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Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management —

Part 1: Local management

Systèmes intelligents de transport — Accès aux communications des services mobiles terrestres (CALM) — Gestion des stations ITS —

Partie 1: Gestion locale

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Contents

Page

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. www.iso.org/directives

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The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

ISO 24102 consists of the following parts, under the general title *Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management*:

— *Part 1: Local management*

— *Part 3: Service access points*

— *Part 4: ITS station-internal management communications*

— *Part 5: Fast service advertisement protocol (FSAP)*

The following parts are under preparation:

— *Part 2: Remote management*

— *Part 6: Path and flow management*

Introduction

This International Standard is part of a family of International Standards for communications access for land mobiles (CALM). An introduction to the whole set of International Standards is provided in ISO 21217.

This part of ISO 24102 is part 1 of a multipart International Standard which determines the intelligent transport systems (ITS) local station management.

The ITS station management entity provides functionality related to the management of communication protocol layers and the security entity presented in the ITS station reference architecture specified in ISO 21217 and presented in Figure 1, and in line with the general ITS architecture specified in ISO 21217.

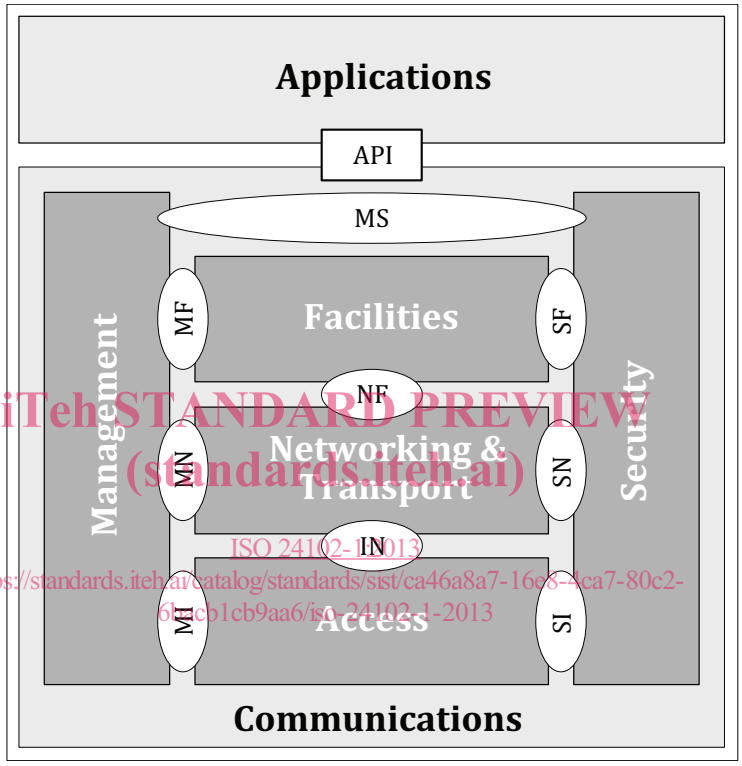

Figure 1 — ITS station reference architecture with named interfaces

ITS station management is specified as a distributed process, where no supervisory entity is employed.

Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management —

Part 1: Local management

1 Scope

This part of ISO 24102 provides specifications for intelligent transport systems (ITS) station management to be compliant with the ITS station reference architecture and the set of communications access for land mobiles (CALM) related standards.

Local ITS station management protocols are specified by means of management messages and data that flow between the ITS station management entity and

— the security entity,

— the application entity, and

— the various communication protocol layers

of the ITS station reference architecture specified in ISO 21217.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

ISO 21218, *Intelligent transport systems — Communications access for land mobiles (CALM) — Access technology support*

ISO 24102-3, *Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management — Part 3: Service access points*

ISO 24102-4, *Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management — Part 4: Station-internal management communications*

ETSI TS 102 797-1, *Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Intelligent Transport Systems, Communications access for land mobiles (CALM), ITS station management (ISO 24102); Part 1: Protocol Implementation Conformance Statement (PICS) proforma*

ETSI TS 102 797-2, *Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Intelligent Transport Systems, Communications access for land mobiles (CALM), ITS station management (ISO 24102); Part 2: Test Suite Structure and Test Purposes (TSS & TP)*

ETSI TS 102 797-3, *Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Intelligent Transport Systems, Communications access for land mobiles (CALM), ITS station management (ISO 24102); Part 3: Abstract Test Suite (ATS) and partial PIXIT information*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21217, ISO 21218, ISO 24102-3, and the following apply.

