SLOVENSKI STANDARD
SIST I-ETS 300 697-2 E1:2003

01-december-2003

Digitalno omreģje z integriranimi storitvami (ISDN) ï Preskuģanje skladnosti programirljivega komunikacijskega vmesnika (PCI) sistema Euro-ISDN ï 2. del: Specifikacija abstraktnega preskuģalnega niza (ATS) za uporabniģke pripomoļ ke vmesnika PCI (PUF)

Integrated Services Digital Network (ISDN); Conformance testing for the Euro-ISDN Programming Communication Interface (PCI); Part 2: Abstract Test Suite (ATS) specification for the PCI User Facility (PUF)

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Ta slovenski standard je istoveten z: **I-ETS 300 697-2 Edition 1**

ICS:

33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)

SIST I-ETS 300 697-2 E1:2003 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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INTERIM
EUROPEAN
TELECOMMUNICATION
STANDARD

I-ETS 300 697-2

March 1998

Source: TE

Reference: DI/TE-02028-3

ICS: 33.020

Key words: ISDN, PCI, ATS, testing

Integrated Services Digital Network (ISDN); Conformance testing for the Euro-ISDN Programming Communication Interface (PCI); Part 2: Abstract Test Suite (ATS) specification for the PCI User Facility (PUF)

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SIST I-ETS 300 697-2 E1:2003

Contents

Foreword 7

Introduction 7

1 Scope 9

2 Normative references 9

3 Definitions and abbreviations 10
3.1 Definitions 10
3.2 Abbreviations 10

4 General constraints for testing and applicable test methods 11
4.1 Testing model 11
4.2 Test methods for PCI message testing 11
4.3 Default values for directions in the Control and User Planes 13

5 ATS naming conventions and use of language conventions 14

6 Typical scenario for a Test Case 16

7 Order of parameters 16

8 Test Purpose (TP) to Test Case (TC) mapping 16

Annex A (normative): Abstract Test Suite (ATS) for ETS 300 325 PUF 17

A.1 The TTCN Graphical form (TTCN.GR) 17

A.2 The TTCN Machine Processable form (TTCN.MP) 17

Annex B (normative): PCTR for ETS 300 325 PUF 18

B.1 Identification summary 18
B.1.1 Protocol Conformance Test Report (PCTR) 18
B.1.2 IUT 18
B.1.3 Testing environment 19
B.1.4 Limits and reservations 19
B.1.5 Comments 19

B.2 IUT conformance status 19

B.3 Static conformance summary 19

B.4 Dynamic conformance summary 19

B.5 Static conformance review report 20

B.6 Test campaign report 20

B.7 Observations 24

Annex C (normative): Partial IXIT proforma for ETS 300 325 PUF 25

C.1 Identification summary 25

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(standards.iteh.ai)
SIST I-ETS 300 697-2 E1:2003
https://standards.iteh.ai/catalog/standards/sist/a52fb0bb-c87b-4b25-b826-a258a2d59c01/sist-i-ets-300-697-2-e1-2003

SIST I-ETS 300 697-2 E1:2003

C.2 Abstract Test Suite summary 25

C.3 Test laboratory 25

C.4 Client 25

C.5 SUT 26

C.6 Protocol information for ETS 300 325 PUF 26
C.6.1 Protocol identification 26
C.6.2 IUT information 26
C.6.2.1 Addresses and compatible incoming parameters 26
C.6.2.1.1 Exchange Mechanism 26
C.6.2.1.2 Control Plane 27
C.6.2.1.3 User Plane 30
C.6.2.2 Information about connection 31
C.6.2.3 Procedural information 31
C.6.2.3.1 Exchange Mechanism 31
C.6.2.3.2 Administration Plane 32
C.6.2.3.3 Control Plane 34
C.6.2.3.4 User Plane 37
C.6.2.4 Upper interface observation 38
C.6.2.4.1 Administration Plane 39
C.6.2.4.2 Control Plane 40
C.6.2.4.3 User Plane 41

