



BSI Standards Publication

Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to EN 15509

National foreword

This British Standard is the UK implementation of EN 15876:2025. It supersedes BS EN 15876:2023, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

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

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English Version

Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to EN 15509

Perception de télépéage - Évaluation de la conformité de l'équipement embarqué et de l'équipement au sol à l'EN 15509

Elektronische Gebührenerhebung - Konformitätsprüfung von Fahrzeuggeräten und straßenseitigen Einrichtungen nach EN 15509

This European Standard was approved by CEN on 13 January 2025.

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European foreword

This document (EN 15876:2025) has been prepared by Technical Committee CEN/TC 278, “Intelligent transport systems”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by October 2025, and conflicting national standards shall be withdrawn at the latest by October 2025.

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

This document supersedes EN 15876:2023.

This fourth edition of EN 15876 incorporates the following main modifications compared with the previous version:

- Correction of the superseded references to ESTI EN 300 674 1:2004, which are replaced by references to ESTI EN 300 674 2 1:2022, ESTI EN 300 674 2 2:2019 and ETSI TS 104 022:2024;
- Amendments to improve clarity of the document.

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

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Introduction

CEN/TC 278 has produced a set of standards that support interoperable DSRC-EFC-systems e.g., EN ISO 14906 (a "toolbox" for defining EFC-application transaction) and EN ISO 14907-2 (EFC application interface conformance tests for on-board units). However, these standards are only of an enabling nature and do not ensure technical interoperability. Therefore, EN 15509, *Electronic fee collection — Interoperability application profile for DSRC* was developed to support technical interoperability between EFC-systems.

This document specifies the test suite structure and the test purposes for conformity evaluation of on-board and roadside equipment designed for compliance with the requirements of EN 15509. A test standard for evaluation of conformity of on-board and roadside equipment is a necessary element for coherent, practical and effective appraisal of products' compliance to EN 15509.

EN 15876 provides the necessary foundation for verification of the implementation of the interoperability requirements as stated in EN 15509:

- industry is provided with an easy-to-use toolbox for product assessment;
- operators can easily assess conformity to EN 15509 and reference to the standard in tendering processes;
- authorities and joint undertakings may reference to the test standard when stating interoperability requirements;
- certification organisations are given an effective tool for certification of products.

1 Scope

This document specifies the test suite structure (TSS) and test purposes (TPs) for evaluation of on-board equipment (OBE) and roadside equipment (RSE) to EN 15509.

Normative Annex A presents the test purposes for the OBE.

Normative Annex B presents the test purposes for the RSE.

Normative Annex C provides the protocol conformance test report (PCTR) proforma for OBE.

Normative Annex D provides the PCTR proforma for RSE.

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.

EN 15509:2023, *Electronic fee collection — Interoperability application profile for DSRC*

EN 12834:2003, *Road transport and traffic telematics - Dedicated Short Range Communication (DSRC) - DSRC application layer*

EN ISO 3166-1:2020, *Codes for the representation of names of countries and their subdivisions — Part 1: Country code (ISO 3166-1)*

EN ISO 14816:2019, *Road transport and traffic telematics — Automatic vehicle and equipment identification — Numbering and data structure (ISO 14816)*

EN ISO 14906:2023, *Electronic fee collection — Application interface definition for dedicated short-range communication (ISO 14906:2022)*

EN ISO 14907-2:2021, *Electronic fee collection — Test procedures for user and fixed equipment — Part 2: Conformance test for the on-board unit application interface (ISO 14907-2:2021)*

ISO/TS 17573-2:2020, *Electronic fee collection — Systems architecture for vehicle-related tolling Part 2: Vocabulary*

ETSI TS 104 022:2024, *Transport and Traffic Telematics (TTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5 795 MHz to 5 815 MHz frequency band; performance tests*

ETSI EN 300 674-2-1:2022, *Transport and Traffic Telematics (TTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5 795 MHz to 5 815 MHz frequency band; Part 2: Harmonised Standard for access to radio spectrum; Sub-part 1: Road Side Units (RSU)*

ETSI EN 300 674-2-2:2019, *Transport and Traffic Telematics (TTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in 5 795 MHz to 5 815 MHz frequency band; Part 2: Harmonised Standard for access to radio spectrum; Sub-part 2: On-Board Units (OBU)*

ETSI/TS 102 486-1-2:2008, *Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 1: DSRC data link layer: medium access and logical link control; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)*

ETSI/TS 102 486-2-2:2008, *Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 2: DSRC application layer; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 17573-2:2020 apply.

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

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

4 Abbreviations

For the purposes of this document, the following abbreviations apply throughout the document unless otherwise specified.

APDU	application protocol data unit
AP	application process
ATS	abstract test suite
BI	behaviour invalid (i.e., invalid behaviour tests)
BST	beacon service table
BV	behaviour valid (i.e., valid behaviour tests)
DSRC	dedicated short-range communication
EFC	electronic fee collection
ICS	implementation conformance statement
IUT	implementation under test
LLC	logical link control
LPDU	LLC protocol data unit
MAC	medium access control
OBE	on-board equipment
OBU	on-board unit
PCTR	protocol conformance test report
PDU	protocol data unit
PICS	protocol implementation conformance statement
PIXIT	protocol implementation extra information for testing
RSE	roadside equipment
RSU	roadside unit
SCTR	system conformance test report

TP	test purposes
TSS	test suite structure
VST	vehicle service table

5 Conformance

The conformance tests shall be performed as specified in Annex A and Annex B.

The conformity assessment body of the OBE and RSE, respectively, is responsible for providing a conformance test report.

The conformity assessment body of the OBE shall complete the protocol conformance test report (PCTR) for the OBE as specified in Annex C.

The conformity assessment body of the RSE shall complete the PCTR for the RSE as specified in Annex D.

NOTE The PCTR forms a basis for the manufacturer's declaration of conformity.

