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**Elektronische Gebührenerhebung –
Konformitätsprüfung von Fahrzeuggeräten und straßenseitigen
Einrichtungen nach EN 15509 –
Teil 1: Struktur und Zweck des Prüfprogramms;
Englische Fassung EN 15876-1:2016**

Electronic fee collection –

Evaluation of on-board and roadside equipment for conformity to EN 15509 –

Part 1: Test suite structure and test purposes;

English version EN 15876-1:2016

Perception de télépéage –

Évaluation de conformité de l'équipement embarqué et de l'équipement au sol à la
EN 15509 –

Partie 1: Structure des suites de tests et intention des tests;

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Nationales Vorwort

Dieses Dokument (EN 15876-1:2016) wurde vom Technischen Komitee CEN/TC 278 „Intelligente Transportsysteme“ ausgearbeitet, dessen Sekretariat vom NEN (Niederlande) gehalten wird.

Das zuständige deutsche Normungsgremium ist der Gemeinschaftsarbeitsausschuss NA 052-02-71 GA „Intelligente Verkehrssysteme“ des Normenausschusses Automobiltechnik.

Innerhalb von CEN/TC 278 wurden Normen zur Unterstützung kompatibler DSRC-EFC-Systeme, wie zum Beispiel EN ISO 14906 und CEN ISO/TS 14907-2, definiert. Trotzdem haben diese Normen nur einführenden Charakter und garantieren keine umfassende technische Kompatibilität. Deswegen wurde EN 15509 entwickelt, um technische Interoperabilität zwischen EFC-Systemen zu gewährleisten.

EN 15876-1 legt die Struktur der Testprogramme sowie Konformitätsprüfungen nach den Anforderungen fest, welche in EN 15509 definiert sind.

Änderungen

Gegenüber DIN EN 15876-1:2012-08 wurden folgende Änderungen vorgenommen:

- a) Ergänzung von Begriffen, bzw. Harmonisierung von Begriffen im Umfeld der Standardisierung im Bereich elektronische Gebührenerhebung;
- b) Hinzufügen eines neuen Abschnittes (5) bezüglich Konformität;
- c) Ergänzungen, die Änderungen in den zugrunde liegenden Grundnormen berücksichtigen. Dabei wurde auf Rückwärtskompatibilität zur ersten Ausgabe dieser Norm geachtet.

Frühere Ausgaben

DIN EN 15876-1: 2011-10, 2012-08

Nationaler Anhang NA (informativ)

Begriffe

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe:

3.1

Attribut

(en: attribute)

adressierbares Datenpaket, welches aus einem einzelnen Datenelement oder strukturierten Sequenzen von Datenelementen besteht

[QUELLE: ISO 17575-1:2016, 3.2]

3.2

Authentifikator

(en: authenticator)

Daten, wenn möglich verschlüsselt, die zur Authentifizierung verwendet werden

[QUELLE: EN 15509:2014, 3.3]

3.3

Datengruppe

(en: data group)

Klasse von verwandten Attributen

[QUELLE: ISO 17575-1:2016, 3.10]

3.4

Element

(en: element)

<DSRC> Verzeichnis, welches Anwendungsinformation in Form von Attributen beinhaltet

[QUELLE: EN ISO 14906:2011, 3.11]

3.5

Erklärung zur Konformität der Implementierung

(en: implementation conformance statement)

Erklärung bezogen auf die implementierte Leistungsfähigkeit und Optionen, die festlegt, in welchem Ausmaß die Implementierung zu einer gegebenen Spezifikation konform ist

3.6

Formular für die Erklärung zur Konformität der Implementierung

(en: implementation conformance statement proforma)

Dokument in Form eines Fragebogens, das, wenn es für eine Implementierung oder ein System ausgefüllt wird, zu einer Erklärung zur Konformität der Implementierung wird

[QUELLE: ISO/IEC 9646-1:1994, 3.3.40]

3.7

Zusatzinformation zur Prüfung der Implementierung

(en: implementation extra information for testing)

Aufstellung aller Informationen bezogen auf die zu prüfende Implementierung (IUT, en: implementation under test) und das korrespondierende zu prüfende System (SUT, en: system under test), die das Prüflabor befähigen, die entsprechende Testreihe gegen die IUT durchzuführen