3.1
regulatory information
set of regulatory requirements for radio wave emission

3.2
ITS-S communication unit
addressable instance of the ITS station reference architecture comprising as a minimum the ITS-S router functionality

3.3
ITS-S path
part of a communication path between a source node and an anchor node being uniquely identified by a LinkID (identifying a CI in the source node and the next hop node) and by the anchor node

4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO 21217, ISO 21218, ISO 24102-3, and the following apply.

ITS-SCU	ITS station communication unit
ITS-SSI	ITS station state information
LDM	local dynamic map
n.a.	not applicable
PDUs	protocol data units
QoS	quality of service
RI	regulatory information

5 Requirements

The ITS station management entity provides functionality specified in the various parts of this multipart International Standard:

1) The functionality of local ITS station management specified in this part of ISO 24102.

2) The functionality of remote ITS station management will be specified in ISO 24103-2.

3) The functionality of management service access points specified in ISO 24102-3.

4) The functionality of ITS station-internal management communications specified in ISO 24102-4.

5) The functionality of the “Fast Service Advertisement Protocol” (FSAP) specified in ISO 24103-5.

General management functionality shall be as specified in this part of ISO 24102.

Means to secure the access to management functionality need to be specified within the global context of CALM security. Details are outside the scope of this part of ISO 24102.

Detailed mandatory requirements are specified in the following clauses of this part of ISO 24102.

— Clause 6 specifies basic management procedures related to communication interfaces.

— Clause 7 describes congestion control.

— Clause 8 specifies neighbour lists and the link to the "Local Dynamic Map" (LDM) application.

— Clause 9 describes the concept of flow and path management.

— Clause 10 specifies management of "Legacy CIs".

— Clause 11 specifies management data elements.

— Clause 12 specifies conformance declaration.

— Clause 13 specifies test methods.

— Annexes provide further mandatory requirements.

6 CI basic management

6.1 General

Basic management procedures related to communication interfaces (CI) shall access a "(Virtual) Communication Interface" (CI/VCI) via the MI-SAP specified in ISO 24102-3.

Any change of status of a CI/VCI shall be reported to all ITS-SCUs with ITS-SCU-Mngmt-Request "VCI-update" specified in ISO 24102-4. Reception of such a notification shall not be acknowledged.

Management communications with CIs/VCIs in other ITS-SCUs shall be with ITS station-internal management communication PDUs "MI-rcmd", "MI-rreq", "MI-rget", and "MI-rset" specified in ISO 24102-4.

Although SAPs and the related service primitives specified in ISO 24102-3 cannot be tested and are not mandatory, in the context of this part of ISO 24102, the elements of the service primitives may be an integral part of PDUs exchanged between physical entities in an ITS station using "ITS station-internal management communications" specified in ISO 24102-4. As PDUs are testable, those elements of service primitives that are part of a PDU become testable.

6.2 CI status

6.2.1 CI state machine

Figure 2 shows the CI state machine specified in ISO 21218.

