BSI Standards Publication

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

Part 2: Abstract test suite

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National foreword

This British Standard is the UK implementation of EN 15876-2:2011.

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

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to EN 15509 - Part 2: Abstract test suite

Perception de télépéage - Evaluation de conformité de l'équipement embarqué et de l'équipement au sol à l'EN 15509 - Partie 2: Suite d'essais abstraite

Elektronische Gebührenerhebung - Konformitätsprüfung von Fahrzeuggeräten und straßenseitigen Einrichtungen mit der EN 15509 - Teil 2: Abstrakte Prüfreihen

This European Standard was approved by CEN on 17 December 2010.

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Contents

Foreword

This document (EN 15876-2:2011) has been prepared by Technical Committee CEN/TC 278 "Road transport and traffic telematics", 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of an identical text or by endorsement, at the latest by September 2011, and conflicting national standards shall be withdrawn at the latest by September 2011.

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.

CEN/TC 278 (WG 1) 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 the standard profile Electronic fee collection – Interoperable application profile for DSRC (EN 15509) was developed to support technical interoperability between EFC-systems.

To evaluate the conformity of On-Board and Roadside Equipment to EN 15509 a two-part standard has been prepared:

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

— *Part 1: Test suite structure and test purposes*

— *Part 2: Abstract test suite*

Part 1 of the 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.

Part 2 of the standard (this standard) provides the Abstract Test Suites (ATS), which are translations of the "human-readable" TSS&TP suite into Tree and Tabular Combined Notation (TTCN). The ATS will be based on the Tree and Tabular Combined Notation test script language that is suitable for implementation in computer-aided test tools. TTCN is a test language that is widespread, dedicated test programming language for compliance testing and is standardized in ISO/IEC 9646-3.

Together, the two parts of the present standard 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.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1   Scope

This European Standard specifies the Abstract Test Suites (ATSs) to evaluate the conformity of On Board Equipment (OBE) and Roadside Equipment (RSE) to EN 15509.

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

2   Normative references

Not applicable.

3   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
access credentials
data that is transferred to *on-board equipment (OBE),* in order to establish the claimed identity of a roadside equipment (RSE) application process entity

NOTE   The access credentials data carries information needed to fulfil access conditions in order to perform the operation on the addressed element in the OBE. The access credentials can carry passwords as well as cryptographic based information such as authenticators.

[EN ISO 14906:2004]

3.2
action
function that an application process resident at the *roadside equipment* can invoke in order to make the *on-board equipment* execute a specific operation during the *transaction*

[EN ISO 14906:2004]

3.3
attribute
application information formed by one or by a sequence of data elements, and is managed by different actions used for implementation of a *transaction*

[EN ISO 14906:2004]

3.4
authenticator
data appended to, or a cryptographic transformation (see 3.8) of, a data unit that allows a recipient of the data unit to prove the source and/or the integrity of the data unit and protect against forgery

[EN ISO 14906:2004]

3.5
channel
information transfer path

[EN ISO 14906:2004]

3.6
component
logical and physical entity composing an *on-board equipment*, supporting a specific functionality

[EN ISO 14906:2004]

3.7
contract
expression of an agreement between two or more parties concerning the use of the road infrastructure

[EN ISO 14906:2004]

3.8
cryptography
discipline which embodies principles, means, and methods for the transformation of data in order to hide its information content, prevent its undetected modification or/and prevent its unauthorised use

[EN ISO 14906:2004]

3.9
data group
collection of closely related EFC data attributes which together describe a distinct part of an EFC transaction

[EN ISO 14906:2004]

3.10
data integrity
property that data has not been altered or destroyed in an unauthorised manner

[EN ISO 14906:2004]

3.11
element
in the context of DSRC, directory containing application information in form of *attributes*

[EN ISO 14906:2004]

3.12
implementation conformance statement
statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities have been implemented

[CEN ISO/TS 14907-2:2006]

3.13
implementation conformance statement pro forma
document, in the form of a questionnaire, which when completed for an implementation or system becomes an implementation conformance statement

[CEN ISO/TS 14907-2:2006]

3.14
implementation extra information for testing
statement made by the supplier or an implementer of a IUT which contains or references all of the information (in addition to that given in the implementation conformance statement) related to the IUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the IUT

[CEN ISO/TS 14907-2:2006]

3.15
implementation extra information for testing pro forma
document, in the form of a questionnaire, which when completed for a DUT becomes an implementation extra information for testing

[CEN/ISO TS 14907-2:2006]

3.16
on-board equipment
equipment located within the vehicle and supporting the information exchange with the *roadside equipment*

NOTE   It is composed of the *on-board unit* and other sub-units whose presence have to be considered optional for the execution of a *transaction*.