6 Test Suite Structure

6.1 Structure

Table 1 shows the test suite structure (TSS) including its subgroups specified for the conformance testing.

Table 1 — Test Suite Structure

Group	Type of IUT	Behaviour
Physical layer	OBE	Valid behaviour
		Invalid behaviour
	RSE	Valid behaviour
		Invalid behaviour
DLC MAC sublayer	OBE	Valid behaviour
		Invalid behaviour
	RSE	Valid behaviour
		Invalid behaviour
DLC LLC sublayer	OBE	Valid behaviour
		Invalid behaviour
	RSE	Valid behaviour
		Invalid behaviour
Application layer – Functions	OBE	Valid behaviour
		Invalid behaviour
	RSE	Valid behaviour
		Invalid behaviour
Application Layer – Data	OBE	Valid behaviour
		Invalid behaviour
	RSE	Valid behaviour
		Invalid behaviour
Application Layer – Security Level 0	OBE	Valid behaviour
		Invalid behaviour
	RSE	Valid behaviour
		Invalid behaviour
Application Layer – Security	OBE	Valid behaviour

Group	Type of IUT	Behaviour
Level 1	RSE	Invalid behaviour
		Valid behaviour
		Invalid behaviour
Application Layer – Transactions	OBE	Valid behaviour
		Invalid behaviour
	RSE	Valid behaviour
		Invalid behaviour

Physical layer tests are to be performed in a radio wave laboratory. They will not form part of the abstract test suite (ATS).

6.2 Reference to Conformance Specifications

Conformance to a profile standard implies conformance to the related base standards; hence, a number of test cases for the profile standard are exactly the same as the conformance test cases for the related base standards. Other test cases are derived from the base standards conformance test cases, by applying some restrictions or choices in e.g. the parameters values, according to the elements stated in the profile standard. Finally, specific conformance test cases for the profile standard are identified for statements contained in the profile standard, which have no equivalence in the base standards. These latter cases cover for example the security algorithms and functions that are specified in the profile standard. This document considers existing conformance test purposes for the base standards by referencing them, so that:

- For test purposes that are identical to those specified in the base standards conformance test cases (see e.g. ETSI/TS 102 486-1-2:2008 or ETSI/TS 102 486-2-2:2008) a direct reference is reported. For reader's convenience, the title or a verbal description of the referenced test purpose is given, together with the reference.
- For test purposes that are derived from those specified in the base standards conformance test cases, a direct reference is reported, plus an indication on how the referred test purpose has to be modified for the profile conformance testing.
- For test purposes that are specific to the standard profile, a complete description is given.

An indication on whether a test purpose is identical, derived, or specific is given in each test purpose.

6.3 Test Purposes

6.3.1 TP Definition Conventions

The TPs are specified in tables with a header that contains a TP ID as specified in the sub-clause 6.3.2 and a title. The content of these tables is following the rules shown in Table 2.

Table 2 — TP Table and Header Content

TP ID	The TP ID is a unique identifier. It is specified according to the TP naming conventions specified in the sub-clause 6.3.2 below.
Title	Short description of Test Purpose objective.
Detailed description	This line is optional and supplements the title.
Reference	The reference contains the references of the subject to be validated by the actual TP (specification reference, clause, and paragraph).
TP origin	It indicates if the TP is identical to a TP specified in another test standard, derived from a TP specified in another test standard, or specific for this profile standard.
Initial condition	The condition specifies in which initial state the IUT shall be to apply the actual TP.
Stimulus and expected behaviour	Specification of the events the tester shall perform, and the events required by the IUT to conform to EN 15509:2023.

Note that the reference field generally points to the clause of the base standard EN 15509:2023. As the same standard contains the Protocol Implementation Conformance Statement proforma, where appropriate a reference to the relevant table of the PICS is given either in this field or in the text introducing the group of Test Purposes.

6.3.2 TP Naming Conventions

Each TP is given a unique identification. This unique identification is built up to contain the following string of information:

TP/<group>/<iut>/<x>-<nn>

- TP : to indicate that it is a Test Purpose;
- <group> : which group among those specified in Table 1 — Test Suite Structure does the TP apply to;
- <iut> : type of IUT (i.e. OBE or RSE);
- X : type of testing (i.e. Valid Behaviour tests – BV, or Invalid Behaviour tests – BI);
- <nn> : sequential TP number (01-99).

The naming conventions are as described in Table 3 — TP Naming Conventions.

Table 3 — TP Naming Conventions

Identifier: TP/<group>/<iut>/<x>-<nn>		
<group>	PHY	Physical layer
	MAC	MAC sublayer
	LLC	LLC sublayer
	AP-0BAS	Application layer – I Kernel support Security level 0
	AP-0FUN	Application layer – T Kernel support Security level 0
	AP-0DAT	Application layer – Data attributes support Security Level 0
	AP-0SEC	Application layer – Security Level 0 support
	AP-0TRA	Application layer – Transaction support Security level 0
	AP-1BAS	Application layer – I Kernel support Security level 1
	AP-1FUN	Application layer – T Kernel support Security level 1

Identifier: TP/<group>/<iut>/<x>-<nn>		
	AP-1DAT	Application layer – Data attributes support Security Level 1
	AP-1SEC	Application layer – Security Level 1 support
	AP-1TRA	Application layer – Transaction support Security level 1
	AP-0BAS	Application layer – Initialisation phase support Security level 0
	AP-0GET	Application layer - GET-rq PDU test purposes, security level 0
	AP-0SET	Application layer - SET-rq PDU test purposes, security level 0
	AP-0STA	Application layer - GET-STAMPED-rq PDU test purposes, security level 0
	AP-0MMI	Application layer - SET-MMI-rq PDU test purposes security level 0
	AP-0ECH	Application layer - ECHO-rq PDU test purposes, security level 0
	AP-0REL	Application layer - EVENT-REPORT-rq PDU test purposes, security level 0
	AP-1BAS	Application layer - initialization phase test purposes, security level 1
	AP-1GET	Application layer - GET-rq PDU test purposes, security level 1
	AP-1SET	Application layer - SET-rq PDU test purposes, security level 1
	AP-1STA	Application layer - GET-STAMPED-rq PDU test purposes, security level 1
	AP-1MMI	Application layer - SET-MMI-rq PDU test purposes security level 1
	AP-1ECH	Application layer - ECHO-rq PDU test purposes, security level 1
<iut> = type of IUT	OBE	On-board equipment
	RSE	Roadside equipment
x = Type of testing	BV	Valid Behaviour Tests
	BI	Invalid Behaviour Tests
<nn> = sequential number	(01-99)	Test Purpose Number

Annex A (normative)

Test purposes for on-board equipment

A.1 General

This annex specifies the test purposes (TP) for the conformity evaluation of on-board equipment (OBE) to EN 15509:2023.

