

ETSI TS 102 760-2 V1.2.1 (2014-06)



Technical Specification

**Intelligent Transport Systems (ITS);
Communications Access for Land Mobiles (CALM);
Test specifications for Access Technology Support
(ISO 21218);
Part 2: Test Suite Structure and Test Purposes (TSS & TP)**

PREVIEW
https://standards.itec.ai/standard/0aa029b3-c39a-46e0-bd6a-5877.../etsi-ts-102-760-2-v1.2.1-
(standards.itec.ai)

Reference

RTS/ITS-00263

Keywords

CALM, ITS, testing, TSS&TP

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaircor/ETSI_support.asp

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2014.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	4
Foreword.....	4
Modal verbs terminology.....	4
Introduction	4
1 Scope	7
2 References	7
2.1 Normative references	7
2.2 Informative references.....	7
3 Definitions and abbreviations.....	8
3.1 Definitions.....	8
3.2 Abbreviations	8
4 Test suite architecture.....	8
5 TP basics	9
5.1 TP definition conventions	9
5.2 TP identifier naming conventions	9
6 Test purposes.....	12
6.1 CI state transitions	12
6.1.1 Valid behaviour tests	12
6.1.2 Invalid behaviour tests	21
6.2 MIB parameters.....	22
6.2.1 Valid behaviour tests	22
6.2.2 Invalid behaviour tests	23
6.3 Handling of CIs	24
6.3.1 Valid behaviour tests	24
6.3.2 Invalid behaviour tests	25
6.4 Handling of data plane	26
6.4.1 Valid behaviour tests	26
6.4.2 Invalid behaviour tests	32
History	33

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 2 of a multi-part deliverable covering the test specifications for ITS access technology support (service access points and related procedures) ISO 21218 [1] as identified below:

Part 1: "Implementation Conformance Statement (ICS) proforma";

Part 2: "Test Suite Structure and Test Purposes (TSS & TP)";

Part 3: "Abstract Test Suite (ATS) and partial PIXIT proforma"

Modal verbs terminology

In the present document **"shall"**, **"shall not"**, **"should"**, **"should not"**, **"may"**, **"may not"**, **"need"**, **"need not"**, **"will"**, **"will not"**, **"can"** and **"cannot"** are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"must" and **"must not"** are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

Communications for Intelligent Transport Systems (ITS) is standardized at ISO TC204 WG16 under the acronym CALM (Communications Access for Land Mobiles). The communications architecture of ITS and cooperative ITS and the concept of an ITS station (ITS-S) as a "Bounded Secured Managed Domain" (BSMD) are specified in ISO 21217 [i.1]. The ITS-S architecture is based on the OSI model as illustrated in figure 1.

An implementation of a BSMD is named an "ITS station unit" (ITS-SU), or more precisely a "Bounded Secured Managed Entity" (BSME), which may consist of one or several physical units named "ITS station communication units" (ITS-SCU). ITS-SCUs are interconnected via the ITS station-internal network specified in ISO 21217 [i.1].

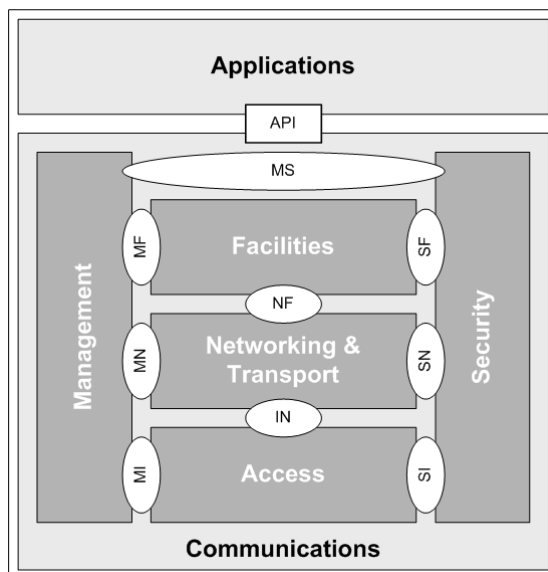


Figure 1: Simplified ITS station reference architecture

The OSI protocol layers of an ITS-S are grouped as shown in figure 1:

