_SECC_V2GTPSupportedAppProtocol_001

TC Id	TC21_SECC_V2GTPSupportedAppProtocol_001
Test purpose	This TC observes whether the SUT sends a SupportedAppProtocolRes message with V2GTP header information ProtocolVersion set to '01'H, InvProtocolVersion set to 'FE'H and PayloadType set to '8001'H after receiving a SupportedAppProtocolReq message from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer by sending a SupportedAppProtocolReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C. For verdict 'pass' the TS then checks whether a SupportedAppProtocolRes message with V2GTP header information is received within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5 with the following format: <pre> V2GTP := { Header := { ProtocolVersion := '01'H InvProtocolVersion := 'FE'H PayloadType := '8001'H PayloadLength := ? } Payload := SupportedAppProtocolRes := ? } </pre>
Document reference	ISO 15118-20:2022, 7.8.3.1
Referenced requirement(s)	[V2G20-2307]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	PICS_CMN_ETT contains (ett_value = AC DC WPT ACDP)
PIXIT	-

Table 27 — Test case description for TC21_SECC_V2GTPSupportedAppProtocol_002

TC Id	TC21_SECC_V2GTPSupportedAppProtocol_002
Test purpose	This TC observes whether the SUT sends a SupportedAppProtocolRes message whose TCP destination port number is in the range of V2G_DST_TCP_DATA after receiving a SupportedAppProtocolReq message from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer by sending a SupportedAppProtocolReq message with all elements and values from the default parameter set according to Annex C. For verdict 'pass' the TS then checks whether the used TCP destination port number of SupportedAppProtocolRes message is in the range of Dynamic Ports (49152-65535).
Document reference	ISO 15118-20:2022, 7.8.2
Referenced requirement(s)	[V2G20-078], [V2G20-080]

Table 27 (continued)

Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	PICS_CMN_ETT contains (ett_value = AC DC WPT ACDP)
PIXIT	-

Table 28 — Test case description for TC21_SECC_V2GTPSupportedAppProtocol_003

TC Id	TC21_SECC_V2GTPSupportedAppProtocol_003
Test purpose	This TC observes whether the SUT ignores a SupportedAppProtocolReq message with invalid V2GTP header information ProtocolVersion set to 'FF'H.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer and V2G_SECC_CommunicationSetup_Termination_Timer by sending a SupportedAppProtocolReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: ProtocolVersion := 'FF'H For verdict 'pass' the TS then checks whether the SUT does not respond to a SupportedAppProtocolReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5. Furthermore, the TS checks whether the SUT does not terminate the TLS connection within V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	PICS_CMN_ETT contains (ett_value = AC DC WPT ACDP)
PIXIT	-

Table 29 — Test case description for TC21_SECC_V2GTPSupportedAppProtocol_004

TC Id	TC21_SECC_V2GTPSupportedAppProtocol_004
Test purpose	This TC observes whether the SUT ignores a SupportedAppProtocolReq message with invalid V2GTP header information InvProtocolVersion set to 'FF'H.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer and V2G_SECC_CommunicationSetup_Termination_Timer by sending a SupportedAppProtocolReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: InvProtocolVersion := 'FF'H For verdict 'pass' the TS then checks whether the SUT does not respond to a SupportedAppProtocolReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5. Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	PICS_CMN_ETT contains (ett_value = AC DC WPT ACDP)
PIXIT	-

Table 30 — Test case description for TC21_SECC_V2GTPSupportedAppProtocol_005

TC Id	TC21_SECC_V2GTPSupportedAppProtocol_005
Test purpose	This TC observes whether the SUT ignores a SupportedAppProtocolReq message with invalid V2GTP header information PayloadType set to '7001'H.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer and V2G_SECC_CommunicationSetup_Termination_Timer by sending a SupportedAppProtocolReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadType := '7001'H For verdict 'pass' the TS then checks whether the SUT does not respond to a SupportedAppProtocolReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5. Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	PICS_CMN_ETT contains (ett_value = AC DC WPT ACDP)
PIXIT	-

