

# ETSI TS 186 005-3 V1.1.1 (2008-09)

*Technical Specification*

## **Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Terminating Identification Presentation (TIP) and Terminating Identification Restriction (TIR); Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification**

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## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

The present document is part 3 of a multi-part deliverable covering Terminating Identification Presentation (TIP) and Terminating Identification Restriction (TIR), as identified below:

- Part 1: "Protocol Implementation Conformance Statement (PICS)";
- Part 2: "Test Suite Structure and Test Purposes (TSS&TP)";
- Part 3: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".**

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# 1 Scope

The present document specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma based on the Test suite Structure and Test purposes defined in TS 186 005-2 [22].

The TSS&TP have been developed to test the Terminating Identification Presentation (TIP) and Terminating Identification Restriction (TIR) PSTN/ISDN simulation services.

The test notation used in the ATS is TTCN-3 (ES 201 873-1 [5]).

The following test specification and design considerations can be found in the body of the present document:

- the overall test suite structure;
- the testing architecture;
- the test methods and port definitions;
- the test configurations;
- the design principles, assumptions, and used interfaces to the TTCN3 tester (System Simulator);
- TTCN styles and conventions;
- the partial PIXIT proforma;
- the modules containing the TTCN-3 ATS.

Annex A provides the Partial Implementation Extra Information for Testing (IXIT) Proforma of the ATS.

Annex B provides the Testing and Test Control Notation (TTCN-3) part of the ATS.

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# 2 References

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## 2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI TS 186 002-4: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control Protocol (BICC) or ISDN User Part (ISUP); Part 4: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) for Profile A and B".
- [2] ETSI EN 383 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control (BICC) Protocol or ISDN User Part (ISUP) [ITU-T Recommendation Q.1912.5, modified]".
- [3] ETSI TS 102 027-3 (V3.1.1): "Methods for Testing and Specification (MTS); Conformance Test Specification for SIP (IETF RFC 3261); Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma".
- [4] ETSI TS 102 351 (V2.1.1): "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT); IPv6 Testing: Methodology and Framework".
- [5] ETSI ES 201 873-1 (V3.1.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".
- [6] ETSI ES 201 873-5 (V3.1.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 5: TTCN-3 Runtime Interface (TRI)".
- [7] ETSI ES 201 873-6 (V3.1.1): "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 6: TTCN-3 Control Interface (TCI)".
- [8] ISO/IEC 9646-1 (1992): "Information Technology - Open Systems Interconnection - Conformance Testing Methodology and Framework - Part 1: General concepts".
- [9] ISO/IEC 9646-7 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [10] ITU-T Recommendation Q.1912.5 (2004): "Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control protocol or ISDN User Part".
- [11] ITU-T Recommendation Q.2150.1 (2001): "Signalling Transport Converter on MTP3 and MTP3b".
- [12] ITU-T Recommendation E.164 (2005): "The international public telecommunication numbering plan".
- [13] ITU-T Recommendation Q.761 (2000): "Signalling System No. 7 - ISDN User Part functional description".
- [14] ITU-T Recommendation Q.762 (2000): "Signalling System No. 7 - ISDN User Part general functions of messages and signals".
- [15] ITU-T Recommendation Q.763 (2000): "Signalling System No. 7 - ISDN User Part formats and codes".
- [16] ITU-T Recommendation Q.764 (2000): "Signalling System No. 7 - ISDN User Part signalling procedures".
- [17] ITU-T Recommendation Q.9: "Vocabulary of switching and signalling terms".
- [18] IETF RFC 3261 (2002): "SIP: Session Initiation Protocol".
- [19] IETF RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax".

- [20] IETF RFC 2617 (1999): "HTTP Authentication: Basic and Digest Access Authentication".
- [21] IETF RFC 2806 (2000): "URLs for Telephone Calls".
- [22] ETSI TS 186 005-2: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); Terminating Identification Presentation (TIP) and Terminating Identification Restriction (TIR); Part 2: Test Suite Structure and Test Purposes (TSS&TP)".

## 2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Not applicable.

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions from the following list of documents apply:

- terms defined in SIP/ISUP interworking reference specification [2],
- terms defined in ISDN User Part (ISUP) reference specification [13] to [16],
- terms defined in ISO/IEC 9646-1 [8] and ISO/IEC 9646-7 [9], and
- terms defined in ES 201 873-1 [5] (TTCN-3).