- The ITS-S access layer contains OSI layers 1 and 2, using the MI-interface towards the ITS-S management entity and the SI-interface towards the ITS-S security entity, and providing the IN-interface towards the ITS-S networking & transport layer.
- The ITS-S networking & transport layer contains OSI layers 3 and 4, using the MN-interface towards the ITS-S management entity, the SN-interface towards the ITS-S security entity, the IN-interface towards the ITS-S access layer, and providing the NF-interface towards the ITS-S facilities layer.
- The ITS-S facilities layer contains OSI layers 5, 6 and 7, using the MF-interface towards the ITS-S management entity, the SF-interface towards the ITS-S security entity and the NF-interface towards the ITS-S networking & transport layer.

There are further interfaces not presented in the simplified view of figure 1, i.e. the interfaces towards "Applications", which will be provided in an implementation by means of the API illustrated in figure 1.

The MI-interface, the MN-interface, the MF-interface, the SI-interface, the SN-interface, the SF-interface are specified in ISO 24102-3 [3] as service access points (SAPs). The IN-interface is described as an SAP in ISO 21218 [1].

In a distributed implementation of an ITS-S, management commands are exchanged between the ITS-SCUs by means of the "ITS station-internal management communications protocol" (IICP) specified in ISO 24102-4 [i.3]. Such management commands directly may carry functions of service primitives of SAPs to which they are addressed. By this, functions of the service primitives become observable as PDUs and thus testable. Consequently the present document indirectly provides also the foundations for testing functions of service primitives, but not the service primitives themselves.

The functionality of "ITS station-internal management communications" may be used to provide the upper tester access in the SUT as specified in ISO 24102-3 [3] and ETSI EG 202 798 [i.2] and in the present document.

Details of the ITS-S access layer, which are subject of the present document are illustrated in figure 2.

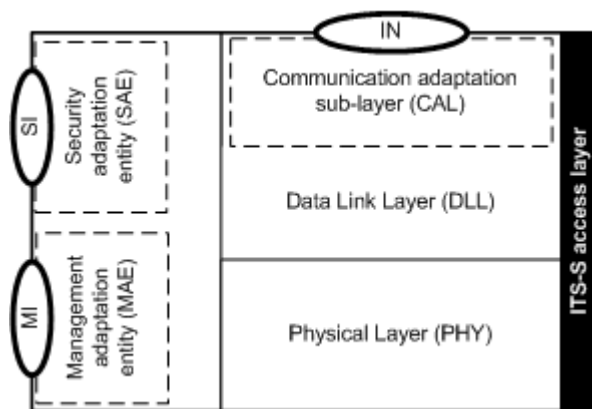


Figure 2: Illustration of the ITS-S access layer

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/0aa029b3-c39a-46e0-bd6a-5871fc83a8ab/etsi-ts-102-760-2-v1.2.1-2014-06>

1 Scope

The present document provides the test suite structure and test purposes (TSS & TP) specification for the protocols specified in ISO 21218 [1] in compliance with the relevant requirements, and in accordance with the relevant guidance given in ETSI TS 102 760-1 [2] and in ETSI EG 202 798 [i.2].

NOTE: ISO 21218 [1] cannot be tested without being applied to a specific CALM-compliant communication interface (CI). Conformance with ISO 21218 [1] thus always is restricted to the CALM-compliant CI declared in the ICS proforma ETSI TS 102 760-1 [2].

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] ISO 21218: "Intelligent Transport Systems - Communications access for land mobiles (CALM) - Access technology support".
- [2] ETSI TS 102 760-1: "Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test specifications for Access Technology Support (ISO 21218); Part 1: Implementation Conformance Statement (ICS) proforma".
- [3] ISO 24102-3: "Intelligent Transport Systems - Communications access for land mobiles (CALM) - ITS station management - Part 3: Service access points".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ISO 21217:2014: "Intelligent Transport Systems - Communications access for land mobiles (CALM) - Architecture".
- [i.2] ETSI EG 202 798: "Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing".
- [i.3] ISO 24102-4:2013: "Intelligent Transport Systems - Communications access for land mobiles (CALM) - ITS station management - Part 4: Station-internal management communication".
- [i.4] ETSI TS 102 760-3: "Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test specifications for Access Technology Support (ISO 21218); Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO 21218 [1], ISO 21217 [i.1], ISO 24102-3 [3], ISO 24102-4 [i.3], ETSI TS 102 760-1 [2] and ETSI EG 202 798 [i.2] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ISO 21218 [1], ISO 21217 [i.1], ISO 24102-3 [3], ISO 24102-4 [i.3], ETSI TS 102 760 1 [2] and ETSI EG 202 798 [i.2] apply.

