ETSI TS 102 797-3 V1.2.1 (2014-06)

Intelligent Transport Systems (ITS);
Communications Access for Land Mobiles (CALM);
Test specifications for ITS station management (ISO 24102);
Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma

Reference
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Contents

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Foreword

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

The present document is part 3 of a multi-part deliverable covering Communications Access for Land Mobiles (CALM); Test specifications for ITS station management (ISO 24102), as identified below:

Part 1: "Protocol Implementation Conformance Statement (PICS) specification";

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).

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1 Scope

The present document provides the Abstract Test Suite (ATS) and partial PIXIT proforma for the protocols specified in ISO 24102-4 [1], ISO 24102-5 [2] based on the related TSS & TP specification TS 102 797-2 [4] and the PICS proforma TS 102 797-1 [3] and in accordance with the relevant guidance given in ISO/IEC 9646-1 [5], ISO/IEC 9646-2 [6], ETS 300 406 [7] and EG 202 798 [i.4].

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 24102-4:2013: "Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 4: Station-internal management communications".

[2] ISO 24102-5:2013: "Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 5: Fast service advertisement protocol (FSAP)".

[3] ETSI TS 102 797-1 (V1.2.1): "Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test specifications for ITS station management (ISO 24102); Part 1: Protocol Implementation Conformance Statement (PICS) specification".

[4] ETSI TS 102 797-2 (V1.2.1): "Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test specifications for ITS station management (ISO 24102); Part 2: Test Suite Structure and Test Purposes (TSS & TP)".

[5] ISO/IEC 9646-1:1994: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General concepts".

[6] ISO/IEC 9646-2:1994: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 2: Abstract Test Suite specification".

[7] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[8] ETSI ES 201 873-1: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

[9] ETSI ES 201 873-7: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 7: Using ASN.1 with TTCN-3".

[10] ETSI ES 202 784: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; TTCN-3 Language Extensions: Advanced Parameterization".

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 24102-3:2013: "Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 3: Service access points".

[i.2] ISO 21217:2014: "Intelligent transport systems -- Communications access for land mobiles (CALM) -- Communications architecture".

[i.3] ISO 21218:2013: "Intelligent transport systems -- Communications access for land mobiles (CALM) -- Medium service access point".

[i.4] ETSI EG 202 798: "Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing".

[i.5] ETSI TR 103 099 (V1.1.1): "Intelligent Transport Systems (ITS); Architecture of conformance validation framework".

[i.6] ISO 29281-1:2013: "Intelligent transport systems -- Communication access for land mobiles (CALM) -- Non-IP networking -- Part 1: Fast networking & transport layer protocol (FNTP)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO 24102-4 [1], ISO 24102-5 [2], TS 102 797-1 [3], TS 102 797-2 [4], ISO/IEC 9646-1 [5], ISO/IEC 9646-2 [6], ETS 300 406 [7], ES 201 873-1 [8], ES 201 873-7 [9], ES 202 784 [10], ISO 24102-3 [i.1], ISO 21217 [i.2], ISO 21218 [i.3] and EG 202 798 [i.4] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ISO 24102-4 [1], ISO 24102-5 [2], TS 102 797-1 [3], TS 102 797-2 [4], ISO/IEC 9646-1 [5], ISO/IEC 9646-2 [6], ETS 300 406 [7], ES 201 873-1 [8], ES 201 873-7 [9], ES 202 784 [10], ISO 24102-3 [i.1], ISO 21217 [i.2], ISO 21218 [i.3] and EG 202 798 [i.4] apply.

4 Abstract protocol tester

In general, the conformance test system architecture as illustrated in the ITS testing framework EG 202 798 [i.4], see figure 1, applies. For the present document, the IUT is given by protocols located in the ITS-S management entity, thus several types of IUTs need to be considered. The "Upper tester application" allows accessing the "upper side" of the IUT. Lower layer protocols indicated by the block "ITS lower layers" allow access to the IUT from the "lower side". "Upper side" and "lower side" are obvious terms in case of protocols residing in an OSI communication layer. For management protocols, it will be clearly specified in clauses 5 and 6 what "upper side" and "lower side" mean.

The test system simulates valid and invalid protocol behaviour and analyses the reaction of the IUT.

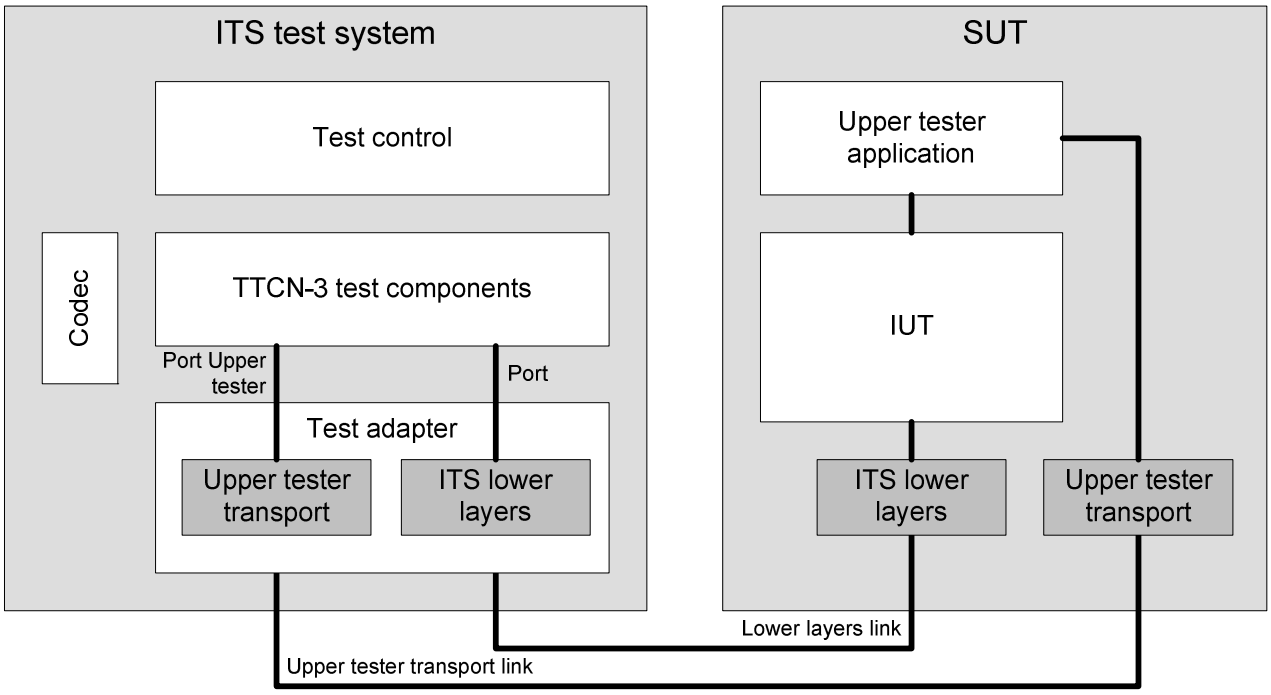


Figure 1: Abstract protocol tester - General approach

5 Abstract test method for FSAP

5.1 Abstract protocol tester

SUTs which support the "ITS station-Internal management Communications Protocol" (IICP) ISO 24102-4 [1] may benefit from the conformance test system architecture illustrated in figure 2, where the access to the IUT from top, i.e. in general via the upper tester application, is performed via management SAPs.