In particular, the following terms apply:

**Abstract Test Case (ATC):** complete and independent specification of the actions required to achieve a specific test purpose, defined at the level of abstraction of a particular Abstract Test Method, starting in a stable testing state and ending in a stable testing state

**Abstract Test Method (ATM):** description of how an IUT is to be tested, given at an appropriate level of abstraction to make the description independent of any particular realization of a Means of Testing, but with enough detail to enable abstract test cases to be specified for this method

**Abstract Test Suite (ATS):** test suite composed of abstract test cases

**address identity:** See ITU-T Recommendation E.164 [12] or/and RFC 2806 [21].

**call:** See ITU-T Recommendation Q.9 [17], definition 2201.

**call state:** state as defined in clause 2.1 of the present document, for either the user side or network side as appropriate

NOTE: A call state may exist for each call reference value (and at the network side for each additional responding CEI in the incoming call states).

**identity information:** includes all the information (RFC 2806 [21]/RFC 2396 [19]/ITU-T Recommendation E.164 [12]) identifying a user, including trusted (network generated) and/or untrusted (user generated) addresses

**Implementation Under Test (IUT):** implementation of one or more OSI protocols in an adjacent user/provider relationship, being part of a real open system which is to be studied by testing

**SIP number:** number conforming to the numbering and structure specified in ITU-T Recommendation E.164 [12]

**Means of Testing (MOT):** combination of equipment and procedures that can perform the derivation, selection, parameterization and execution of test cases, in conformance with a reference standardized ATS, and can produce a conformance log

**PICS proforma:** document, in the form of a questionnaire, which when completed for an implementation or system becomes the PICS

**PIXIT proforma:** document, in the form of a questionnaire, which when completed for the IUT becomes the PIXIT

**Point of Control and Observation:** point within a testing environment where the occurrence of test events is to be controlled and observed, as defined in an Abstract Test Method

**Pre-test condition:** setting or state in the IUT which cannot be achieved by providing stimulus from the test environment

**Protocol Implementation Conformance Statement (PICS):** statement made by the supplier of a protocol claimed to conform to a given specification, stating which capabilities have been implemented

**Protocol Implementation eXtra Information for Testing (PIXIT):** statement made by a supplier or implementor of an IUT (protocol) which contains or references all of the information related to the IUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the IUT

**supplementary service:** service that modifies or supplements a basic Telecommunication service

**System Under Test (SUT):** real open system in which the IUT resides

**trusted identity:** network generated user address information

**untrusted identity:** user generated user address information

**voice session:** existing voice connection between two terminal equipments

EXAMPLE: Via RTP.

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in table 2/Q.762 of ITU-T Recommendation Q.762 [14] (ISUP messages) and the following apply:

NOTE: Abbreviations have been used both in the present document and in the TTCN-3 library modules (annex B).

ASP Abstract Service Primitive

NOTE: Exchanged between entities inside the TS or between the user of the ATS (operator) and the TS.

ATC	Abstract Test Case
ATM	Abstract Test Method
ATM	Asynchronous Transfer Mode
ATS	Abstract Test Suite
BCI	Backward Call Indicators
CIC	Circuit Identification Code
CN	Core Network
CS	Circuit Switched
DSS1	Digital Subscriber System No. 1
FCI	Forward Call Indicators
TIP	Terminating Identification Presentation
TIR	Terminating Identification Restriction
IETF	Internet Engineering Task Force
IM	IP Multimedia
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
IUT	Implementation Under Test
IWU	Interworking Unit
LLC	Low Layer Compatibility
LT	Lower Tester
MOT	Means Of Testing



MTC	Main Test Component
MTP	Message Transfer Part
NCI	Nature of Connection Indicators
NGN	Next Generation Network
NNI	Network-network interface
PCO	Point of Control and Observation
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PSTN	Public Switch Telephone Network
PTC	Parallel Test Component
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SN	Signalling Node
STC	Signalling Transport Converter

NOTE According to ITU-T Recommendation Q.2150.1 [11].

