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Digitalno omrežje z integriranimi storitvami (ISDN) – Signalizacija št. 7 – Podpora aplikacij navideznega zasebnega omrežja (VPN) z informacijskimi tokovi v referenčni točki Q zasebnega omrežja s signalizacijo številka 1 (PSS1) – 3. del: Zgradba preskusnega niza in namen preskušanja (TSS&TP) – Specifikacija

Integrated Services Digital Network (ISDN); Signalling System No.7; Support of Virtual Private Network (VPN) applications with Private network Q reference point Signalling System number 1 (PSS1) information flows; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification

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**Integrated Services Digital Network (ISDN);
Signalling System No.7;
Support of Virtual Private Network (VPN)
applications with Private network Q reference point
Signalling System number 1 (PSS1) information flows;
Part 3: Test Suite Structure and
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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 Integrated Services Digital Network (ISDN); Signalling System No.7; Support of Virtual Private Network (VPN) applications with Private network Q reference point Signalling System number 1 (PSS1) information flows, as identified below:

Part 1: "Protocol specification [ITU-T Recommendations Q.765.1 and Q.699.1, 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) specification".

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1 Scope

The present document contains the validation (conformance) test specification for the application transport mechanism, support of VPN applications with PSS1 information flows defined in ITU-T Recommendation Q.765.1 [18]. The present document applies only to exchanges having implemented the ISUP v3 protocol specification for the Application Transport Mechanism and APM support of VPN applications for 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.

EN 301 062-2 [1] presents the Protocol Implementation Conformance Statements (PICS) and the document EN 301 062-4 [2] presents the Protocol Implementation eXtra Information for Testing (PIXIT), Protocol Conformance Test Report (PCTR) and the ATS for the application transport mechanism, support of VPN applications with PSS1 information flows.

The supplier of an implementation that is claimed to conform to the reference specification for the Signalling System Number 7, Application Transport Mechanism, support of VPN applications with PSS1 information flows ITU-T Recommendation Q.765.1 [18] is required to complete a copy of the PICS proforma provided in annex A document EN 301 062-2 [1].

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.

[1] ETSI EN 301 062-2: "Integrated Services Digital Network (ISDN); Signalling System No.7; Support of Virtual Private Network (VPN) applications with Private network Q reference point Signalling System number 1 (PSS1) information flows; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[2] ETSI EN 301 062-4: "Integrated Services Digital Network (ISDN); Signalling System No.7; Support of Virtual Private Network (VPN) applications with Private network Q reference point Signalling System number 1 (PSS1) information flows; Part 4: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".

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

[4] ISO/IEC 9646-3 (1998): "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 E.164 (1997): "The international public telecommunication numbering plan".

[7] ITU-T Recommendation Q.701 (1993): "Functional description of the message transfer part (MTP) of Signalling System No. 7".

[8] ITU-T Recommendation Q.702 (1988): "Signalling data link".

[9] ITU-T Recommendation Q.703 (1996): "Signalling link".

[10] ITU-T Recommendation Q.704 (1996): "Signalling network functions and messages".

[11] ITU-T Recommendation Q.705 (1993): "Signalling network structure".

[12] ITU-T Recommendation Q.706 (1993): "Message transfer part signalling performance".

[13] ITU-T Recommendation Q.707 (1988): "Testing and maintenance".

[14] ITU-T Recommendation Q.762 (1997): "Signalling System No. 7; ISDN user part general functions of messages and signals".

[15] ITU-T Recommendation Q.763 (1997): "Signalling System No. 7; ISDN user part formats and codes".

[16] ITU-T Recommendation Q.764 (1997): "Signalling System No. 7; ISDN user part signalling procedures".

[17] ITU-T Recommendation Q.765: "Signalling System No. 7; Application Transport Mechanism".

[18] ITU-T Recommendation Q.765.1: "Signalling System No. 7; Application Transport Mechanism, support of VPN applications with PSS1 information flows".

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 specification ITU-T Recommendations Q.765.1 [18], Q.765 [17], Q.763 [15] and Q.764 [16];

- 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 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 [6]

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], subclause 3.3.39 and subclause 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], subclause 3.3.41 and subclause 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:

ACM	Address Complete Message
ANM	ANswer Message
APM	Application transPort Mechansim protocol control
ASE	Application Service Entity
ATII	Application Transport Instruction Indicators
ATM	Abstract Test Method
ATS	Abstract Test Suite
CNID	Corporate Telecommunications Network Identifier
CON	CONnect
CPG	Call Progress messaGe
CPN	Calling Party Number
DLE	Destination Local Exchange
GPINX	Gateway PINX
IAM	Initial Address Message
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
IUT	Implementation Under Test
LAB	PCO for signalling link
LAC	PCO for signalling link
LT	Lower Tester
MNT	Maintenance PCO
MOT	Means Of Testing
MTP	Message Transfer Part
NNI	Network-Network Interface
OLE	Originating Local Exchange
PAN	Public Addressed Node
PCO	Point of Control and Observation
PICS	Protocol Implementation Conformance Statement
PIN	Public Initiating Node
PINX	Private Integrated Services Network Exchange
PIXIT	Protocol Implementation eXtra Information for Testing
PSS1	Private network Q reference point Signalling System number 1
SP	Signalling Point
SUT	System Under Test
TCP	Test Coordination Procedures
TP	Test Purpose (context dependent)
TPINX	Transit PINX
TSS	Test Suite Structure
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester
VPN	Virtual Private Network

The ISUP message acronyms can be found in table 2 of ITU-T Recommendation Q.762 [14].

