



DPC: 24/30495505 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 25110

Electronic fee collection — Interface definition for on-board account using integrated circuit card (ICC)

*Perception du télépéage — Définition d'interface pour compte de
bord utilisant une carte à circuit intégré (ICC)*

ICS: ISO ics

ISO/TC 204

Secretariat: **ANSI**

Voting begins on:
2024-08-26

Voting terminates on:
2024-11-18

This document is circulated as received from the committee secretariat.

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

This second edition cancels and replaces the first edition of ISO 25110:2017.

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

- [Clause 3](#) has been updated and ISO/TS 17573-2 has been made the primary source for terms and definitions;

Introduction

Background and motivation

There are two payment systems dealing with electronic fee collection (EFC). The first is the central account system using a one-piece on-board unit (OBU) and the second is the on-board account system using a payment media such as the integrated circuit card (ICC) inserted in an on-board equipment (OBE).

ICCs have been widely used for public transport cards such as subway and bus payment means and electronic money cards for general purpose payments, as well as for credit cards and banking cards. The ICC is expected to be used for EFC payment means along with these global trends and provides convenience and flexibility.

Currently, the descriptions in the existing EFC-related International Standards are focused on the central account system, which is rather simple and gives more feasibility for EFC interoperability than the on-board account system, which is complex and has more items to be settled.

With consideration of the widespread use for transport cards or electronic money cards, a new International Standard for the on-board account system using those ICCs is required as shown in [Figure 1](#). Furthermore, a state-of-the-art mobile phone integrated with ICC functions, a so-called “mobile electronic purse”, has been used for public transport or retail shopping as a payment means in some countries so rapidly that standardization on this theme is important and essential for considering future EFC payment methods as well.

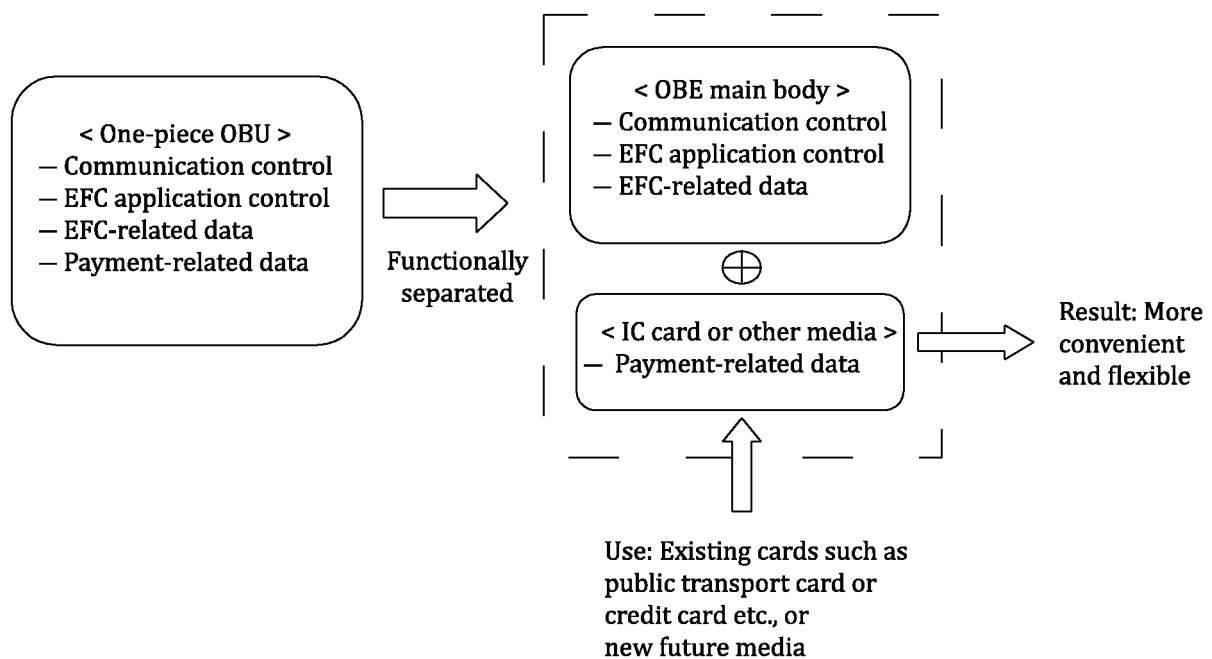


Figure 1 — Motivation for on-board account using ICC

[Figure 2](#) shows the basic model of EFC, in which the OBE is used as a communication means and the ICC carries the payment means.