SUT	System Under Test
TC	Test Case
TCI	TTCN-3 Control Interface
TCP	Test Coordination Procedures
TD	Test Description
TE	Test Equipment
TISPAN	ETSI technical body with responsibility for NGN standardization
TMR	Transmission Medium Requirement
TP	Test Purpose
TS	Test System
TSS	Test Suite Structure
TSS&TP	Test Suite Structure and Test Purposes
TTCN	Tree and Tabular Combined Notation
TTCN-3	Testing and Test Control Notation edition 3
UE	User Equipment

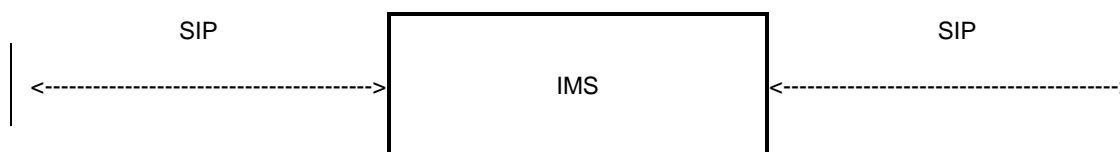
## 4 Abstract Test Method (ATM)

### 4.1 Network architecture

Two different network configurations have been assumed in the scope of the test purpose description defined in TS 186 005-2 [22], SIP-SIP and SIP-ISUP. The test purposes from the latter configuration are also covered in TS 186 002-4 [1]; they have been adopted and integrated to the present document and its related TTCN-3 test code specification.

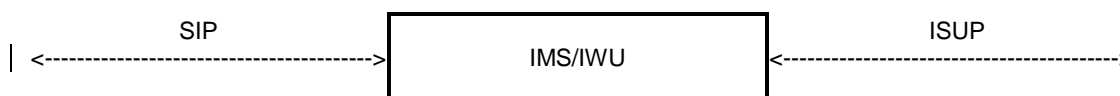
Figures 1 and 2 show the network architecture for SIP-SIP and SIP-ISUP configuration.

Figure 1 shows the network architecture for SIP-SIP UE Interworking.



**Figure 1: Interworking between two SIP UEs**

Figure 2 shows the network architecture for SIP-ISUP Interworking.



**Figure 2: Interworking between SIP and ISUP**

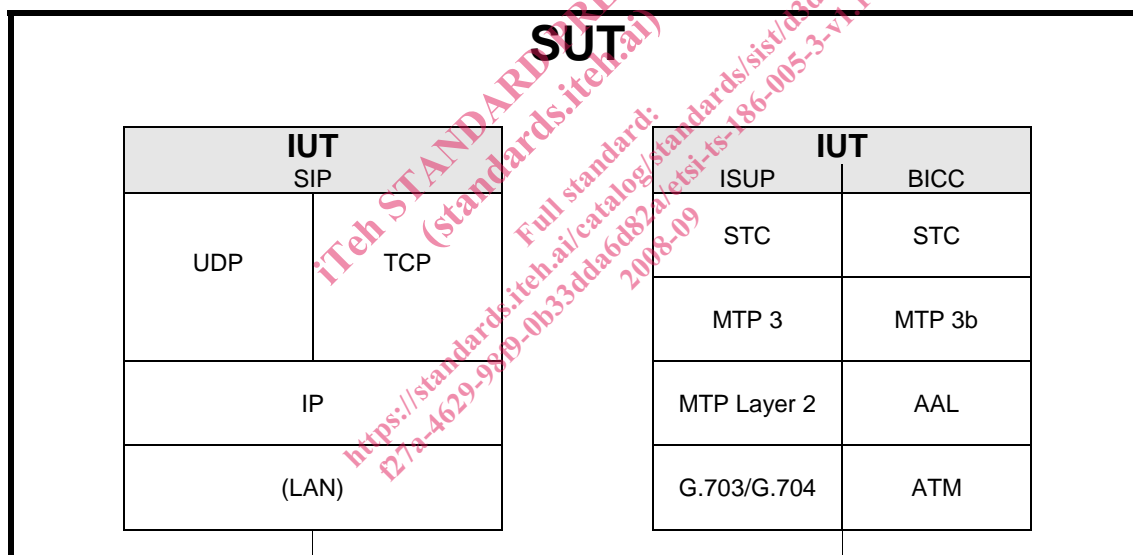
## 4.2 Protocol architecture

Figures 1 and 2 show that there are two configurations of the SUT (representing the SUT in the testing environment described in the present document): a SIP UE interface and either a second SIP UE or an ISUP interface or BICC interface.

Since the ISUP and BICC protocols are very similar (the latter one being derived from ISUP), they are treated here as one protocol.

NOTE: No signalling is used within the SIP-ISUP-Interworking ATS to control the ATM bearer in case of BICC (ASPs are used).

Figure 3 shows the protocol architecture regarding the two interfaces.



**Figure 3: Protocol architecture of the SIP and ISUP interfaces**

## 4.3 Test architecture

### 4.3.1 Interconnection of TS and SUT

Figure 4 shows the interconnection of TS and SUT in terms of signalling message flows.

