

SLOVENSKI STANDARD

SIST EN 15876-2:2017

01-april-2017

Nadomešča:

SIST EN 15876-2:2011

Elektronsko pobiranje pristojbin - Vrednotenje skladnosti opreme v vozilu in v obcestni napravi s standardom EN 15509 - 2. del: Abstraktni preskuševalni niz

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

Elektronische Gebührenerhebung - Konformitätsprüfung von Fahrzeuggeräten und straßenseitigen Einrichtungen nach EN 15509 - Teil 2: Zusammengefasstes Prüfprogramm

[SIST EN 15876-2:2017](#)

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

Ta slovenski standard je istoveten z: EN 15876-2:2016

ICS:

| | | |
|-----------|---|--|
| 03.220.20 | Cestni transport | Road transport |
| 35.240.60 | Uporabniške rešitve IT v prometu | IT applications in transport |
| 43.040.15 | Avtomobilska informatika. Vgrajeni računalniški sistemi | Car informatics. On board computer systems |

SIST EN 15876-2:2017

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 15876-2:2017

<https://standards.iteh.ai/catalog/standards/sist/613850ce-7f04-479c-b4a8-662aef0db8df/sist-en-15876-2-2017>

EUROPEAN STANDARD

EN 15876-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2016

ICS 35.240.60

Supersedes EN 15876-2:2011

English Version

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 nach EN 15509 - Teil 2: Zusammengefasstes Prüfprogramm

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.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

| Contents | Page |
|--|-------------|
| European foreword..... | 4 |
| Introduction | 5 |
| 1 Scope..... | 6 |
| 2 Normative references..... | 6 |
| 3 Terms and definitions | 6 |
| 4 Abbreviations | 7 |
| 5 Abstract Test Method (ATM)..... | 8 |
| 5.1 General..... | 8 |
| 5.2 Test architecture..... | 8 |
| 6 Untestable Test Purposes (TP)..... | 9 |
| 7 Abstract test suite (ATS) conventions | 10 |
| 7.1 General..... | 10 |
| 7.2 Naming conventions..... | 10 |
| 7.2.1 Declarations part..... | 10 |
| 7.2.2 Constraints part..... | 12 |
| 7.2.3 Dynamic part | 12 |
| 7.3 Implementation conventions..... | 13 |
| 7.3.1 Declaration part..... | 13 |
| 7.3.2 Constraint part..... | 13 |
| 7.3.3 Dynamic part | 13 |
| Annex A (normative) Abstract Test Suite (ATS) for On-Board Equipment | 14 |
| A.1 Introduction | 14 |
| A.2 TTCN Graphical form (TTCN.GR) | 14 |
| A.3 TTCN Machine Processable form (TTCN.MP)..... | 14 |
| Annex B (normative) Abstract Test Suite (ATS) for Roadside Equipment | 15 |
| B.1 Introduction | 15 |
| B.2 TTCN Graphical form (TTCN.GR) | 15 |
| B.3 TTCN Machine Processable form (TTCN.MP)..... | 15 |
| Annex C (normative) Partial PIXIT Proforma for On-Board Equipment..... | 16 |
| C.1 Introduction | 16 |
| C.2 Identification summary | 16 |
| C.3 ATS summary..... | 16 |
| C.4 Test laboratory | 16 |
| C.5 Client identification..... | 16 |
| C.6 DUT..... | 17 |
| C.7 Protocol layer information..... | 17 |

| | | |
|--------------|--|-----------|
| C.7.1 | Protocol identification | 17 |
| C.7.2 | DUT information | 17 |
| | Annex D (normative) Partial PIXIT Proforma for Roadside Equipment | 18 |
| D.1 | Introduction | 18 |
| D.2 | Identification summary | 18 |
| D.3 | ATS summary | 18 |
| D.4 | Test laboratory | 18 |
| D.5 | Client identification | 18 |
| D.6 | DUT | 19 |
| D.7 | Protocol layer information | 19 |
| D.7.1 | Protocol identification | 19 |
| D.7.2 | DUT information | 19 |
| | Bibliography | 20 |

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 15876-2:2017

<https://standards.iteh.ai/catalog/standards/sist/613850ce-7f04-479c-b4a8-662aef0db8df/sist-en-15876-2-2017>

EN 15876-2:2016 (E)

European foreword

This document (EN 15876-2:2016) 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 15876-2:2011.

This edition incorporates the following main technical changes compared to the previous version:

- amendments to reflect changes to the underlying "requirements standard" (i.e. EN 15509:2014), notably the amended definition of vehicle licence plate number;
- amendments of terms, in order to reflect the harmonization of terms across electronic fee collection (EFC) standards.

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 (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 conformance test for the on-board unit application interface). 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.