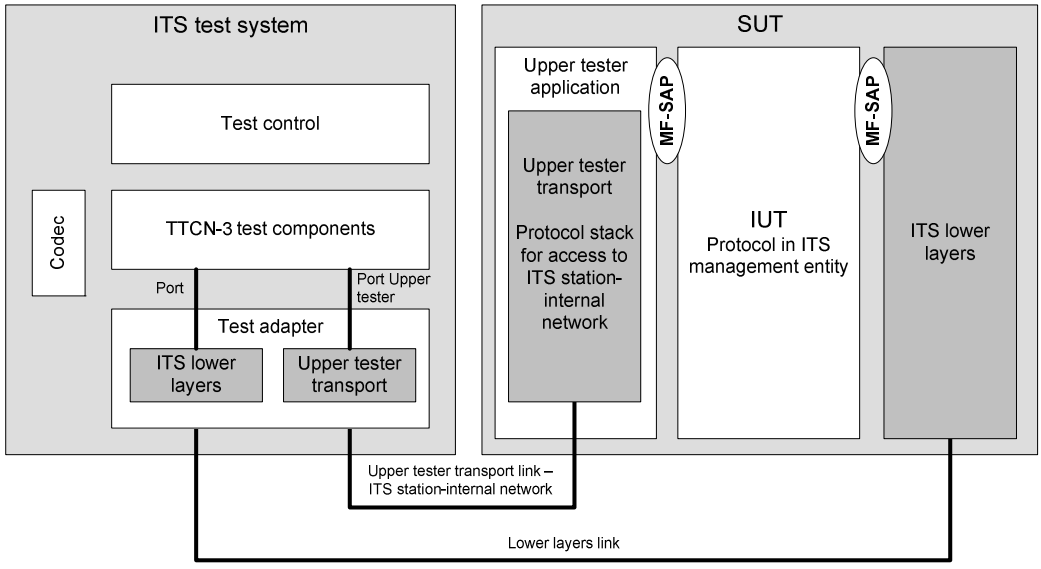


Figure 2: Abstract protocol tester for FSAP - IICP approach for upper tester

5.2 Test configurations

5.2.1 Roles of an ITS-SCU

The test suite for FSAP uses two test configurations in order to cover the different test scenarios. Distinction between the two configurations is given by the two possible implementation scenarios for an ITS station, i.e. a single-unit implementation, or an implementation with several "ITS station communication units" (ITS-SCU) which are interconnected via an ITS station-internal network ISO 24102-4 [1], ISO 24102-5 [2], ISO 21217 [i.2]. These ITS-SCUs can take over the roles of an ITS-S host, or an ITS-S router, or the combined role of ITS-S host and ITS-S router. The two identified testing configurations are referred to as CF01 for the single unit implementation, and CF02 for the multi-unit implementation and are described in clauses 5.2.2 and 5.2.3.

5.2.2 Test configuration CF01: No ITS station-internal network

In test configuration CF01 the roles of ITS-S host and ITS-S router are implemented in a single ITS-SCU as illustrated in figure 3. Consequently the whole supported functionality of FSAP is given in a single ITS-SCU and no station-internal forwarding between ITS-S host and ITS-S router is needed.

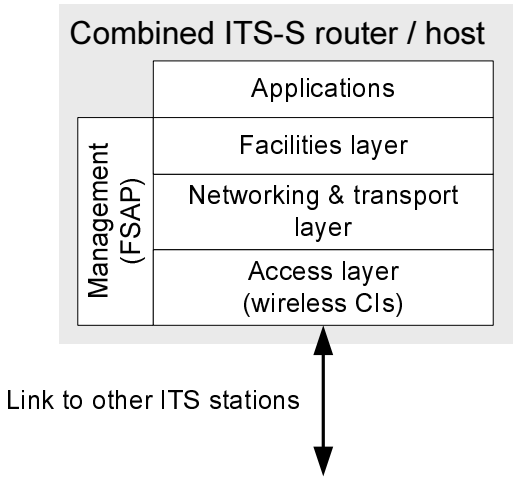


Figure 3: Test configuration CF01 architecture

This configuration is used in the cases listed below TS 102 797-2 [4]:

- ITS-S station internal-network PICS (PICS_S_INW) is set to false.
- The roles PICS (PICS_ROLE_RH) is set to true.

5.2.3 Test configuration CF02: ITS station-internal network

In test configuration CF02, the roles of ITS-S host and ITS-S router are implemented in different ITS-SCUs as illustrated in figure 4. Consequently there is communications needed between the ITS-SCU with host functionality and the ITS-SCU with router functionality. This communication goes via the ITS station-internal network using the "ITS station-Internal management Communications Protocol" (IICP) ISO 24102-4 [1].

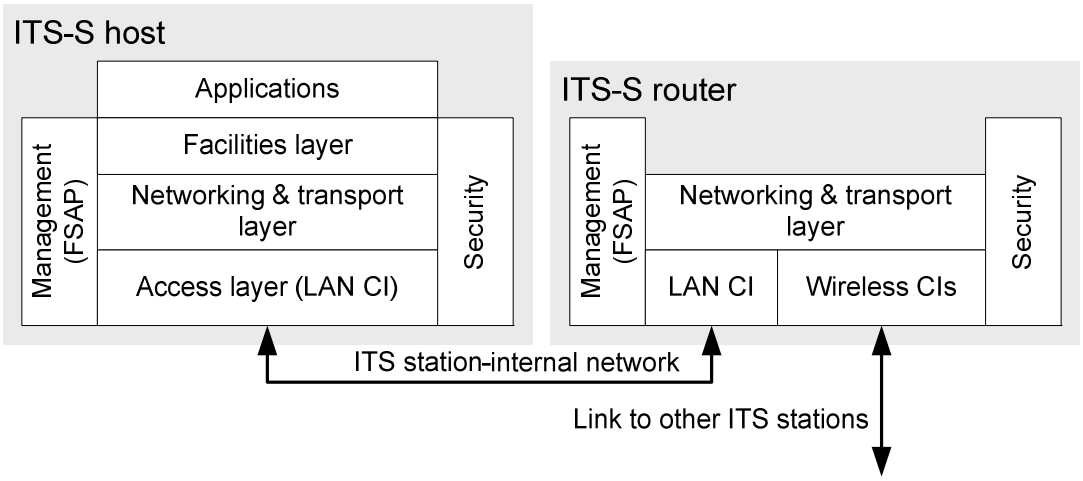


Figure 4: Test configuration CF02 architecture

This configuration is used in the cases listed below TS 102 797-2 [4]:

- ITS-S station internal-network PICS (PICS_S_INW) is set to true.

5.3 Test architecture

The present document implements the general TTCN-3 test architecture described in EG 202 798 [i.4], clauses 6.3.2 and 8.3.1.

Figure 5 shows the TTCN-3 test architecture used for the FSAP ATS.

- The MTC is of type ItsFSAP and communicates with the SUT over fsapPort in order to exchange FSAP messages (SAM, CTX) between the FSAP test component and the FASP IUT. The "ITS lower layers transport" system adapter is used to enable usage of ITS lower layers in the SUT in case the MF-SAP is not directly accessible.

- The MTC communicates with the SUT over the utPort in order to trigger FSAP functionalities by simulating primitives from e.g. application entities. It is required to trigger the FSAP layer in the SUT to send FSAP messages, which are resulting from upper layer primitives. Furthermore, receiving FSAP messages may result in notifications to other entities. The "Upper tester transport" system adapter is used to adapt to the upper tester application implementation of the SUT.

- The MTC communicates with the SUT over the cfPort in order to perform settings in the SUT. The "Configuration transport" system adapter is used to adapt to the configuration-access implementation of the SUT.