Table 31 — Test case description for TC21_SECC_V2GTPSupportedAppProtocol_006

TC Id	TC21_SECC_V2GTPSupportedAppProtocol_006
Test purpose	This TC observes whether the SUT ignores a SupportedAppProtocolReq message with invalid V2GTP header information PayloadLength set to '00000000'H.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer and V2G_SECC_CommunicationSetup_Termination_Timer by sending a SupportedAppProtocolReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadLength := '00000000'H For verdict 'pass' the TS then checks whether the SUT does not respond to a SupportedAppProtocolReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5. Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	PICS_CMN_ETT contains (ett_value = AC DC WPT ACDP)
PIXIT	-

Table 32 — Test case description for TC21_SECC_V2GTPSupportedAppProtocol_007

TC Id	TC21_SECC_V2GTPSupportedAppProtocol_007
Test purpose	This TC observes whether the SUT ignores a SupportedAppProtocolReq message with invalid V2GTP header information PayloadLength set to the result of function 'setSmallerV2GTPPayloadLength(payload_value)'.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer and V2G_SECC_Communication-Setup_Termination_Timer by sending a SupportedAppProtocolReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadLength := setSmallerV2GTPPayloadLength(payload_value) For verdict 'pass' the TS then checks whether the SUT does not respond to a SupportedAppProtocolReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5. Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	PICS_CMN_ETT contains (ett_value = AC DC WPT ACDP)
PIXIT	-

Table 33 — Test case description for TC21_SECC_V2GTPSupportedAppProtocol_008

TC Id	TC21_SECC_V2GTPSupportedAppProtocol_008
Test purpose	This TC observes whether the SUT ignores a SupportedAppProtocolReq message with invalid V2GTP header information PayloadLength set to the result of function 'setLargerV2GTPPayloadLength(payload_value)'.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer and V2G_SECC_Communication-Setup_Termination_Timer by sending a SupportedAppProtocolReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadLength := setLargerV2GTPPayloadLength(payload_value) For verdict 'pass' the TS then checks whether the SUT does not respond to a SupportedAppProtocolReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5. Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	PICS_CMN_ETT contains (ett_value = AC DC WPT ACDP)
PIXIT	-

8.2.2.3 SECC V2GTP test case specifications with CommonV2GMessages payload

Table 34 — Test case description for TC21_SECC_V2GTPCommonMessages_001

TC Id	TC21_SECC_V2GTPCommonMessages_001
Test purpose	This TC observes whether the SUT sends a SessionSetupRes message with V2GTP header information ProtocolVersion set to '01'H, InvProtocolVersion set to 'FE'H and PayloadType set to '8002'H after receiving a SessionSetupReq message from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established and the V2G message sequence is succeeded until the SupportedAppProtocolRes message is received.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer by sending a SessionSetupReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C. For verdict 'pass' the TS then checks whether a SessionSetupRes message with V2GTP header is received within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5 with the following format: <pre> V2GTP := { Header := { ProtocolVersion := '01'H InvProtocolVersion := 'FE'H PayloadType := '8002'H PayloadLength := ? } Payload := SessionSetupRes := ? } </pre>
Document reference	ISO 15118-20:2022, 7.8.3.1
Referenced requirement(s)	[V2G20-2307]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	-
PIXIT	-

Table 35 — Test case description for TC21_SECC_V2GTPCommonMessages_002

TC Id	TC21_SECC_V2GTPCommonMessages_002
Test purpose	This TC observes whether the SUT sends a SessionSetupRes message whose TCP destination port number is in the range of V2G_DST_TCP_DATA after receiving a SessionSetupReq message from the TS.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established and the V2G message sequence is succeeded until the SupportedAppProtocolRes message is received.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer by sending a SessionSetupReq message with all elements and values from the default parameter set according to Annex C. For verdict 'pass' the TS then checks whether the used TCP destination port number of SessionSetupRes message is in the range of Dynamic Ports (49152-65535).
Document reference	ISO 15118-20:2022, 7.8.2
Referenced requirement(s)	[V2G20-078], [V2G20-080]