The APM primitives acronyms can be found in the different tables of ITU-T Recommendation Q.765 [17].

The VPN primitives acronyms can be found in the different tables of ITU-T Recommendation Q.765.1 [18].

3.2.1 ISUP abbreviations

The following abbreviations apply for ISUP parameters and parameter values.

AdSg	Address Signals
CdPN	called party number
CgPN	Calling Party Number
GenNb	generic number parameter
GenNot	Generic Notification
IUT	Implementation Under Test
LAB	PCO for signalling link
LT	Lower Tester
MNT	Maintenance PCO
PAN	Public Addressed Node
PCO	Point of Control and Observation
PIN	Public Initiating Node
TCP	Test Coordination Procedures
TMR	Transmission Medium Requirement
TPINX	Transit PIN
USI	User Service Indicator
UT	Upper Tester
UT	Upper Tester

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 Application Transport Mechanism, support of VPN applications with PSS1 information flows, as shown in figure 1.

The protocol functions for the Application Transport Mechanism, support of VPN applications with PSS1 information flows' relates to the signalling associations with a bearer (ISUP). Therefore the defined ISUP Basic Call and its associated formats and codes are required to support the Application Transport Mechanism for VPN applications. The following main subjects have to be considered in this area:

a) APM-user Protocol Control (APM-user Application Service Element);

b) Application Transport Mechanism protocol control (APM Application Service Element);

c) ISUP Basic Call (ISUP Application Service Element.

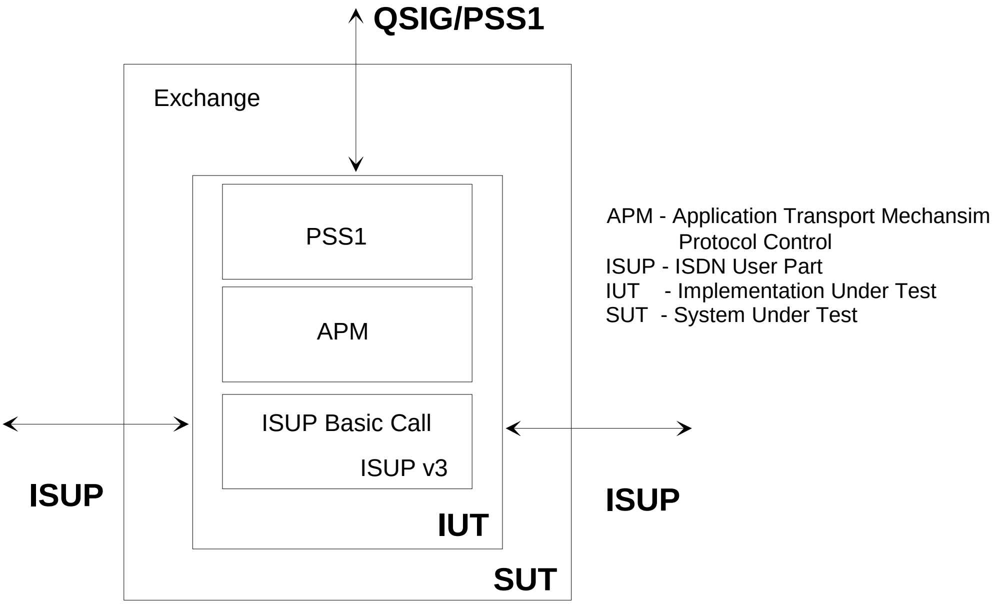

Figure 1: The System Under Test

The ISUP signalling protocol can be observed on the SS No.7 link on the Network-Network Interface (NNI).

4.2 ATM and testing configuration for ISUP v3 - APM support of VPN

The Abstract Test Method (ATM) chosen for the Application Transport Mechanism, support of VPN applications with PSS1 information flows' 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 testing architectures are described in the following subclauses.

The ATS is written in concurrent TTCN.

4.3 Local exchanges

As mentioned above, the IUT can be tested within different configurations. The following text describes the test configuration for the IUT where the software for IUSP v3 and also the VPN part reside in a local exchange.

Figure 2 shows the logical test components of the adopted test configuration. The main test component is located on the right side of the IUT, it contains the ISUP part. On the left side there is a parallel test component which covers the VPN part.

To observe and control the message flow on the ISUP and VPN side for each side a Point of Control and Observation (PCO) is needed. The PCO for the ISUP link is abbreviated with an 'L' followed by two letters indicating the interface. The PCO for the PSS1 interface is abbreviated with an 'A' followed by two letters indicating the interface.

The LAB PCO is used by the Lower Tester (LT) to control and observe the ISUP on the signalling to the exchange.

The ACH PCO is used by the Upper Tester (UT) to control and observe the PSS1 signalling to the PIN.

The MNT PCO is used by the Upper Tester (UT) to control and observe the maintenance functions of the exchange.