[QUELLE: ISO/IEC 19105:2000, 3.20]

3.8

Zusatzinformation zur Prüfung der Implementierung

(en: implementation extra information for testing proforma)

Dokument in Form eines Fragebogens, das, wenn es für eine zu testende Implementierung ausgefüllt wird, zur Zusatzinformation zur Prüfung der Implementierung wird

[QUELLE: ISO/IEC 9646-1:1994, 3.3.42, modifiziert]

3.9

fahrzeuginterne Einrichtung

(en: on-board equipment)

alle erforderlichen Einrichtungen im Fahrzeug zur Durchführung notwendiger Funktionen der elektronischen Gebührenerhebung (EFC, en: electronic fee collection) und von Kommunikationsdiensten

3.10

fahrzeuginterne Einheit

(en: on-board unit)

kleinste Komponente einer *fahrzeuginternen Einrichtung*, welche mindestens die DSRC-Schnittstelle beinhaltet

[QUELLE: EN ISO 14906:2011, 3.14]

3.11

Straßenrand-Einrichtung

(en: roadside equipment)

feste oder mobile Einrichtung entlang einer Straße

[QUELLE: EN ISO 14906:2011, 3.16, modifiziert]

3.12

Tester

(en: tester)

Kombination von Gerät, Personen und Prozessen, die spezifische Konformitätsprüfungen durchführen kann

3.13

Vorgang

(en: transaction)

Gesamtheit eines Informationsaustauschs zwischen zwei physikalisch getrennten Kommunikationseinrichtungen

[QUELLE: ISO 17575-1:2016, 3.21]

English Version

Electronic fee collection - Evaluation of on-board and
roadside equipment for conformity to EN 15509 - Part 1:
Test suite structure and test purposes

Perception de télépéage - Evaluation de conformité de
l'équipement embarqué et de l'équipement au sol à la
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Elektronische Gebührenerhebung -
Konformitätsprüfung von Fahrzeuggeräten und
straßenseitigen Einrichtungen nach EN 15509 - Teil 1:
Struktur und Zweck des Prüfprogramms

This European Standard was approved by CEN on 5 September 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 15876-1:2016) 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 April 2017, and conflicting national standards shall be withdrawn at the latest by April 2017.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document supersedes EN 15876-1:2010+A1:2012.

This second edition of EN 15876-1 incorporates the following main modifications compared to the previous one:

- amendment of terms, in order to reflect harmonization of terms across electronic fee collection (EFC) standards;
- addition of a new clause (i.e. Clause 5) on conformance;
- amendments to reflect changes to the underlying base standard, with emphasis on backward compatibility with the first edition of this standard.

For the revision of this European Standard, the following principles have been used:

- take into account the evolution of some of the underlying standard, i.e. EN 15509:2014
- maintain compatibility with the previous edition of this European Standard.

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

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 CEN ISO/TS 14907-2 (EFC application interface conformance tests for On Board Units). However, these standards are only of an enabling nature and do not guarantee unambiguous technical interoperability. Therefore EN 15509, *Electronic fee collection — Interoperability application profile for DSRC* was developed to support technical interoperability between EFC-systems.

This European Standard defines the test suite structure and the test purposes for conformity evaluation of OBUs and RSE designed for compliance with the requirements set up in 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.

This document forms Part 1 of a two-part standard:

- EN 15876-1, *Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to EN 15509 — Part 1: Test suite structure and test purposes*
- EN 15876-2, *Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to EN 15509 — Part 2: Abstract test suites*

Together, the two parts of EN 15876 provide the necessary foundation for 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

The objective of this document is to provide a basis for conformance tests for DSRC equipment (on-board and roadside units) to support interoperability between different equipment supplied by different manufacturers.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15509:2014, *Electronic fee collection — Interoperability application profile for DSRC*

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

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

EN ISO 14906:2011, *Electronic fee collection — Application interface definition for dedicated short-range communication (ISO 14906:2011)*

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

ETSI EN 300 674-1:2004, *Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band; Part 1: General characteristics and test methods for Road Side Units (RSU) and 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 following terms and definitions apply.