[Adapted from EN ISO 14906:2004]

3.17
on-board unit
minimum component of an *on-board equipment*, whose functionality always includes at least the support of the DSRC interface

[EN ISO 14906:2004]

3.18
roadside equipment
equipment located at a fixed position along the road transport network, for the purpose of communication and data exchanges with the *on-board equipment* of passing vehicles

[EN ISO 14906:2004]

3.19
service (EFC)
road transport related facility provided by a *service provider*

NOTE   Normally a type of infrastructure, the use of which is offered to the *user* for which the *User* may be requested to pay.

[Adapted from EN ISO 14906:2004]

3.20
service primitive (communication)
elementary communication service provided by the Application layer protocol to the application processes

NOTE   The invocation of a service primitive by an application process implicitly calls upon and uses services offered by the lower protocol layers.

[EN ISO 14906:2004]

3.21
service provider (EFC)
operator that accepts the user's payment means and in return provides a road-use service to the user

[EN ISO 14906:2004]

3.22
session
exchange of information and interaction occurring at a specific EFC station between the *roadside equipment* and the user/vehicle

[EN ISO 14906:2004]

3.23
transaction
whole of the exchange of information between the *roadside equipment* and the *on-board equipment* necessary for the completion of an EFC operation over the DSRC

[EN ISO 14906:2004]

3.24
transaction model
functional model describing the general structure of Electronic Payment Fee Collection transactions

[EN ISO 14906:2004]

3.25
tester
combination of equipment and processes which is able to perform conformance tests according to this standard

3.26
user
entity that uses transport services provided by the *Service Provider* according to the terms of a *contract*

[EN ISO 14906:2004]

4 Abbreviations

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

ADU   Application Data Unit

APDU   Application Protocol Data Unit

AP   Application Process

ASN.1   Abstract Syntax Notation One (ISO/IEC 8824-1)

ATS   Abstract Test Suite

BI   Beviour Invalid (i.e. Invalid Behaviour tests)

B-Kernel   Broadcast Kernel

BST   Beacon Service Table

BV   Behaviour Valid (i.e. Valid Behaviour tests)

cf   Confirm

DLC   Data Link Control

DSRC   Dedicated Short-Range communication

DUT   Device Under Test [CEN ISO/TS 14907-2]

EID   Element Identifier

EFC   Electronic Fee Collection

EVENT-RT   EVENT-REPORT

ICS   Implementation Conformance Statement

IUT   Implementation Under Test

IXIT   Implementation eXtra Information for Testing

LLC   Logical Link Control

MAC   Medium Access Control

TSS   Test Suite Structure

VST Vehicle Service Table

5   Abstract Test Method (ATM)

5.1   General

This clause describes the ATM used to test the layers at the OBU side and at the RSU side.

5.2   Test architecture

Clause 4 in both ETSI TS 102 486-1-3:2009 and ETSI TS 102 486-2-3:2008 describe the test architecture for their respective layers for testing. As TPs from ETSI TS 102 486-1-3 and ETSI TS 102 486-2-3 are referenced to in EN 15876-1, the test architectures presented there are also relevant for the corresponding TCs. For all specific TPs introduced in EN 15876-1, the test architecture defined in ETSI TS 102 486-2-3 is relevant too.

6   Untestable Test Purposes (TP)

This clause gives a list of TPs which are not implemented in the Abstract Test Suite due to the chosen Abstract Test Method or other restrictions.

Table 1 — Untestable TPs

Test purpose	Reason
TP/PHY/OBU/BV/01	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/OBU/BV/02	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/OBU/BV/03	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/OBU/BV/04	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/OBU/BV/05	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/OBU/BV/06	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/OBU/BV/07	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/OBU/BV/08	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/OBU/BV/09	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/01	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/02	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/03	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/04	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/05	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/06	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/07	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/08	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/09	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/10	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/11	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.
TP/PHY/RSE/BV/12	Physical layer tests are to be performed in a radio wave lab. They do not form part of the ATS.