Annex D (informative): ETS 300 325 PUF PCI ICS proforma 43

D.1 Instructions for completing the PUF PCI ICS proforma 43
D.1.1 Purposes and structure 43
D.1.2 Symbols, abbreviations and conventions 45
D.1.2.1 Standardized symbols for the status column 45
D.1.2.2 Standardized symbols for the support column 45
D.1.3 Instructions for completing the PCI ICS 45

D.2 Identification of the implementation 46
D.2.1 Date of statement 46
D.2.2 Implementation Under Test (IUT) identification 46
D.2.3 System Under Test (SUT) identification 46
D.2.4 Product supplier 46
D.2.5 Client 47
D.2.6 ICS contact person 47

D.3 PCI ICS/System Conformance Statement (SCS) 48

D.4 Identification of the PCI 48

D.5 Global statement of conformance 48

D.6 Static requirements 49
D.6.1 Major capabilities 49
D.6.1.1 Underlying Operating System 49
D.6.1.2 Exchange Mechanism 49
D.6.1.3 Connection types 50
D.6.1.4 Dialling mode 50
D.6.1.5 User Plane protocols 50
D.6.2 Messages 51
D.6.2.1 Administration Plane messages 51
D.6.2.2 Control Plane messages 52
D.6.2.3 User Plane messages 54
D.6.3 Messages parameters 55
D.6.3.1 Administration Plane messages parameters 55
D.6.3.1.1 ACreateNCOReq 55

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST I-ETS 300 697-2 E1:2003
https://standards.iteh.ai/catalog/standards/sist/a52fb0bb-e87b-4b25-b826-a258a2d39c01/sist-i-ets-300-697-2-e1-2003

SIST I-ETS 300 697-2 E1:2003

D.6.3.1.2 ACreateNCOCnf 56
D.6.3.1.3 ADestroyNCOReq 56
D.6.3.1.4 ADestroyNCOCnf 56
D.6.3.1.5 AErrorInd 57
D.6.3.1.6 AGetNCOInfoReq 57
D.6.3.1.7 AGetNCOInfoCnf 57
D.6.3.1.8 ASecurityReq 57
D.6.3.1.9 ASecurityCnf 58
D.6.3.1.10 AManufacturerReq 58
D.6.3.1.11 AManufacturerInd 58
D.6.3.2 Control Plane messages parameters 58
D.6.3.2.1 CAlertReq 58
D.6.3.2.2 CAlertInd 59
D.6.3.2.3 CConnectReq 59
D.6.3.2.4 CConnectInd 60
D.6.3.2.5 CConnectRsp 60
D.6.3.2.6 CConnectCnf 60
D.6.3.2.7 CDisconnectReq 61
D.6.3.2.8 CDisconnectInd 61
D.6.3.2.9 CDisconnectRsp 62
D.6.3.2.10 CDisconnectCnf 62
D.6.3.2.11 CProgressInd 62
D.6.3.2.12 CStatusInd 62
D.6.3.2.13 CSetupAckInd 63
D.6.3.2.14 CConnectInfoReq 63
D.6.3.2.15 CProceedingInd 63
D.6.3.2.16 CUserInformationReq 64
D.6.3.2.17 CUserInformationInd 64
D.6.3.2.18 CCongestionControlReq 64
D.6.3.2.19 CCongestionControlInd 65
D.6.3.2.20 CSuspendReq 65
D.6.3.2.21 CSuspendCnf 65
D.6.3.2.22 CResumeReq 65
D.6.3.2.23 CResumeCnf 66
D.6.3.2.24 CNotifyInd 66
D.6.3.2.25 CFacilityReq 66
D.6.3.2.26 CFacilityInd 66
D.6.3.2.27 CExtEquipAvailibilityInd 67
D.6.3.2.28 CExtEquipBlockDiallingInd 67
D.6.3.2.29 CExtEquipKeyPressedInd 67
D.6.3.2.30 CExtEquipOffHookInd 67
D.6.3.2.31 CExtEquipOnHookInd 68
D.6.3.3 User Plane messages parameters 68
D.6.3.3.1 U3ConnectReq 68
D.6.3.3.2 U3ConnectInd 69
D.6.3.3.3 U3ConnectRsp 70
D.6.3.3.4 U3ConnectCnf 71
D.6.3.3.5 U3DisconnectReq 72
D.6.3.3.6 U3DisconnectInd 72
D.6.3.3.7 U3DataReq 73
D.6.3.3.8 U3DataInd 73
D.6.3.3.9 U3ExpeditedDataReq 73
D.6.3.3.10 U3ExpeditedDataInd 74
D.6.3.3.11 U3ResetReq 74
D.6.3.3.12 U3ResetInd 74
D.6.3.3.13 U3ResetRsp 75
D.6.3.3.14 U3ResetCnf 75
D.6.3.3.15 U3DataAcknowledgeReq 75
D.6.3.3.16 U3DataAcknowledgeInd 75
D.6.3.3.17 U3ReadyToReceiveReq 76
D.6.3.3.18 U3ReadyToReceiveInd 76
D.6.3.3.19 U3ErrorInd 76
D.6.3.3.20 U1DataReq 76