3.1

attribute

addressable package of data consisting of a single data element or structured sequences of data elements

[SOURCE: ISO 17575-1:2016, 3.2]

3.2

authenticator

data, possibly encrypted, that is used for authentication

[SOURCE: EN 15509:2014, 3.3]

3.3

data group

class of closely related attributes

[SOURCE: ISO 17575-1:2016, 3.10]

3.4

element

DSRC directory containing application information in form of attributes

[SOURCE: EN ISO 14906:2011, 3.11]

3.5

implementation conformance statement

statement of capabilities and options that have been implemented defining to what extent it is compliant with a given specification

3.6

implementation conformance statement proforma

document, in the form of a questionnaire, which when completed for an implementation or system becomes an implementation conformance statement (ICS)

[SOURCE: ISO/IEC 9646-1:1994, 3.3.40]

3.7

implementation extra information for testing

statement containing all of the information related to the implementation under test (IUT) and its corresponding system under test (SUT) which will enable the testing laboratory to run an appropriate test suite against that IUT

[SOURCE: ISO 19105:2000, 3.20]

3.8

implementation extra information for testing proforma

document, in the form of a questionnaire, which when completed for an implementation under test (IUT) becomes an implementation extra information for testing (IXIT)

[SOURCE: ISO/IEC 9646-1:1994, 3.3.42, modified]

3.9

on-board equipment

all required equipment on-board a vehicle for performing required EFC functions and communication services

3.10

on-board unit

minimum component of an *on-board equipment*, whose functionality always includes at least the support of the DSRC interface

[SOURCE: EN ISO 14906:2011, 3.15]

3.11

roadside equipment

equipment located along the road, either fixed or mobile

[SOURCE: EN ISO 14906:2011, 3.17]

3.12

tester

combination of equipment, humans and processes able to perform specified conformance tests

3.13

transaction

whole of the exchange of information between two physically separated communication facilities

[SOURCE: ISO 17575-1:2016, 3.21]

4 Abbreviations

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

APDU	Application Protocol Data Unit (EN ISO 14906)
AP	Application Process
ASN.1	Abstract Syntax Notation One (ISO/IEC 8824-1)
ATS	Abstract Test Suite
BI	Behaviour Invalid (i.e. Invalid Behaviour tests)
BST	Beacon Service Table (EN ISO 14906)
BV	Behaviour Valid (i.e. Valid Behaviour tests)
DSRC	Dedicated Short-Range communication (EN ISO 14906)
DUT	Device Under Test (CEN ISO/TS 14907-2)
EFC	Electronic Fee Collection (ISO 17573)
ICS	Implementation Conformance Statement
LLC	Logical Link Control (EN 12795)
LPDU	LLC Protocol Data Unit (EN 12795)
MAC	Medium Access Control (EN 12795)
PCTR	Protocol Conformance Test Report
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
SCTR	System Conformance Test Report

TP Test Purposes
TSS Test Suite Structure
VST Vehicle Service Table (EN ISO 14906)

5 Conformance

The manufacturer of the OBU and RSE, respectively, is responsible for providing a conformance test report.

The manufacturer of the OBU shall complete the protocol conformance test report (PCTR) for on-board units as defined in Annex C.

The manufacturer of the RSE shall complete the PCTR for roadside equipment as defined in Annex D.

6 Test Suite Structure

6.1 Structure

The table below shows the Test Suite Structure (TSS) including its subgroups defined for the conformance testing.

Table 1 — Test Suite Structure

Group	Type of DUT	Behaviour
Physical layer	On Board Unit	Valid behaviour
		Invalid behaviour
	Road Side Equipment	Valid behaviour
		Invalid behaviour
DLC MAC sublayer	On Board Unit	Valid behaviour
		Invalid behaviour
	Road Side Equipment	Valid behaviour
		Invalid behaviour
DLC LLC sublayer	On Board Unit	Valid behaviour
		Invalid behaviour
	Road Side Equipment	Valid behaviour
		Invalid behaviour
Application layer – Functions	On Board Unit	Valid behaviour
		Invalid behaviour
	Road Side Equipment	Valid behaviour
		Invalid behaviour
Application Layer – Data	On Board Unit	Valid behaviour
		Invalid behaviour
	Road Side Equipment	Valid behaviour
		Invalid behaviour
Application Layer – Security Level 0	On Board Unit	Valid behaviour
		Invalid behaviour
	Road Side Equipment	Valid behaviour
		Invalid behaviour
Application Layer – Security Level 1	On Board Unit	Valid behaviour
		Invalid behaviour
	Road Side Equipment	Valid behaviour
		Invalid behaviour
Application Layer – Transactions	On Board Unit	Valid behaviour
		Invalid behaviour
	Road Side Equipment	Valid behaviour
		Invalid behaviour