4 Test suite architecture

ISO 21218 [1] cannot be tested without being applied to a specific communication interface (CI) specified in ISO 21217 [i.1]. Thus the test architecture presented in figure 3 shows also the OSI communication layers PHY and DLL which are below the "Communication Adaptation Layer" (CAL), both in the system under test (SUT) and in the ITS lower layers of the ITS test system.

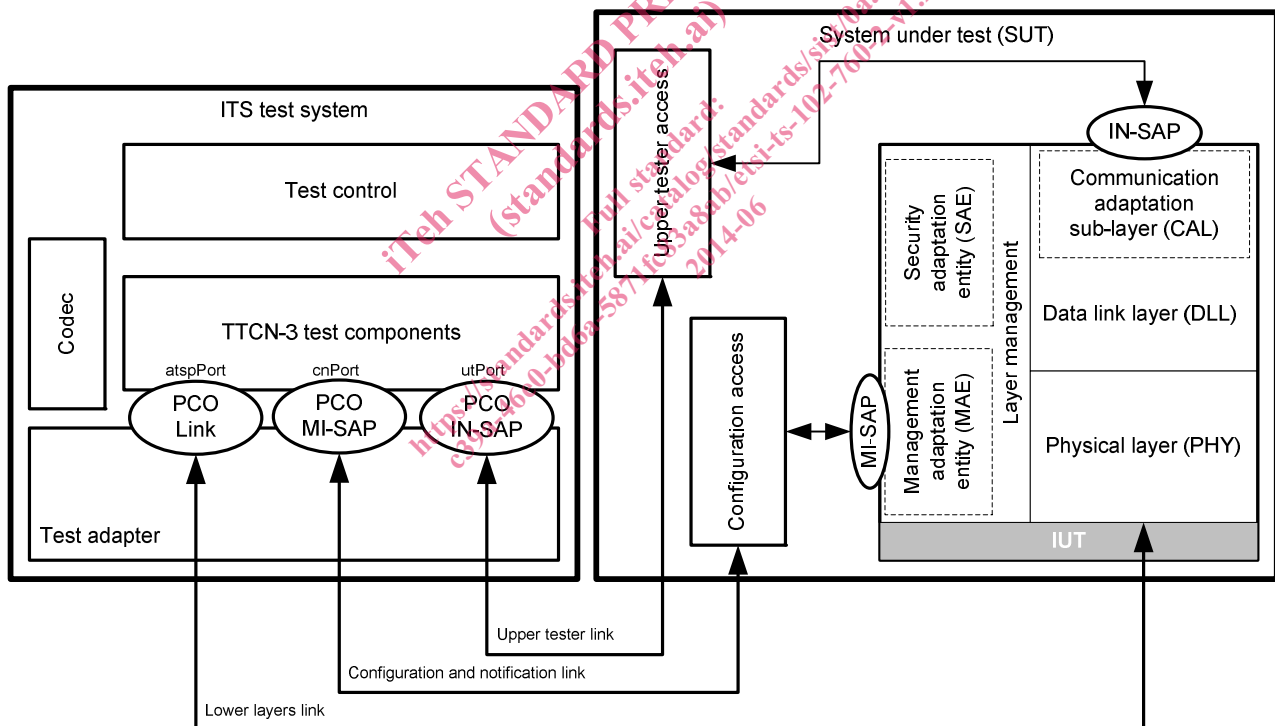


Figure 3: Test architecture

The IUT is connected via three points of control and observation (PCO) with the TTCN-3 test components:

- "PCO IN-SAP", providing access to the IN-SAP of the IUT;
- "PCO MI-SAP", providing access to the MI-SAP of the IUT;
- "PCO Link", the communication link.