OBE and OBU have been used as terms with the same or similar meaning in the standardization of DSRC and DSRC-based EFC within CEN and ETSI. Previously developed relevant standards used the term OBU with the meaning OBE as specified in this document. When referring to relevant tests in other documents, this document uses the terms of the referenced source, which explains why the term OBU is often used in this Annex.

A.2 Physical Layer

A.2.1 BV Test Purposes

Table A.1 to Table A.9 specify the physical layer BV test purposes.

Test subgroup objective:

- to test the behaviour of the IUT in relation to syntactically and contextual correct behaviour of the test system.

Table A.1 — TP/PHY/OBU/BV/01 — Dynamic range – sensitivity

TP Origin	Identical to ETSI EN 300 674-2-2:2019, Clause 5.3.2.2.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.2.2.1.
Stimulus and Expected Behaviour	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.2.2 and Clause 4.3.2.2.

Table A.2 — TP/PHY/OBU/BV/02 — Dynamic range – upper power limit for communication

TP Origin	Identical to ETSI TS 104 022:2024, Clause 9.1.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI TS 104 022:2024, Clause 9.1.1.
Stimulus and Expected Behaviour	In accordance with ETSI TS 104 022:2024, Clause 9.1 and Clause 7.2.1. .

Table A.3 — TP/PHY/OBU/BV/03 — Cut-off power level

TP Origin	Identical to ETSI TS 104 022:2024, Clause 9.2.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI TS 104 022:2024, Clause 9.2.1.
Stimulus and Expected Behaviour	In accordance with ETSI TS 104 022:2024, Clause 9.2 and Clause 7.2.2.

Table A.4 — TP/PHY/OBU/BV/04 — Conversion gain

TP Origin	Identical to ETSI TS 104 022:2024, Clause 9.3.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI TS 104 022:2024, Clause 9.3.1.
Stimulus and Expected Behaviour	In accordance with ETSI TS 104 022:2024, Clause 9.3 and Clause 7.2.3.

Table A.5 — TP/PHY/OBU/BV/05 — Maximum equivalent isotropic radiated power

TP Origin	Identical to ETSI EN 300 674-2-2:2019, Clause 5.3.1.2.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.1.2.1.
Stimulus and Expected Behaviour	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.1.2 and Clause 4.3.1.2.

Table A.6 — TP/PHY/OBU/BV/06 — Frequency error

TP Origin	Identical to ETSI EN 300 674-2-2:2019, Clause 5.3.1.3.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.1.3.1.
Stimulus and Expected Behaviour	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.1.3 and Clause 4.3.1.3.

Table A.7 — TP/PHY/OBU/BV/07 — Transmitter spectrum mask

TP Origin	Identical to ETSI EN 300 674-2-2:2019, Clause 5.3.1.1.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.1.1.1.
Stimulus and Expected Behaviour	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.1.1 and Clause 4.3.1.1.

Table A.8 — TP/PHY/OBU/BV/08 — Transmitter unwanted emissions

TP Origin	Identical to ETSI EN 300 674-2-2:2019, Clause 5.3.1.4.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.1.4.1.
Stimulus and Expected Behaviour	In accordance with ETSI EN 300 674-2-2:2019, , Clause 5.3.1.4 and Clause 4.3.1.4.

Table A.9 — TP/PHY/OBU/BV/09 — Receiver spurious emissions

TP Origin	Identical to ETSI EN 300 674-2-2:2019, Clause 5.3.2.1.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI EN 300 674-2-2:2019, Clause 5.3.2.1.1.
Stimulus and Expected Behaviour	In accordance with ETSI EN 300 674-2-21:2019, Clause 5.3.2.1 and Clause 4.3.2.1.

A.2.2 BI Test Purposes

BI test purposes group do not apply for Layer 1.

A.3 MAC

A.3.1 BV Test Purposes

Table A.10 to Table A.17 specify the MAC BV test purposes.

Test subgroup objective:

- to test the behaviour of the IUT in relation to syntactically and contextual correct behaviour of the test system.

Table A.10 — TP/MAC/OBU/BV/01 — Receive downlink frames – maximum length

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/01.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/01.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/01.

Table A.11 — TP/MAC/OBU/BV/02 — Receive downlink frames within T1

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/02.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/02.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/02.

Table A.12 — TP/MAC/OBU/BV/03 — Timing constraints for public uplink windows

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/03.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/03.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/03.

Table A.13 — TP/MAC/OBU/BV/04 — Receive downlink frames within T2

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/04.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/04.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/04.

Table A.14 — TP/MAC/OBU/BV/05 — Timing constraints for private uplink windows

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/05.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/05.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/05.

Table A.15 — TP/MAC/OBU/BV/06 — S-bit and L-bit in MAC control field

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/06.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/06.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/06.

Table A.16 — TP/MAC/OBU/BV/07 — Manage S-bit state variable

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/07.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/07.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/07.

Table A.17 — TP/MAC/OBU/BV/08 — Random selection of N5 public uplink windows

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/08.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/08.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BV/08.