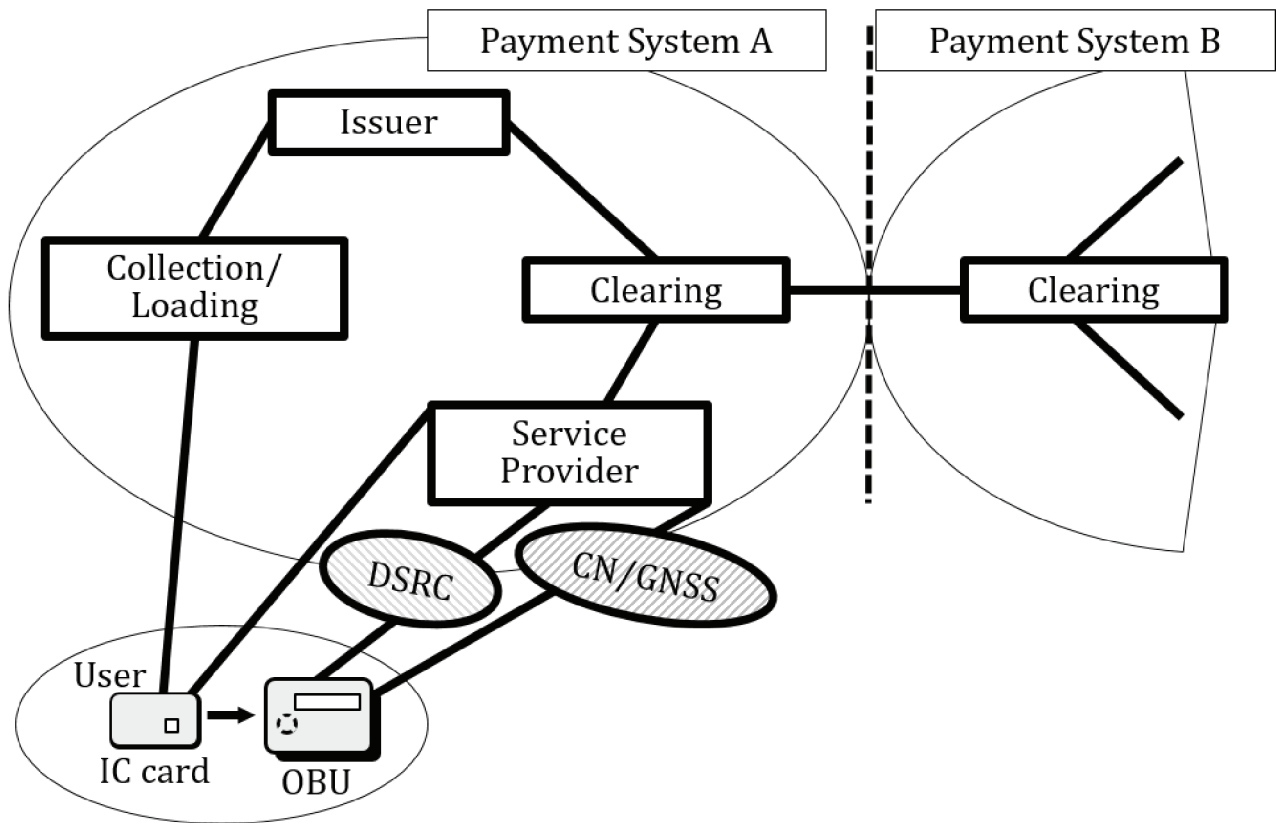


Figure 2 — The basic model of EFC

The objective of this document is to classify data transfer models based on operational requirements and define a specific ICC access interface for on-board accounts using the ICC. Furthermore, this document provides practical examples of transactions in [Annex B](#), for consideration and easy adoption by toll road operators.