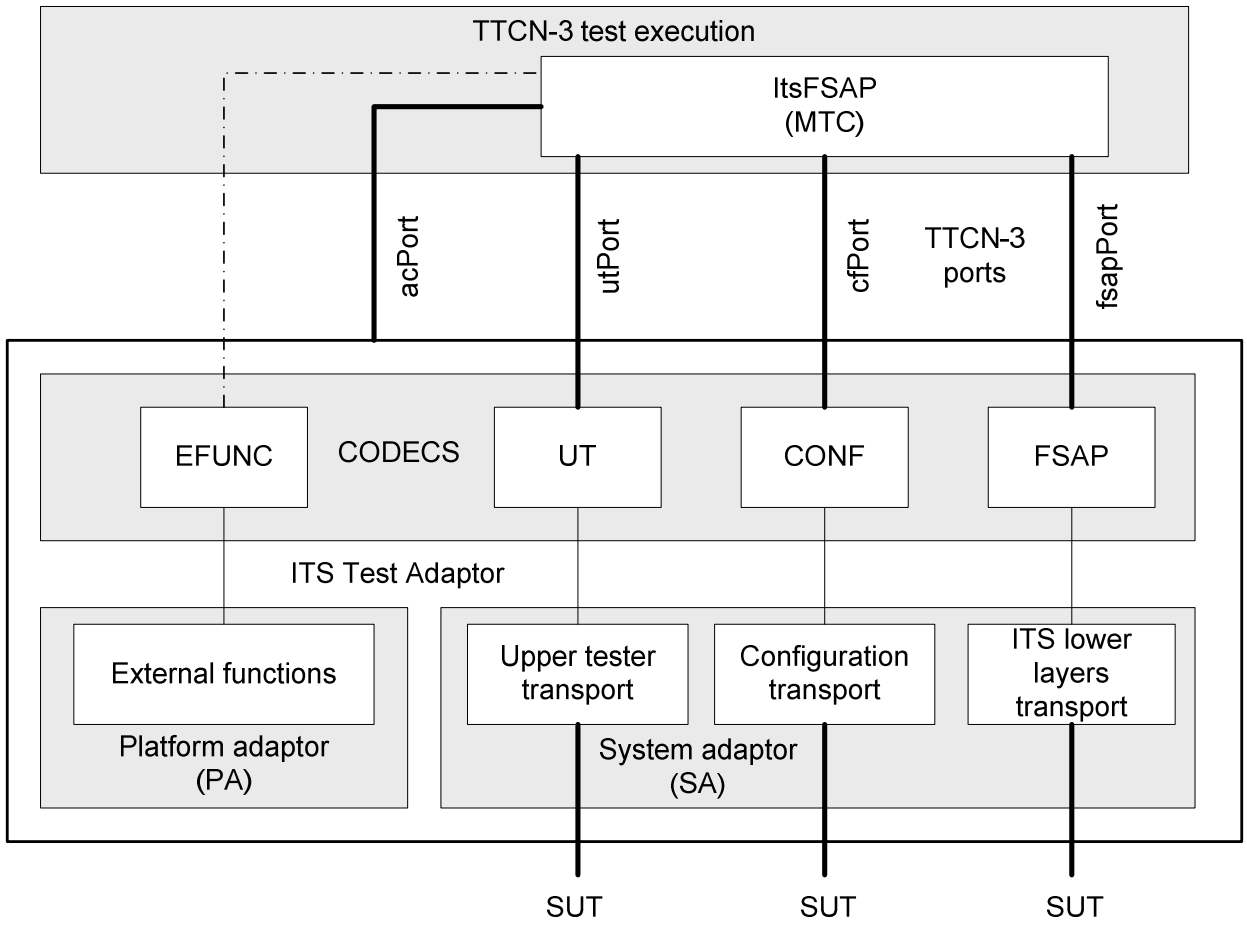


Figure 5: Test system architecture for FSAP

5.4 Ports and abstract service primitives

5.4.1 Overview

The following TTCN-3 ports are used by the FSAP ATS:

- fsapPort of type FsapPort is used to receive messages from and transmit messages to the IUT (via MF-SAP).
- utPort of type UpperTesterPort is used to receive service message from and transmit service messages to the IUT (via MF-SAP).

Every port provides "Abstract Service Primitives" (ASPs) as specified in clauses 5.4.2 and 5.4.3.

5.4.2 ASPs of the fsapPort

The following ASPs are used in the fsapPort:

- The FsapReq primitive used to send messages of type NFsapPrimitivesUp or INsapPrimitivesUp sent by the IUT.
- The FsapInd primitive used to receive messages of type NFsapPrimitivesDown or INsapPrimitivesDown from the IUT.

5.4.3 ASPs of the utPort

The following ASPs are used in the utPort:

- The UtInitialize primitive is used to initialize IUT.
- The FAsapPrimitivesDown primitive is used to send FA-SAP service primitives to the IUT.
- The FAsapPrimitivesUp primitive is used to receive FA-SAP service primitives from the IUT.

6 Abstract Test Method for IICP

6.1 Abstract protocol tester

SUTs which support the "ITS station-Internal management Communications Protocol" (IICP) ISO 24102-4 [1] may benefit from the conformance test system architecture illustrated in figure 6, where the access to the IUT from top, i.e. in general via the upper tester application, is performed via management SAPs.

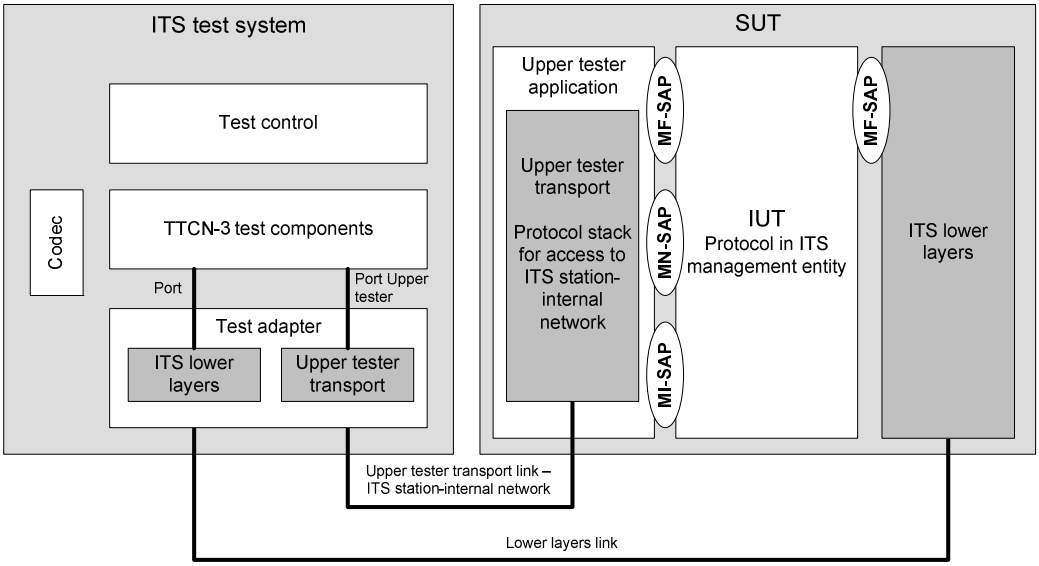


Figure 6: Abstract protocol tester for IICP

6.2 Test configurations

IICP becomes applicable once an ITS station-internal network is available. This results in the basic configuration illustrated in figure 7, where the SUT is an ITS-SCU which either has the role of an ITS-S router, or an ITS-S host, or a combined ITS-S host and router and where the ITS test system simulates such an ITS-SCU at the ITS station-internal network.