7 ATS conventions

7.1 General

The ATS conventions are intended to give a better understanding of the ATS but they also describe the conventions made for the development of the ATS. These conventions shall be considered during any later maintenance or further development of the ATS.

The ATS conventions contain two clauses, the naming conventions and the implementation conventions. The naming conventions describe the structure of the naming of all ATS elements. The implementation conventions describe the functional structure of the ATS.

7.2 Naming conventions

7.2.1 Declarations part

7.2.1.1 General

This clause describes the naming conventions chosen for the elements of the ATS declarations part.

The following general rules apply for the names given in the declarations part.

Names of ASN.1 types imported from the base standard are preserved.

Predefined types (e.g. BITSTRING [12]) are never used in structured type definitions, ASP type definitions or PDU type definitions. Simple types are used instead.

All declarations in the test suite are listed in alphabetical order. A different order of listing should be used for only maintenance reasons.

7.2.1.2 Test suite operations

The test suite operation identifiers are prefixed with "TSO_".

EXAMPLE   TSO_substring.

7.2.1.3   Test suite parameter declarations

If the test suite parameter references a Protocol Implementation Conformance Statement (PICS) item, the test suite parameter identifiers are prefixed "TSPC_".

EXAMPLE 1   TSPC_extended_rf_carriers.

If the test suite parameter references a PIXIT item, the suite parameter identifiers are prefixed "TSPX_".

EXAMPLE 2   TSPX_pmid.

If the test suite parameter represents a system parameter, the complete name defined in the protocol is used.

7.2.1.4   Test case selection expression definition

The test case selection expression identifiers begin with the prefix "SEL_".

7.2.1.5   Test suite constant declarations

The test suite constant identifiers are prefixed "TSC_".

If the test suite constant represents a system parameter, the complete name defined in the protocol is used.

7.2.1.6   Test suite variable declarations

The test suite variable identifiers are prefixed "TSV_".

Complete names as defined in the protocol are used.

7.2.1.7   Test case variable declarations

The test case variable identifiers are prefixed "TCV_".

Complete names as defined in the protocol are used.

7.2.1.8   Timer declarations

Timers begin with the prefix "T_".

7.2.1.9   ASP type definitions

The general conventions in 7.2.1.1 apply. All capital letters shall be used.

The identifier of an ASP type uses the same name as the name defined in the protocol.

7.2.1.10   PDU type definitions

The general conventions in 7.2.1.1 apply. All capital letters shall be used.

The identifier of a PDU type uses the same name as the name defined in the protocol.

7.2.1.11   Co-ordination Message (CM) type definitions

All capital letters shall be used.

7.2.1.12   Alias definitions

Alias definitions are not used.

7.2.2   Constraints part

This clause describes the naming conventions chosen for the elements of the ATS constraints part.

Constraints shall be written with all lowercase letters.

7.2.3   Dynamic part

7.2.3.1   General

This clause describes the naming conventions used for the elements of the ATS dynamic part.

All test cases shall be listed in the order in which they appear in the Test Suite Structure (TSS) and TP document.

7.2.3.2   Test Case (TC) identifier

The identifier of the test case is built in a similar way as for the test purpose.

The identifier of a TC is built according to Table 2.

Table 2 — TC naming convention

Identifier:	TC_<layer>_<dut>_<x>_<nn>		
	<layer>	AP-0BAS	Application layer – I Kernel support Security level 0
		AP-1BAS	Application layer – I Kernel support Security level 1
		…	…
	<dut> = type of DUT	OBU	On Board Unit
		RSE	Roadside Equipment
	x = Type of testing	BV	Valid Behaviour Tests
		BI	Invalid Behaviour Tests
	<nn> = sequential number	(01-99)	Test Purpose Number

EXAMPLE 1   TP identifier: TP/AP-0DAT/OBU/BV/01

EXAMPLE 2   TC identifier: TC_AP_0DAT_OBU_BV_01

7.2.3.3   Test step identifier

The test step identifier is built of substrings in lowercase letters, preceded by a string of uppercase letters. The substrings are joined by underscore characters. The first substring indicates the main function of the test step; e.g. PR for PReamble, PO for POstamble, LTS for Local Tree and STP for general test step. The second substring indicates the purpose of the step.