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST I-ETS 300 697-2 E1:2003
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SIST I-ETS 300 697-2 E1:2003

D.6.3.3.21 U1DataInd 77
D.6.3.3.22 U1ErrorInd 77
D.6.4 Miscellaneous features and supplementary services 77

History 78

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST I-ETS 300 697-2 E1:2003
https://standards.iteh.ai/catalog/standards/sist/a52fb0bb-c87b-4b25-b826-a258a2d39c01/sist-i-ets-300-697-2-e1-2003

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Foreword

The second part of this Interim European Telecommunication Standard (I-ETS) has been produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

An ETSI standard may be given I-ETS status either because it is regarded as a provisional solution ahead of a more advanced standard, or because it is immature and requires a "trial period". The life of an I-ETS is limited to three years after which it can be converted into an ETS, have its life extended for a further two years, be replaced by a new version, or be withdrawn.

This is the second part of a I-ETS which comprises four Parts:

"Integrated Services Digital Network (ISDN); Conformance testing for the Euro-ISDN Programming Communication Interface (PCI);

Part 1: "Test Suite Structure and Test Purposes (TSS&TP) for the PCI User Facility (PUF);

Part 2: "Abstract Test Suite (ATS) for the PCI User Facility (PUF);

Part 3: "Test Suite Structure and Test Purposes (TSS&TP) for the Network Access Facility (NAF);

Part 4: "Abstract Test Suite (ATS) for the Network Access Facility (NAF)".

Annexes A, B and C to this part of the I-ETS are normative whereas annex D is informative.

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Announcement date	
Date of adoption of this I-ETS:	6 March 1998
Date of latest announcement of this I-ETS (doa):	30 June 1998

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Introduction

I-ETS 300 697, Parts 1 to 4 comprises the Test Suite Structure and Test Purposes (TSS&TP) and the Abstract Test Suites (ATS) to ETS 300 325 [1]. The Euro-ISDN PCI is a PCI which provides access to the Euro-ISDN. The basic model of the ISDN PCI consists of two entities, a service user called the PCI User Facility (PUF) and a service provider called the Network Access Facility (NAF). For the purpose of conformance testing, the PUF and the NAF are treated separately. This is because the PUF manufacturer and the NAF manufacturer may be completely different and their testing needs should be treated separately. Each part is tested to ensure that they each meet the conformance requirements of the ETS and to increase their probability of inter-operating. This is the reason why a separate TSS&TP and a separate ATS has been produced for each of the PCI User Facility (PUF) and the Network Access Facility (NAF).