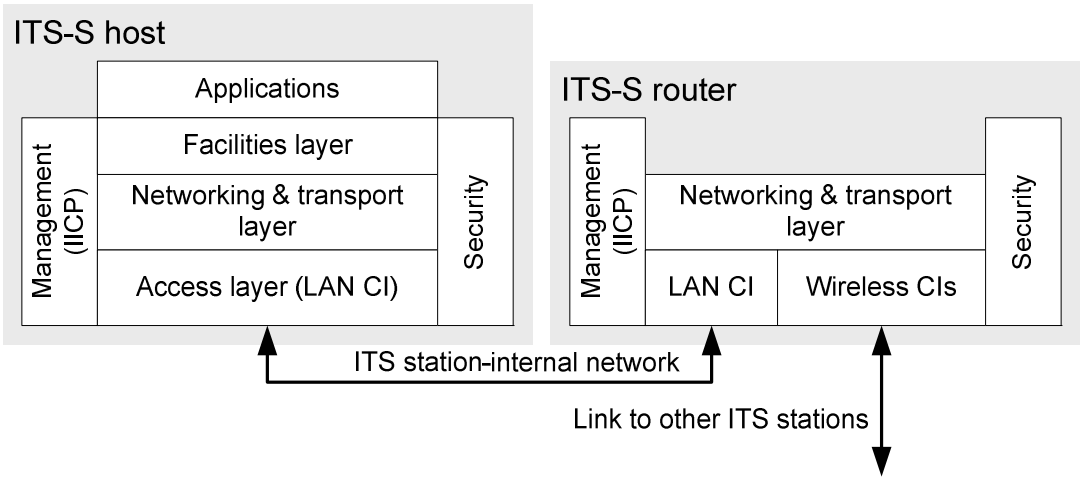


Figure 7: Test configuration CF01 architecture

This configuration is used in the cases listed below TS 102 797-2 [4]:

- ITS-S station internal-network PICS (PICS_S_INW) is set to true.
- Either one of the roles PICS (PICS_ROLE_RH, PICS_ROLE_RONLY, PICS_ROLE_HONLY) is set to true.

6.3 Test architecture

The present document implements the general TTCN-3 test architecture described in EG 202 798 [i.4], clauses 6.3.2 and 8.3.1.

Figure 8 shows the TTCN-3 test architecture used for the IICP ATS.

- The MTC is of type ItsIICP and communicates with the SUT over iicpPort in order to exchange IICP PDUs between the IICP test component and the IICP IUT. The "ITS lower layers transport" system adapter is used to enable usage of ITS lower layers in the SUT in case the MF-SAP is not directly accessible.
- The MTC communicates with the SUT over the utPort in order to trigger IICP functionalities by simulating primitives from e.g. application entities. It is required to trigger the IICP layer in the SUT to send IICP PDUs, which are resulting from other entities. Furthermore, receiving IICP PDUs may result in notifications to other entities. The "Upper tester transport" system adapter is used to adapt to the upper tester application implementation of the SUT.
- The MTC communicates with the SUT over the cfPort in order to perform settings in the SUT. The "Configuration transport" system adapter is used to adapt to the configuration access implementation of the SUT.

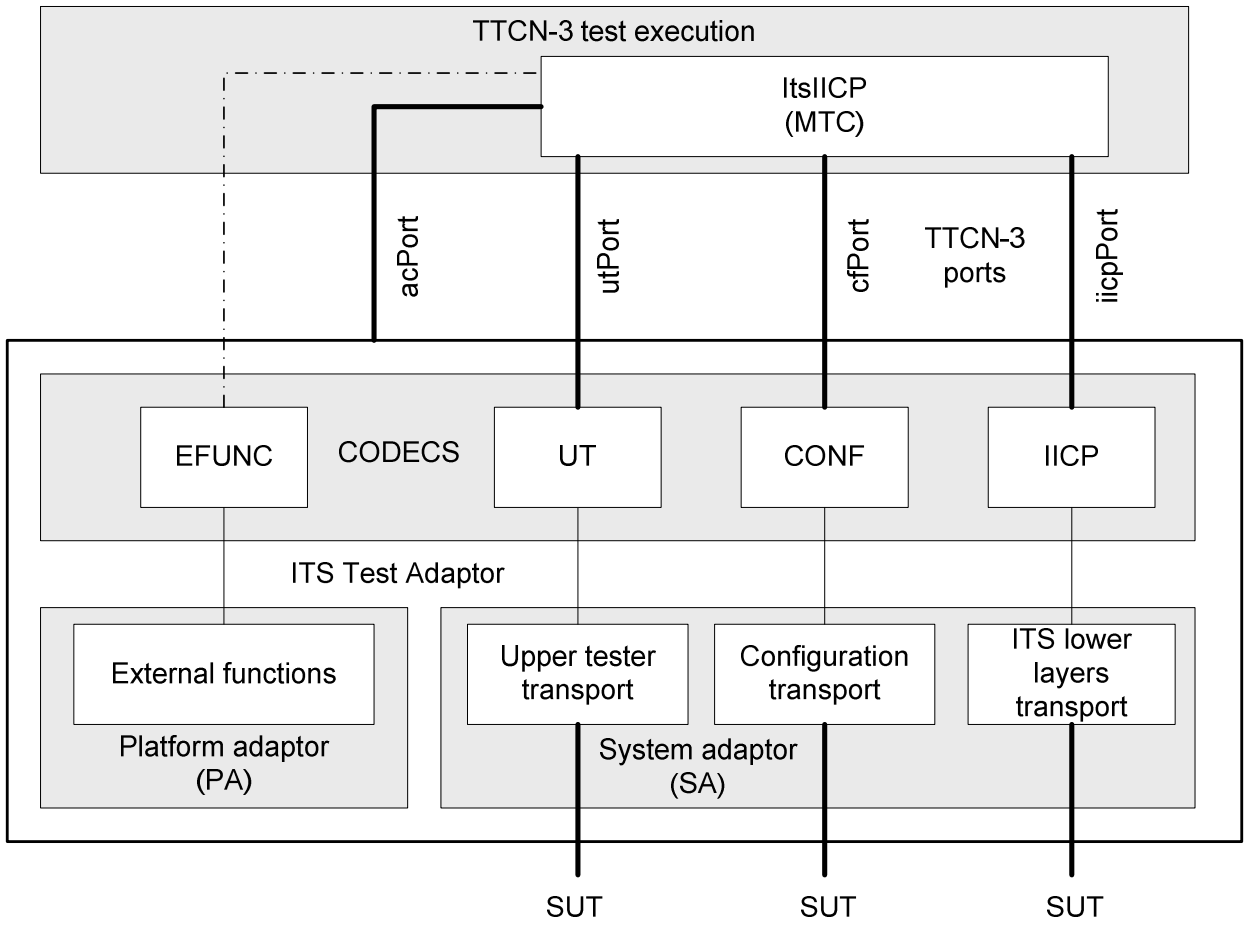


Figure 8: Test system architecture for IICP

6.4 Ports and abstract service primitives

6.4.1 Overview

The following TTCN-3 ports are used by the IICP ATS:

- iicpPort of type IicpPort is used to receive messages from and transmit messages to the IUT (via MF-SAP).
- utPort of type UpperTesterPort is used to receive service message from and transmit service messages to the IUT.
- cfPort of type CfPort is used to configure the IICP (via MF-SAP).

Each of the above ports provides "Abstract Service Primitives" (ASPs) as specified in clauses 6.4.2 and 6.4.3.

6.4.2 ASPs of the iicpPort

Two ASPs are used in the iicpPort:

- The IicpReq primitive used to receive messages of type IIC-Request or IIC-Response sent to the IICA by the IUT.
- The IicpResp primitive used to send messages of type IIC-Request or IIC-Response received from the IUT.

These primitives use IICP types, which are declared in the CALMiitssci module, following the ASN.1 definition from the base standard ISO 24102-4 [1].

