
**Intelligent transport systems —
Cooperative ITS — Test architecture**

*Systèmes intelligents de transport — SIT coopératifs —
Architecture d'essai*

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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).

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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*.

Introduction

For conformance testing in C-ITS, ETSI developed a generic initial test architecture, published in Reference [6]. Considering the ITS station and communication architecture for C-ITS specified in ISO 21217 and implementations of ITS station units being compliant with the ITS-S station-internal management communications protocol (IICP) specified in ISO 24102-4, conformance testing can be simplified and related effort and cost can be reduced by applying the extended test architecture specified in this document. IICP enables remote access to all points of control and observation (PCO) of the implementation under test (IUT) without the need to implement IUT-specific upper tester applications and lower tester access.

Understanding of this document requires knowledge of:

- the ITS station and communication architecture specified in ISO 21217,
- the IICP specified in ISO 24102-4, and
- the related MX-SAP service primitive functions specified in ISO 24102-3.

Further knowledge of standards related to conformance testing with TTCN-3 is also recommended, for example:

- Reference [6] on the framework on C-ITS conformance testing, and
- Reference [7] on the TTCN-3 core language.

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Intelligent transport systems — Cooperative ITS — Test architecture

1 Scope

This document specifies an extension of the ETSI C-ITS test architecture for conformance testing of protocols and applications in ITS station units. It specifies usage of the ITS station-internal management communication protocol (IICP) for the purpose of connecting an ITS test system to an implementation under test (IUT) residing in a system under test (SUT).

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 21217:2014, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

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*

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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp/>

3.1 implementation under test

IUT

part of a real system which is to be studied by testing

3.2 system under test

SUT

real system in which an *IUT* (3.1) resides

4 Abbreviated terms

CI	communication interface
IIC	ITS-S internal management communications
IICA	IIC agent

IICM	IIC manager
IICP	IIC protocol
ITS	intelligent transport systems
ITS-SCU	ITS station communication unit
ITS-SCU-ID	ITS-SCU identifier
PCO	point of control and observation
PDU	protocol data unit
TTCN-3	testing and test control notation version 3

5 Conventions

In this document, text presented in `Courier` font indicates ASN.1 codes.

6 Test system architecture

6.1 General

The general test system architecture is illustrated in Figure 1. It shows how an implementation under test (IUT) contained in a system under test (SUT) is connected to the ITS test system via a lower layers link and an upper tester transport link and a configuration/notification link. These links allow accessing the points of control and observation (PCO) of the IUT.

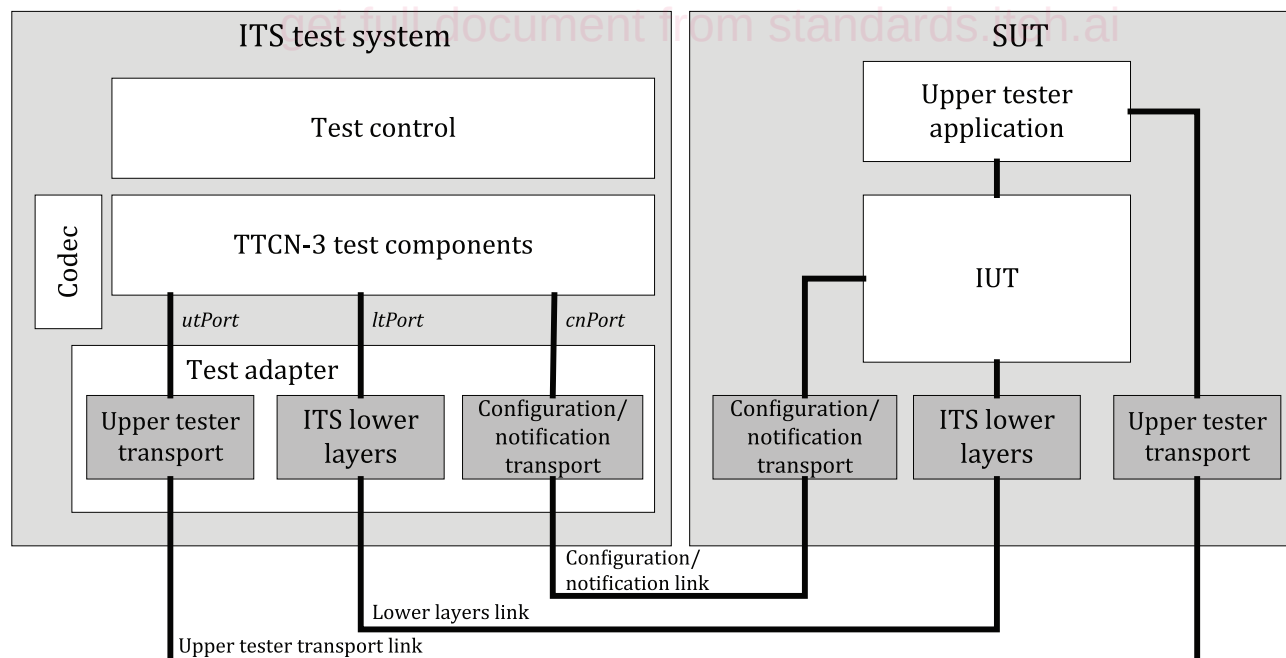


Figure 1 — General conformance test system architecture

The lower layers link may end up in the SUT at the block “ITS lower layers”, in case lower layers are used during testing, or directly at the lower interface of the IUT. The upper tester transport link ends up in the SUT at the block “upper tester transport”. This “upper tester transport” block together with the “upper tester application” block provides the test access to the upper interface of the IUT. The configuration

and event notification link is needed for testing of some IUTs, e.g. to set initial conditions and to retrieve status information, allowing remote access to the management/security SAPs in the SUT.