All Parts have been produced according to ISO/IEC 9646 [2, 3, 4, 5, 6] and ETS 300 406 [8].

As stated above, this I-ETS is structured in four parts:

- part 1 contains the TSS&TP for the PUF;
- **part 2 contains the ATS for the PUF;**
- part 3 contains the TSS&TP for the NAF;
- part 4 contains the ATS for the NAF.

SIST I-ETS 300 697-2 E1:2003

Part 1 (TSS&TP for the PUF) contains all Test Purposes (TPs) for the PUF (PCI messages). It describes what is covered by the TPs for the PUF and what areas of the ETS are not covered. The Test Suite Structure is described and the convention followed in naming the TPs is described. A list of basic interconnection tests is given.

This second Part of the I-ETS (ATS for the PUF) contains the ATS for the PUF (PCI messages). The test method used is described in detail and diagrams explaining the test method are presented. The reasons for choosing that test method are also given. The ATS is written in Tree and Tabular Combined Notation language (TTCN) and the TTCN is contained in annex A. Annex B contains the Protocol Conformance Test Report (PCTR), annex C contains the Implementation eXtra Information for Testing (IXIT) and annex D contains an Implementation Conformance Statement (ICS).

Part 3 (TSS&TP for the NAF) contains all the TPs for the NAF (PCI messages and Exchange Mechanism). It describes what is covered by the TPs for the NAF and what areas of the ETS are not covered. The TSS is described and the TPs are given. A list of basic interconnection tests is given.

Part 4 (ATS for the NAF) contains the ATS for the NAF (PCI messages and Exchange Mechanism). The test method used is described in detail and a diagram explaining the test method is given. The reasons for choosing that test method is also given. The ATS is written in concurrent TTCN and the TTCN is contained in annex A. Annex B contains the PCTR, annex C contains the IXIT and annex D contains an ICS.

NOTE: The ICS in annexes D of part 2 and part 4 are informative as ETS 300 325 [1] already contains an ICS. However, the ICS in ETS 300 325 [1] is not adequate for these ATSs and should eventually be replaced by annex D of part 2 and part 4.

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SIST I-ETS 300 697-2 E1:2003

1 Scope

Part 2 of this I-ETS contains the Abstract Test Suite (ATS) for the PUF (PCI messages). The test method used is described in detail and diagrams explaining the test method are presented. The reasons for choosing this test method are also given. The Abstract Test Suite is written in TTCN and the TTCN is contained in annex A. Annex B contains the PCTR, annex C contains the IXIT and annex D contains an ICS.

2 Normative references

Part 2 of this I-ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] ETS 300 325 (1994): "Integrated Services Digital Network (ISDN); Programming Communication Interface (PCI) for Euro-ISDN".

[2] ISO/IEC 9646-1 (1991): "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[3] ISO/IEC 9646-2 (1991): "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".

[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 9646-5 (1994): "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".

[6] ISO/IEC DIS 9646-7 (1991): "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statement".

[7] ETS 300 697-1: "Integrated Services Digital Network (ISDN); Conformance testing for the Euro-ISDN Programming Communication Interface (PCI); Part 1: Test Suite Structure and Test Purposes (TSS&TP) for the PCI User facility (PUF)".

[8] ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization Methodology".

[9] ETS 300 080: "Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals".

[10] ISO/IEC 8208 (1990): "Information technology; Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment".

[11] CCITT Recommendation T.70 (1998): "Network-independent basic transport service for the telematic services".

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SIST I-ETS 300 697-2 E1:2003

3 Definitions and abbreviations

3.1 Definitions

For the purposes of part 2 of this I-ETS, the terms defined in ETS 300 325 [1], ISO/IEC 9646, Parts 1, 2, 3, 5 and 7 ([2] to [6]) and its amendments and draft amendments apply.