6.4.3 ASPs of the utPort

The following ASPs are used in the utPort:

- The UtInitialize primitive is used to initialize IUT.
- The MX-Command-request, MX-Request, MI-Get-request, MI-Set-Request and McmdRq primitives are used to send service primitives.

7 ATS conventions

7.1 Testing conventions

7.1.1 Testing states

7.1.1.1 Initial state

All test cases start with the function f_prInitialState. This function brings the IUT in an "initialized" state by invoking the upper tester primitive UtInitialize.

7.1.1.2 Final state

All test cases end with the function f_poDefault. This function brings the IUT back in an "idle" state. As no specific actions are required for the idle state in the base standards ISO 24102-4 [1] and ISO 24102-5 [2], the function f_poDefault does not invoke any action.

As necessary, further actions may be included in the f_poDefault function.

7.1.2 Message types - ASN.1 definitions

Message types are defined in ASN.1. ASN.1 definitions from the base standards ISO 24102-4 [1] and ISO 24102-5 [2] are directly imported in TTCN-3 using the ASN.1 import method specified in ES 201 873-7 [9].

The following example shows the TTCN-3 import statement used to import ASN.1 definitions from ISO 24102-5 [2] in the TTCN-3 modules:

```
import from CALMfsap language "ASN.1:1997" all;
```

7.2 Naming conventions

7.2.1 General guidelines

This test suite follows the naming convention guidelines provided in EG 202 798 [i.4].

7.2.2 Usage of Log statements

All TTCN-3 log statements use the following format:

- Three asterisks followed by a blank character.
- The TTCN-3 test case or function identifier in which the log statement is defined followed by a colon and a blank character.
- One of the log categories: INFO, WARNING, ERROR, PASS, FAIL, INCONC, TIMEOUT followed by a colon and a blank character.
- Free text.

- A blank character followed by three asterisks.

EXAMPLE 1:

log("*** TC_FSAP_SP_HR_BV_01: INFO: Preamble: IUT was setup properly ***");

Furthermore, the following rules are applied for the Fsap ATS:

- Log statements are used in the body of the functions, so that invocations of functions are visible in the test logs.
- All TTCN-3 setverdict statements are combined with a log statement following the same above rules (see example 2).

EXAMPLE 2:

setverdict(pass, "*** TC_FSAP_SP_HR _BV_01: PASS: SAM transmitted at prescribed periodicity ***");

7.2.3 Test Case (TC) identifier

Table 1 shows the test case naming convention for FSAP ISO 24102-5 [2], which follows the test purposes TS 102 797-2 [4] naming convention.

Table 1: FSAP TC naming conventions

TC_<root>_<gr>_<sgr>_<x>_<nn>		
<root> = root	FSAP	Fast Service Advertisement Protocol
<gr> = group	SP	Service provider
	SU	Service user
<sgr> = sub-group	HR	Combined ITS-S host and ITS-S router
	HO	ITS-S host only
	RO	ITS-S router only
<x> = type of testing	BV	Valid Behaviour tests
	BI	Invalid Syntax or Behaviour Tests
<nn> = sequential number		01 to 99

EXAMPLE 1: TP identifier: TP/FSAP/SP/HR/BV/01
TC identifier: TC_FSAP_SP_HR_BV_01

Table 2 shows the test case naming convention for IICP ISO 24102-4 [1], which follows the test purposes TS 102 797-2 [4] naming convention.

Table 2: IICP TC naming conventions

TC_<root>_<gr>_<x>_<nn>		
<root> = root	IICP	Inter-ITS-SCU communication Protocol
<gr> = group	MGM	Management
	COM	Communication
<x> = type of testing	BV	Valid Behaviour tests
	BI	Invalid Syntax or Behaviour Tests
<nn> = sequential number		01 to 99

EXAMPLE 2: TP identifier: TP/IICP/COM/BV/01
TC identifier: TC_IICP_COM_BV_01

Annex A (normative): Partial PIXIT proforma for FSAP

A.1 Identification summary

Table A.1

PIXIT Number:	
Test Laboratory Name:	
Date of Issue:	
Issued to:	

A.2 ATS summary

Table A.2: Summary

Protocol Specification:	ISO 24102-5 [2]
Protocol to be tested:	FSAP
ATS Specification:	TS 102 797-3
Abstract Test Method:	Clause 5

A.3 Test laboratory

Table A.3: Test laboratory

Test Laboratory Identification:	
Test Laboratory Manager:	
Means of Testing:	
SAP Address:	

A.4 Client identification

Table A.4: Client identification

Client Identification:	
Client Test manager:	
Test Facilities required:	

A.5 SUT

Table A.5: SUT identification

Name:	
Version:	
SCS Number:	
Machine configuration:	
Operating System Identification:	
IUT Identification:	
PICS Reference for IUT:	
Limitations of the SUT:	
Environmental Conditions:	

A.6 Protocol layer information

A.6.1 Protocol identification

Table A.6: Protocol identification

Name:	ISO 24102-5 [2]
Version:	
PICS References:	TS 102 797-1 [3]

A.6.2 IUT information

Table A.7: Fsap Pixits

Identifier	Description	
PX_WL_LOCAL_CIID	**Comment**	Identifies the CI on ITS-S host
	Type	EUI64
	Def. value	'03000AFFFFFF0000'O
PX_SRC_REMOTE_CIID	**Comment**	Identifies the VCI on ITS-S host
	Type	EUI64
	Def. value	'FF000AFFFFFFFFFF'O
PX_APP_PORT_NUMBER	**Comment**	The service provider ITS station
	Type	PortNumber
	Def. value	12345
PX_LOCAL_PORT_NUMBER	**Comment**	The service provider ITS station
	Type	PortNumber
	Def. value	55555
PX_REMOTE_PORT_NUMBER	**Comment**	The service provider ITS station
	Type	PortNumber
	Def. value	5556
PX_ITS_AID	**Comment**	The globally unique ITS-AID of the ITS-S application
	Type	ITSaid
	Def. value	{ content := 8 }
PX_SERVER_ID	**Comment**	The globally unique ITS-AID of the ITS-S application
	Type	StationID
	Def. value	'11111111'O
PX_IUT_ID	**Comment**	The globally unique ITS-AID of the ITS-S application
	Type	StationID
	Def. value	'00003930'O
PX_UNKNOWN_ITS_AID	**Comment**	An unknown ITS-AID of the ITS-S application
	Type	ITSaid
	Def. value	{ content := 126 }
PX_SESSION_PORT	**Comment**	A session port value
	Type	PortNumber
	Def. value	{ portLong := 7896 }
PX_NO_SESSION_PORT	**Comment**	An unspecified session port value
	Type	PortNumber
	Def. value	{ portLong := c_unknown_portLong }
PX_UNKNOWN_SESSION_PORT	**Comment**	An unknown session port value
	Type	PortNumber
	Def. value	{ portLong := 1234 }
PX_APPLICATION_ID	**Comment**	ITS application object ID (ITS-AID) for GCregServer MF-REQUEST
	Type	ApplicationID
	Def. value	{ hostITS_scuId := 1, seqNumber := { itsaid := PX_ITS_AID, instance := 1, flowNo := 0 } }

Identifier	Description	
PX_CLIENT_APPLICATION_ID	**Comment**	ITS application object ID (ITS-AID) for GCregClient MF-REQUEST
	Type	ApplicationID

	Def. value	{
		hostITS_scuId := 2,
		seqNumber := {
		itsaid := PX_ITS_AID,
		instance := 1,
		flowNo := 0
		}
		}

PX_GSCHED_ACCESS_TECH_NONIP	**Comment**	Scheduling information for registration / deregistration request in order to select the proper VCI in the ITS-station for communication 'medium' field indicates a request of specific access technology
	Type	GCsched

