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Intelligent transport systems — Localized communications —

Part 2:
Legacy system support

Systèmes intelligents de transport — Communications localisées —

Partie 2: Support pour systèmes hérités

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Foreword

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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).

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For an explanation of 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 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 (ISO 29281-2:2013), which has been technically revised. It also incorporates the Amendment ISO 29281-2:2013/Amd 1:2014.

A list of all parts of the ISO 29281 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is part of a family of International Standards for communications in Intelligent Transport Systems (ITS) based on the ITS station and communication architecture specified in ISO 21217:2014.

This document is Part 2 of a multipart series of International Standards which determines functionalities of ITS localized communications related to the legacy communications application layer specified in ISO 15628. These functionalities are protocols and procedures located in the various layers and entities of the ITS station.

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Intelligent transport systems — Localized communications —

Part 2:
Legacy system support

1 Scope

This document specifies elements of communications for localized communications in ITS.

In particular, the following architectures, procedures and protocols are specified:

— support of communication interfaces (DSRC-CI) using the DSRC application layer specified in ISO 15628;

— support of ISO 15628 DSRC applications via an ITS access technology suited for localized communications.

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/IEC 8825-2, *Information technology — ASN.1 encoding rules: Specification of Packed Encoding Rules (PER) — Part 2*

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

ISO 17419, *Intelligent transport systems — Cooperative systems — Globally unique identification*

ISO 17423, *Intelligent transport systems — Cooperative systems — Application requirements and objectives*

ISO 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

ISO 21218, *Intelligent transport systems — Hybrid communications — Access technology support*

ISO 22418, *Intelligent transport systems — Fast service announcement protocol (FSAP)*

ISO 24102-1, *Intelligent transport systems — ITS station management — Part 1: Local management*

ISO 24102-3, *Intelligent transport systems — ITS station management — Part 3: Service access points*

ISO 24102-4, *Intelligent transport systems — ITS station management — Part 4: Station-internal management communications*

ISO 24103, *Intelligent transport systems — Communications access for land mobiles (CALM) — Media adapted interface layer (MAIL)*

ISO 29281-1, *Intelligent transport systems — Localized communications — Part 1: Fast networking & transport layer protocol (FNTP)*

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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
15628 legacy CI
communication interface design in support of the ISO 15628 application layer

3.2
15628 legacy service
application layer service specified in ISO 15628

3.3
DSRC application layer
application layer specified in ISO 15628

3.4
15628 legacy application
ITS application using the ISO 15628 application layer

4 Symbols and abbreviated terms

DSRC   Dedicated short range communication

NOTE   The term DSRC has two meanings. One indicates IEEE 802.11 OCB communications at 5,9 GHz, standardized for ITS in ISO 21215. The other one indicates communications at 5,8 GHz such as the European DSRC backscatter technology standardized in EN 12253[3], and the Japanese active transceiver technology standardized in ARIB STD-T75[9] and ARIB STD-T110[10]. The latter meaning of DSRC applies in this document.

5 Requirements

Communication functionality, which is different to the functionality of networked communications, e.g. functionality out of the set of Internet protocols (IP), is referred to as localized communications functionality in this document.

The functionality to support legacy systems, especially those related to ISO 15628 "DSRC application layer" shall be as specified in this document.

Detailed requirements are specified in the following clauses of this document.

— Clause 6 specifies architectural elements.

— Clause 7 specifies facility layer protocols

— Clause 8 specifies conformance declaration.

— Clause 9 specifies test methods.

— Annexes A and B provide further mandatory requirements.

— The informative Annex C provides 15628 legacy service guidelines.

6 Architecture

6.1 ITS station

The specifications given in this document shall comply with the ITS station architecture and with the concept of an ITS station communication unit (ITS-SCU) as specified in ISO 21217 and ISO 24102-4.

6.2 Communication scenarios

General ITS communication scenarios are illustrated in ISO 21217. Specific communication scenarios for service advertisement are specified in ISO 22418.