Physical layer tests are to be performed in a radio wave lab. 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 what is 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 described in the profile standard. This document takes into account already defined test purposes for conformance to the base standards by referencing them, so that:

- a) For test purposes that are **identical** to those defined in the base standards conformance test cases (see e.g ETSI/TS 102 486-1-2 or ETSI/TS 102 486-2-2) 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.
- b) For test purposes that are **derived** from those defined 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.
- c) 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 defined following the rules shown in Table 2 below.

Table 2 — TP Definition Rules

TP ID according to the TP naming conventions	Title
	Reference
	TP origin
	Initial condition
	Stimulus and expected behaviour

TP ID	The TP ID is a unique identifier. It shall be specified according to the TP naming conventions defined in the sub-clause below.
Title	Short description of Test Purpose objective.
Reference	The reference should contain the references of the subject to be validated by the actual TP (specification reference, clause, and paragraph).
TP origin	Indicates if the TP is identical to a TP defined in another test standard, derived from a TP defined in another test standard, or specific for this standard profile.
Initial condition	The condition defines in which initial state the DUT has to be to apply the actual TP.
Stimulus and expected behaviour	Definition of the events the tester performs, and the events that are expected from the DUT to conform to the base specification.

Note that the reference field normally points to the clause of the base standard EN 15509. 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>/<dut>/<x>-<nn>

- TP : to indicate that it is a Test Purpose;
- <group> : which group among those defined in Table 1 — Test Suite Structure does the TP apply to;
- <dut> : type of DUT (i.e. OBU 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 below.

Table 3 — TP Naming Conventions

Identifier: TP/<group>/<dut>/<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
	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
<dut> = type of DUT	OBU	On Board Unit
	RSE	Road Side 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 Units

A.1 Introduction

This annex contains the Test Purposes (TP) for the conformity evaluation of OBUs to EN 15509:2014.

A.2 Physical Layer

A.2.1 BV Test Purposes

Test subgroup objective:

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

TP/PHY/OBU/BV/01	Dynamic range – sensitivity
TP Origin	Identical to ETSI EN 300 674-1, 10.1.1
Reference	EN 15509, 6.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.1.1	

TP/PHY/OBU/BV/02	Dynamic range – upper power limit for communication
TP Origin	Identical to ETSI EN 300 674-1, 10.1.2
Reference	EN 15509, 6.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.1.2	

TP/PHY/OBU/BV/03	Cut-off power level
TP Origin	Identical to ETSI EN 300 674-1, 10.2
Reference	EN 15509, 6.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.2	

TP/PHY/OBU/BV/04	Conversion gain
TP Origin	Identical to ETSI EN 300 674-1, 10.3
Reference	EN 15509, 6.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.3	

TP/PHY/OBU/BV/05	Maximum equivalent isotropically radiated power
TP Origin	Identical to ETSI EN 300 674-1, 10.4
Reference	EN 15509, 6.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.4	

TP/PHY/OBU/BV/06	Frequency error
TP Origin	Identical to ETSI EN 300 674-1, 10.5
Reference	EN 15509, 6.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.5	

TP/PHY/OBU/BV/07	Transmitter spectrum mask
TP Origin	Identical to ETSI EN 300 674-1, 10.6
Reference	EN 15509, 6.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.6	

TP/PHY/OBU/BV/08	Transmitter unwanted emissions
TP Origin	Identical to ETSI EN 300 674-1, 10.7
Reference	EN 15509, 6.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.7	

TP/PHY/OBU/BV/09	Receiver spurious emissions
TP Origin	Identical to ETSI EN 300 674-1, 10.8
Reference	EN 15509, 5.1.2
Initial condition	See ETSI EN 300 674-1, Clause 8.
Stimulus and Expected Behaviour	
See ETSI EN 300 674-1, 10.8	

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

Test subgroup objective:

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

TP/MAC/OBU/BV/01	Receive downlink frames – maximum length
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/01
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/01
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/01	