	Def. value	{
		medium := c_medType_iso21215,
		directivity := {
		mode := 0,
		dirPredef := 0,
		fill := '0000000'B,
		dirVar := { }
		}, // End of field 'directivity'
		gcInterval :=
		float2int(PICS_SAM_RETRANSMIT_TIMER)
		}

PX_GSCHED_LOG_PERIOD_TIME_ACCESS_TECH_NONIP	**Comment**	Scheduling information for registration / deregistration request in order to select the proper VCI in the ITS-station for communication 'medium' field indicates a request of an unknown access technology
	Type	GCsched

	Def. value	{
		medium := 254,
		directivity := {
		mode := 0,
		dirPredef := 0,
		fill := '0000000'B,
		dirVar := { }
		}, // End of field 'directivity'
		gcInterval := 3000
		}

PX_GSCHED_NONIP	**Comment**	Scheduling information for registration / deregistration request in order to select the proper VCI in the ITS-station for communication 'medium' field indicates no request of specific access technology
	Type	GCsched

	Def. value	{
		medium := c_medType_any,
		directivity := {
		mode := 0,
		dirPredef := 0,
		fill := '0000000'B,
		dirVar := { }
		}, // End of field 'directivity'
		gcInterval :=
		float2int(PICS_SAM_RETRANSMIT_TIMER)
		}

Identifier	Description	
PX_SERVICE_DATA_REG_WITH_NO_SESSION_PHASE	**Comment**	Receive template for advertisement details with no session phase
	Type	ServiceDataReg

	Def. value	{
		fill := '0000000'B,
		datareg := {
		nonipData := {
		serviceID := PX_ITS_AID,
		serviceData := ''O,
		providerPort :=
		PX_NO_SESSION_PORT
		}
		}

PX_SERVICE_DATA_REG_WITH_SESSION_PHASE_AND_CHANNEL_CHANGE	**Comment**	Receive template for advertisement details with session phase
	Type	ServiceDataReg

	Def. value	{
		fill := '0000000'B,
		datareg := {
		nonipData := {
		serviceID := PX_ITS_AID,
		serviceData := ''O,
		providerPort :=
		PX_SESSION_PORT
		}
		}

PX_NO_IP_SERVICE_WITH_NO_SESSION_AND_NO_CHANGE_CHANNEL	**Comment**	Non-IP information on services offered, with no session phase and no channel change requested
	Type	ServiceDataReg

	Def. value	{
		serviceID := PX_ITS_AID,
		timeout_ := 100,
		serviceData := ''O,
		providerPort :=
		PX_NO_SESSION_PORT ,
		sessionChannel :=
		PX_NO_SESSION_CHANNEL
		}

PX_NO_IP_SERVICE_WITH_SESSION_AND_NO_CHANGE_CHANNEL	**Comment**	Non-IP information on services offered, with session phase and no channel change requested
	Type	NonipService

	Def. value	{
		serviceID := PX_ITS_AID,
		timeout_ := 100,
		serviceData := ''O,
		providerPort :=
		PX_SESSION_PORT
		}

PX_NO_IP_SERVICE_WITH_SESSION_AND_CHANNEL_CHANGE	**Comment**	Non-IP information on services offered, with no session phase and channel change requested
	Type	NonipService

	Def. value	{
		serviceID := PX_ITS_AID,
		
		serviceData := ''O,
		providerPort :=
		PX_SESSION_PORT
		}

Identifier	Description	
PX_NO_IP_SERVICE_WITH_UNKNOWN_SERVICE_ID	**Comment**	Non-IP information on an unknown services offered, with session phase and no channel change requested
	Type	NonipService

	Def. value	{
		serviceID := PX_UNKNOWN_ITS_AID,
		serviceData := 'O,
		providerPort := PX_SESSION_PORT,
		sessionChannel := 1
		}

PX_NO_IP_SERVICE_WITH_UNKNOWN_CHANNEL	**Comment**	Non-IP information on services offered, with session phase and channel change requested on an unknown channel
	Type	NonipService

	Def. value	{
		serviceID := PX_ITS_AID,
		serviceData := 'O,
		providerPort := PX_UNKNOWN_SESSION_PORT,
		sessionChannel := PX_SESSION_CHANNEL
		}

PX_FMTID_SAM	**Comment**	SAM tag identifier
	Type	FmtID
	Def. value	0
PX_FMTID_CTX	**Comment**	CTX tag identifier
	Type	FmtID
	Def. value	1
PX_VERSION_FSAP	**Comment**	FSAP version number
	Type	VersionFSAP
	Def. value	0

Table A.8: Configuration Pixits (cfPort)

Identifier	Description	
PX_SRC_ITS_SCU_ID	**Comment**	ITS-SCU-ID of the source ITS-SCU which produces the request
	Type	ITS_scuId
	Def. value	8
PX_DST_ITS_SCU_ID	**Comment**	ITS-SCU-ID of the destination ITS-SCU which shall evaluate the request
	Type	ITS_scuId
	Def. value	9
PX_HOST_SCU_ID	**Comment**	ITS-SCU-ID of the host ITS-SCU
	Type	ITS_scuId
	Def. value	7
PX_HOST_CIID	**Comment**	Host CI identifier
	Type	CIID
	Def. value	0
PX_REMOTE_PORT	**Comment**	Indicate the remote port number
	Type	PortNumber
	Def. value	0
PX_USER_PRIORITY	**Comment**	The user priority as specified in ISO 21218 [i.3]
	Type	UserPriority
	Def. value	0

Annex B (normative): Partial PIXIT proforma for IICP

B.1 Identification summary

Table B.1

PIXIT Number:	
Test Laboratory Name:	
Date of Issue:	
Issued to:	

B.2 ATS summary

Table B.2: Summary

Protocol Specification:	ISO 24102-4 [1]
Protocol to be tested:	IICP
ATS Specification:	TS 102 797-3
Abstract Test Method:	Clause 6

B.3 Test laboratory

Table B.3: Test laboratory

Test Laboratory Identification:	
Test Laboratory Manager:	
Means of Testing:	
SAP Address:	

B.4 Client identification

Table B.4: Client identification

Client Identification:	
Client Test manager:	
Test Facilities required:	

B.5 SUT

Table B.5: SUT identification

Name:	
Version:	
SCS Number:	
Machine configuration:	
Operating System Identification:	
IUT Identification:	
PICS Reference for IUT:	
Limitations of the SUT:	
Environmental Conditions:	

B.6 Protocol layer information

B.6.1 Protocol identification

Table B.6: Protocol identification

Name:	ISO 24102-4 [1]
Version:	
PICS References:	TS 102 797-1 [3]

B.6.2 IUT information

Table B.7: IICP Pixits

Identifier	Description	
PX_ACTIVE_VCI_LINK_ID	**Comment**	Defines the active CI link identifier
	Type	Link_ID

	Def. value	{
		remoteCIID := '0000000000000000'O,
		localCIID := '0000000000000000'O
		}

PX_PDU_REQUEST_FILL_FIELD_VALUE	**Comment**	Defines the value to set to fill field for PduRequest field
	Type	Bit4
	Def. value	'0000'B
PX_SRC_ITS_SCU_ID	**Comment**	ITS-SCU-ID of the source ITS-SCU which produces the request
	Type	ITS_scuId
	Def. value	5
PX_DST_ITS_SCU_ID	**Comment**	ITS_SCUtype of the source ITS-SCU which produces the request
	Type	ITS_SCUtype
	Def. value	0
PX_LOCAL_ITS_SCU_ID	**Comment**	The own ITS scuID
	Type	ITS_scuId
	Def. value	8
PX_LOCAL_ITS_TYPE	**Comment**	The type ITS scuID
	Type	ITS_SCUtype
	Def. value	1
PX_HOST_SCU_ID	**Comment**	Host ITS-SCU-ID
	Type	ITS_scuId
	Def. value	0
PX_TALIVE	**Comment**	Alive timer
	Type	Talive
	Def. value	100
PX_MI_RCMD_STATECINOTIFY	**Comment**	MI-Command value used for IICP/COM/xx TPs
	Type	MI_Command

