



**SLOVENSKI STANDARD**  
**SIST EN 301 070-3 V1.1.2:2005**  
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8 [[ ]HJbc`ca fYy`Y`n`]bhY[ f]fUb]a ]g]cf]h] Ua ]`f]G8 BŁĚ`G][ bU]nUWY`U`yH`+`Ě  
 A YXgYVc`bc`j`d`]j Ub`Y`a YX`f`Y`h`c`f`Un`] ]WŁ`=G8 B!i dcfUWb]y`\_Y[ UXY`U`f]G] DŁ`]b  
 Ud`\_]`UW]g`\_ja`XY`ca` ]bhY`][ Yb]bY[ Uca fYy`U`f]B5 DŁĚ`' "XY`.'N[ fUXVUdfYg\_i`y`U`bY[ U  
 b]nU]b`b]La Yb`dfYg\_i`y`Ub`U`f]HGG`/ HDŁĚ`GdYW]Z`\_UW]U

Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 interactions with the Intelligent Network Application Part (INAP); Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification

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# ETSI EN 301 070-3 V1.1.2 (2000-11)

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*European Standard (Telecommunications series)*

**Integrated Services Digital Network (ISDN);  
Signalling System No.7;  
ISDN User Part (ISUP) version 3 interactions  
with the Intelligent Network Application Part (INAP);  
Part 3: Test Suite Structure and  
Test Purposes (TSS&TP) specification**

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## Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 3 of a multi-part EN covering the interactions between ISDN User Part (ISUP) version 3 and Intelligent Network Application Part (INAP) in the scope of IN Capability Set 1 (CS1), as identified below:

- Part 1: "Protocol specification [ITU- Recommendation Q.1600 (1997), modified]";
- Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";
- Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification";**
- Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".

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## 1 Scope

The present document contains the validation (conformance) test specification for the interaction between ISUP v3 and INAP CS1 defined in [1]. The present document applies only to exchanges having implemented the ISUP v3 protocol specification in the call control function (CCF) and the INAP CS1 in the service switching function (SSF) of the exchange. It is applicable for validation testing of all types of exchanges as defined in the ISUP v3 protocol specification. The present document does not deal with compatibility testing.

The main text part of the present document presents the requirements regarding the chosen test method, conventions used within the ATS, the Test Suite Structure and Test Purposes (TSS&TP) for the interaction between ISUP v3 and INAP CS1.

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## 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

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- [1] ETSI EN 301 070-1 (V1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 interactions with the Intelligent Network Application Part (INAP); Part 1: Protocol specification [ITU-T Recommendation Q.1600 (1997), modified]".
  - [2] ETSI EN 300 356-1: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 4 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 modified]".
  - [3] ISO/IEC 9646-1 (1997): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General Concepts".
  - [4] ISO/IEC 9646-3 (1992): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".
  - [5] ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
  - [6] ITU-T Recommendation Q.1214 (1995): "Distributed functional plane for intelligent network CS-1".
  - [7] ITU-T Recommendation Q.1218 (1995): "Interface Recommendation for intelligent network CS-1".
  - [8] ITU-T Recommendation E.164 (1997): "The international public telecommunication numbering plan".
  - [9] ITU-T Recommendation Q.701 (1993): "Functional description of the message transfer part (MTP) of Signalling System No. 7".
  - [10] ITU-T Recommendation Q.702 (1988): "Signalling data link".
  - [11] ITU-T Recommendation Q.703 (1996): "Signalling link".
  - [12] ITU-T Recommendation Q.704 (1996): "Signalling network functions and messages".

- [13] ITU-T Recommendation Q.705 (1993): "Signalling network structure".
- [14] ITU-T Recommendation Q.706 (1993): "Message transfer part signalling performance".
- [15] ITU-T Recommendation Q.707 (1988): "Testing and maintenance".

## 3 Definitions and abbreviations

### 3.1 Definitions

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

- terms defined in ISDN User Part (ISUP) reference specifications [1] and [2];
- terms defined in ISO/IEC 9646-1 [3], ISO/IEC 9646-3 [4] and in ISO/IEC 9646-7 [5].

In particular, the following terms and definitions 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 (see ISO/IEC 9646-1 [3], subclause 3.3.3).