A.3.2 BI Test Purposes

Table A.18 to Table A.41 specify the MAC BI test purposes.

Test subgroup objective:

- to check the behaviour of the IUT in response to invalid stimuli and behaviour from the test tool.

Table A.18 — TP/MAC/OBU/BI/01 — Manage double-bit errors in the LID, MAC control and LPDU fields

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/01.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/01.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/01.

Table A.19 — TP/MAC/OBU/BI/02 — Detect and manage double-bit errors in the FCS field

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/02.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/02.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/02.

Table A.20 — TP/MAC/OBU/BI/03 — Detect and manage a block of 15 bits errors

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/03.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/03.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/03.

Table A.21 — TP/MAC/OBU/BI/04 — Detect and manage the abort sequence in the LPDU field

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/04.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/04.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/04.

Table A.22 — TP/MAC/OBU/BI/05 — Detect and manage the abort sequence at the end of a downlink frame

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/05.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/05.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/05.

Table A.23 — TP/MAC/OBU/BI/06 — Detect and manage a too long downlink frame in accordance with N2

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/06.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/06.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/06.

Table A.24 — TP/MAC/OBU/BI/07 — Detect and manage wrong format of LID

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/07.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/07.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/07.

Table A.25 — TP/MAC/OBU/BI/08 — Detect and manage missing MAC control field

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/08.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/08.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/08.

Table A.26 — TP/MAC/OBU/BI/09 — Detect and manage wrong A-bit in MAC control field in broadcast frame

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/09.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/09.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/09.

Table A.27 — TP/MAC/OBU/BI/10 — Detect and manage wrong D-bit in MAC control field in broadcast frame

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/10.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/10.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/10.

Table A.28 — TP/MAC/OBU/BI/11 — Detect and manage wrong D-bit in MAC control field in private frame

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/11.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/11.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/11.

Table A.29 — TP/MAC/OBU/BI/12 — Detect and manage wrong L-bit in MAC control field in broadcast frame

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/12.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/12.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/12.

Table A.30 — TP/MAC/OBU/BI/13 — Detect and manage wrong L-bit in MAC control field in private frame

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/13.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/13.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/13.

Table A.31 — TP/MAC/OBU/BI/14 — Detect and manage wrong C/R-bit in MAC control field of a PrWa frame

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/14.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/14.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/14.

Table A.32 — TP/MAC/OBU/BI/15 — Detect and manage a wrong MAC control field

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/15.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/15.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/15.

Table A.33 — TP/MAC/OBU/BI/16 — Detect and manage blocked signals

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/16.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/16.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/16.

Table A.34 — TP/MAC/OBU/BI/17 — Detect and manage blocked end flag

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/17.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/17.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/17.

Table A.35 — TP/MAC/OBU/BI/18 — Detect and manage blocked start flag

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/18.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/18.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/18.

Table A.36 — TP/MAC/OBU/BI/19 — Detect and manage broadcast LID where expecting private LID

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/19.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/19.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/19.

Table A.37 — TP/MAC/OBU/BI/20 — Detect and manage multicast LID where expecting private LID

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/20.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/20.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/20.

Table A.38 — TP/MAC/OBU/BI/21 — Detect and manage wrong A-bit in MAC control field in private frame

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/21.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/21.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/21.

Table A.39 — TP/MAC/OBU/BI/22 — Manage wrong A-bit in MAC control field in private downlink frame with ACn

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/22.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/22.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/22.

Table A.40 — TP/MAC/OBU/BI/23 — Detect and manage wrong private LID

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/23.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/23.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/23.

Table A.41 — TP/MAC/OBU/BI/24 — Verify that the OBU can manage retransmission of PrWRq

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/24.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/24.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/MAC/OBU/BI/24.

A.4 LLC

A.4.1 BV Test Purposes

Table A.42 to Table A.46 specify the LLC BV test purposes.

Test subgroup objective:

- to test the behaviour of the IUT in relation to syntactically and contextual correct behaviour of the test system.

Table A.42 — TP/LLC/OBU/BV/01 — Exchange UI commands

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/01.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/01.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/01.

Table A.43 — TP/LLC/OBU/BV/02 — Manage ACn data transmission

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/02.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/02.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/02.

Table A.44 — TP/LLC/OBU/BV/03 — Manage ACn data exchange

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/03.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/03.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/03.

Table A.45 — TP/LLC/OBU/BV/04 — Empty Test Purpose, left to keep numbering aligned with ETSI/TS 102 486-1-2:2008

TP Origin	
Reference	
Initial condition	
Stimulus and Expected Behaviour	

Table A.46 — TP/LLC/OBU/BV/05 — Manage data response Procedure I

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/05.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/05.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BV/05.

A.4.2 BI Test Purposes

Table A.47 to Table A.53 specify the LLC BI test purposes.

Test subgroup objective:

- to check the behaviour of the IUT in response to invalid stimuli and behaviour from the test tool.

Table A.47 — TP/LLC/OBU/BI/01 — Detect and manage corrupted LLC control field when expecting UI command

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/01.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/01.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/01.

Table A.48 — TP/LLC/OBU/BI/02 — Detect and manage invalid LPDU with fractional number of octets in length

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/02.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/02.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/02.

Table A.49 — TP/LLC/OBU/BI/03 — Detect and manage corrupted LLC control field when expecting ACn command

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/03.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/03.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/OBU/BI/03.

Table A.50 — TP/LLC/ObU/BI/04 — Detect and manage LPDU containing acknowledged connectionless LLC command control field when LID is multicast or broadcast

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/04.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/04.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/04.

Table A.51 — TP/LLC/ObU/BI/05 — Detect and manage invalid LPDU with fractional number of octets in length

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/05.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/05.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/05.

Table A.52 — TP/LLC/ObU/BI/06 — Detect and manage an invalid ACn command with P=1 and no LSDU.

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/06.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/06.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/06.