3.2 Abbreviations

For the purposes of this I-ETS, the following abbreviations apply:

AOC-E	Advice Of Charging at End of call
API	Application Programming Interface
ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
CLIR	Calling Line Identification Restriction
DDI	Direct Dialling In
ExID	Exchange IDentifier
HDLC	High level Data Link Control
ICS	Implementation Conformance Statement
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
IXIT	Implementation eXtra Information for Testing
LT	Lower Tester
MTS	Methods for Testing and Specification
NAF	Network Access Facility
NCO	Network Connection Object
NCOID	Network Connection Object Identifier
NMA	Network layer Message Access
OSI	Open Systems Interconnection
PCI	Programming Communication Interface
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PDU	Protocol Data Unit
PUF	PCI User Facility
SCS	System Conformance Statement
SUT	System Under Test
TC	Test Case
TCV	Test Case Variable
TMA	Transparent Message Access
TP	Test Purpose
TSC	Test Suite Constant
TSO	Test Suite Operation
TSS	Test Suite Structure
TSS&TP	Test Suite Structure & Test Purposes
TSV	Test Suite Variable
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester

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4 General constraints for testing and applicable test methods

4.1 Testing model

A Euro-ISDN PCI is an interface and not a protocol standard. ISO/IEC 9646-2 [3] explicitly states that it applies only to protocols of the Open Systems Interconnection (OSI) stack. This means that ISO/IEC 9646-3 [4] cannot be used directly for testing ETS 300 325 [1]. This is why, whilst testing, the layer model is applied to the EURO-ISDN PCI even though this notion does not exist in the ETS itself.

In the EURO-ISDN PCI, it is as if the Exchange Mechanism is a layer below the three planes, Administration, Control and User. The Exchange Mechanism transports the messages of the three planes, just as Layer 2 of a protocol transports Layer 3 Protocol Data Units (PDUs). The Exchange Mechanism provides a service to the 3 planes.

Within this ATS, the upper layer, i.e. the layer of messages of the three planes, is referred to as the "message layer" and the lower layer, i.e. the Exchange Mechanism, is referred to as the "Exchange Mechanism layer". By using this model, ISO 9646, Parts 1, 2 and 3 [2,3,4] terminology can be used and abstract test methods can be defined for each of the layers of this interface standard.

Using this model, PCI messages and the Exchange Mechanism should be tested in two different test suites. Only PCI message testing is dealt with here.

4.2 Test methods for PCI message testing

a) Definitions

As previously stated, ISO 9646, Parts 1, 2 and 3 [2], [3], [4] can be used by mapping its concepts onto PCI concepts.

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PDUs: In ISO 9646, Parts 1, 2 and 3 [2,3,4] the data unit tested is called a "PDU", only because it normally applies to protocols. However, the important concept behind this word is "what is tested" In this case, what is tested are PCI messages. However, they shall still be called PDUs in the test suite.

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Abstract Service Primitives (ASPs): In ISO 9646, Parts 1, 2 and 3 [2], [3], [4], ASPs are an implementation-independent description of an interface between a service-user and a service-provider. In particular, ASPs transport PDUs between the tested layer N+1 (service-user) and the layer N below (service-provider) in the Lower Tester (LT). In this case, the Exchange Mechanism is the layer below the message layer. Consequently, the description of Exchange Mechanism functions, independent of the operating system, shall be called ASPs in the test suite. According to the test methods described below, they are used within the LT (the NAF emulator).

Each function is translated into a pair of "FunctionName_Ind"/"FunctionName_Rsp" ASPs. A "FunctionName_Ind" contains parameters provided by the PUF and a "FunctionName_Rsp" contains the return parameters provided by the NAF.

EXAMPLE 1: PciDeregister function is translated into two ASPs: PciDeregister_ind with ExID parameter, and PciDeregisterRsp with ErrorCode parameter.