Access to the MI-SAP and IN-SAP beneficially may be provided with the "ITS station-internal management communications protocol" (IICP) specified in ISO 24102-4 [i.3] as specified in ETSI TS 102 760-3 [i.4]. Alternative approaches for the upper tester access specified in ETSI EG 202 798 [i.2] also are possible.

NOTE: Not using IICP to access IM-SAP and MI-SAP may cause extra cost to the applicant in order to adapt the SUT to the test environment in a test house.

A SUT may contain several CIs. However in a given test at a given time, only a single of them together with the functionality of ISO 21218 [1] shall constitute the IUT. Testing of a SUT containing several CIs thus requires repetition of the tests for all CIs contained in the SUT.

Tests for a configuration with several active CIs in a single SUT are not considered in the present document.

5 TP basics

5.1 TP definition conventions

The TP definition is built according to the guidelines provided in the ITS testing framework ETSI EG 202 798 [i.2], applying a formalized language with pre-defined keywords for the behaviour description.

5.2 TP identifier naming conventions

The identifier of the TP is built according to table 1 as recommended in the ITS testing framework ETSI EG 202 798 [i.2].

Table 1: TP naming convention

TP/<group>/<x>/<nn>		
group = Group of tests	SE	State event transitions
	MB	MIB I-Parameters
	HC	Handling of CIs
	DP	Handling of data plane
x = Type of testing	BV	Valid Behaviour Tests
	BI	Invalid Behaviour Tests
<nn> = sequential number	>0	Test Purpose Number, 01 .. 99

5.3 Rules for behaviour description

The description of the TP is built according to the guidelines provided in the ITS testing framework ETSI EG 202 798 [i.2].

5.4 Sources of TP definitions

All TPs are specified according to ISO 21218 [1].

5.5 TP proforma

ETSI EG 202 798 [i.2] proposes a TP proforma which is used in the present document. The fields of this proforma as used in the present document are explained in table 1.

Table 1: TP proforma field description

TP Header	
TP ID	The TP ID is a unique identifier according to the TP naming conventions in table 1.
Test objective	Short description of test purpose objective according to the requirements from the base standard.
Reference	The reference indicates the clauses of the reference standard specifications in which the conformance requirement is expressed.
PICS selection	Reference to the PICS statement involved for selection of the TP. Contains a Boolean expression. May contain PICS acronyms specified in table 2. This section is only used in case an optional or conditional behaviour needs to be selected. Mandatory behaviour is not identified here.
TP Behaviour	
Initial conditions (optional)	The initial conditions define in which initial state the IUT has to be to apply the actual TP. In the corresponding "Test Case" (TC), when the execution of the initial condition does not succeed, it leads to the assignment of an Inconclusive verdict.
Expected behaviour (TP body)	Definition of the events, which are parts of the TP objective, the IUT is expected to perform in order to conform to the base specification. In the corresponding Test Case, "Pass" or "Fail" verdicts can be assigned there.
Final conditions (optional)	Definition of the events that the IUT is expected to perform or shall not perform, according to the base standard and following the correct execution of the actions in the expected behaviour above. In the corresponding Test Case, the execution of the final conditions is evaluated for the assignment of the final verdict.

The following initial conditions shall apply for all TPs, if not defined differently in a specific TP:

- The Link-ID of all CIs not being in the CI state "not_existent" and of all existent VCIs shall be known to the ITS test system, see figure 3.
- The MIB of the CI / VCI shall contain default values except for the I-Parameters ISO 21218 [1] listed below.
 - "MinimumUserPriority" shall be set to zero if not requested differently.

Additional initial conditions may apply for specific TPs.

According to ISO 24102-3 [3], the service primitives COMMAND.confirm and REQUEST.confirm shall be present in case of an error and may be omitted otherwise. The optional presence of confirm service primitives with ErrStatus indicating success are not explicitly included in the TPs, but will have to be considered in the abstract test suite, i.e. in part 3 [i.4] of this multi-part deliverable.

5.6 PICS mnemonics

The PICS mnemonics presented in table 2 are used in the TP proforma.

