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Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Circuit mode basic services; Network Layer (NL); Part 2: Abstract Test Suite (ATS) specification

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**Private Integrated Services Network (PISN);
Inter-exchange signalling protocol;
Circuit mode basic services;
Network Layer (NL);
Part 2: Abstract Test Suite (ATS) specification**

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Contents

Intellectual Property Rights.....	6
Foreword	6
1 Scope.....	7
2 References.....	7
3 Definitions and abbreviations	8
3.1 Definitions	8
3.2 Abbreviations	9
4 Abstract Test Method (ATM).....	10
4.1 Choice of the ATM.....	10
4.1.1 Functional subsets.....	10
4.1.2 Single- and Multi-party testing	10
4.2 Single PCO testing	11
4.2.1 Call Control testing for non-Transit PINX and Protocol Control testing.....	11
4.2.2 Segmentation and Protocol Discriminator Filter testing	12
4.3 Multiple PCO testing.....	12
4.3.1 Call Control testing for a Transit PINX.....	12
4.4 Test Configurations and use of Concurrent TTCN.....	13
5 Untestable Test Purposes	14
6 Conformance	15
6.1 PCTR conformance	15
6.2 PIXIT conformance	15
6.3 ATS conformance.....	15
7 ATS Conventions	16
7.1 Short names and abbreviations	16
7.2 Test suite type, ASP type, PDU type and Alias identifiers.....	17
7.2.1 ASP type identifiers	17
7.2.2 PDU type identifiers	17
7.2.3 Test Suite Type identifiers (Information Elements).....	17
7.2.4 Aliases	18
7.3 Identifiers concerning test configuration	18
7.3.1 Test components	18
7.3.2 Test component configurations.....	18
7.3.3 Points of Control and Observations (PCOs)	18
7.3.4 Co-ordination Points (CPs).....	18
7.3.5 CM types.....	18
7.4 Test Suite Parameter and Selection Expression identifiers.....	19
7.4.1 Test suite parameters	19
7.4.2 PICS Parameters	19
7.4.3 PIXIT parameters	19
7.4.4 Test Case Selection Expressions.....	19
7.4.5 Abbreviations used in PIXIT parameters and Test Case Selection Expressions.....	20
7.5 Miscellaneous identifiers.....	21
7.5.1 Test suite operations	21
7.5.2 Test suite constants	21
7.5.3 Test suite variables	21
7.5.4 Test case variables	21
7.5.5 Timers	21
7.6 Constraints.....	22
7.6.1 TTCN Test suite type constraints	22
7.6.2 ASP constraints.....	22
7.6.3 PDU constraints	22
7.6.4 CM constraints.....	22

7.7	Dynamic part	22
7.7.1	Test Case identifiers.....	22
7.7.2	Test Step identifier.....	23
7.7.3	Default identifier.....	23
7.8	Notation.....	23
7.9	Bit and octet order.....	24
8	Test case and test purpose mapping.....	24
Annex A (normative): Partial PIXIT proforma.....		25
A.1	Identification summary	25
A.2	ATS summary	25
A.3	Test laboratory	25
A.4	Client identification	25
A.5	SUT	26
A.6	Protocol layer information	26
A.6.1	Protocol identification	26
A.6.2	IUT information	26
A.6.2.1	General information.....	26
A.6.2.1.1	General Configuration.....	26
A.6.2.1.2	Addressing	27
A.6.2.2	Clearing Procedures.....	28
A.6.2.3	General Sending of Messages.....	28
A.6.2.4	Originating PINX.....	30
A.6.2.5	Terminating PINX.....	30
A.6.2.6	Incoming Gateway PINX.....	31
A.6.2.7	Outgoing Gateway PINX.....	32
A.6.2.8	Transit PINX.....	32
A.6.2.9	Status Procedure.....	33
A.6.2.10	Layer Management	33
A.6.2.11	Error Handling.....	33
A.6.2.12	Segmentation	34
A.6.2.13	Timers.....	34
A.6.3	Called Party Numbers in the PIXIT	34
Annex B (normative): Protocol Conformance Test Report (PCTR) Proforma for PSS1_BC Layer		36
B.1	Identification summary	36
B.1.1	Protocol conformance test report.....	36
B.1.2	IUT identification.....	36
B.1.3	Testing environment.....	37
B.1.4	Limits and reservation	37
B.1.5	Comments.....	37