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b) Abstract Test Methods (ATMs)

There are two kinds of Test Purposes (TPs):

- one for which a point of observation is located in the LT and the control at the upper interface is not specified and consists only of an implicit specification such as "do whatever is necessary within the System Under Test (SUT) in order to provoke the required behaviour". In TTCN it is specified using the implicit send event, with a reference to a procedural information item in the IXIT in annex C;

EXAMPLE 2: Ensure that the IUT in order to initiate an outgoing call sends a CConnectReq.

- one for which the point of observation is located at the upper interface of the Implementation Under Test (IUT) (the verdict shall be assigned by the test operator who observes the behaviour of the IUT at the upper interface). What is to be observed at this interface is not defined in ETS 300 325 [1] and may vary greatly from IUT to IUT, therefore, the required observations are described as upper interface observation items in the IXIT. The point of control is located in the LT.
  These TPs are the "OP" (optional) TPs and may be de-selected as a group by answering "NO" to an IXIT item. For more details, see ETS 300 697-1 [7].

EXAMPLE 3: Ensure that the IUT, on receiving a CAlertInd message, reacts as stated in the IXIT.

There are two different ATMs to deal with these two kinds of TPs:

- a remote test method for the first case, called the PCIMsgRemote ATM (see figure 1);

- a distributed test method for the second one, called the PCIMsgDistributed ATM (see figure 2).

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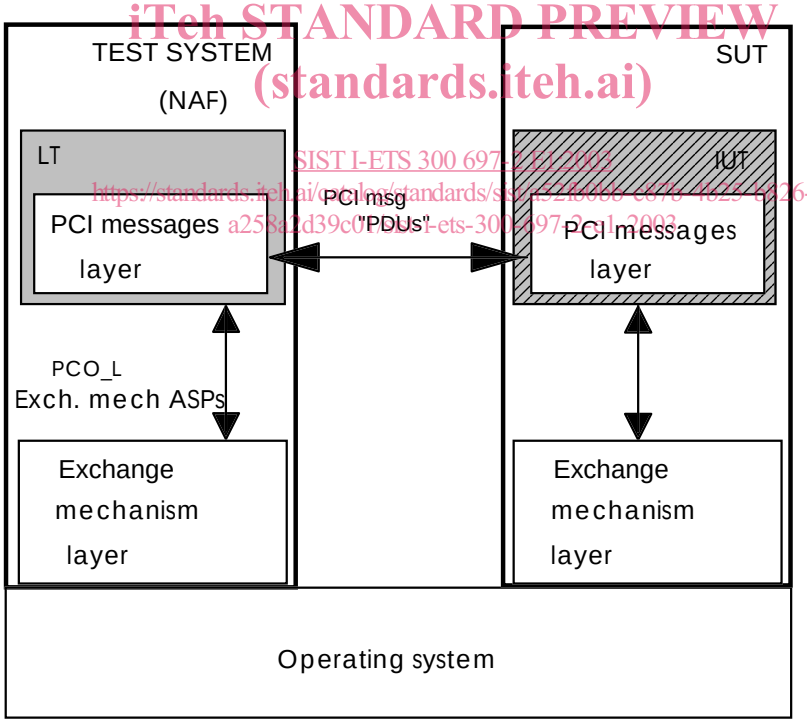

Key:

ASP	Abstract Service Primitive
Exch mech ASPs	Exchange Mechanism ASPs
IUT	Implementation Under test
LT	Lower Tester
NAF emul.	NAF emulator
Operating system	Operating system used by the Exchange Mechanism
PCI Msg PDUs	PCI message PDUs
PCO_L	Point of Control and Observation (Lower)
SUT	System Under Test