This document provides a common technical platform for on-board accounts using ICCs to deal with various operational requirements and practical examples of on-board accounts used or planned in several countries.

Each toll road operator can establish their own specification by selecting one example in the models of this document (like a toolbox) to meet their requirements.

Electronic fee collection — Interface definition for on-board account using integrated circuit card (ICC)

1 Scope

This document defines the data transfer models between roadside equipment (RSE) and integrated circuit card (ICC) and the interface descriptions between the RSE and on-board equipment (OBE) for on-board accounts using the ICC. It also provides examples of interface definitions and transactions deployed in several countries.

This document covers:

- data transfer models between the RSE and ICC which correspond to the categorized operational requirements and the data transfer mechanism for each model;
- interface definition between the RSE and OBE based on each data transfer model;
- interface definition for each model;
- functional configuration;
- RSE command definitions for ICC access;
- data format and data element definitions of RSE commands;
- a transaction example for each model in [Annex B](#).

[Figure 3](#) shows the principle of an on-board account architecture and the scope of this document. The descriptions in this document focus on the interface (I/F) between the RSE and OBE to access the ICC.

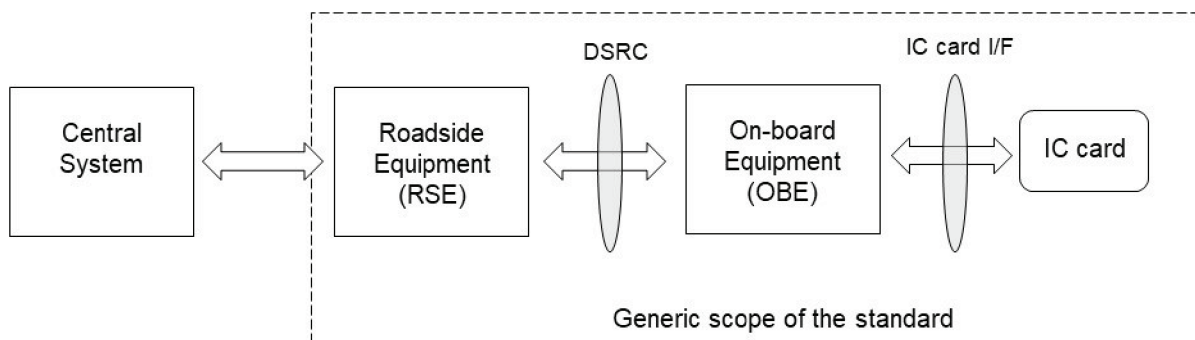


Figure 3 — Principle of an on-board account architecture and scope of this document

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.

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

ISO 15628, *Intelligent transport systems — Dedicated short range communication (DSRC) — DSRC application layer*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 17573-2 and the following term and definition 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 <http://www.iso.org/obp>

3.1

Element

DSRC directory containing application information in the form of attributes

[SOURCE: ISO 14906:2022, 3.8]

4 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply unless otherwise specified.

AID	Application Identifier
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation One
ATR	Answer to Reset
ATS	Answer to Select
BST	Beacon Service Table
DSRC	Dedicated Short-Range Communication
EAL	Evaluation Assurance Level
EFC	Electronic Fee Collection
EID	Element Identifier
EVENT-RT	EVENT-Report
MAC	Medium Access Control
IC	Integrated Circuit(s)
ICC	Integrated Circuit(s) Card (IC card)
IFMS	Interoperable Fare Management System

5 Data transfer models

5.1 General

There are three types of data transfer models for on-board accounts using ICC to cope with the operational requirements described in [Annex A](#).

The data transfer models are as follows:

- the transparent type;
- the caching type;
- the buffering type;

[Figure 4](#) shows the layer structure of the RSE, OBE and ICC where the mid-layer of application interfaces is denoted as the practical scope of this document.