Table A.53 — TP/LLC/ObU/BI/07 — Detect and manage duplicate ACn commands

TP Origin	Identical to ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/07.
Reference	EN 15509:2023, 6.1.2
Initial condition	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/07.
Stimulus and Expected Behaviour	In accordance with ETSI/TS 102 486-1-2:2008 TP/LLC/ObU/BI/07.

A.5 Application Layer

A.5.1 General

For the description of the application layer test purposes, a special notation and symbol convention is used. Table A.54 explains this convention.

Table A.54 — Description of TP Symbols

SYMBOL	DESCRIPTION
$XXX.rq \Rightarrow$	The Tester sends the XXX.rq PDU to the IUT
$\Leftarrow YYY.rs$	The IUT sends the YYY.rs PDU to the Tester
$A \equiv B$	Test Purpose A "is congruent to" Test Purpose B. The notation Test Purpose A $\equiv$ Test Purpose B means that the Test Purpose A is the same as Test Purpose B. If differences in parameters or parameter values have to be applied, these differences are indicated in the text immediately below.
$A \rightarrow B$	Object A "is transformed" into Object B. So a notation like "Table X $\rightarrow$ Table Y" means that, for the scope of the Test Purpose, any reference of Table X should be changed into references to Table Y.
$=$	Means "assignment". That is, a notation like "accessCredentials = a value" means that the field accessCredentials is given a value.
$\emptyset$	Means "empty" or "not set". So, a notation like "accessCredentials = $\emptyset \rightarrow$ accessCredentials = calculated value", for a given Test Purpose, means "change all occurrences in which the field accessCredentials has not been assigned to calculation of the value accessCredentials to a given value".

A.5.2 Structure of BST and VST

A.5.2.1 BST

The BST general structure, as is *transmitted* to the OBU, shall be in accordance with Table A.55 — BST, General Structure.

Table A.55 — BST, General Structure

			Length	Allowed Values
T-APDUs			4 bit	'1000' indicating initialisation-request (BST)
			1 bit (nonmandApplications opt.)	0/1
rsu	manufacturerid		16 bits	In accordance with EN ISO 14816:2019.
	individualid		27 bits	as specified by the conformity assessment body
time			32 bits	UNIX real time
profile			1 bit (Profile ext.)	0 (= no extension)
			7 bits	In accordance with EN 12834:2003, Annex A.
mandApplications			1 bit (mandApplications ext.)	0 (= no extension)
			7 bits (number of applications)	M
	EFC Application		1 bit (eid opt.)	0 (= eid not present)
			1 bit (parameter opt.)	0 (= parameter not present)
		aid	1 bit (aid ext.)	0 (= no extension)
	Application 2 (not EFC)		5 bits	1 (= electronic-fee-collection)
			1 bit (eid opt.)	0/1
			1 bit (parameter opt.)	0/1
		aid	1 bit (aid ext.)	0 (= no extension)
			5 bits	In accordance with DSRCApplicationEntityID, as specified in EN 12834:2003, Annex A.
		eid	1 bit (eid ext.)	0 (= no extension)
			7 bits	any
		parameter		In accordance with ApplicationContextMark, as specified in EN 12834:2003, Annex A.
	...		...	...
	Application M (not EFC)		1 bit (eid opt.)	0/1
			1 bit (parameter opt.)	0/1
		aid	1 bit (aid ext.)	0 (= no extension)
			5 bits	In accordance with DSRCApplicationEntityID, as specified in EN 12834:2003, Annex A.
		eid	1 bit (eid extension)	0 (= no extension)
			7 bits	any
		parameter		In accordance with ApplicationContextMark, as specified in EN 12834:2003, Annex A.
nonmandApplications			1 bit (mandApplications ext.)	0 (= no extension)
			7 bits (number of applications)	N
	Application 1 (not EFC)		...	See "Application 2 (not EFC)" of mandApplications
	...		...	...
	Application N (not EFC)		...	See "Application 2 (not EFC)" of mandApplications
profileList			1 bit (profileList ext.)	0 (= no extension)
			7 bits (number of profiles)	K
	Profile 1		1 bit (Profile ext.)	0 (= no extension)
			7 bits	In accordance with the Profile specified in EN 12834:2003, Annex A.
	...		...	...
	Profile K		1 bit (Profile ext.)	0 (= no extension)
			7 bits	In accordance with the Profile specified in EN 12834:2003, Annex A.

A.5.2.2 VST

The VST general structure, as is *transmitted* by the OBU, shall be in accordance with Table A.56 — VST, General Structure and Table A.57 — VST, General Structure for security level 1.

Table A.56 — VST, General Structure

					Length	Allowed Values
T-APDUs					4 bits	'1001' indicating initialisation-response (VST)
fill					4 bits	'0000'
profile					1 bit (Profile ext.)	0 (= no extension)
					7 bits	In accordance with the Profile specified in EN 12834:2003, Annex A.
applications	EFCApplication	parameter	aid		1 bit (applications ext.)	0 (= no extension)
					7 bits (number of applic.)	M
					1 bit (eid opt.)	1 (= eid present)
					1 bit (parameter opt.)	1 (= parameter present)
					1 bit (aid ext.)	0 (= no extension)
					5 bits	1 (= electronic-fee-collection)
			eid		1 bit (eid ext.)	0 (= no extension)
					7 bits	any (≠ other eid used in this VST)
					1 bit (Container ext.)	0 (= no extension)
					7 bits (Container CHOICE)	2 (= OCTET STRING)
					1 bit (octet string ext.)	0 (= no extension)
					7 bits (octet string length)	6
			contract Provider		10 bits (CountryCode)	In accordance with EN ISO 3166-1:2020
					14 bits (IssuerIdentifier)	In accordance with EN ISO 14816:2019
			typeOf Contract		16 bits	any
			context Version		1 bit (contextVersion ext.)	0 (= no extension)
					7 bits	any
	Application 2		aid		1 bit (eid opt.)	0/1
					1 bit (parameter opt.)	0/1
					1 bit (aid ext.)	0 (= no extension)
					5 bits	In accordance with DSRCAApplicationEntityID, as specified in EN 12834:2003, Annex A.
			eid		1 bit (eid ext.)	0 (= no extension)
					7 bits	any (≠ other eid used in this VST)
			parameter			In accordance with ApplicationContextMark, as specified in EN 12834:2003, Annex A.
			Application M		1 bit (eid opt.)	0/1
					1 bit (parameter opt.)	0/1
					1 bit (aid ext.)	0 (= no extension)
					5 bits	In accordance with DSRCAApplicationEntityID, as specified in EN 12834:2003, Annex A.
					1 bit (eid extension)	0 (= no extension)
					7 bits	any (≠ other eid used in this VST)
obeConfiguration						In accordance with ApplicationContextMark, as specified in EN 12834:2003, Annex A.
					1 bit (obeStatus opt.)	0/1
					equipmentClass	15 bits
					manufacturerID	16 bits
					obeStatus	16 bits