	Def. value	{
		fill := PX_PDU_REQUEST_FILL_FIELD_VALUE,
		miCmd := {
		wakeUp := 10
		}
		}

PX_MN_RCMD_STATECINOTIFY	**Comment**	MN-Command value used for IICP/COM/xx TPs
	Type	MN_Command

	Def. value	{
		fill := '00000'B,
		mnCmd := {
		fWTdelete := {
		fill := '0000000'B,
		delete := {
		fntp := {
		reference := 10
		}
		}
		}
		}
		}

Identifier	Description	
PX_MN_RCMD_FWYSETNOTIFY	**Comment**	MN-Request value used for IICP/COM/xx TPs
	Type	MN_Request

	Def. value	{
		fill := '00000'B,
		mnReq := {
		fWTsetNot := {
		fill := '0000000'B,
		setNot := {
		fast := {
		reference := 0,
		remotePort := {
		portShort := 0
		},
		linkID := {
		remoteCIID := '0000000000000000'O,
		localCIID := '0000000000000000'O
		},
		ciStatus := 0,
		linkPort := {
		portShort := 0
		},
		serviceInfo := {
		servicePort := {
		portShort := 0
		},
		hostITSscu := 0,
		servicePriority := 0
		},
		priority := 0,
		timeout_ := 0
		}
		}
		}
		}
		}

PX_MI_RCMD_REGTYPE	**Comment**	MI-Request value used for IICP/COM/xx TPs
	Type	MI_Request

	Def. value	{
		fill := '0000'B,
		miReq := {
		regReq := {
		medType := MedType_iso17515_
		}
		}
		}

PX_MF_RCMD_STATECINOTIFY	**Comment**	MF-Command value used for IICP/COM/xx TPs
	Type	MF_Command

	Def. value	{
		fill :=
		PX_PDU_REQUEST_FILL_FIELD_VALUE,
		mfCmd := {
		stateCInotify := {
		linkId := {
		remoteCIID := '0000000000000000'O,
		localCIID := '0000000000000000'O
		},
		cIstatus := 8
		}
		}
		}

Identifier	Description	
PX_MF_RCMD_LDM_REGISTER	**Comment**	MF-Command value used for IICP/COM/xx TPs
	Type	MF_Request

	Def. value	{
		fill :=
		PX_PDU_REQUEST_FILL_FIELD_VALUE,
		mfReq := {
		lDMregister := {
		iTS_scuId := 0,
		reference := "O
		}
		}
		}

PX_MI_IPARAMNOLIST	**Comment**	List of reference number of parameter to be monitored
	Type	IParamNoList

	Def. value	{
		0, // AuxiliaryChannel
		1 // ControlChannel
		}

PX_MI_IPARAMLIST	**Comment**	List of error status for each parameter to be monitored
	Type	IParamList

	Def. value	{
		{
		fill := '00'B,
		param_ := {
		errors := {
		{
		paramNo := 0,
		fill := '0000000'B,
		med := { },
		errStatus := 0
		}
		}
		}
		}
		}

PX_MI_ERRORSLIST	**Comment**	List of errors
	Type	ErrorsList

	Def. value	{
		{
		{
		paramNo := 0,
		fill := '0000000'B,
		med := { },
		errStatus := 0
		}
		}
		}

PX_IIC_RESPONSE	**Comment**	Error status in response of MF-REQUEST.request service primitive
	Type	MF_Request_confirm

	Def. value	{
		commandRef := 1,
		reqConfirm := {
		fill := '0000'B,
		mfReqConf := {
		lDMregister := 0
		}
		},
		errStatus := 0
		}

Annex C (normative): TTCN-3 library modules

C.1 Electronic annex, zip file with TTCN-3 code

This ATS has been produced using the Testing and Test Control Notation (TTCN) according to ES 201 873-1 [8]. The ATS was developed on a TTCN-3 software tool. This test suite has been compiled error-free using three different commercial TTCN-3 compilers.

The TTCN-3 library modules, which form parts of the present technical standard, are contained in archive ts_10279703v010201p0.zip which accompanies the present document.

C.2 Extensions of Architecture of conformance validation framework

Validation of this ATS required some enhancement of the Architecture of conformance validation framework, TR 103 099 [i.5].

C.2.1 Test Adapter

A configuration port was added to monitor notification on MX-SAP.

C.2.2 Lower Tester

Figure C.1 presents the simplified class diagram of the test adapter. For better readability, auxiliary classes such as factories are not represented.

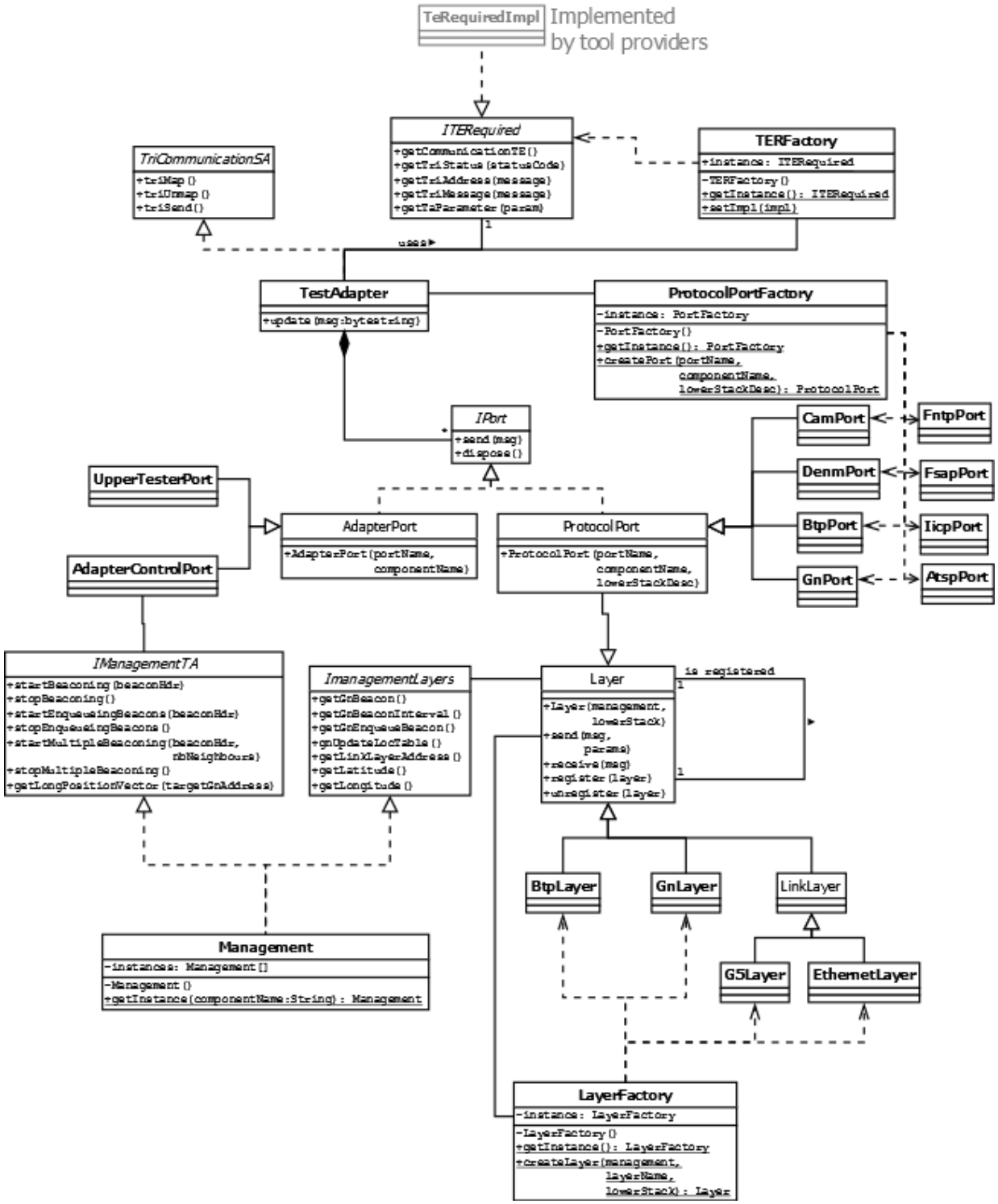


Figure C.1: Test Adapter class diagram

Currently the following layers have been implemented:

- FntpLayer: basic functionalities of FNTP layer
- FsapLayer: basic functionalities of FSAP layer, including SAM transmission in case of service user role
- IicpLayer: basic functionalities of IICP protocol layer
- AtspLayer: basic functionalities of ATSP layer

The following AC primitives are used to control the dynamic configuration of the various layers:

AC Primitive	Description
startSamTransmission	Requests Test Adapter to start SAM transmission
stopSamTransmission	Requests Test Adapter to stop SAM transmission

C.2.3 Dispatcher

The dispatcher is used to organize the connection between the ports of the test system and the IICP port of the IUT. It offers three communication ports to the test system:

- UT port
- LT port
- CF port

The communication with the IUT is handled by a single port using IICP protocol [1].

Incoming messages from UT, LT or CF ports are encapsulated into IICP message frames and forwarded to the IUT via the IICP port.

Messages received via IICP port are partly analysed and the contained payload is forwarded to one of the three test system ports depending on the configuration and the IICP message identifier.

C.2.4 Codecs source code

The software modules are contained in archive AnnexC_Codec.zip which is included in archive ts_10279703v010201p0.zip which accompanies the present document.

C.2.5 Test Adapter source code

The software modules are contained in archive AnnexC_Adapter.zip which is included in archive ts_10279703v010201p0.zip which accompanies the present document.

C.2.6 Dispatcher source code

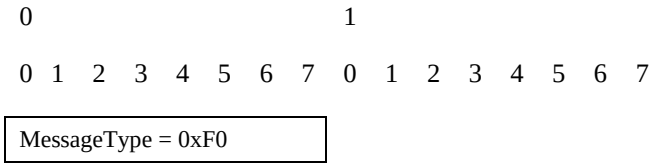
The software modules are contained in archive AnnexC_Dispatcher.zip which is included in archive ts_10279703v010201p0.zip which accompanies the present document.

C.3 Upper Tester message format

C.3.1 FNTP Upper Tester Primitives

C.3.1.1 FntpInitialize

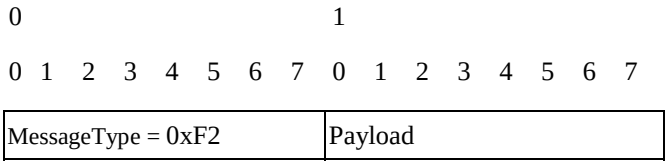
This message is used to request initialization of FNTP implementation.



Name	Length	Value
MessageType	1 byte	0xF0
Settings	3 bytes	

C.3.1.2 FntpPortCreationRequest

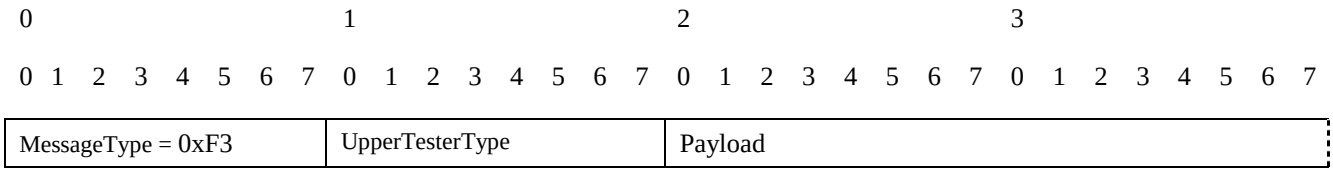
This message is used to request FNTP to create a new port/socket (see ISO 29281-1:2013 [i.6], clause 8.2.1).



Name	Length	Value
MessageType	1 byte	0xF2
Payload	Variable	Packet's final payload

C.3.1.3 FntpPortCreationConfirm

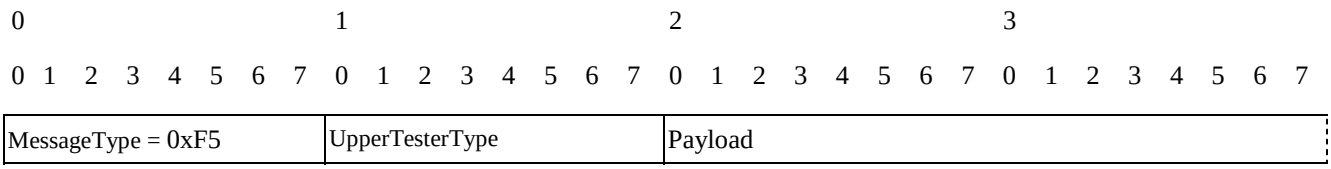
This message is sent by FNTP to confirm the creation of a new port/socket (see ISO 29281-1:2013[i.6], clause 8.2.2).



Name	Length	Value
MessageType	1 byte	0xF3
UpperTesterType	1 byte	0xFD if the vendor upper tester uses IICP protocol as described in ISO 24102-4 [1], 0xFE otherwise
Payload	Variable	Packet's final payload

C.3.1.4 FntpForwardTableNotification

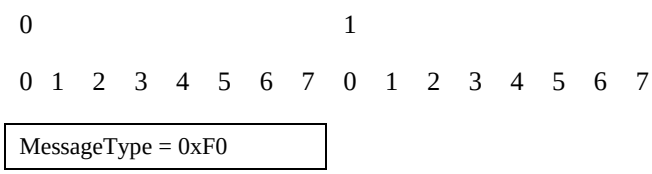
This message is sent FNTP to the ITS Management layer to notify it that a new port/socket was created (see ISO 24102-3 [i.1], clause E.2.3).



Name	Length	Value
MessageType	1 byte	0xF5
UpperTesterType	1 byte	0xFD if the vendor upper tester uses IICP protocol as described in ISO 24102-4 [1], 0xFE otherwise
Payload	Variable	Packet's final payload

C.3.2 FSAP Upper Tester Primitives - FsapInitialize

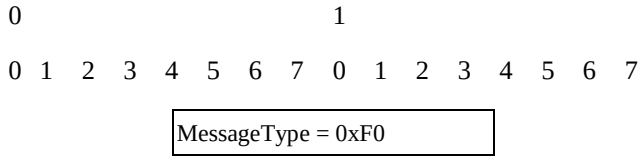
This message is used to request initialization of FSAP implementation.



Name	Length	Value
MessageType	1 byte	0xF0
Settings	3 bytes	

C.3.3 IICP Upper Tester Primitives - IicpInitialize

This message is used to request initialization of FSAP implementation.



Name	Length	Value
MessageType	1 byte	0xF0
Settings	3 bytes	

History

Document history		
V1.1.1	August 2012	Publication
V1.2.1	June 2014	Publication