



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 15876:2023

Electronic fee collection - Conformity evaluation of on-board and roadside equipment to EN 15509

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

Perception de télépéage - Évaluation de
la conformité des équipements
embarqués et des équipements
d'infrastructures en bord de route à l'EN

05/2023



National Foreword

This European Standard EN 15876:2023 was adopted as Luxembourgish Standard ILNAS-EN 15876:2023.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

THIS PUBLICATION IS COPYRIGHT PROTECTED

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

EUROPEAN STANDARD ILNAS-EN 15876:2023 **EN 15876**
NORME EUROPÉENNE
EUROPÄISCHE NORM May 2023

ICS 35.240.60

Supersedes EN 15876-1:2016

English Version

Electronic fee collection - Conformity evaluation of on-board and roadside equipment to EN 15509

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

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

This European Standard was approved by CEN on 17 April 2023.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Abbreviations	8
5 Conformance	9
6 Test suite structure	9
6.1 Structure.....	9
6.2 Reference to conformance specifications	10
6.3 Test purposes	10
Annex A (normative) Test purposes for on-board equipment	13
Annex B (normative) Test purposes for roadside equipment	71
Annex C (normative) PCTR proforma for on-board equipment	103
Annex D (normative) PCTR proforma for roadside equipment	114
Bibliography	122

European foreword

This document (EN 15876:2023) 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 November 2023 and conflicting national standards shall be withdrawn at the latest by November 2023.

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

This document supersedes EN 15876-1:2016.

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

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

- amendments to reflect changes to the underlying requirements standards, in particular the updated data definitions in EN 15509;
- amendments to reflect changes in EN ISO 14907-2, specifically updated references following its amended structure;
- updated terms to reflect the harmonized terms between electronic fee collection standards in ISO/TS 17573-2;
- amendment of the document reference and title of EN 15876-1 to EN 15876, *Electronic fee collection – Conformity evaluation of on-board and roadside equipment to EN 15509*, following the withdrawal of EN 15876-2.

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

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye 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 EN ISO 14907-2 (EFC application interface conformance tests for on-board units). However, these standards are only of an enabling nature and do not ensure technical interoperability. Therefore, EN 15509, *Electronic fee collection – Interoperability application profile for DSRC* was developed to support technical interoperability between EFC-systems.

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

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

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

1 Scope

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

Normative Annex A presents the test purposes for the OBE.

Normative Annex B presents the test purposes for the RSE.

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

Normative Annex D provides the PCTR proforma for RSE.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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

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

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

ETSI EN 300 674-1:2004, *Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics; 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.

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

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

**3.1
attribute**
addressable package of data consisting of a single data element or structured sequences of data elements

[SOURCE: ISO/TS 17573-2:2020, 3.13]

**3.2
authenticator**
data, possibly encrypted, that is used for authentication

[SOURCE: ISO/TS 17573-2:2020, 3.16]

**3.3
data group**
class of closely related attributes

[SOURCE: ISO/TS 17573-2:2020, 3.55]

**3.4
Element
EFC Element**
coherent set of data and functionality

Note 1 to entry: The functionality includes, where applicable, the security-related functions and the associated security keys.

Note 2 to entry: EFC Elements are created by the applications and addressed using Element identifiers.

Note 3 to entry: In a given *on-board equipment* (OBE) (3.9), the EID is used to address a toll context, identified by the EFC-ContextMark, in which *attributes* (3.1) can be addressed unambiguously by AttributeIDs inside an EFC Element of the OBE.

[SOURCE: ISO/TS 17573-2:2020, 3.71]

**3.5
implementation conformance statement**
statement of capabilities and options that have been implemented that defines to what extent the implementation is compliant with a given specification

[SOURCE: ISO/TS 17573-2:2020, 3.90]

**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* (3.5)

[SOURCE: ISO/TS 17573-2:2020, 3.91]

**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/TS 17573-2:2020, 3.92]

3.8**implementation extra information for testing proforma**

document, in the form of a questionnaire, which when completed for an IUT becomes an implementation extra information for testing (3.7)

[SOURCE: ISO/TS 17573-2:2020, 3.93]

3.9**on-board equipment**

all required equipment on-board a vehicle for performing required electronic fee collection functions and communication services

[SOURCE: ISO/TS 17573-2:2020, 3.126]

3.10**on-board unit**

electronic unit on-board a vehicle for performing specific electronic fee collection functions and for communication with external systems

Note 1 to entry: OBE and OBU have been used as terms with the same or similar meaning in the standardization of DSRC and DSRC-based EFC within CEN and ETSI. Previously developed relevant standards used the term OBU with the meaning OBE as defined in this document. When referring to relevant tests in other documents, this document uses the terms of the referenced source, which explains why the term OBU is often used in the Annexes.

[SOURCE: ISO/TS 17573-2:2020, 3.127]

3.11**roadside equipment**

fixed or movable electronic fee collection equipment located along the road

Note 1 to entry: RSE and RSU have been used as terms with the same or similar meaning in the standardization of DSRC and DSRC-based EFC within CEN and ETSI. Previously developed relevant standards used the term RSU with the meaning RSE as defined in this document. When referring to relevant tests in other documents, this document uses the terms of the referenced source, which explains why the term RSU is often used in the Annexes.

[SOURCE: ISO/TS 17573-2:2020, 3.161]

3.12**tester**

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

[SOURCE: ISO/TS 17573-2:2020, 3.188]

3.13**transaction**

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

[SOURCE: ISO/TS 17573-2:2020, 3.211]