B.2	IUT Conformance status	38
B.3	Static conformance summary	38
B.4	Dynamic conformance summary.....	38
B.5	Static conformance review report	38
B.6	Test campaign report.....	39
B.7	Observations.....	46
Annex C (normative): Abstract Test Suite (ATS) for PSS1_BC		47
C.1	The TTCN Graphical form (TTCN.GR).....	47
C.2	The TTCN Machine Processable form (TTCN.MP)	47
Annex D (informative): Compatibility		48
D.1	Other PSS1 protocol specifications	48
D.2	Other connection scenarios	50
D.2.1	Number of channels.....	50
D.2.2	Coding of information elements	50
Annex E (informative): Summary of changes from previous edition		51
E.1	Introduction	51
E.2	Test Suite Structure and Test Case identifier changes.....	51
E.3	Support for multirate	51
E.4	Test Suite Operation and type changes	51
E.5	Review of derivation of TPs	52
E.6	Test suite parameters and test case selection.....	52
Bibliography		53
History		54

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Foreword

This European Standard (Telecommunications series) has been produced by European Computer Manufacturers Association (ECMA) on behalf of its members and those of the European Telecommunications Standards Institute (ETSI).

The present document is part 2 of a multi-part EN covering the Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Circuit mode basic services; Network Layer (NL), as identified below:

Part 1: "Test Suite Structure and Test Purposes (TSS&TP) specification";

Part 2: "Abstract Test Suite (ATS) specification".

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1 Scope

The present document specifies the Abstract Test Suite (ATS) for the Network Layer, Circuit Mode Basic Services of the Inter-exchange signalling protocol, for Private Integrated Services Networks (PISN).

The objective of the present document is to provide conformance tests which give a high probability of inter-operability of the Network Layer. The present document covers the procedures described in EN 300 172 [3] and those parts of EN 301 048 [6] which relate to the use of the transit counter in connection with Basic Call procedures.

NOTE 1: The parts of EN 301 048 [6] included are those which are equivalent to ETS 300 172 [4] annex ZB.

NOTE 2: The ATS in the present document can also be used for testing equipment implemented according to certain other PSS1 specifications.

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [7], ISO/IEC 9646-2 [8] and ISO/IEC 9646-3 [9]) is used as basis for the test methodology.

The present document is applicable to implementations which support either a Basic Rate or a Primary Rate access interface, or both, operating over a leased line. It is applicable to various PINX roles, i.e. Originating, Terminating, Transit, Incoming/Outgoing Gateway.

NOTE 3: The present document can also be applicable to other scenarios if the scenario concerned does not rely on extensions to the protocol for basic call defined in the mapping specification (e.g. the use of National Standard codepoints in the Bearer Capability IE) or support more than 30 information channels. For scenarios which do not satisfy these conditions some test cases can be unsuitable and/or require modifications.

Annex A provides the Partial Protocol Implementation eXtra Information for Testing (PIXIT) Proforma of this specification.

Annex B provides the Protocol Conformance Test Report (PCTR) Proforma of this specification.

Annex C provides the Tree and Tabular Combined Notation (TTCN) part of this specification.

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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, subsequent revisions do apply.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ECMA-143 (1997): "Private Integrated Services Network (PISN) - Circuit Mode Bearer Services - Inter-Exchange Signalling Procedures and Protocol (QSIG-BC)".
- [2] ECMA-225 (1997): "Private Integrated Services Network (PISN) - Inter-Exchange Signalling Protocol - Transit Counter Additional Network Feature (QSIG-TC)".
- [3] ETSI EN 300 172 (V1.4): "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Circuit-mode basic services [ISO/IEC 11572 (1996) modified]".
- [4] ETSI ETS 300 172: "Private Telecommunication Network (PTN); Inter-exchange signalling protocol; Circuit mode basic services".