Table A.57 — VST, General Structure for security level 1

			Length	Allowed Values
Fill			4 bits	Any
Profile			1 bit (Profile ext.)	0 (= no extension)
			7 bits	In accordance with the Profile specified in EN 12834:2003, Annex A.
applications	<i>EFC Application</i>		1 bit (applications ext.)	0 (= no extension)
			7 bits (number of applic.)	M
			1 bit (eid opt.)	1 (= eid present)
			1 bit (parameter opt.)	1 (= parameter present)
		aid	1 bit (aid ext.)	0 (= no extension)
			5 bits	1 (= electronic-fee-collection)
		eid	1 bit (eid ext.)	0 (= no extension)
			7 bits	any (≠ other eid used in this VST)
			1 bit (Container ext.)	0 (= no extension)
			7 bits (Container CHOICE)	2 (= OCTET STRING)
			1 bit (octet string ext.)	0 (= no extension)
			7 bits (octet string length)	16
		EFC-ContextMark	10 bits (CountryCode)	In accordance with EN ISO 3166-1:2020
			14 bits (IssuerIdentifier)	In accordance with EN ISO 14816:2019
			typeOf Contract	16 bits
			context Version	1 bit (contextVersion ext.)
			7 bits	any
			1 bit (Container ext.)	0 (= no extension)
			7 bits (Container CHOICE)	2 (= OCTET STRING)
			1 bit (octet string ext.)	0 (= no extension)
			7 bits (octet string length)	2
		AC_CR_Reference	AC_CR_MasterKeyRef	8 bits
			AC_CR_Diversifier	8 bits
			1 bit (Container ext.)	0 (= no extension)
			7 bits (Container CHOICE)	2 (= OCTET STRING)

				Length	Allowed Values	
obeConfiguration				1 bit (octet string ext.)	0 (= no extension)	
				7 bits (octet string length)	4	
			RndOBE	32 bits	any	
	Application 2			1 bit (eid opt.)	0/1	
				1 bit (parameter opt.)	0/1	
		aid		1 bit (aid ext.)	0 (= no extension)	
				5 bits	In accordance with the DSRCApplicationEntityID, as specified in EN 12834:2003, Annex A.	
		eid		1 bit (eid ext.)	0 (= no extension)	
				7 bits	any (≠ other eid used in this VST)	
		parameter		In accordance with the ApplicationContextMark as specified in EN 12834:2003, Annex A.		
		...		...	...	
		Application M			1 bit (eid opt.)	0/1
				1 bit (parameter opt.)	0/1	
	aid			1 bit (aid ext.)	0 (= no extension)	
				5 bits	In accordance with the DSRCApplicationEntityID, as specified in EN 12834:2003, Annex A.	
	eid			1 bit (eid extension)	0 (= no extension)	
				7 bits	any (≠ other eid used in this VST)	
	parameter			In accordance with the ApplicationContextMark, as specified in EN 12834:2003, Annex A.		
					1 bit (obeStatus opt.)	0/1
		equipmentClass			15 bits	any
manufacturerID			16 bits	any		
obeStatus			16 bits	any		

A.5.3 PDUs Parameters

A.5.3.1 Parameters of request PDUs for security level 0

The format of the request APDUs for the security level 0 shall be in accordance with the following tables:

- Table A.58 — GET-Rq parameters for security level 0;
- Table A.59 — SET-Rq parameters for security level 0;
- Table A.60 — ACTION-Rq parameters for security level 0;
- Table A.61 — EVENT-REPORT-Rq parameters for security level 0.

Table A.58 — GET-Rq parameters for security level 0

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.16
GET-Rq	fill	=
	eid	
	accessCredentials OPTIONAL	prohibited
	iid OPTIONAL	
	attributeIdList OPTIONAL	mandatory

Table A.59 — SET-Rq parameters for security level 0

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.18
SET-Rq	fill	=
	mode	
	eid	
	accessCredentials OPTIONAL	prohibited
	attrList	=
	iid OPTIONAL	prohibited

Table A.60 — ACTION-Rq parameters for security level 0

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.20
ACTION-Rq	mode	=
	eid	
	actionType	
	accessCredentials OPTIONAL	prohibited
	actionParameter OPTIONAL	mandatory
	iid OPTIONAL	prohibited

Table A.61 — EVENT-REPORT-Rq parameters for security level 0

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.22
EVENT-REPORT-Rq	mode	=
	Eid	
	eventType	
	accessCredentials OPTIONAL	prohibited
	eventParameter OPTIONAL	
	iid OPTIONAL	

A.5.3.2 Parameters of request PDUs for security level 1

The valid format of the request APDUs for the security level 1 shall be in accordance with the following tables:

- Table A.62 — GET-Rq parameters for security level 1;
- Table A.63 — SET-Rq parameters for security level 1;
- Table A.64 — ACTION-Rq parameters for security level 1;
- Table A.65 — EVENT-REPORT-Rq parameters for security level 1.