TP/MAC/OBU/BV/02	Receive downlink frames within T1
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/02
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/02
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/02	

TP/MAC/OBU/BV/03	Timing constraints for public uplink windows
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/03
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/03
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/03	

TP/MAC/OBU/BV/04	Receive downlink frames within T2
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/04
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/04
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/04	

TP/MAC/OBU/BV/05	Timing constraints for private uplink windows
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/05
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/05
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/05	

TP/MAC/OBU/BV/06	S-bit and L-bit in MAC control field
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/06
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/06
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/06	

TP/MAC/OBU/BV/07	Manage S-bit state variable
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/07
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/07
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/07	

TP/MAC/OBU/BV/08	Random selection of N5 public uplink windows
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/08
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/08
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BV/08	

A.3.2 BI Test Purposes

Test subgroup objective:

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

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 TP/MAC/OBU/BI/01
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/01
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/01	

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 TP/MAC/OBU/BI/02
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/02
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/02	

TP/MAC/OBU/BI/03	Detect and manage a block of 15 bit errors
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/03
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/03
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/03	

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 TP/MAC/OBU/BI/04
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/04
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/04	

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 TP/MAC/OBU/BI/05
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/05
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/05	

TP/MAC/OBU/BI/06	Detect and manage a too long downlink frame according to N2
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/06
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/06
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/06	

TP/MAC/OBU/BI/07	Detect and manage wrong format of LID
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/07
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/07
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/07	

TP/MAC/OBU/BI/08	Detect and manage missing MAC control field
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/08
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/08
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/08	

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 TP/MAC/OBU/BI/09
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/09
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/09	

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 TP/MAC/OBU/BI/10
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/10
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/10	

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 TP/MAC/OBU/BI/11
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/11
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/11	

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 TP/MAC/OBU/BI/12
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/12
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/12	

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 TP/MAC/OBU/BI/13
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/13
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/13	

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 TP/MAC/OBU/BI/14
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/14
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/14	

TP/MAC/OBU/BI/15	Detect and manage a wrong MAC control field
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/15
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/15
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/15	

TP/MAC/OBU/BI/16	Detect and manage blocked signals
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/16
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/16
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/16	

TP/MAC/OBU/BI/17	Detect and manage blocked end flag
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/17
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/17
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/17	

TP/MAC/OBU/BI/18	Detect and manage blocked start flag
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/18
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/18
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/18	

TP/MAC/OBU/BI/19	Detect and manage broadcast LID where expecting private LID
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/19
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/19
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/19	

TP/MAC/OBU/BI/20	Detect and manage multicast LID where expecting private LID
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/20
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/20
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/20	

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 TP/MAC/OBU/BI/21
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/21
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/21	

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 TP/MAC/OBU/BI/22
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/22
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/22	

TP/MAC/OBU/BI/23	Detect and manage wrong private LID
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/23
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/23
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/23	

TP/MAC/OBU/BI/24	Verify that the OBU can manage retransmission of PrWRq
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/24
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/24
Stimulus and Expected Behaviour	
See ETSI/TS 102 486-1-2 TP/MAC/OBU/BI/24	

A.4 LLC

A.4.1 BV Test Purposes

Test subgroup objective:

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

TP/LLC/OBU/BV/01	Exchange UI commands
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/01
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/01
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/01	

TP/LLC/OBU/BV/02	Manage ACn data transmission
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/02
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/02
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/02	

TP/LLC/OBU/BV/03	Manage ACn data exchange
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/03
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/03
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/03	

TP/LLC/OBU/BV/04	Empty Test Purpose, left to keep numbering aligned with ETSI/TS 102 486-1-2
TP Origin	
Reference	
Initial condition	
Stimulus and Expected Behaviour	

TP/LLC/OBU/BV/05	Manage data response Procedure I
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/05
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/05
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BV/05	

A.4.2 BI Test Purposes

Test subgroup objective:

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

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 TP/LLC/OBU/BI/01
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/01
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/01	

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 TP/LLC/OBU/BI/02
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/02
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/02	

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 TP/LLC/OBU/BI/03
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/03
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/03	

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 TP/LLC/OBU/BI/04
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/04
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/04	

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 TP/LLC/OBU/BI/05
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/05
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/05	

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 TP/LLC/OBU/BI/06
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/06
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/06	

TP/LLC/OBU/BI/07	Detect and manage duplicate ACn commands
TP Origin	Identical to ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/07
Reference	EN 15509, 6.1.2
Initial condition	See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/07
Stimulus and Expected Behaviour See ETSI/TS 102 486-1-2 TP/LLC/OBU/BI/07	

A.5 Application Layer

A.5.1 Introduction and general conventions

For the application layer test purposes, a special notation and symbol convention is used, as defined in what follows.