- [5] ETSI EN 300 805-1 (V1.2): "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Circuit mode basic services; Network Layer (NL); Part 1: Test Suite Structure and Test Purposes (TSS&TP) specification".
- [6] ETSI EN 301 048 (V1.1): "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Transit counter additional network feature [ISO/IEC 15056 (1997) modified]".
- [7] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [8] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [9] ISO/IEC 9646-3 (1998): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".
- [10] ISO/IEC 9646-4 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realization".
- [11] ISO/IEC 9646-5 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".
- [12] ISO/IEC 11572 (1997): "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol".
- [13] ISO/IEC 15056 (1997): "Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Transit counter additional network feature".
- [14] ETSI TR 101 101 (V1.1): "Methods for Testing and Specification (MTS); TTCN interim version including ASN.1 1994 support [ISO/IEC 9646-3] (Second Edition Mock-up for JTC1/SC21 Review)".
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3 Definitions and abbreviations

3.1 Definitions

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

Abstract Test Suite (ATS): see ISO/IEC 9646-1 [7].

final test purpose: see EN 300 805-1 [5].

Implementation Under Test (IUT): see ISO/IEC 9646-1 [7].

incoming call: see EN 300 172 [3].

incoming gateway PINX: see EN 300 172 [3].

Lower Tester (LT): see ISO/IEC 9646-1 [7].

network layer: for the purposes of this ATS the procedures described in EN 300 172 [3].

originating PINX: see EN 300 172 [3].

outgoing call: see EN 300 172 [3].

outgoing gateway PINX: see EN 300 172 [3].

PICS proforma: see ISO/IEC 9646-1 [7].

PIXIT proforma: see ISO/IEC 9646-1 [7].

Point Of Control And Observation (PCO): see ISO/IEC 9646-1 [7].

preceding PINX: see EN 300 172 [3].

Protocol Implementation Conformance Statement (PICS): see ISO/IEC 9646-1 [7].

Protocol Implementation Extra Information For Testing (PIXIT): see ISO/IEC 9646-1 [7].

segmentation: see EN 300 805-1 [5].

Signalling Carriage Mechanism (SCM): see EN 300 172 [3].

subsequent PINX: see EN 300 172 [3].

super test purpose: see EN 300 805-1 [5].

System Under Test (SUT): see ISO/IEC 9646-1 [7].

terminating PINX: see EN 300 172 [3].

transit PINX: see EN 300 172 [3].

Upper Tester (UT): see ISO/IEC 9646-1 [7].

3.2 Abbreviations

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

ANF-TC	Transit Counter Additional Network Feature
ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
CM	Co-ordination Message
CP	Co-ordination Point
IE	Information Element ISO International Organization for Standardization
IUT	Implementation Under Test
LT	Lower Tester
MOT	Mean Of Testing
MSB	Most Significant Bit
MTC	Master Test Component
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated Services eXchange
PISN	Private Integrated Services Network
PIXIT	Protocol Implementation eXtra Information for Testing
PSS1 or QSIG	Private Integrated Signalling System Number 1
PTC	Parallel Test Component
SCM	Signalling Carriage Mechanism
SUT	System Under Test
TC	Test Case
TP	Test Purpose
TSO	Test Suite Operation
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester

4 Abstract Test Method (ATM)

This clause describes the different Abstract Test Methods (ATM) used for testing the Network Layer protocol. Two methods are applied: the Remote single layer test method, and the Multi-Party test method.

4.1 Choice of the ATM

4.1.1 Functional subsets

The choice of functional subsets is based primarily on the fact that PSS1 is subdivided into two functional entities:

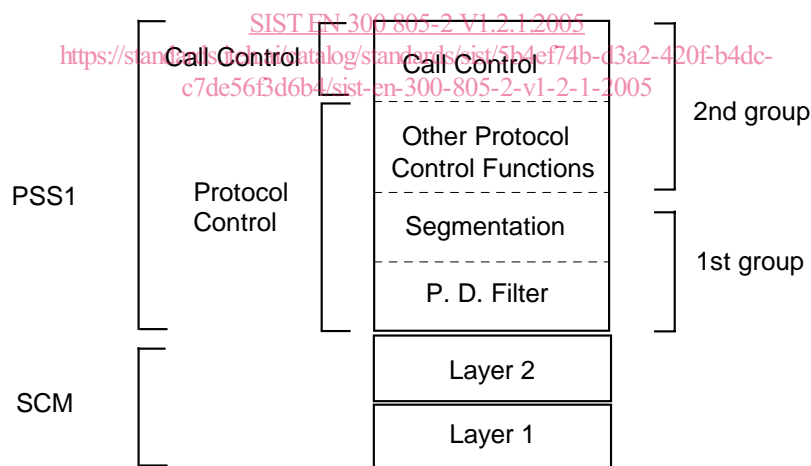
- Call Control;
- Protocol Control.