**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 (see ISO/IEC 9646-1 [3], subclause 3.3.5).

**Abstract Test Suite (ATS):** test suite composed of abstract test cases (see ISO/IEC 9646-1 [3], subclause 3.3.6).

**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 (see ISO/IEC 9646-1 [3], subclause 3.3.43).

**ISDN number:** number conforming to the numbering and structure specified in ITU-T Recommendation E.164 [8].

**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 (see ISO/IEC 9646-1 [3], subclause 3.3.54).

**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 (PCO):** point within a testing environment where the occurrence of test events is to be controlled and observed, as defined in an Abstract Test Method (see ISO/IEC 9646-1 [3], subclause 3.3.64).

**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 (see ISO/IEC 9646-1 [3], subclauses 3.3.39 and 3.3.80).

**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 (see ISO/IEC 9646-1 [3], subclauses 3.3.41 and 3.3.81).

**System Under Test (SUT):** real open system in which the IUT resides (see ISO/IEC 9646-1 [3], subclause 3.3.103).



## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACON	Abnormal CONditions
AM_ISSP	Assist Method - procedure in the Initiating SSP
ASP	Abstract Service Primitive
A-SSP	Assisting Signalling Switching Point
ATM	Abstract Test Method
ATS	Abstract Test Suite
CCF	Call Control Function
CD	Call Deflection
CG	Call Gapping
CON	CONnect operation
CS1	IN Capability Set No 1
DPP	Detection Point Processing
HOM_ASSP	Hand-Off Method – procedure in the Assisting SSP
HOM_ISSP	Hand-Off Method – procedure in the Initiating SSP
ICS	Implementation Conformance Statement
IDP	Initial Detection Point operation
INAP	Intelligent Network Application Protocol
INB	Setup of an IN call to destination B
INBC	INAP Basic Call
INCD	IN call with SCP request to Collect further Digits
IPC	SSP supports requested IP Capabilities
ISDN	Integrated Services Digital Network
ISS	Impact on Supplementary Services
I-SSP	Initiating Signalling Switching Point
ISUP	ISDN User Part
IUT	Implementation Under Test
MOT	Means Of Testing
MTP	Message Transfer Part
OIN	Other IN basic call related issues
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
SCP_IC	SCP Initiated Call
SCS	Successful Call Setup
SF	Service Filtering
SP	Signalling Point
SSF	Service Switching Function
SUT	System Under Test
TP	Test Purpose (context dependent)
TSS & TP	Test Suite Structure and Test Purposes
TSS	Test Suite Structure
TTCN	Tree and Tabular Combined Notation
UID	User Interactive Dialogue (in-band)
V	Valid behaviour stimulus

The ISUP message acronyms can be found in table 2 of ITU-T Recommendation Q.762 as endorsed by [2].

The following abbreviations apply for ISUP parameters and parameter values:

AdSg	Address Signals
CgPN	Calling Party Number
GenNot	Generic Notification
TMR	Transmission Medium Requirement
USI	User Service Indicator

## 4 Implementation under test and test methods

### 4.1 Identification of the system and implementation under test

The system under test (SUT) is an exchange. The implementation under test (IUT) is the ISUP v3 implementation in this exchange, mainly the part responsible for the interaction between ISUP v3 and INAP CS1 which takes place in the CCF and SSF, as shown in figure 1.

The following main subjects have to be considered in this area:

- detection point processing in the CCF;
- receipt of INAP CS1 operations in the SSF.