EXAMPLE   STP_emulate_mac.

7.2.3.4   Default identifier

The default identifiers begin with the prefix "DF_", followed by a string in lowercase letters.

7.3 Implementation conventions

7.3.1 Declaration part

The comment line of single element TTCN tables (e.g. test suite constants) is used to give a reference where the format and content of the element is described in the relevant protocol document. Any particularity of the element format or content is described in the comment line.

The detailed comments are used to describe any peculiarity of the table.

In the ASP, PDU, and CM type declarations, the comments column is used to identify if a parameter (in ASPs) or field (in PDUs) is mandatory or optional:

— M: mandatory;

— O: optional.

In the ASP and PDU declarations the comments column is further used to give information about the parameter/field value, in particular if the parameter/field contains a fixed spare value.

7.3.2 Constraint part

The ASPs and PDUs are defined in a way that all relevant parameters/fields are parameterized. That improves the transparency of the constraints in the dynamic part, as all values which are relevant for the test are always present.

Generally no modified constraints are used. This allows an easier reuse and adaptation of constraints if they are reused in other test specifications.

The detailed comments footer is used to describe any particularity of the table.

7.3.3 Dynamic part

All events which are defined as a conformance requirement by the TP, causes a preliminary verdict PASS if the requirement is met.

The preamble, the test body and the postamble have different defaults, which allows a specific verdict handling, e.g. only INCONC verdicts are assigned in the preamble.

Except for local trees, test steps do not contain a default. Then there are no restrictions regarding the error handling.

TPs which are listed in the untestable TP list in Clause 6 are not considered in the ATS, thus these TC identifiers are missing in the ATS and the numbering of the TCs may not always be continuous.

Annex A

(normative)

Abstract Test Suite (ATS) for On Board Units

A.1 Introduction

This ATS has been produced using the Tree and Tabular Combined Notation (TTCN) according to ISO/IEC 9646-3. The ATS was developed on a separate TTCN software tool and therefore the TTCN tables are not completely referenced in the table of contents. The ATS itself contains a test suite overview part which provides additional information and references.

A.2 The TTCN Graphical form (TTCN.GR)

The TTCN.GR representation of this ATS is contained in an HTML file (EN_15876-2_AP_OBU.html contained in archive EN_15876-2.zip) which accompanies the present document.

Where an Abstract Test Suite (in TTCN-2) is published in both graphical and machine processable format these two forms shall be considered equivalent. In the event that there appears to be syntactical or semantic differences between the two then the problem shall be resolved and the erroneous format (whichever it is) shall be corrected.

A.3 The TTCN Machine Processable form (TTCN.MP)

The TTCN.MP representation corresponding to this ATS is contained in an ASCII file (EN_15876-2_AP_OBU.mp contained in archive EN_15876-2.zip) which accompanies the present document.

Where an Abstract Test Suite (in TTCN-2) is published in both graphical and machine processable format these two forms shall be considered equivalent. In the event that there appears to be syntactical or semantic differences between the two then the problem shall be resolved and the erroneous format (whichever it is) shall be corrected.

Annex B
(normative)

Abstract Test Suite (ATS) for Roadside Equipment

B.1 Introduction

This ATS has been produced using the Tree and Tabular Combined Notation (TTCN) according to ISO/IEC 9646-3. The ATS was developed on a separate TTCN software tool and therefore the TTCN tables are not completely referenced in the table of contents. The ATS itself contains a test suite overview part which provides additional information and references.

B.2 The TTCN Graphical form (TTCN.GR)

The TTCN.GR representation of this ATS is contained in an HTML file (EN_15876-2_AP_RSE.html contained in archive EN_15876-2.zip) which accompanies the present document.

Where an Abstract Test Suite (in TTCN-2) is published in both graphical and machine processable format these two forms shall be considered equivalent. In the event that there appears to be syntactical or semantic differences between the two then the problem shall be resolved and the erroneous format (whichever it is) shall be corrected.