Each of these two functional entities is tested using different sets of Test Purposes and hence different Test Cases.

The Protocol Control entity is further divided into three sublayers:

- the Protocol Discriminator Filter sublayer;
- the Message Segmentation sublayer;
- the Other Protocol Control Functions sublayer.

From the viewpoint of this ATS, PSS1 is considered to be divided into two functional subsets, as shown in figure 1. The first of these functional groups consists of the Protocol Discriminator Filter sublayer and the Message Segmentation sublayer. The second functional group consists of the Other Protocol Control Functions sublayer and the Call Control entity. A different PCO is used for each of these functional groups when being tested.



NOTE: In the remainder of clause 4, the term "Protocol Control" refers only to the "Other Protocol Control Functions" sublayer.

Figure 1: PSS1 functional subsets

4.1.2 Single- and Multi-party testing

For Call Control, the protocol defines different roles that a PINX can play: it can be an end or gateway PINX (Originating, Terminating, Incoming Gateway, Outgoing Gateway), or a Transit PINX. In the first case, only one interface needs to be tested, and in the second case, two interfaces need to be tested simultaneously.

4.2 Single PCO testing

Single PCO testing applies to the Segmentation and Protocol Discriminator Filter, to the Protocol Control, and to the Call Control for an Originating, Terminating, Incoming Gateway or Outgoing Gateway PINX.

4.2.1 Call Control testing for non-Transit PINX and Protocol Control testing

As shown in figure 2, the IUT is the Protocol Control and Call Control part, and it is an end-system. It is not possible to observe and control the upper service boundary of the IUT. Consequently, the test method chosen is the Remote Test Method, where the co-ordination procedures are expressed in an informal way. The test system will only contain one LT and no UT. The PCO, called LX, is located between the Protocol Control and Call Control part, and the Segmentation part. Only unsegmented Protocol Data Units (PDUs) are exchanged.

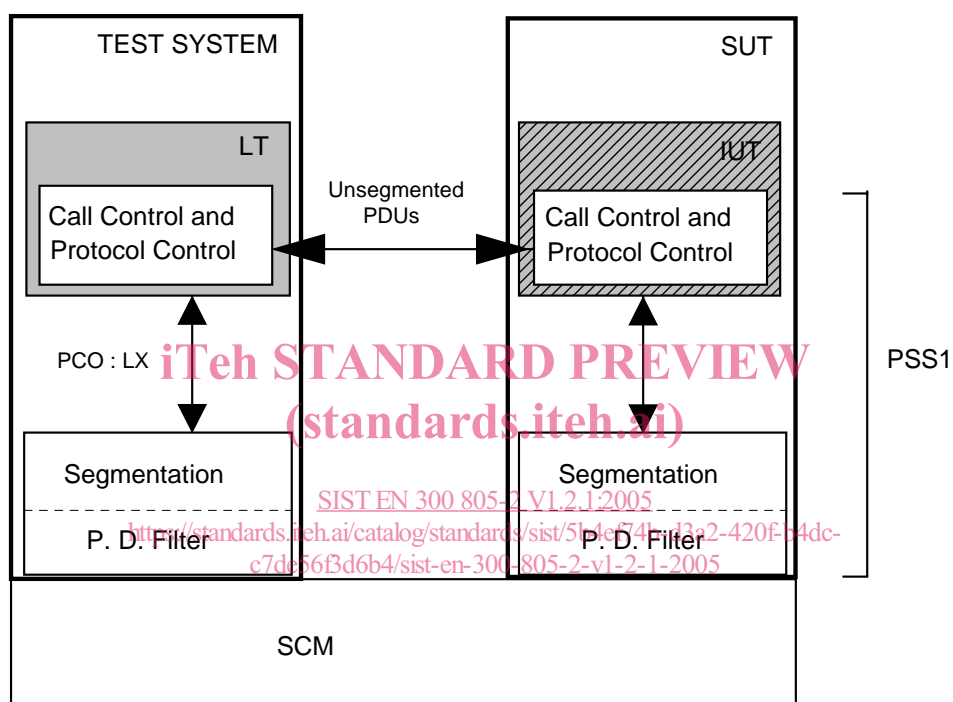


Figure 2: Remote single layer test method for Protocol Control and Call Control for non-Transit PINX