NOTE The existing standards for physical and other protocol layers both between the RSE and OBE, and between OBE and ICC, are outside the scope of this document. For example, DSRC-related items (i.e. the communication protocol layers 1, 2 and 7) and ICC-related items (ICC commands, data definition, etc.) are outside the scope of this document.

There are two types of virtual bridges contained in an OBE. The first type is Bridge-1 on which an RSE command sent from the RSE is decomposed and the ICC access command contained in the application protocol data unit (APDU) part of the RSE command is transferred to ICC I/F to access the ICC. The second type is Bridge-2 in which an RSE command sent from the RSU is transformed to ICC access command and transferred to ICC I/F to access the ICC.

Bridge-1 corresponds to the transparent type and the buffering type defined in this document, whereas Bridge-2 corresponds to the caching type.

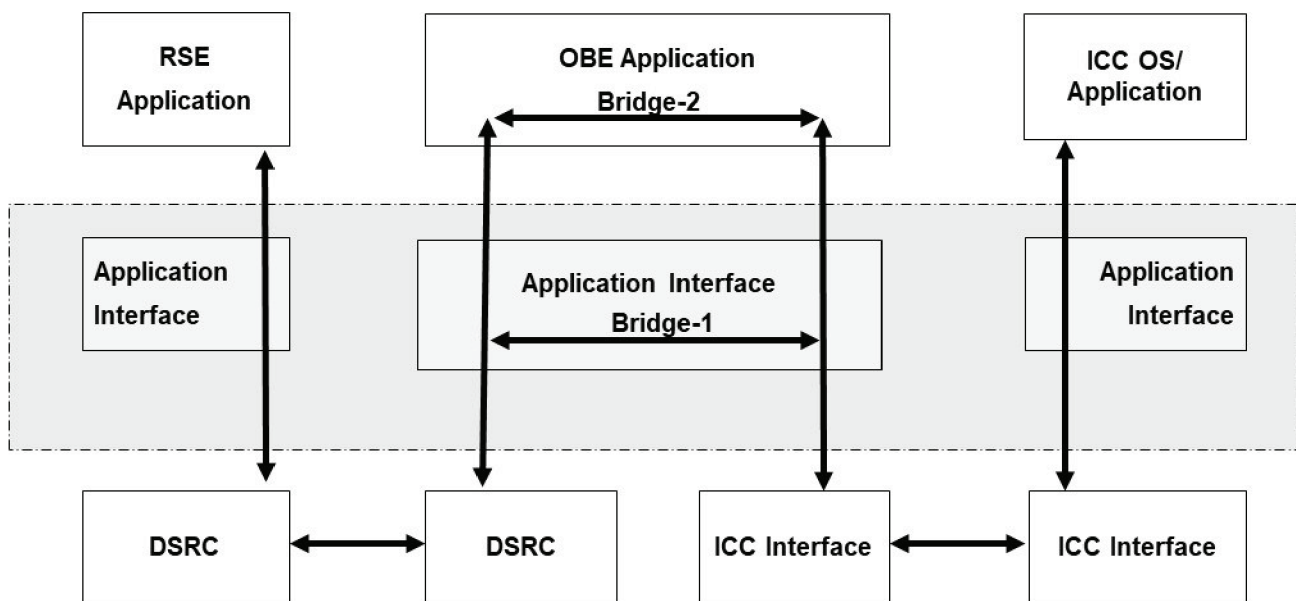


Figure 4 — Application interfaces of RSE, OBE and ICC

5.1.1 Transparent type

The ICC command data are transferred directly from the RSE to the ICC through the OBE. The OBE temporarily stores the ICC command data and response data in the buffer memory. See [Figure 5](#).

