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Electronic toll collection — Transaction specification for Australian interoperability on the DSRC link



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Engineers Australia
Federal Chamber of Automotive Industries
Intelligent Transport Systems Australia
National Transport Research Organisation (NTRO)
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How to read this Standard

This page explains the meaning of the language and structure of this Standard.

Refer to Standards Australia's Standardisation Guide 006 for more details about drafting rules.

Australian and Australian/New Zealand Standards are voluntary unless they are referenced in legislation or called up in contracts.

Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

Recommendations, permissions and possibilities

The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee IT-023, Transport Information and Control Systems, and Subcommittee IT-023-05, Electronic Tolling and Traffic Management to supersede AS 4962:2005.

The objective of this document is to provide an agreed scheme of interoperability for toll operators, electronic fee collection system integrators and equipment suppliers. The interoperability only relates to the sequences between vehicle and roadside.

The major changes in this edition are as follows:

(a) Section 5 updated to include references to appendices.

(b) Changed sequence of Appendices E and F.

(c) Updated Appendix E to include all current toll roads and their relevant details such as toll point locations and issuer IDs.

(d) Updated Appendix F to remove outdated references to classification methods and updated classification rules.

The terms “normative”’ and “informative”’ are used in Standards to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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Introduction

Electronic fee collection (EFC) is a telematics service offered by road operators or concessionaires as a service to their customers. To provide a seamless service across the concession areas, an agreed scheme of interoperability is required. A seamlessly interoperable service requires harmonization of technical interfaces (e.g. the short-range radio link between in-vehicle equipment and roadside stations), common definitions of operational data (e.g. tariff class definitions), and contractual arrangements (e.g. covering clearing among operators).

Australian operators have decided to offer EFC services based on the 5.8 GHz microwave Dedicated Short-Range Communication (DSRC) link according to the CEN Standards EN 12253, EN 12795, EN 12834, EN 13372, also referred to as DSRC Standards. It was quickly recognized that the DSRC Standards provide for a toolbox of functions required to define individual EFC applications according to local needs. The DSRC Standards provide for a well-defined common technical interface but do not by themselves provide for interoperability on higher levels (i.e. describe the data to exchange on the link or the sequence of communication steps to perform).

From the first installations it became evident that without agreed Standards relating to communication on higher levels, every new EFC installation would probably use a new, or at least slightly modified, EFC transaction variant. Such modifications could result from the local needs of operators or from preferred solutions of the equipment supplier. Users would not be able to enjoy interoperable service.

The framework specified herein relies on the following principles:

(a) All equipment used will support the same radio link functionality, without variants.

(b) Roadside equipment (RSE) will support all recognized transaction sequences specified in Appendix A and B (in order to perform transactions with every type of on-board equipment).

(c) On-board equipment (OBE) will support only one of the recognized transaction sequences.

The above framework applies to the domain of interoperability only. For local usage, operators or other DSRC system users are free to make use of other data and transaction sequences, as long as they conform to the DSRC Standards. The DSRC Standards already provide for the selection/switching mechanism required to negotiate the applications between roadside and on-board equipment.

The framework thus allows both for full interoperability through tightly specified recognized EFC transactions and for flexibility for future expansions and local needs through the negotiation mechanism inherent in the DSRC Standards. Additional transactions may be added in the future by introducing a recognized Type C transaction.

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NOTES

Australian Standard®

Electronic toll collection — Transaction specification for Australian interoperability on the DSRC link

1 Scope

This document specifies a framework for interoperable electronic fee collection (EFC) based on dedicated short-range communication (DSRC).

In addition, data to be used in interoperable Australian EFC transactions are specified. Depending on the on-board equipment type, these data may be transferred by different EFC transaction sequences.

Two transaction sequences are defined in this document, both supporting central account payment.

NOTE More transaction sequences might be recognized in the future should the need arise (e.g. in order to support payment based on values carried inside the on-board equipment).

This document defines the protocol stack for communication between roadside equipment and on-board equipment using DSRC to perform EFC.

It specifies the following:

(a) The complete DSRC communication stack (OSI Layers 1, 2, and 7).

(b) The supported EFC transaction types.

(c) The EFC transaction data including security elements.

Tests and requirements regarding conformance of equipment with this specification, such as type approval procedures, lie outside the 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.

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

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

CEN EN 12253, *Road transport and traffic telematics — Dedicated short range communication — Physical layer using microwave at 5,8 GHz*

CEN EN 12795, *Road transport and traffic telematics — Dedicated short range communication — DSRC data link layer: medium access and logical link control*

CEN EN 12834, *Road transport and traffic telematics — Dedicated short-range communication (DSRC) — DSRC application layer*

CEN EN 13372, *Road transport and traffic telematics (RTTT) — Dedicated short-range communication — Profiles for RTTT applications*

ETSI EN 300-674, *Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Technical Characteristics and Test Methods for Dedicated Short Range*

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