4.2.2 Segmentation and Protocol Discriminator Filter testing

As shown in figure 3, the IUT is the Segmentation and Protocol Discriminator Filter part, and it is an end-system. It is not possible to observe and control the upper service boundary of the IUT. Consequently, the test method chosen is the Remote Test Method, where the co-ordination procedures are expressed in an informal way. The test system will only contain one LT and no UT. The PCO, called LSEG, is located between the Segmentation and Protocol Discriminator Filter part, and the SCM. The PDUs exchanged are SEGMENT PDUs and unsegmented PDUs.

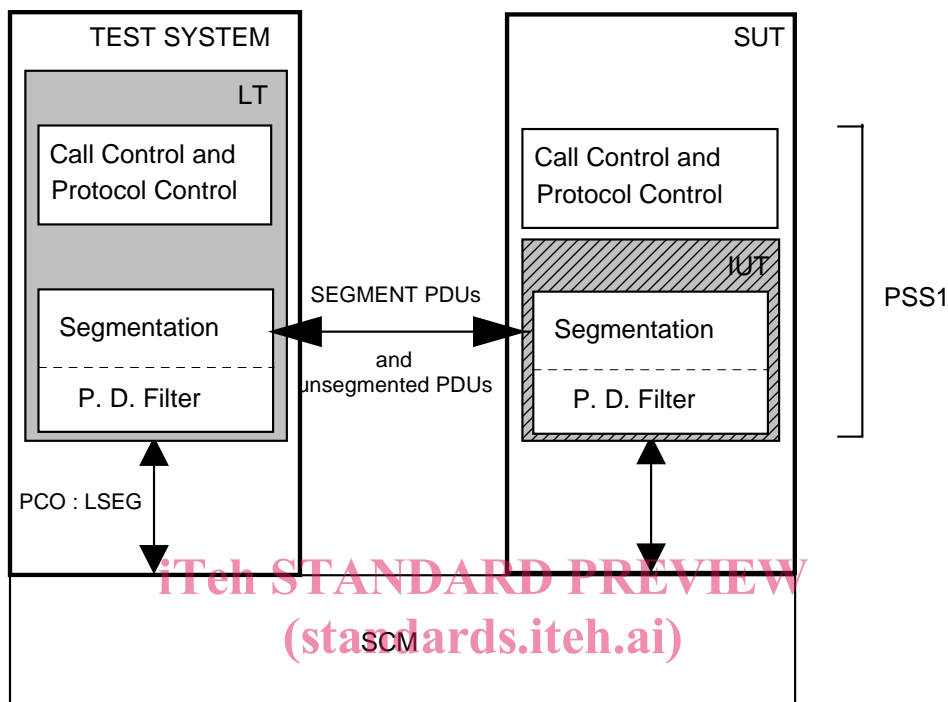


Figure 3: Remote single layer test method for Segmentation and Protocol Discriminator Filter

4.3 Multiple PCO testing

Multiple PCO testing applies to the Protocol Control and the Call Control for Transit PINX.

4.3.1 Call Control testing for a Transit PINX

As shown in figure 4, the IUT is the Protocol Control and Call Control part of the Transit PINX, and it is an open-relay system. Consequently, the test method chosen is a Multi-Party Test Method with no UT. The test system will contain two LTs attached to the IUT via two PCOs, called LX and LY between the Protocol Control and Call Control part, and the Segmentation part. The PDUs exchanged are only unsegmented PDUs.