Figure 1: PCIMsgRemote ATM

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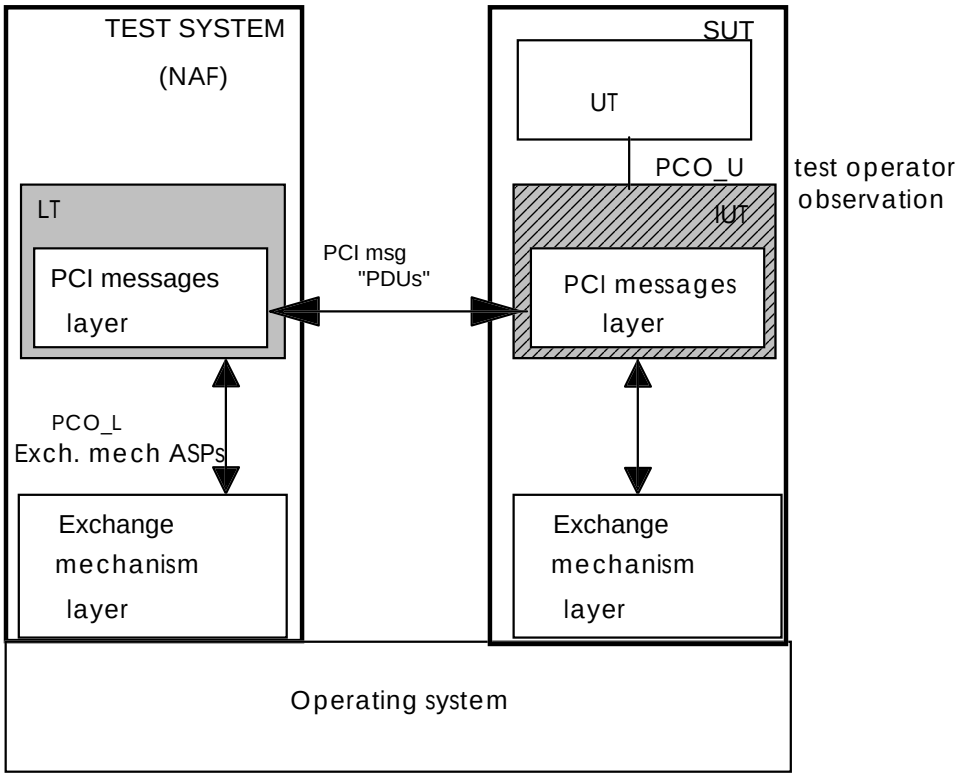

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(standards.iteh.ai)

Key:

ASP	Abstract Service Primitive
Exch mech ASPs	Exchange Mechanism ASPs
IUT	Implementation Under Test
LT	Lower Tester
NAF emul.	NAF emulator
Operating system	Operating system used by the Exchange Mechanism
PCI Msg PDUs	PCI message PDUs
PCO_L	Point of Control and Observation (Lower)
PCO_U	Point of Control and Observation (Upper)
SUT	System Under Test
UT	Upper Tester

SIST I-ETS 300 697-2 E1:2003
https://standards.iteh.ai/catalog/standards/sist/a52fb0bb-c87b-4b25-b826-a258a2d39c01/sist-i-ets-300-697-2-e1-2003

Figure 2: PCIMsgDistributed ATM

4.3 Default values for directions in the Control and User Planes

There are very few mandatory features in a PUF, including the direction of calls on the Control and User planes. When directions are not specified in a TP, the default direction is incoming for both planes. However, this can only be if the IUT has claimed to support the incoming direction in answer to an Implementation Conformance Statement (ICS) question.

An outgoing user connection can only be supported on an outgoing call in the Control Plane. In this instance, for TCs about outgoing connection establishment on the User Plane, (the direction of the Control Plane is not specified in such TPs), the direction for the Control Plane shall be outgoing.

IXIT items indicate the CDirection/UDirection combinations supported by the IUT, and allow the tester to select the direction of the Control Plane.

The same problem can arise for the direction of data transfer and the direction of a user connection. It is also dealt with by IXIT items used to indicate the UDirection/data transfer direction combinations.