Symbols are used in the description of the TPs, with meanings according to Table A.1 below.

Table A.1 — Description of TP Symbols

SYMBOL	DESCRIPTION
$XXX.rq \Rightarrow$	The Tester sends the XXX.rq PDU to the DUT
$\Leftarrow YYY.rs$	The DUT 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, is described in Table A.2 — BST, General Structure, below.

Table A.2 — 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	See ISO 14816
	individualid		27 bits	as specified by manufacturer
time			32 bits	UNIX real time
profile			1 bit (Profile ext.)	0 (= no extension)
			7 bits	See Profile in [EN 12834] 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)
			5 bits	1 (= electronic-fee-collection)
	Application 2 (not EFC)		1 bit (eid opt.)	0/1
			1 bit (parameter opt.)	0/1
		aid	1 bit (aid ext.)	0 (= no extension)
			5 bits	See DSRCApplicationEntityID in [EN 12834] Annex A
			1 bit (eid ext.)	0 (= no extension)
		eid	7 bits	any
				See ApplicationContextMark in [EN 12834] Annex A
		parameter		
	...		...	...
	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	See DSRCApplicationEntityID in [EN 12834] Annex A
			1 bit (eid extension)	0 (= no extension)
		eid	7 bits	any
				See ApplicationContextMark in [EN 12834] Annex A
		parameter		
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	See Profile in [EN 12834] Annex A
	...		...	...
	Profile K		1 bit (Profile ext.)	0 (= no extension)
			7 bits	See Profile in [EN 12834] Annex A

A.5.2.2 VST

The VST general structure, as is *transmitted* by the OBU, is described in Table A.3 — VST, General Structure and Table A.4 — VST, General Structure (security level 1) below.

Table A.3 — 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	See Profile in [EN 12834] Annex A										
applications					1 bit (applications ext.)	0 (= no extension)										
							7 bits (number of applic.)	M								
	EFC Application				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)					
					parameter						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			
									EFC-ContextMark				contract Provider		10 bits (CountryCode)	See ISO 3166-1
													14 bits (IssuerIdentifier)		See ISO 14816	
													typeOf Contract		16 bits	any
													context Version		1 bit (contextVersion ext.)	0 (= no extension)
					7 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		See DSRCApplicationEntityID, [EN 12834] Annex A					
	eid								1 bit (eid ext.)	0 (= no extension)						
									7 bits		any (≠ other eid used in this VST)					
	parameter										See ApplicationContextMark, [EN 12834] 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		See DSRCApplicationEntityID, [EN 12834] Annex A					
					eid				1 bit (eid extension)	0 (= no extension)						
									7 bits		any (≠ other eid used in this VST)					
					parameter						See ApplicationContextMark, [EN 12834] Annex A					
	obeConfiguration							1 bit (obeStatus opt.)	0/1							
						equipmentClass		15 bits	any							
manufacturerID						16 bits	any									
obeStatus						16 bits	valid status									

Table A.4 — VST, General Structure (security level 1)

				Length	Allowed Values
Fill				4 bits	Any
Profile				1 bit (Profile ext.)	0 (= no extension)
				7 bits	See Profile in EN 12834 Annex A
applications				1 bit (applications ext.)	0 (= no extension)
				7 bits (number of applic.)	M
	<i>EFC Application</i>			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)
		parameter		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	contract Provider	10 bits (CountryCode) See EN ISO 3166-1
				14 bits (IssuerIdentifier)	See EN ISO 14816
				typeOf Contract	16 bits any
			context Version	1 bit (contextVersion ext.)	0 (= no extension)
				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	any
			AC_CR_Diversifier	8 bits	any
				1 bit (Container ext.)	0 (= no extension)
				7 bits (Container CHOICE)	2 (= OCTET STRING)
				1 bit (octet string ext.)	0 (= no extension)

obeConfiguration				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	See DSRCApplicationEntityID, EN 12834 Annex A	
		eid	1 bit (eid ext.)	0 (= no extension)	
			7 bits	any (≠ other eid used in this VST)	
		parameter		See ApplicationContextMark, EN 12834 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	See DSRCApplicationEntityID, EN 12834 Annex A	
	eid		1 bit (eid extension)	0 (= no extension)	
			7 bits	any (≠ other eid used in this VST)	
	parameter			See ApplicationContextMark, EN 12834 Annex A	
					1 bit (obeStatus opt.)
		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 (security level 0)