Table 35 (continued)

Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	-
PIXIT	-

Table 36 — Test case description for TC21_SECC_V2GTPCommonMessages_003

TC Id	TC21_SECC_V2GTPCommonMessages_003
Test purpose	This TC observes whether the SUT ignores a SessionSetupReq message with invalid V2GTP header information ProtocolVersion set to 'FF'H.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established and the V2G message sequence is succeeded until the SupportedAppProtocolRes message is received. After TLS connection establishment, the TS also starts the V2G_SECC_CommunicationSetup_Termination_Timer.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer by sending a SessionSetupReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: ProtocolVersion := 'FF'H For verdict 'pass' the TS then checks whether the SUT does not respond to a SessionSetupReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5. Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	-
PIXIT	-

Table 37 — Test case description for TC21_SECC_V2GTPCommonMessages_004

TC Id	TC21_SECC_V2GTPCommonMessages_004
Test purpose	This TC observes whether the SUT ignores a SessionSetupReq message with invalid V2GTP header information InvProtocolVersion set to 'FF'H.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established and the V2G message sequence is succeeded until the SupportedAppProtocolRes message is received. After TLS connection establishment, the TS also starts the V2G_SECC_CommunicationSetup_Termination_Timer.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer by sending a SessionSetupReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: InvProtocolVersion := 'FF'H For verdict 'pass' the TS then checks whether the SUT does not respond to a SessionSetupReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5. Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5.
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]

Table 37 (continued)

Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	-
PIXIT	-

Table 38 — Test case description for TC21_SECC_V2GTPCommonMessages_005

TC Id	TC21_SECC_V2GTPCommonMessages_005
Test purpose	This TC observes whether the SUT ignores a SessionSetupReq message with invalid V2GTP header information PayloadType set to '7001'H.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established and the V2G message sequence is succeeded until the SupportedAppProtocolRes message is received. After TLS connection establishment, the TS also starts the V2G_SECC_CommunicationSetup_Termination_Timer.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer by sending a SessionSetupReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadType := '7001'H For verdict 'pass' the TS then checks whether the SUT does not respond to a SessionSetupReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5 . Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5 .
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]
Config Id	CF_21_001, CF_21_003, CF_21_005
PICS	-
PIXIT	-

Table 39 — Test case description for TC21_SECC_V2GTPCommonMessages_006

TC Id	TC21_SECC_V2GTPCommonMessages_006
Test purpose	This TC observes whether the SUT ignores a SessionSetupReq message with invalid V2GTP header information PayloadLength set to '00000000'H.
Pre-condition	The SUT and TS are initialized to a state where the data link and TLS connection are successfully established and the V2G message sequence is succeeded until the SupportedAppProtocolRes message is received. After TLS connection establishment, the TS also starts the V2G_SECC_CommunicationSetup_Termination_Timer.
Test behaviour	The TS starts the V2G_EVCC_Msg_Observation_Timer by sending a SessionSetupReq message and the corresponding V2GTP header with all elements and values from the default parameter set according to Annex C with consideration of the following parameter adjustment: PayloadLength := '00000000'H For verdict 'pass' the TS then checks whether the SUT does not respond to a SessionSetupReq message with invalid V2GTP header within the V2G_EVCC_Msg_Timeout according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5 . Furthermore, the TS checks whether the SUT does not terminate the TLS connection within the V2G_SECC_CommunicationSetup_Performance_Time according to ISO 15118-20:2022, Table 215, and the TS timer handling as specified in 6.5 .
Document reference	ISO 15118-20:2022, 8.6.4.6.3.1
Referenced requirement(s)	[V2G20-800]