

Electronic fee collection - Interoperability application  
profile for DSRC



## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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ICS 35.240.60

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English Version

## Electronic fee collection - Interoperability application profile for DSRC

Perception de télépéage - Profil d'application  
d'interopérabilité pour DSRC

Elektronische Gebührenerhebung - Anwendungsprofil  
für DSRC Interoperabilität

This European Standard was approved by CEN on 30 January 2023.

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## European foreword

This document (EN 15509:2023) 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of an identical text or by endorsement, at the latest by September 2023, and conflicting national standards shall be withdrawn at the latest by September 2023.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 15509:2014.

The main changes compared to the previous edition are as follows:

- updated data definitions to reflect changes made to the underlying base standards, notably in EN ISO 14906, whilst seeking to ensure backward compatibility with previous editions of this document;
- use of imported ASN.1 types with successors (i.e. including all future minor versions);
- updated terms, to take into account the harmonized terms across electronic fee collection standards, as specified in ISO/TS 17573-2;
- deletion of the normative annex on “Security calculations”, which has been moved to EN ISO 14906;
- updated informative Annex G on the “Use of this document for the European electronic toll service” (EETS), to reflect the recast of the EETS legislation (i.e. Directive (EU) 2019/520<sup>[21]</sup> and the corresponding Commission Delegated and Implementing Regulations <sup>[22]</sup> <sup>[23]</sup>).

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

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 organisations 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 supports interoperable dedicated short-range communication (DSRC)-based electronic fee collection (EFC) systems (e.g. EN ISO 14906, a “toolbox” for definition of EFC-DSRC transactions). However, these standards provide necessary but not sufficient support for technical interoperability between EFC-DSRC-systems.

This document specifies an Interoperable Application Profile (IAP) to support EFC-DSRC transactions, with a coherent set of requirements. The main objective is to support technical interoperability between EFC-systems within the scope of this document (as described in Clause 1). A basic description of the EFC-service and an EFC System can be found in EN ISO 17573-1.

This document specifies a basic level of technical interoperability for EFC equipment, i.e. on-board unit (OBU) and roadside equipment (RSE) using DSRC. It does not provide a full solution for interoperability, nor does it specify other parts of the EFC-system, other services, other technologies and non-technical elements of interoperability.

The elaboration of this document is based on the experiences from a considerable number of implementations and projects throughout Europe. This document makes use of the results from European projects such as CARDME, PISTA and CESARE, as they represent fruits of European EFC harmonization and have been used as the basis for several national implementations.

The development of a common European electronic toll service (EETS) as a part of the European Directive (2004/52/EC<sup>[19]</sup>) also calls for the definition of an interoperable EFC-service. The first edition of this document was referenced as a mandatory element in the service definition of the EETS, in the EC decision 2009/750/EC<sup>[20]</sup>.

The revision of the EETS legislation (recast in EU legal parlance) resulted in the adoption of Directive 2019/520/EC<sup>[21]</sup> on *the interoperability of electronic road tolling systems and facilitating cross-border exchange of information on the failure to pay road fees in the Union*, which refers to the second edition of this document (EN 15509:2014) as a mandatory element for the EETS. Further technical and procedural characteristics of the EETS were laid down in the associated Commission Delegated Regulation (EU) 2020/203<sup>[22]</sup> and Commission Implementing Regulation (EU) 2020/204<sup>[23]</sup>.

Although there are standards and specifications, there are specific needs that motivate this document:

- Definition of the necessary and sufficient EFC-DSRC requirements to underpin technical interoperability;
- Choice of data elements including vehicle data;
- Extended definition of the use of some data elements, including semantics and coding;
- Choice of security measures;
- It facilitates a complementing test specification with clear relations between the conformance requirements and evaluation tests;
- The provisions laid down in Directive 2019/520/EC and the associated Commission Regulations;
- Support for procurements.

The Application Profile is described using the concept of “International Standardized Profiles (ISP)” as specified in ISO/IEC TR 10000-1<sup>[15]</sup>. The ISP-concept is specifically suited for defining interoperability specifications where a set of base standards can be used in different ways. This is exactly the case in EFC, where a set of base standards allows for different choices that are not interoperable.