This document forms Part 2 of a two-part European Standard:

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

Part 1 of the standard defines the test suite structure and the test purposes for conformity evaluation of OBEs and RSE designed for compliance with the requirements set 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 European Standard (this standard) provides the Abstract Test Suite (ATS), which are translations of the “human-readable” TSS&TP suite into Tree and Tabular Combined Notation (TTCN). The ATS is based on the TTCN test script language that is suitable for implementation in computer-aided test tools and for specification of test cases and steps for assessment of protocol and application behaviour. TTCN is a widespread dedicated test programming language for compliance testing and is standardized in ISO/IEC 9646-3. The TTCN language is supported by modern automated tools that accelerate software design, implementation and testing.

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.

This part of EN 15876 is based on:

- EN 15509:2014,
- the set of dedicated short range communication (DSRC) standards defining the communication stack, and
- ISO/IEC 9646.

EN 15876-2:2016 (E)**1 Scope**

This European Standard specifies the abstract test suite (ATS) to evaluate the conformity of on-board equipment (OBE) and roadside equipment (RSE) to EN 15509 in accordance with the test suite structure and test purposes defined in EN 15876-1:2016.

The objective of the present document is to provide a basis for conformance tests for DSRC equipment (OBE and RSE) 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.

ETSI/TS 102 486-2-3, V1.2.1 (2008-10), *Electromagnetic compatibility and Radio spectrum Matters (ERM); 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*

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

[ISO 17575-1:2016, 3.1]

ITEH STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 15876-2:2017
<https://standards.iteh.ai/catalog/standards/sist/613850ce-7f04-479c-b4a8-662aef0db8df/sist-en-15876-2-2017>

3.2 authenticator

data, possibly encrypted, that is used for authentication

[EN 15509:2014, 3.3]

3.3 data group

collection of closely related attributes

[ISO 17575-1:2016, 3.10]

3.4 element

DSRC directory containing application information in form of attributes

[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)

[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**roadside equipment**

equipment located along the road, either fixed or mobile

[SOURCE: EN ISO 14906:2011, 3.17]

3.11**tester**

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

[EN 15876-1:2016, 3.12]

3.12**transaction**

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

[ISO 17575-1:2016, 3.21]

4 Abbreviations

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

| | |
|------|--|
| ADU | Application Data Unit (ISO 14906) |
| APDU | Application Protocol Data Unit (ISO 14906) |
| AP | Application Process (ISO 14906) |

EN 15876-2:2016 (E)

| | |
|----------|---|
| ASN.1 | Abstract Syntax Notation One (ISO/IEC 8824-1) |
| ASP | Application Service Point |
| ATS | Abstract Test Suite |
| BI | Beviour Invalid (i.e. Invalid Behaviour tests) |
| B-Kernel | Broadcast Kernel |
| BST | Beacon Service Table (ISO 14906) |
| BV | Behaviour Valid (i.e. Valid Behaviour tests) |
| cf | Confirm (ISO 14906) |
| CM | Co-ordination Message |
| DLC | Data Link Control |
| DSRC | Dedicated Short-Range communication (ISO 14906) |
| DUT | Device Under Test (CEN ISO/TS 14907-2) |
| EID | Element Identifier (ISO 14906) |
| EFC | Electronic Fee Collection (ISO 17573) |
| EVENT-RT | EVENT-REPORT (EN 12834) |
| ICS | Implementation Conformance Statement (EN 15509) |
| IUT | Implementation Under Test (ISO/TS 14907-1) |
| IXIT | Implementation eXtra Information for Testing (CEN ISO/TS 14907-2) |
| LLC | Logical Link Control (EN 12795) |
| MAC | Medium Access Control (EN 12795) |
| OBE | On-board equipment |
| OBU | On-board unit |
| PDU | Protocol Data Unit (ISO 14906) |
| RSE | Road-side equipment |
| TC | Test Case |
| TP | Test Purpose |
| TSS | Test Suite Structure (EN 15876-1) |
| VST | Vehicle Service Table (ISO 14906) |

5 Abstract Test Method (ATM)**5.1 General**

This clause describes the abstract test method (ATM) used to test the layers at the OBE side and at the RSE side.

5.2 Test architecture

ETSI/TS 102 486-1-3:2009, Clause 4 and ETSI/TS 102 486-2-3:2009, Clause 4 describe the test architecture for their respective layers for testing. As test purposes (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 test cases (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 (ATS) due to the chosen abstract test method (ATM) or other restrictions.

NOTE The abbreviation OBU, rather than OBE, is used in the naming of test purposes for historical reasons and for direct correspondence with ETSI/TS 102 486-1-3, ETSI/TS 102 486-2-3 and EN 15876-1.

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. |