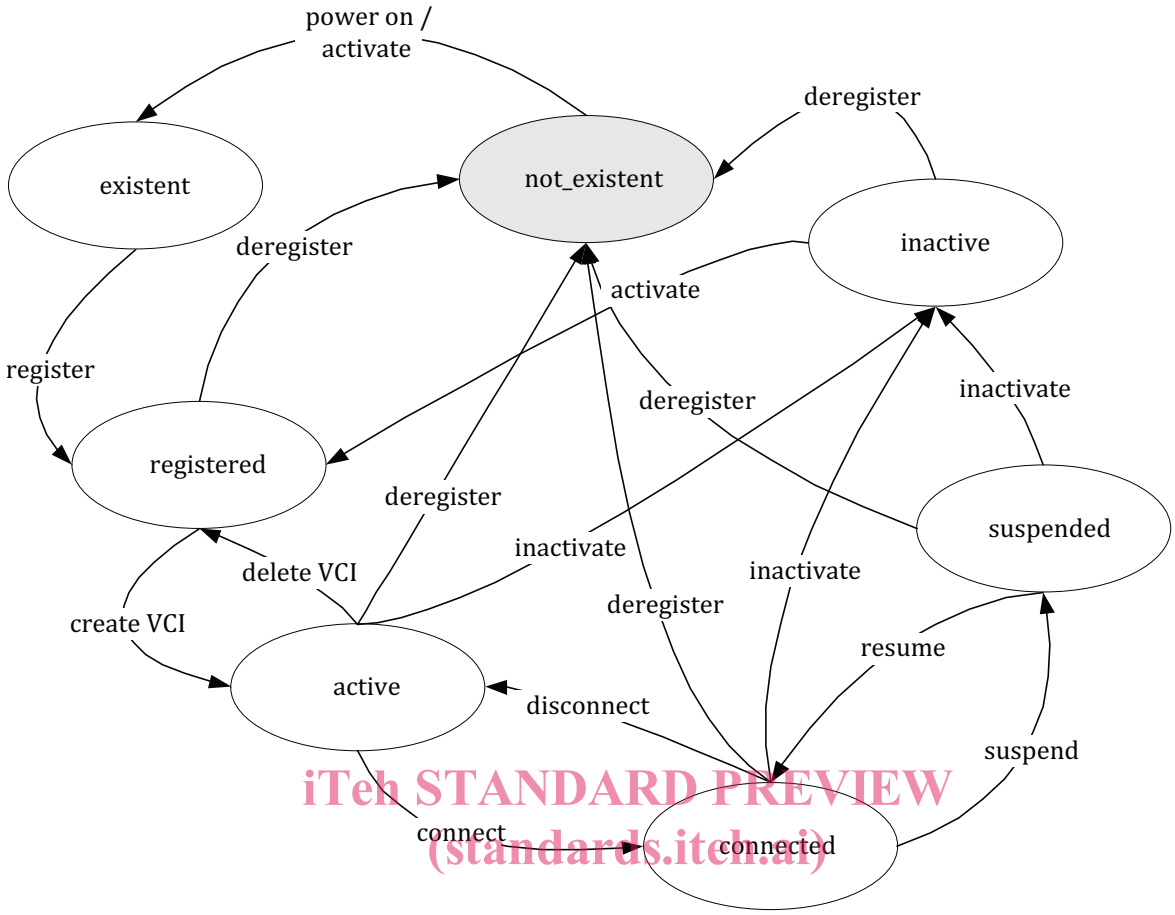

Figure 2 — CI state machine ISO 21218

6.2.2 Registration

Registration of a CI at the ITS station management entity is the process to make the CI known to the ITS station management entity, and to make it addressable via a unique Link-ID (see ISO 21218).

Registration of a CI shall be done as specified in ISO 21218.

The medium identifier MedID, part of the Link-ID specified in ISO 21218, and assigned to a CI during the process of registration shall be unique within an ITS-SCU.

Upon successful registration of a CI, the ITS station management entity shall create an entry in the VCI list with the values specified in Table 1.

Table 1 — Entry in VCI list upon registration of CI

LocalCIID	Medium	CI Status	ConnectMode	RemoteCIID
Identifying the CI as specified in ISO 21218.	I-Parameter "MedType" as specified in ISO 21218.	I-Parameter CIstatus equal to "registered", see ISO 21218.	I-parameter "Connect".	Not applicable. Value identifying the CI as specified in ISO 21218.

6.2.3 VCI creation

Creation of a VCI may be done

— upon request of the ITS station management entity, or

— by the CI on its own.

Creation of a VCI shall be done as specified in ISO 21218.

Upon successful creation of a VCI, the ITS station management entity

— shall create an entry in the VCI list with the values specified in Tables 2, 3, and 4, as applicable, and

— shall create initial entries in the forwarding tables of all supported networking protocols using MN-COMMAND "FWTset" specified in ISO 24102-3, if applicable.