B.3 The TTCN Machine Processable form (TTCN.MP)

The TTCN.MP representation corresponding to this ATS is contained in an ASCII file (EN_15876-2_AP_RSE.mp contained in archive EN_15876-2.zip) which accompanies the present document.

Where an Abstract Test Suite (in TTCN-2) is published in both graphical and machine processable format these two forms shall be considered equivalent. In the event that there appears to be syntactical or semantic differences between the two then the problem shall be resolved and the erroneous format (whichever it is) shall be corrected.

Annex C
(normative)

Partial PIXIT Proforma for On Board Units

C.1 Introduction

The PIXIT Proforma is based on ISO/IEC 9646-6. Any additional information needed can be found in this international standard document.

C.2 Identification summary

Table C.1 — Identification summary

PIXIT N-number:	
Test laboratory name:	
Date of issue:	
Issued to:	

C.3 ATS summary

Table C.2 — ATS summary

Protocol specification:	
Protocol to be tested:	
ATS specification:	
Abstract Test Method:	

C.4 Test laboratory

Table C.3 — Test laboratory

Test laboratory identification:	
Test laboratory manager:	
Means of testing:	
Service access point address:	

C.5 Client identification

Table C.4 — Client identification

Client identification:	
Client test manager:	
Test facilities required:	

C.6 DUT

Table C.5 — DUT

Name:	
Version:	
Semiconductor characterisation system number:	
Machine configuration:	
Operating system identification:	
DUT identification:	
PICS reference for DUT:	
Limitations of the DUT:	
Environmental conditions:	

C.7 Protocol layer information

C.7.1 Protocol identification

Table C.6 — Protocol identification

Name:	
Version:	
PICS references:	

C.7.2 DUT information

The DUT information shall be provided by the manufacturer of the DUT in an ASCII file. The DUT information required can be found in the HTML file EN_15876-2_AP_OBU.html in the Declarations Part, subsection Test Suite Parameter Declarations.

Annex D
(normative)

Partial PIXIT Proforma for Roadside Equipment

D.1 Introduction

The PIXIT Proforma is based on ISO/IEC 9646-6. Any additional information needed can be found in this international standard document.

D.2 Identification summary

Table D.1 — Identification summary

PIXIT number:	
Test laboratory name:	
Date of issue:	
Issued to:	

D.3 ATS summary

Table D.2 — ATS summary

Protocol specification:	
Protocol to be tested:	
ATS specification:	
Abstract Test Method:	

D.4 Test laboratory

Table D.3 — Test laboratory

Test laboratory identification:	21
Test laboratory manager:	
Means of testing:	
Service access point address:	

D.5 Client identification

Table D.4 — Client identification

Client identification:	
Client test manager:	
Test facilities required:	

D.6 DUT

Table D.5 — DUT

Name:	
Version:	
Semiconductor characterisation system number:	
Machine configuration:	
Operating system identification:	
DUT identification:	
PICS reference for DUT:	
Limitations of the DUT:	
Environmental conditions:	

D.7 Protocol layer information

D.7.1 Protocol identification

Table D.6 — Protocol identification

Name:	
Version:	
PICS references:	

D.7.2 DUT information

The DUT information shall be provided by the manufacturer of the DUT in an ASCII file. The DUT information required can be found in the HTML file EN_15876-2_AP_RSE.html in the Declarations Part, subsection Test Suite Parameter Declarations.

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[9] ISO/IEC 9646-2, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 2: Abstract Test Suite specification*

[10] ISO/IEC 9646-3, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 3: The Tree and Tabular Combined Notation (TTCN)*

[11] ISO/IEC 9646-4, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 4: Test realization*

[12] ISO/IEC 9646-5, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 5: Requirements on test laboratories and clients for the conformance assessment process*

[13] ISO/IEC 9646-6, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 6: Protocol profile test specification*

[14] ISO/IEC 9646-7, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 7: Implementation Conformance Statements*

[15] ETSI TS 102 486-1-2, *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)*

[16] ETSI TS 102 486-1-3 Ver. 1.2.2 (2009-05), *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 3: Abstract Test Suite (ATS) and partial PIXIT proforma

[17] ETSI TS 102 486-2-2, 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)

[18] ETSI TS 102 486-2-3 Ver. 1.2.1 (2008-10), 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 3: Abstract Test Suite (ATS) and partial PIXIT proforma

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