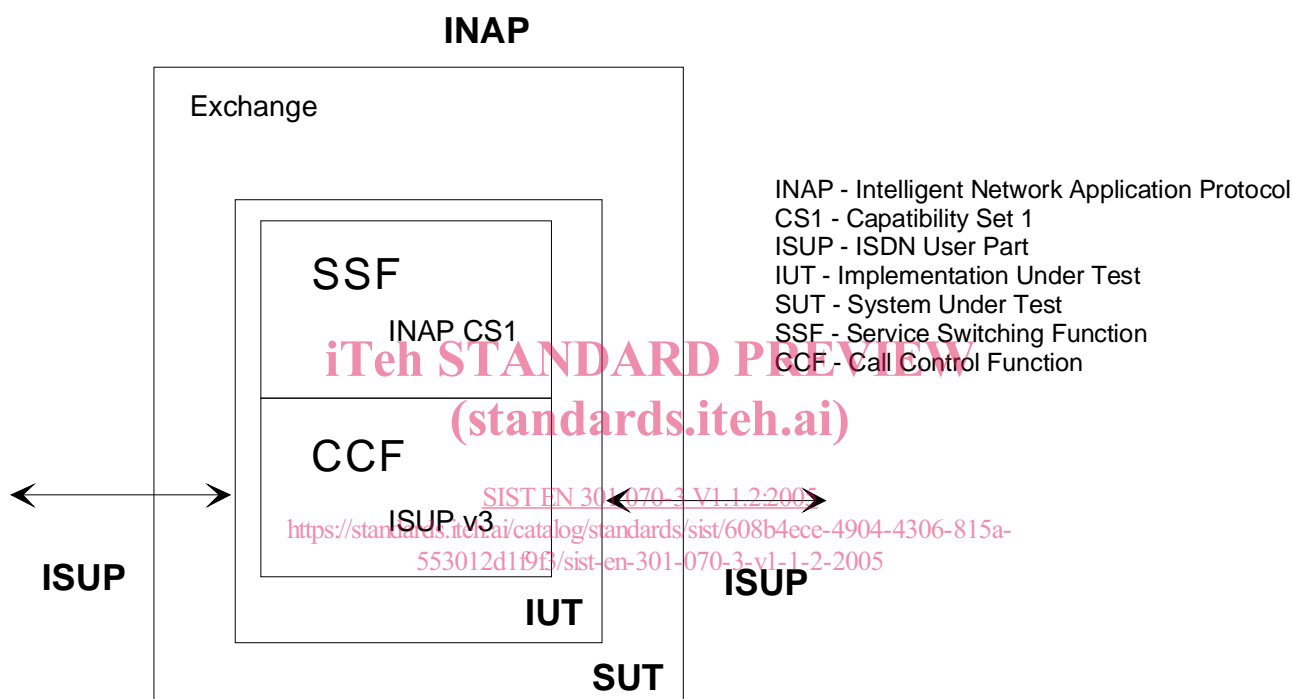


Figure 1: System under test

The ISUP signalling protocol and the INAP can be observed on the SS No.7 link on the network nodal interface (NNI). On the signalling links pointing to the Call Control Function (CCF) the ISDN User Part procedures can be observed. The signalling link emerging from the SSF the INAP procedures can be observed.

### 4.2 ATM and testing configuration for ISUP v3

The Abstract Test Method (ATM) chosen for the Interaction between ISUP v3 and INAP testing specification is the distributed multi-party test method. The ATM is defined at an appropriate level of abstraction so that the test cases may be specified appropriately, without adding restrictions to the implementation under test.

The ATS is written in concurrent TTCN.

## 4.3 IN exchange

The configuration proposed for testing exchanges having an SSF (IN exchanges) is shown in figure 2/Q.ISIN\_TEST. In order to test the protocol and functionality of these exchanges one needs to consider the incoming and outgoing ISUP circuits and the signalling link to the SCP.

The IUT is observed and controlled from two ISUP links with associated circuits. The points of control and observation (PCO) are labelled LAC and CAC on one side, and LAD and CAD on the other.

The naming convention for the signalling link PCO is 'L' followed by two letters indicating the interface. Similarly for the circuit PCO, the name is 'C' followed by the same two letters designating the interface.

The LAB PCO is used by the lower tester (LT) to control and observe the INAP on the signalling to the SCP.

The LAC and LAD PCOs are used by the lower testers (LT) for controlling the ISUP signalling link, whereas the CAC and CAD PCOs are used by the lower testers for observing circuit related events, such as connectivity, DTMF tones, announcements, etc.

The ISUP PDUs to be sent and observed on the LAC and LAD PCOs side allow for PDU constraints to be specified and coded down to the bit-level. The same applies for the INAP PDUs on the LAB PCO.