Table 2 — Entry in VCI list indicating an active CI

LocalCIID	Medium	CI Status	ConnectMode	RemoteCIID
Identifying the CI as specified in ISO 21218.	Set equal to I-parameter "Medium". See ISO 21218.	Set equal to I-Parameter CIstatus. See ISO 21218.	Set equal to I-parameter "Connect". See ISO 21218.	Not applicable. Value identifying the CI as specified in ISO 21218.

Table 3 — Entry in VCI List upon creation of a broadcast VCI

LocalCIID	Medium	CI Status	ConnectMode	RemoteCIID
As specified in ISO 21218.	Set equal to I-parameter "Medium". See ISO 21218.	Set equal to I-Parameter CIstatus. See ISO 21218.	Set equal to I-parameter "Connect". See ISO 21218.	As specified in ISO 21218.

Table 4 — Entry in VCI List upon creation of a multicast VCI

LocalCIID	Medium	CI Status	ConnectMode	RemoteCIID
As specified in ISO 21218.	Set equal to I-Parameter "Medium". See ISO 21218.	Set equal to I-Parameter CIstatus. See ISO 21218.	Set equal to I-parameter "Connect". See ISO 21218.	As specified in ISO 21218.

Upon request of an ITS-S networking and transport layer protocol to create a VCI with a specific relation to a peer station, of which the MAC address is known a priori, and with specific settings of the I-parameters, the ITS station management entity shall create the VCI and perform all required settings. The state of the CI shall be set to "connected" (see Table 5). The ITS station management entity shall update the VCI list and the forwarding tables.

6.2.4 Deregistration

Deregistration of a CI at the ITS station management entity is the process reversal to the registration process. Successful deregistration is a prerequisite to remove a CI from the system during operation.

Deregistration of a CI may be done

— by the CI on its own,

— upon request of the ITS station management entity as specified in this part of ISO 24102.

Deregistration of a CI shall be done as specified in ISO 21218.

Upon successful deregistration, the ITS station management entity

— shall delete all entries of this CI and the related VCIs in the VCI list, and

— shall delete all entries of this CI and the related VCIs in the forwarding tables using MN-COMMAND "FWTdelete" specified in ISO 24102-3, if applicable.

6.2.5 Inactivation

Inactivation of a CI is the process to reset the CI and to block all subsequent communications.

Inactivation of a CI may be done upon request of the ITS station management entity.

NOTE Conditions when a CI shall or may be inactivated are not specified in this part of ISO 24102.

Inactivation of a CI shall be done as specified in ISO 21218.

Upon successful inactivation, the ITS station management entity

— shall change the status element of this CI in the VCI list to "inactive", and shall delete the entries of all related VCIs in the VCI list, and

— shall change the CI state of this CI in the forwarding tables to "inactive", and shall delete the entries of all related VCIs in the forwarding tables using MN-COMMAND "FWTdelete" specified in ISO 24102-3, if applicable.

6.2.6 Activation

Activation of a CI is the process to enable communications in an inactive CI. Upon successful activation, the ITS station management entity shall change the status element of this CI to the value "registered".

Activation of a CI may be done upon request of the ITS station management entity as specified in this part of ISO 24102.

NOTE Requirements on events upon which a CI shall or may be activated are not specified in this part of ISO 24102.

Activation of a CI shall be done as specified in ISO 21218.

Upon successful activation, the ITS station management entity shall change the status element of this CI in the VCI list to the value "registered".

6.2.7 Suspension

Suspension of a CI is the process to put all communications of a CI on hold, without deleting any packets or state variables.

Suspension of a CI may be done upon request of the ITS station management entity as specified in this part of ISO 24102.

NOTE Requirements when a CI shall or may be suspended are not specified in this part of ISO 24102.

Suspension of a CI shall be done as specified in ISO 21218.

Upon successful suspension, the ITS station management entity shall change

— the status element of this CI and the related VCIs in the VCI list to "suspended", and

— the CI state of this CI and the related VCIs in the forwarding tables to "suspended" using MN-COMMAND "FWTupdate" specified in ISO 24102-3, if applicable.