6.3 Implementation scenarios

The protocols specified in this document may support the implementation architectures introduced in ISO 21217 and illustrated in Figures 1 and 2 with an ITS station unit and a peer DSRC station unit.
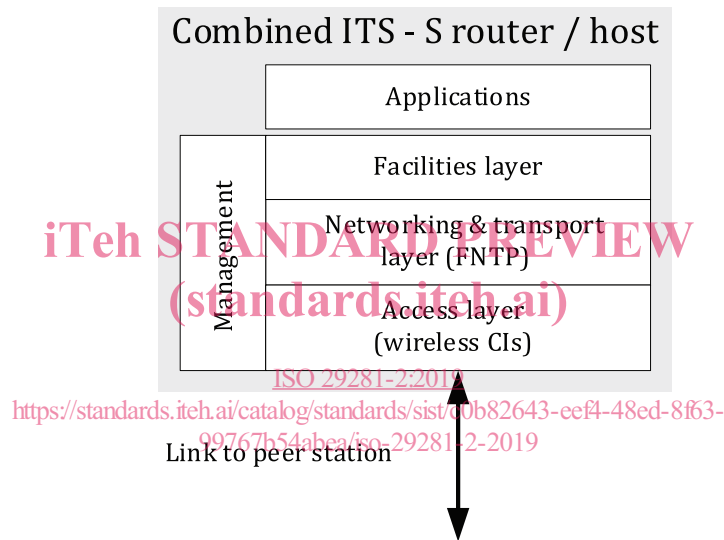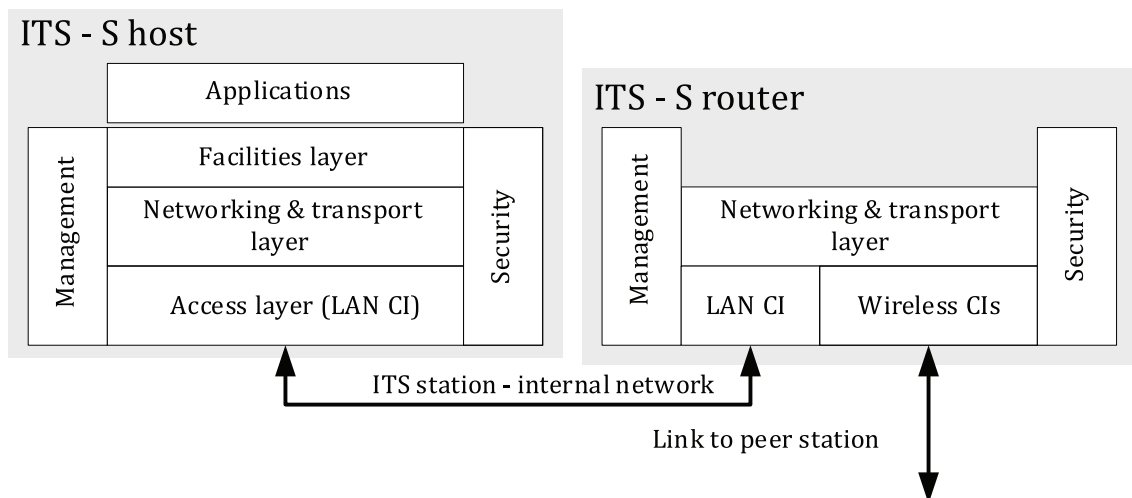

Figure 1 — Combined ITS-S host / router

Figure 2 — ITS-S host and ITS-S router separated in different ITS-SCUs

6.4   15628 legacy CIs

An existing ITS-S access layer technology may be implemented in an ITS station as a "15628 legacy CI", as presented in Figure 3, such that it can communicate with peer stations that are not necessarily aware of any ITS-S context, and where none of the networking protocols specified for ITS-S are used in the wireless link.

EXAMPLE   Examples of legacy CIs are the passive 5,8 GHz backscatter technology specified in EN 12253[3] and referred to as "CEN DSRC", and the active 5,8 GHz technology specified ARIB STD-T75[9].

Types of CIs are specified in the ISO 21218 I-parameter "MedType". "MedType" presents values of the ITS-ATT globally unique identifier of access technologies specified in ISO 17419. A legacy CI medium identified as an ITS access technology in ISO 17419 is "DSRC" with an application layer specified in ISO 15628. Further types may be added.