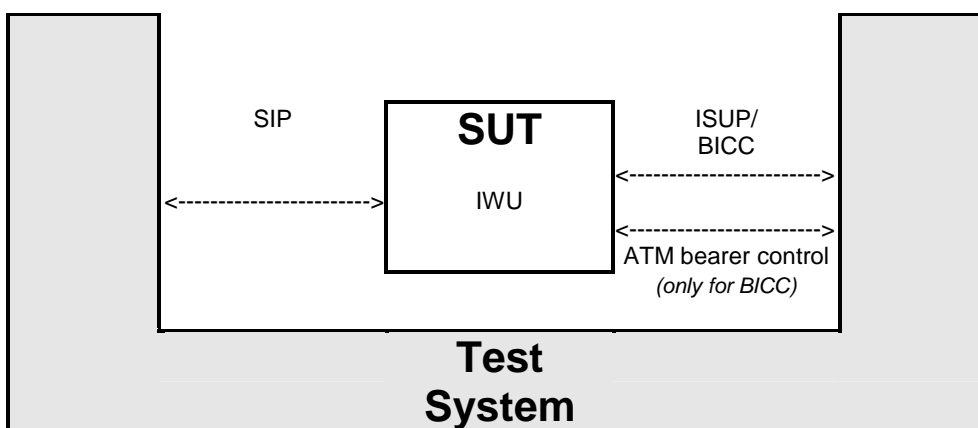


Figure 4: Interconnection of TS and SUT

## 4.3.2 Test system architecture

### 4.3.2.1 General

Test systems that implement this ATS shall conform to the requirements as defined in this clause.

### 4.3.2.2 Structure

An abstract architecture for a test system (TS) implementing a TTCN-3 ATS is displayed in figure 5 and also stated in ES 201 873-5 [6].

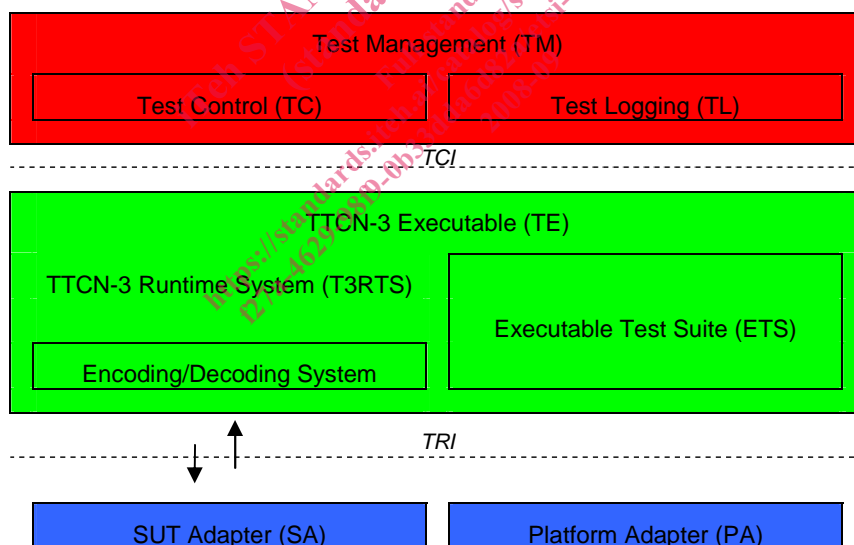


Figure 5: Abstract Test System Architecture

A TS has two interfaces, the TTCN-3 Control Interface (TCI) and the TTCN-3 Runtime Interface (TRI), which specify the interface between Test Management (TM) and TTCN-3 Executable (TE) entities, and TE, SUT Adapter (SA) and Platform Adapter (PA) entities, respectively. Out of these two interfaces the TRI has been standardized in ES 201 873-5 [6], whereas the specification and implementation of the TCI is in ES 201 873-6 [7].

The part of TS that deals with interpretation and execution of TTCN-3 modules, i.e. the Executable Test Suite (ETS), is shown as part of the TTCN-3 Executable (TE). This ETS corresponds either to the executable code produced by a TTCN-3 compiler or a TTCN-3 interpreter from the TTCN-3 ATS in a TS implementation. The remaining part of the TS, which deals with any aspects that cannot be concluded from information being present in the TTCN-3 ATS alone, can be decomposed into Test Management (TM), SUT Adapter (SA), and Platform Adapter (PA) entities. In general, these entities cover a TS user interface, test execution control, test event logging, communication of test data with the SUT, and timer implementation.