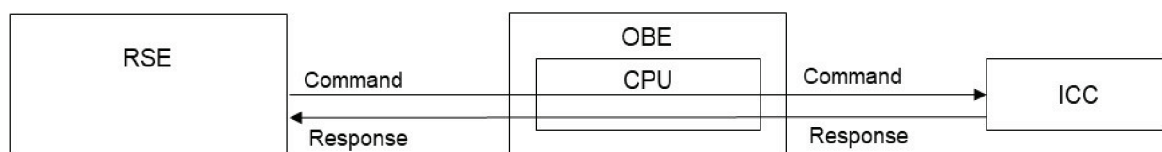


Figure 5 — Generic structure of transparent type

5.1.2 Caching type

The EFC-related data are read out from the ICC at the presentation and stored in the SAM of the OBE. In the DSRC communication, the EFC-related data in the SAM is transferred to the RSE. See [Figure 6](#).

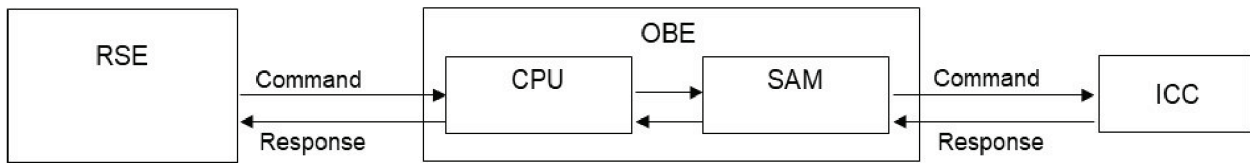


Figure 6 — Generic structure of caching type

5.1.3 Buffering type

The EFC-related data which is limited to non-sensitive data are read from the ICC at the presentation and stored in the buffer memory in the OBE. In the DSRC communication, the EFC-related data in the buffer memory is transferred to the RSE. See [Figure 7](#).

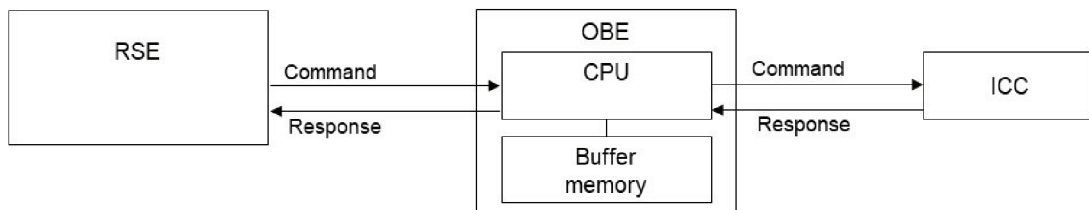


Figure 7 — Generic structure of buffering type

5.2 Symbols

In the data transfer mechanism of each model, the symbols given in [Figure 8](#) are applied.

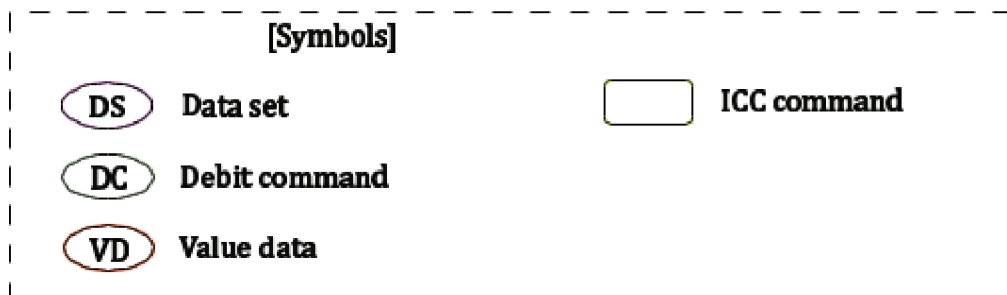


Figure 8 — Definition of symbols

5.3 Transparent type

5.3.1 General

In this model, the maximum vehicle speed is limited by the data transfer rate between the ICC and OBE so that the vehicle has to stop or go through slowly under an RSE antenna when a conventional contact ICC is used. The feature of the transparent type is to simplify the OBE by eliminating the secure memory inside of the OBE and the performance is improved according to the developing ICC with high transfer data rate.