The links shown in [Figure 1](#) between the ITS test system and the SUT indicate connectivity between entities in the two systems and the physical implementation of these links is implementation dependent. For example, the three logical links shown may be implemented on a single physical communication medium such as a single Ethernet connection between the ITS test system and the SUT.

Following the ITS station and communication architecture specified in ISO 21217 (see [Figure 2](#)), an IUT can be a protocol or an ITS-S application process located in the

- ITS-S access layer (e.g. ITS-M5 specified in ISO 21215/ISO 21218),
- ITS-S networking and transport layer (e.g. FNTF specified in ISO 29281-1),
- ITS-S facilities layer (e.g. the LDM specified in ISO 18750),
- ITS-S management entity, or
- ITS-S security entity.

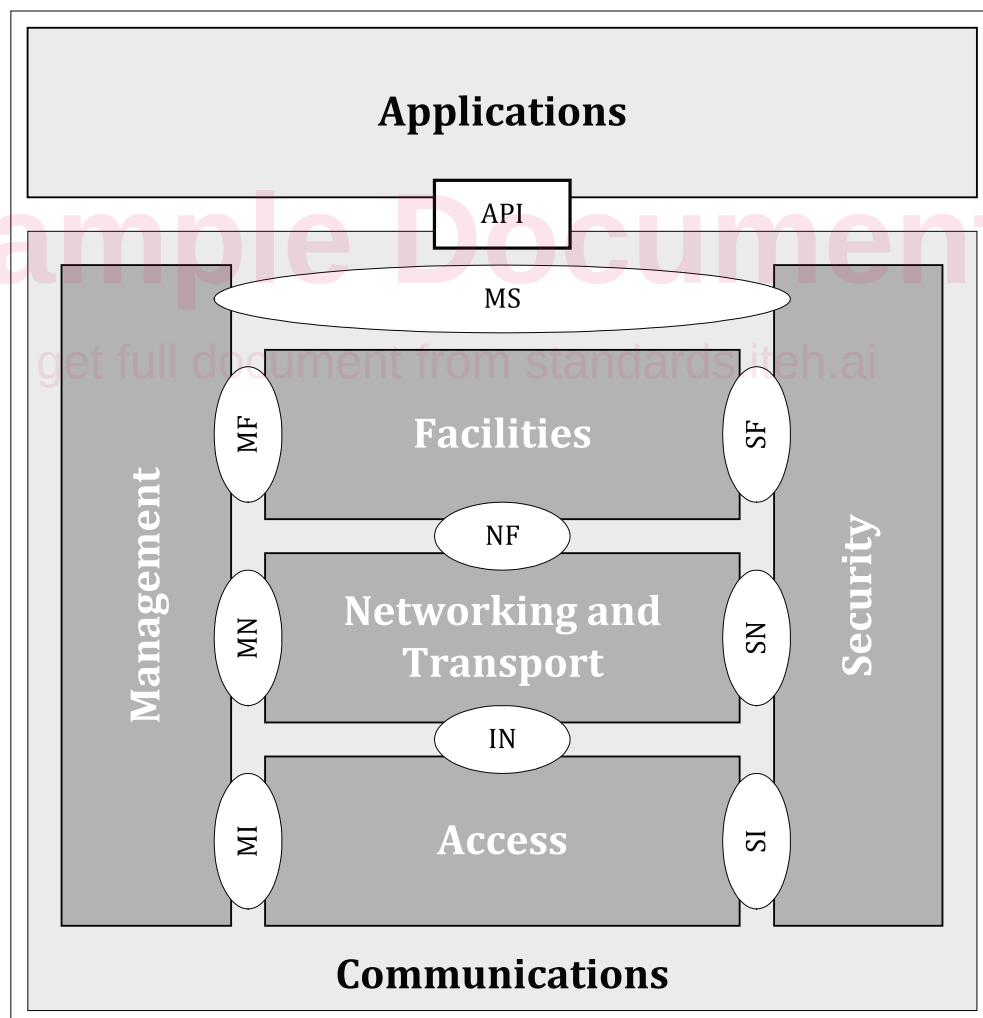


Figure 2 — ITS station architecture

An IUT may include functionalities in more than one architectural layer, for example, functionality in the:

- ITS-S access layer and the ITS-S networking and transport layer;