NOTE   The presentation of ITS-ATT in ISO 17419 refers to the CEN DSRC at 5,8 GHz specified in EN 12253[3], and inconsistently to ISO 15628, which is the DSRC application layer that can be used in combination with the EN 12253 access technology, but also in combination with other access technologies, e.g. the Japanese active DSRC technology. In order to resolve this ambiguity, this document specifies a new value of ITS-ATT in support of the Japanese DSRC access technology. The proposed value of ITS-ATT is 129; it is to be registered in the ITS-ATT registry introduced in ISO 17419. Further on, this inconsistency is to be resolved in the already started revision of ISO 17419 into a two-part document.
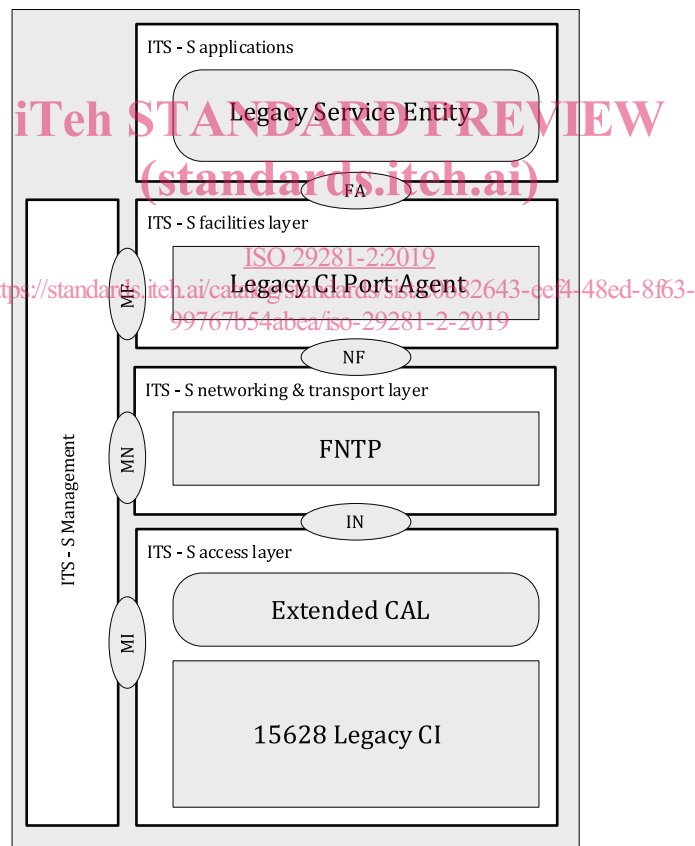

Figure 3 — General architecture for ISO 15628 legacy CIs

Inside the ITS station, the "Fast networking & transport layer protocol" (FNTP) specified in ISO 29281-1 shall be used for the forwarding of packets between the ITS-S access layer and the ITS-S facilities layer.

This requires

— implementing a communication adaptation layer (CAL) as specified in ISO 21218, extended with the additional functionality for FNTP support as specified in this document, which optionally may also include parts of the service processing functionality;

— making use of the "Legacy CI Port Agent" as specified in this document.

This document specifies new I-Parameters, in addition to those already specified in ISO 21218. These new I-Parameters are presented in Table 1.

Table 1 — I-Parameters dedicated to ISO 15628 legacy CIs

| I-Param no[a]	I-Parameter name	ASN.1 type	Description
57	LegacyOption	`LegacyOption15628`	Classification of different operational options specified in this document.
58	PortPA	`PortPA15628`	Port number of the "Legacy CI Port Agent" connecting to the applicable "Legacy Service Entity"
[a] Numbers are assigned by the I-Parameter registry, see ISO 17419, and published in a future version of ISO 21218			

The "Legacy Service Entity", i.e. the 15628 legacy application, shall register at the "Legacy CI Port Agent" indicating the CI class and legacy option of the required legacy CI.

Further details depend on the existing CI technology. Normative examples for legacy systems in accordance with ISO 15628 are provided in Annex B.