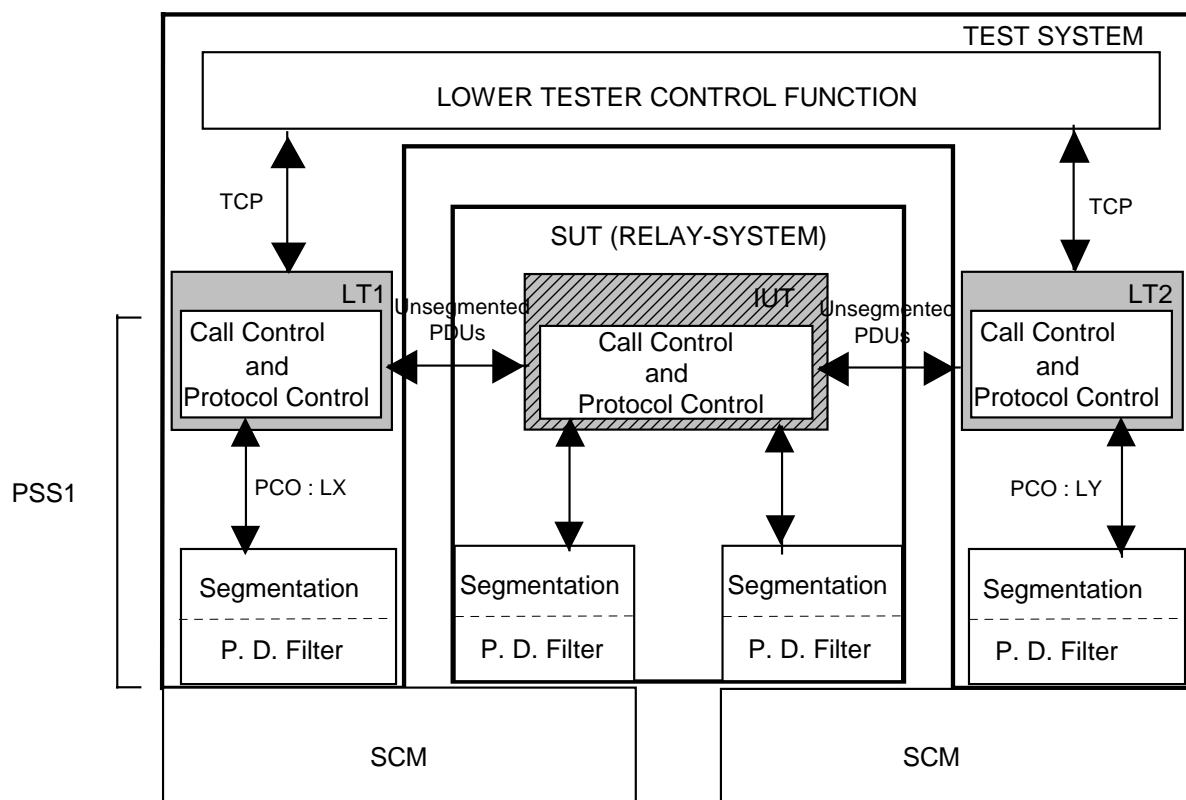


Figure 4: Multi-party test method for Protocol Control and Call Control for Transit PINX

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4.4 Test Configurations and use of Concurrent TTCN

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As this ATS covers both single-party testing using non-concurrent TTCN, and multi-party testing using concurrent TTCN, the notation chosen for the complete ATS is the concurrent TTCN syntax. Therefore, test components are defined to describe the two configurations: the "mono" configuration and the "transit" configuration, as shown in figures 5 and 6.

The mono configuration is used in case of single-party testing, i.e. for the Protocol Control testing, the Call Control testing for non-transit PINX, and the Segmentation and Protocol Discriminator Filter testing. Only one test component, which is the master test component MTC_MONO, connected to the IUT via the PCOs LX or LSEG, is needed in this case.

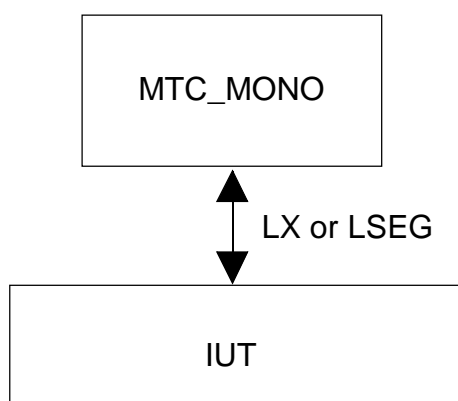


Figure 5: Mono configuration