The principles of the ISP-concept can be summarized as follows:

- An ISP makes references only to base standards or other ISPs;
- The profile restricts the choice of base standard options to the extent necessary to maximize the probability of interoperability (e.g. chosen classes, conforming subsets, options and parameter values of base standards);
- The ISP does not copy content of the base standards to ensure consistency with the base standards;
- The profile does not specify any requirements that would contradict or cause non-conformance to the base standards;
- The profile may contain conformance requirements that are more specific and limited in scope than those of the base standards;
- Conformance to a profile implies conformance to a set of base standards, whereas conformance to that set of base standards does not necessarily imply conformance to the profile.

The use of the Application Profiling concept also provides for a flexible framework towards adoption, migration and use of this document. Toll Chargers (TCs), Toll Service Providers (TSPs) and Manufacturers may use this IAP as a basis for interoperable use of their equipment, without having to interfere with or otherwise affect any EFC-system used locally.

The general requirements of this document are set out in Clause 5, whilst the specific conformance requirements are given in Clause 6. For ease of referencing, testing and look-up, these specific requirements are divided into two parts; on-board unit (OBU) requirements and roadside equipment (RSE) requirements.

For future use, it is envisaged that other IAPs may be defined using the same structure as is defined in Clause 6. Annex C contains IAP taxonomy and numbering.

In addition, this document includes various annexes that provide further detailed specifications as well as background, motivation and examples for the conformance requirements. These are intended to enhance the readability and understanding of the document.

This document is complemented by standard EN 15876 that specifies how to evaluate on-board and roadside equipment for conformity to EN 15509 (this document).

## 1 Scope

The scope of this document is limited to:

- payment method: central account based on EFC-DSRC;
- physical systems: on-board unit (OBU), roadside equipment (RSE) and the DSRC interface between them (all functions and information flows related to these parts);
- DSRC-link requirements;
- EFC transactions over the DSRC interface;
- data elements to be used by OBU and RSE used in EFC-DSRC transactions;
- security mechanisms for OBU and RSE used in EFC-DSRC transactions.

It is outside the scope of this document to specify:

- contractual and procedural interoperability requirements;
- conformance procedures and test specifications;
- setting-up of operating organizations e.g. toll charger (TC), toll service provider (TSP), trusted third party, etc.;
- other payment methods in DSRC-based EFC (e.g. on-board accounts using integrated circuit cards);
- other basic technologies (e.g. GNSS/CN or video registration-based EFC);
- non-EFC transactions over the DSRC interface (e.g. compliance check communication and localization augmentation communication, which are specified in other standards);
- other interfaces or functions in EFC-systems than those specified above (i.e. information flows and data exchange between operators or personalization, initialization and customization of the OBU).

NOTE Some of the issues that are outside the scope of this document are subject of separate standards prepared by CEN/TC 278, ISO/TC 204 and ETSI ERM.

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

EN 13372:2004, *Road Transport and Traffic Telematics (RTTT) - Dedicated short-range communication - Profiles for RTTT applications*

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



ETSI/TS 102 486-1-1 V1.1.1 (2006-03), *Electromagnetic compatibility and Radio spectrum Matters (ERM); 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 1: Protocol Implementation Conformance Statement (PICS) proforma specification*

ETSI/TS 102 486-2-1 V1.2.1 (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 1: Protocol Implementation Conformance Statement (PICS) proforma specification*

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

EN ISO 17573-3:—,<sup>1</sup> *Electronic fee collection — System architecture for vehicle-related tolling — Part 3: Data dictionary*

### 3 Terms and definitions

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

ISO and IEC maintain terminological 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

##### **access credentials**

trusted attestation or secure module that establishes the claimed identity of an object or application

[SOURCE: ISO/TS 17573-2:2020, 3.4]

#### 3.2

##### **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]

#### 3.3

##### **authenticator**

data, possibly encrypted, that is used for authentication

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

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<sup>1</sup> Under preparation. Stage at time of publication: ISO/DIS 17573-3:2022