Table A.62 — GET-Rq parameters for security level 1

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.16
GET-Rq	Fill	=
	Eid	
	accessCredentials OPTIONAL	mandatory
	iid OPTIONAL	prohibited
	attributeldList OPTIONAL	mandatory

Table A.63 — SET-Rq parameters for security level 1

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.18
SET-Rq	Fill	=
	mode	
	Eid	
	accessCredentials OPTIONAL	mandatory
	attrList	=
	iid OPTIONAL	prohibited

Table A.64 — ACTION-Rq parameters for security level 1

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.20
ACTION-Rq	mode	=
	eid	
	actionType	
	accessCredentials OPTIONAL	mandatory
	actionParameter OPTIONAL	
	iid OPTIONAL	prohibited

Table A.65 — EVENT-REPORT-Rq parameters for security level 1

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.22
EVENT-REPORT-Rq	mode	=
	eid	
	eventType	
	accessCredentials OPTIONAL	prohibited
	eventParameter OPTIONAL	
	iid OPTIONAL	

A.5.3.3 Parameters of response PDUs

The valid format of the response APDUs shall be in accordance with the following tables:

- Table A.66 — GET-Rs parameters;
- Table A.67 — SET-Rs parameters;
- Table A.68 — ACTION-Rs parameters.

Table A.66 — GET-Rs parameters

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.17
GET-Rs	fill	=
	eid	
	iid OPTIONAL	prohibited
	attributelist OPTIONAL	mandatory
	ret OPTIONAL	

Table A.67 — SET-Rs parameters

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.19
SET-Rs	Fill	=
	Eid	
	lid OPTIONAL	prohibited
	ret OPTIONAL	mandatory

Table A.68 — ACTION-Rs parameters

	EN 12834:2003, Annex A	EN 15509:2023, B.4.5.5 Table B.21
ACTION-Rs	Fill	=
	Eid	
	lid OPTIONAL	prohibited
	responseParameter OPTIONAL	mandatory
	Ret OPTIONAL	

A.5.4 Application I-kernel test purposes for OBE, security level 0 (AP-0BAS)

A.5.4.1 Data Structures

The Test Purposes in clause A.5.4 are applicable to the security level 0 claimed in EN 15509:2023 ICS proforma for OBE, B.4.3C.4.4, Table CB3.

For the conformance tests specified in clause A.5.4, the BST parameters specified in Table A.69 — BST1: valid BST shall be transmitted to the IUT. Invalid values are indicated in **boldface**.

Table A.69 — BST1: valid BST

			Length	Values
			1 bit (nonmandApplications opt.)	0 (= nonmandApplications not present)
rsu	manufacturerid		16 bits	registered value
	individualid		27 bits	any
time			32 bits	any
profile			1 bit (Profile ext.)	0 (= no extension)
			7 bits	0
mandApplications			1 bit (mandApplications ext.)	0 (= no extension)
			7 bits (number of applications)	1
	EFC Application		1 bit (eid opt.)	0 (= eid not present)
			1 bit (parameter opt.)	0 (= parameter not present)
		aid	1 bit (aid ext.)	0 (= no extension)
			5 bits	1 (= electronic-fee-collection)
profileList			1 bit (profileList ext.)	0 (= no extension)
			7 bits (number of profiles)	0 (= list empty)

A.5.4.2 BV test purposes

Table A.70 to Table A.79 specify the application I-kernel BV test purposes for OBE with security level 0.

Test subgroup objective:

a) to test the behaviour of the IUT in relation to:

- 1) valid BST;
- 2) valid EVENT-REPORT-Rq (Release);

b) to test the IUT support of:

- 1) BeaconId;
- 2) Time;
- 3) Profile;
- 4) Applications;
- 5) LID.

Table A.70 — TP/AP-OBAS/OBU/BV/01 — Receive and manage INITIALISATION.request (BST)

TP Origin	Identical to TP/AL-I/OBU/BV/01 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-I/OBU/BV/01 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-I/OBU/BV/01 in ETSI/TS 102 486-2-2:2008, 5.4.1.

Table A.71 — TP/AP-OBAS/OBU/BV/02 — Receive and manage EVENT-REPORT.request (RELEASE) with mode=0

TP Origin	Identical to TP/AL-I/OBU/BV/02 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-I/OBU/BV/02 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-I/OBU/BV/02 in ETSI/TS 102 486-2-2:2008, 5.4.1.

Table A.72 — TP/AP-OBAS/OBU/BV/03 — Read and manage the BeaconID in the BST

TP Origin	Identical to TP/AL-I/OBU/BV/03 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-I/OBU/BV/03 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-I/OBU/BV/03 in ETSI/TS 102 486-2-2:2008, 5.4.1.

Table A.73 — TP/AP-0BAS/OBU/BV/04 — Read and manage time of reception of BST in parameter Time in BST

TP Origin	Identical to TP/AL-I/OBU/BV/04 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-I/OBU/BV/04 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-I/OBU/BV/04 in ETSI/TS 102 486-2-2:2008, 5.4.1.

Table A.74 — TP/AP-0BAS/OBU/BV/05 — Empty Test Purpose, left to keep numbering aligned with ETSI/TS 102 486-2-2:2008

TP Origin	
Reference	
Initial condition	
Stimulus and Expected Behaviour	

Table A.75 — TP/AP-0BAS/OBU/BV/06 — Empty Test Purpose, left to keep numbering aligned with ETSI/TS 102 486-2-2:2008

TP Origin	
Reference	
Initial condition	
Stimulus and Expected Behaviour	

Table A.76 — TP/AP-0BAS/OBU/BV/07 — Empty Test Purpose, left to keep numbering aligned with ETSI/TS 102 486-2-2:2008

TP Origin	
Reference	
Initial condition	
Stimulus and Expected Behaviour	

Table A.77 — TP/AP-0BAS/OBU/BV/08 — Empty Test Purpose, left to keep numbering aligned with ETSI/TS 102 486-2-2:2008

TP Origin	
Reference	
Initial condition	
Stimulus and Expected Behaviour	

Table A.78 — TP/AP-0BAS/OBU/BV/09 — Manage profile selection

TP Origin	Identical to TP/AL-I/OBU/BV/09 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-I/OBU/BV/09 in ETSI/TS 102 486-2-2:2008, 5.4.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-I/OBU/BV/09 in ETSI/TS 102 486-2-2:2008, 5.4.1.