6.5 15628 legacy applications

Applications built on top of the ISO 15628 application layer may be operated over an ITS CI of CI class CIC-l1 specified in ISO 21218. The services shall interface with the FNTP via the "15628 Kernel Emulator", see Figure 4.
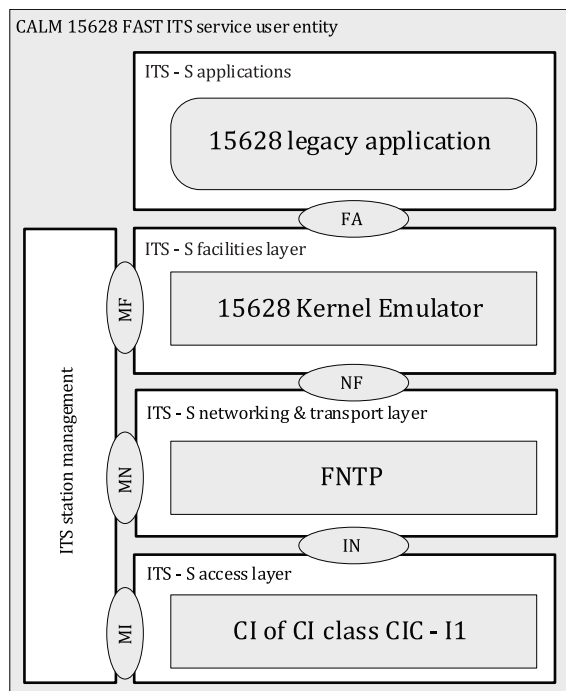
Figure 4 — 15628 legacy service operated over a CI of CI class CIC-l1 specified in ISO 21218

The 15628 initialization phase, i.e. exchange of BST and VST, shall be implemented with the FSAP service initialization phase functionality, i.e. exchange of FSAM and FSRM, specified in ISO 22418.

The "15628 Kernel Emulator" shall perform the following tasks:

— Register at server FSAP manager for periodic transmission of BST, if applicable.

— Register at client FSAP manager for reception of BSTs, if applicable.

— Emulate the 15628 T-Kernel interface for usage by applications.

— Map the 15628 "FlowControl" on BC-VCI and UC-VCI.

The purpose of the 15628 link identifier (LID) shall be served by Link-ID specified in ISO 21218.

Detailed procedures are specified in Clause 7.

7 Facilities layer protocols

7.1 General

The ITS-S facilities layer shall use functionality of the MF-SAP for management purposes as specified in ISO 24102-3.

NOTE 1   This document does not specify details of MF-SAP service primitive functions, allowing for private implementations as enabled in ISO 24102-3.

The ITS-S facilities layer shall be connected to ITS-S applications via an API. The API introduced in ISO 21217 basically provides the functionality of the MA-SAP, the FA-SAP, and the SA-SAP. Details of the API are outside the scope of this document.

NOTE 2   The design of service primitive functions in ISO 22418 assumes that ITS-S application processes always register via the MA-SAP. In the case of 15628 legacy applications and the architecture given in this document, the registration is made via the MF-SAP. Thus the respective MA-SAP service primitive functions specified in ISO 22418 also apply for the MF-SAP. Alternatively the registration is done by the 15628 legacy application via the MA-SAP, i.e. the API.

The ITS-S facilities layer shall use functionality of the NF-SAP for connecting to the ITS-S networking & transport layer.

7.2 FSAP communication handler

The FSAP communication handler specified in ISO 22418 and located in the ITS-S facilities layer is responsible for reception of FSAMs and FSRMs and for repetitive transmission of FSAMs.

7.3 Legacy CI Port Agent

Upon registration of a 15628 legacy CI at the ITS station management entity as specified in ISO 24102-1 and optionally registered as specified in ISO 17423, the ITS station management entity notifies the "Legacy CI Port Agent" about the presence of this 15628 legacy CI, indicating the Link-ID and the type of legacy CI as specified in ISO 21218.

The "Legacy CI Port Agent" shall

— use the NF-SAP service NF-FNTP-PORT of the FNTP to get a host port number assigned as specified in ISO 29281-1;

— notify the port number to the ITS station management entity, indicating also the Link-ID of the related 15628 legacy CI.