The following tables:

- Table A.5 — GET-Rq parameters (security level 0);
- Table A.6 — SET-Rq parameters (security level 0);
- Table A.7 — ACTION-Rq parameters (security level 0)

describe the valid format of the request APDUs for the security level 0.

Table A.5 — GET-Rq parameters (security level 0)

	EN 12834, Annex A	EN 15509, C.4.5.5 Table C.16
GET-Rq	fill	=
	eid	
	accessCredentials OPTIONAL	prohibited
	iid OPTIONAL	
	attributeldList OPTIONAL	mandatory

Table A.6 — SET-Rq parameters (security level 0)

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

Table A.7 — ACTION-Rq parameters (security level 0)

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

Table A.8 — EVENT-REPORT-Rq parameters (security level 0)

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

A.5.3.2 Parameters of request PDUs (security level 1)

The following tables:

- Table A.9 — GET-Rq parameters (security level 1);
- Table A.10 — SET-Rq parameters (security level 1);
- Table A.11 — ACTION-Rq parameters (security level 1);
- Table A.12 — EVENT-REPORT-Rq parameters (security level 1)

describe the valid format of the request APDUs for the security level 1.

Table A.9 — GET-Rq parameters (security level 1)

	EN 12834 Annex A	EN 15509, C.4.5.5 Table C.16
GET-Rq	Fill	=
	Eid	
	accessCredentials OPTIONAL	mandatory
	iid OPTIONAL	prohibited
	attributeIdList OPTIONAL	mandatory

Table A.10 — SET-Rq parameters (security level 1)

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

Table A.11 — ACTION-Rq parameters (security level 1)

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

Table A.12 — EVENT-REPORT-Rq parameters (security level 1)

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

A.5.3.3 Parameters of response PDUs

The following tables:

- Table A.13 — GET-Rs parameters;
- Table A.14 — SET-Rs parameters;
- Table A.15 — ACTION-Rs parameters

describe the valid format of the response APDUs.

Table A.13 — GET-Rs parameters

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

Table A.14 — SET-Rs parameters

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

Table A.15 — ACTION-Rs parameters

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

A.5.4 Application I-kernel test purposes for On-Board Unit, security level 0 (AP-OBAS)

A.5.4.1 Data Structures

These Test Purposes apply to the security level 0 claimed in EN 15509 ICS proforma for OBU, C.4.4, Table C.3.

For the purpose of this conformance test, the BSTs parameters described in Table A.16 — BST1: valid BST are transmitted to the DUT in the Test Purposes that follow. Invalid values are indicated in **boldface**.

Table A.16 — 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

Test subgroup objective:

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

- 1) valid BST;
 - 2) valid EVENT-REPORT-Rq (Release);
- b) to test the DUT support of:
- 1) BeaconId;
 - 2) Time;
 - 3) Profile;
 - 4) Applications;
 - 5) LID.

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, 5.4.1
Reference	EN 15509, 6.1.4
Initial condition	See TP/AL-I/OBU/BV/01 in ETSI/TS 102 486-2-2, 5.4.1
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BV/01 in ETSI/TS 102 486-2-2, 5.4.1	

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, 5.4.1
Reference	EN 15509, 6.1.4
Initial condition	See TP/AL-I/OBU/BV/02 in ETSI/TS 102 486-2-2, 5.4.1
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BV/02 in ETSI/TS 102 486-2-2, 5.4.1	

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, 5.4.1
Reference	EN 15509, 6.1.4
Initial condition	See TP/AL-I/OBU/BV/03 in ETSI/TS 102 486-2-2, 5.4.1
Stimulus and Expected Behaviour	
See TP/AL-I/OBU/BV/03 in ETSI/TS 102 486-2-2, 5.4.1	