Table A.79 — TP/AP-0BAS/OBU/BV/10 — Verify that the IUT replies to a BST with a VST

TP Origin	Specific			
Reference	EN 15509:2023, 6.1.4			
Initial condition	IUT not in sleep mode and not yet initialized			
Stimulus and Expected Behaviour		Tester		IUT
	1	BST1	⇒	
	2		⇐	VST
	3	Verify length and allowed values of VST (see Table A.56 – VST, General Structure)		
	4	IF verification performed in step 3 is NOT OK THEN TP failed		

A.5.4.3 BI test purposes

Table A.80 to Table A.81 specify the application I-kernel BI test purposes for OBE with security level 0.

Test subgroup objective:

- to check the behaviour of the IUT in response to invalid stimuli and behaviour from the test tool.

Table A.80 — TP/AP-0BAS/OBU/BI/01 — Manage profile selection

TP Origin	Identical to TP/AL-I/OBU/BI/01 in ETSI/TS 102 486-2-2:2008, 5.4.2.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-I/OBU/BI/01 in ETSI/TS 102 486-2-2:2008, 5.4.2.
Stimulus and Expected Behaviour	In accordance with TP/AL-I/OBU/BI/01 in ETSI/TS 102 486-2-2:2008, 5.4.2.

Table A.81 — TP/AP-0BAS/OBU/BI/02 — Manage applications

TP Origin	Identical to TP/AL-I/OBU/BI/02 in ETSI/TS 102 486-2-2:2008, 5.4.2.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-I/OBU/BI/02 in ETSI/TS 102 486-2-2:2008, 5.4.2.
Stimulus and Expected Behaviour	In accordance with TP/AL-I/OBU/BI/02 in ETSI/TS 102 486-2-2:2008, 5.4.2.

A.5.5 Application T-kernel test purposes for On-Board Unit, security level 0 (AP-0FUN)

A.5.5.1 General

The Test Purposes specified in Table A.82 to Table 108 are applicable to the security level 0 claimed in EN 15509:2023 ICS proforma for OBU, B.4.3, Table B.3.

A.5.5.2 BV test purposes

Table A.82 to Table A.102 specify the application T-kernel BV test purposes for OBE with security level 0.

Test subgroup objective:

- to test the behaviour of the IUT in relation to syntactically and contextual correct behaviour of the test system.

Table A.82 — TP/AP-0FUN/OBU/BV/01 — Receive GET.request and manage GET.response with LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/01 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/01 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/01 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.83 — TP/AP-0FUN/OBU/BV/02 — Receive SET.request and manage SET.response with LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/02 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/02 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/02 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.84 — TP/AP-0FUN/OBU/BV/03 — Receive SET.request with mode=1 and GET.request, manage SET.response and GET.response with LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/03 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/03 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/03 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.85 — TP/AP-0FUN/OBU/BV/04 — Receive SET.request with mode=0 and GET.request, manage GET.response with LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/04 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/04 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/04 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.86 — TP/AP-0FUN/OBU/BV/05 — Receive SET.request with mode=0 and GET.request, manage GET.response with LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/05 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/05 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/05 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.87 — TP/AP-0FUN/OBU/BV/06 — Receive SET.request with mode=0 and LID=broadcast after init and GET.request, manage GET.response with LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/06 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/06 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/06 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.88 — TP/AP-0FUN/OBU/BV/07 — Receive SET.request with mode=0 and LID=broadcast without init and GET.request, manage GET.response with LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/07 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/07 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/07 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.89 — TP/AP-0FUN/OBU/BV/08 — Receive ACTION.request with mode=1, manage ACTION.response with LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/08 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/08 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/08 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.90 — TP/AP-0FUN/OBU/BV/09 — Receive ACTION.request with mode=0 and LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/09 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/09 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/09 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.91 — TP/AP-0FUN/OBU/BV/10 — Receive ACTION.request with mode=0 and LID=private

TP Origin	Identical to TP/AL-T/OBU/BV/10 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/10 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/10 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.92 — TP/AP-0FUN/OBU/BV/11 — Receive ACTION.request with mode=0 and LID=broadcast

TP Origin	Identical to TP/AL-T/OBU/BV/11 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/11 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/11 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.93 — TP/AP-0FUN/OBU/BV/12 — Receive ACTION.request with mode=0 and LID=broadcast

TP Origin	Identical to TP/AL-T/OBU/BV/12 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/12 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/12 in ETSI/TS 102 486-2-2:2008, 5.2.1. NOTE Request without accessCredentials.

Table A.94 — TP/AP-0FUN/OBU/BV/13 — Receive and manage non-fragmented APDUs with random PDU number

TP Origin	Identical to TP/AL-T/OBU/BV/13 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/13 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/13 in ETSI/TS 102 486-2-2:2008, 5.2.1.

Table A.95 — TP/AP-0FUN/OBU/BV/14 — Receive and manage multiplexed APDUs from two different applications

TP Origin	Identical to TP/AL-T/OBU/BV/14 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Reference	EN 15509:2023, 6.1.4
Initial condition	In accordance with TP/AL-T/OBU/BV/14 in ETSI/TS 102 486-2-2:2008, 5.2.1.
Stimulus and Expected Behaviour	In accordance with TP/AL-T/OBU/BV/14 in ETSI/TS 102 486-2-2:2008, 5.2.1.