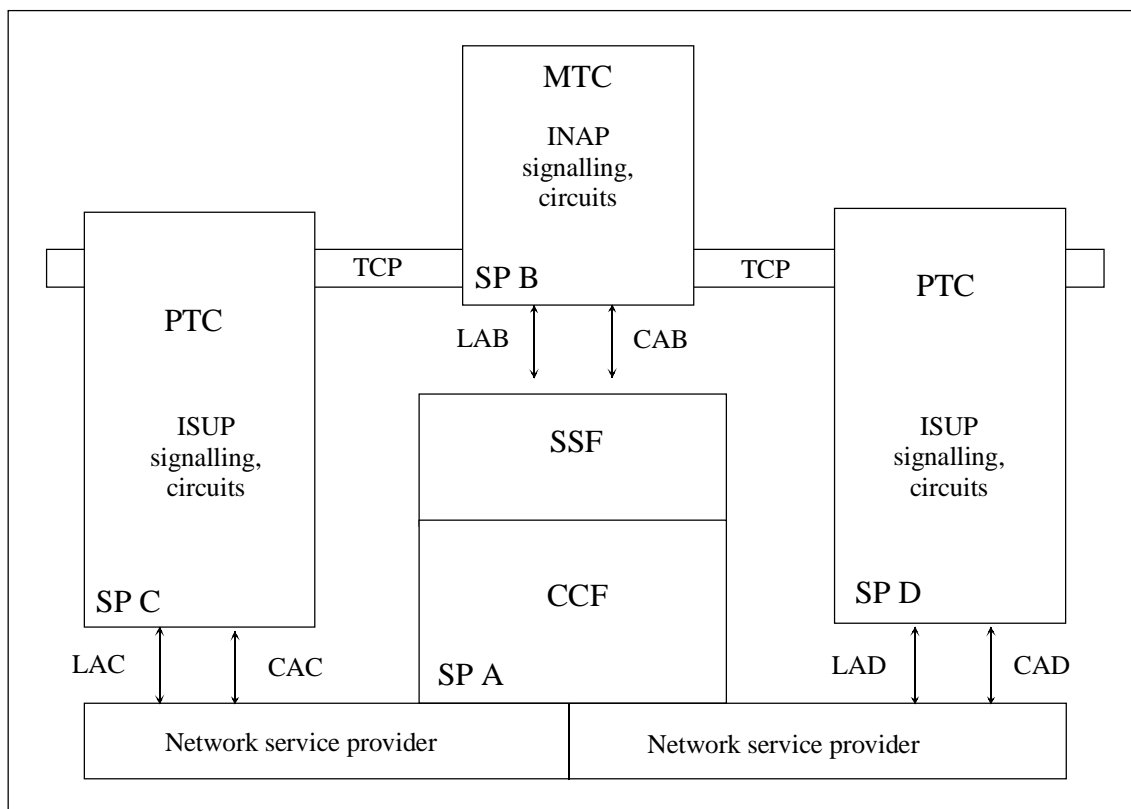
The underlying network service provider is the Message Transfer Part (MTP) protocol as specified in ITU-T Recommendations Q.701 [9] to Q.707 [15].

Figure 2/Q.ISIN\_TEST shows the actual used configuration for IN exchanges, with a main testing component (MTC), responsible for the AB interface and two slave parallel testing components (PTCs), responsible for the AC and AD interfaces.

The test co-ordination procedures (TCP) allow for communication between the testers. The test components are mostly implicitly co-ordinated (asynchronously); the TCPs are only used when it is necessary to obtain the verdict from the parallel test component.

The left and right side parallel test components may be of any kind: they may be international or national ISUP.