Table 2: PICS mnemonics

Mnemonic	PICS item	Explanation
PICS_ACT	ETSI TS 102 760-1 [2] C.11/4	
PICS_BCVCI	ETSI TS 102 760-1 [2] C.8/1	IUT is supporting BC-VCI transmitter
PICS_CIAC1	ETSI TS 102 760-1 [2] C.6/1	IUT is of CI access class CIAC-1 (no user authentication required, usage of CI is free of charge)
PICS_CIAC2	ETSI TS 102 760-1 [2] C.6/2	IUT is of CI access class CIAC-2 (access credentials required, usage of CI is subject of a service charge)
PICS_CIAC3	ETSI TS 102 760-1 [2] C.6/3	IUT is of CI access class CIAC-3 (access credentials required, usage of CI is free of charge)
PICS_CIC_il1	ETSI TS 102 760-1 [2] C.5/6	IUT is of CI class CIC-il1 (non-deterministic ITS station-internal network interface)
PICS_CIC_il2	ETSI TS 102 760-1 [2] C.5/7	IUT is of CI class CIC-il2 (deterministic ITS station-internal network interface)
PICS_CIC_I1	ETSI TS 102 760-1 [2] C.5/1	IUT is of CI class CIC-I1 (multiple simultaneous peer stations transceiver)
PICS_CIC_I2	ETSI TS 102 760-1 [2] C.5/2	IUT is of CI class CIC-I2 (single peer station transceiver)
PICS_CIC_I3	ETSI TS 102 760-1 [2] C.5/3	IUT is of CI class CIC-I3 (groupcast transmitter)
PICS_CIC_I4	ETSI TS 102 760-1 [2] C.5/4	IUT is of CI class CIC-I4 (broadcast receiver only)
PICS_CIC_I5	ETSI TS 102 760-1 [2] C.5/5	IUT is of CI class CIC-I5 (CEN / Japanese DSRC)
PICS_CONN	ETSI TS 102 760-1 [2] C.11/7	IUT is supporting the connection procedure
PICS_CRCIP_I	ETSI TS 102 760-1 [2] C.11/10	IUT is supporting the Cross-CI prioritization - interferer procedure
PICS_CRCIP_V	ETSI TS 102 760-1 [2] C.11/9	IUT is supporting the Cross-CI prioritization - victim procedure
PICS_DISCONN	ETSI TS 102 760-1 [2] C.11/8	IUT is supporting the disconnection procedure
PICS_DYNREG	ETSI TS 102 760-1 [2] C.1/1	Dynamic registration using the standardized registration procedure
PICS_INACT	ETSI TS 102 760-1 [2] C.11/3	IUT is supporting the inactivation procedure
PICS_INUDS	ETSI TS 102 760-1 [2] C.12/2	IUT is supporting the IN-UNITDATA-STATUS service
PICS_IPNO	ETSI TS 102 760-1 [2] C.24 any selected I-Parameter	IUT is supporting notification-only I-Parameters
PICS_IPRO	ETSI TS 102 760-1 [2] C.21 and C.22 any selected I-Parameter	IUT is supporting read-only I-Parameters
PICS_IPRW	ETSI TS 102 760-1 [2] C.19 and C.20 any selected I-Parameter	IUT is supporting read/write I-Parameters
PICS_IPWO	ETSI TS 102 760-1 [2] C.23 any selected I-Parameter	IUT is supporting write-only I-Parameters
PICS_MAC48	ETSI TS 102 760-1 [2] C.4/1	IUT uses 48 bit MAC addresses
PICS_MCVCI	ETSI TS 102 760-1 [2] C.8/2	IUT is supporting MC-VCI transmitter
PICS_REJECT	ETSI TS 102 760-1 [2] C.11/20	IUT is supporting rejection of DL-UNITDATA.requests with user priority less than given in parameter "MinimumUserPriority"
PICS_RES	ETSI TS 102 760-1 [2] C.11/6	IUT is supporting the resuming procedure
PICS_RIM	ETSI TS 102 760-1 [2] C.11/12	IUT is supporting the Regulatory Information Management procedure
PICS_SNAP	ETSI TS 102 760-1 [2] C.13/1	IUT is supporting SNAP
PICS_SUSP	ETSI TS 102 760-1 [2] C.11//5	IUT is supporting the suspension procedure
PICS_UCVCI	ETSI TS 102 760-1 [2] C.8/3	IUT is supporting UC-VCI (transmitter and receiver)