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IUT - Implementation Under Test

MTC - Main Test Component

PCO - Point of Control and Observation

PTC - Parallel Test Component

SP - Signalling Point

SSF - Service Switching Function

CCF - Call Control Function

LAB - PCO for signalling link AB

CAB - Circuit PCO on AB interface

LAC - PCO for signalling link AC

CAC - Circuit PCO on AC interface

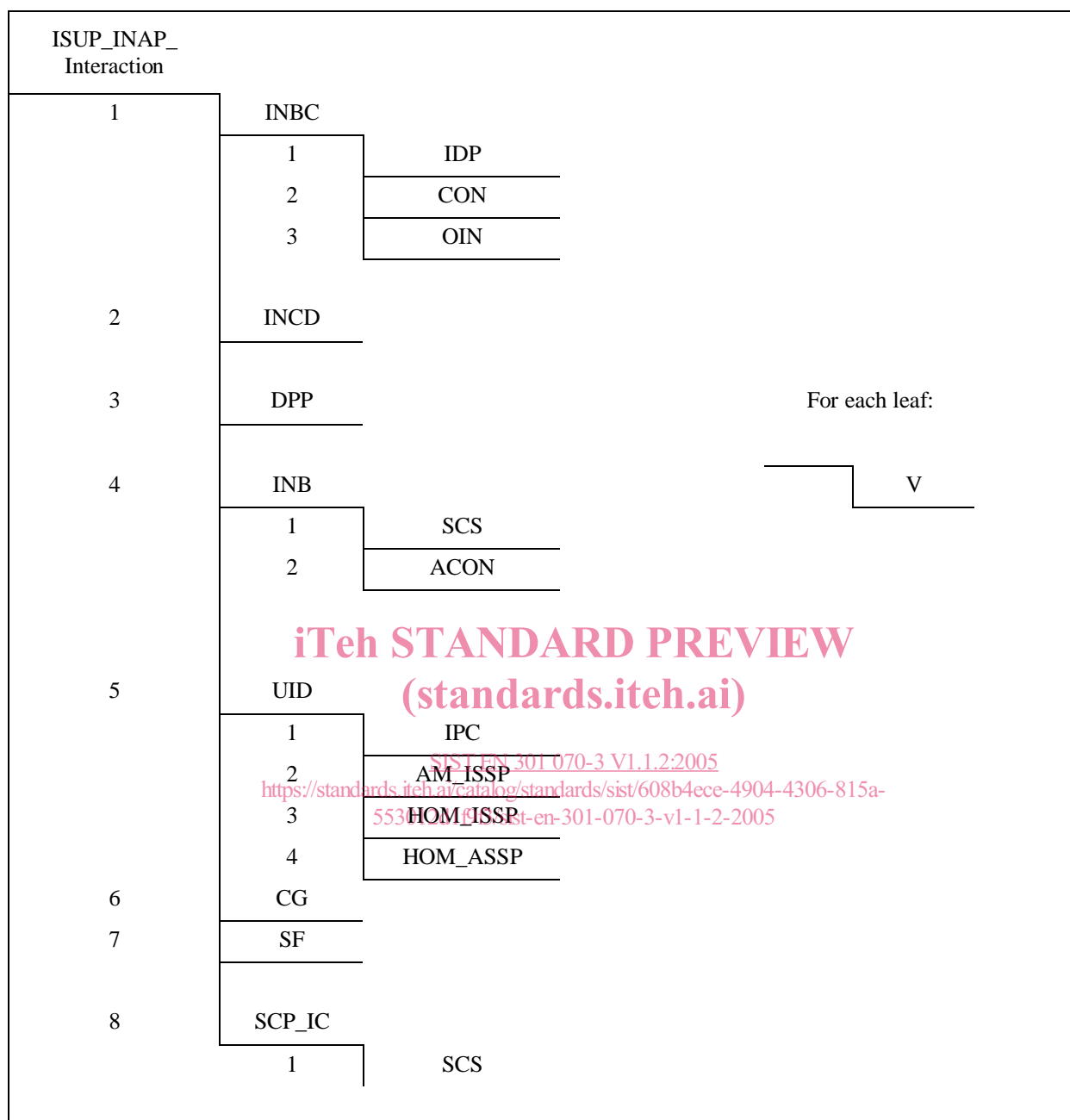
LAD - PCO for signalling link AD

CAD - Circuit PCO on AD interface

TCP - Test Coordination Procedures

**Figure 2: ISUP mixed test configuration for local exchanges**

## 5 Test Suite Structure (TSS)



**Figure 3: Test suite structure**

Test Suite Structure (TSS) naming conventions are:

INBC	<b>INAP</b> Basic Call
IDP	<b>I</b> nitial <b>D</b> etection <b>P</b> oint operation
CON	<b>CON</b> nect operation
OIN	<b>O</b> ther <b>IN</b> basic call related issues
INCD	<b>IN</b> call with SCP request to <b>C</b> ollect further <b>D</b> igits
DPP	<b>D</b> etection <b>P</b> oint <b>P</b> rocessing
INB	Setup of an <b>IN</b> call to destination <b>B</b>

SCS	Successful Call Setup
ACON	Abnormal CONDITIONS
ISS	Impact on Supplementary Services
UID	User Interactive Dialogue (in-band)
IPC	SSP supports requested IP Capabilities
AM_ISSP	Assist Method - procedure in the Initiating SSP
HOM_ISSP	Hand-Off Method – procedure in the Initiating SSP
HOM_ASSP	Hand-Off Method – procedure in the Assisting SSP
CG	Call Gapping
SF	Service Filtering
SCP_IC	SCP Initiated Call
V	Valid behaviour stimulus

## 6 Test purposes (TP)

### 6.1 Introduction

For each test requirement a Test Purpose (TP) is defined.

### 6.2 Test purpose (TP) naming convention

Test Purposes are numbered ascending within each group. Groups are organized according to the Test Suite Structure (TSS) down to the last but one level. The classification in the V/I groups is done by the inclusion of V or I in the test case name. Additional qualifiers, in form of lower case letters, are added to identify variants within one generic test case (see table 1).

**Table 1: TP Identifier naming convention scheme**

Identifier:	<b>ISN_&lt;group&gt;_&lt;N&gt;_&lt;n&gt;_{&lt;n&gt;}_{&lt;a&gt;}</b>	
<b>ISN</b>	=	<b>ISUP INAP Interaction</b>
<group>	=	One character representing the test group:
	V:	Valid stimulus
	I:	Inopportune stimulus
<N>	=	Sequence number in the test suite structure
<n>	=	Sequence number used within the group
{<n>}	=	Optional additional number used
{<a>}	=	Optional lower-case character distinguishing tests with same reference number

## 6.2.1 Source of test purpose definition

The test purposes cover validation testing aspects and were developed within ETSI.

## 6.2.2 Test purpose structure

The test purpose structure overlaps with the Test Suite Structure (TSS).

Test purposes that test normal behaviour have been grouped in the **V** - valid behaviour group.

Test purposes that test the IUT behaviour in situations that are not normal operation have been grouped in the **I** - Inopportune stimulus group.

## 6.3 Test purposes for the ISUP - INAP interaction

All of the following test purposes belong to the main group ISUP\_INAP\_Interaction. Each test purpose is presented in a separate table. The first row of the table contains the following items:

TSS	Identifier in the test suite structure (test group/subgroup identifier)
TP	Identifier of the test purpose
Reference ITU-T Recommendation Q.1600	The reference to the requirement in the ISUP INAP interaction standard, which led to the test purpose.
Selection expression	Selection criterion for the test purpose taking into account the exchange's role and the answers to the specified PICS questions (see annex A/Q.isin_test). If there is no selection expression specified, the TP is valid for all roles of exchanges.
Configuration	This is a reference to the test configuration used.

The next row defines the test purpose itself, each having a *title* in *italics* and a text body.

The ISUP **messages**, **parameters**, the INAP **operations** and **information elements** are highlighted **bold** to ease the readability.

In order to check the specified behaviour for some test purposes, a special prerequisite test condition has to be fulfilled. If such a condition is needed, it is presented after the test purpose under the heading 'Pre-test conditions'.

### 6.3.1 INAP basic call

#### 6.3.1.1 Initial Detection Point

TSS /INBC/IDP	TP ISN_V_1_1_1	Reference ITU-T Recommendation Q.1600 9.1.1.1 as endorsed by [1]; table 4/Q.1600 as endorsed by [1]	Selection expression	Configuration 1
Test purpose <i>Mapping of the called party number</i> To verify that the IUT can successfully map the <b>called party number</b> from the <b>IAM</b> to the <b>calledPartyNumber</b> of the <b>InitialDP</b> operation. Pre-test conditions: Arm DP3 (Analyzed_Information)				