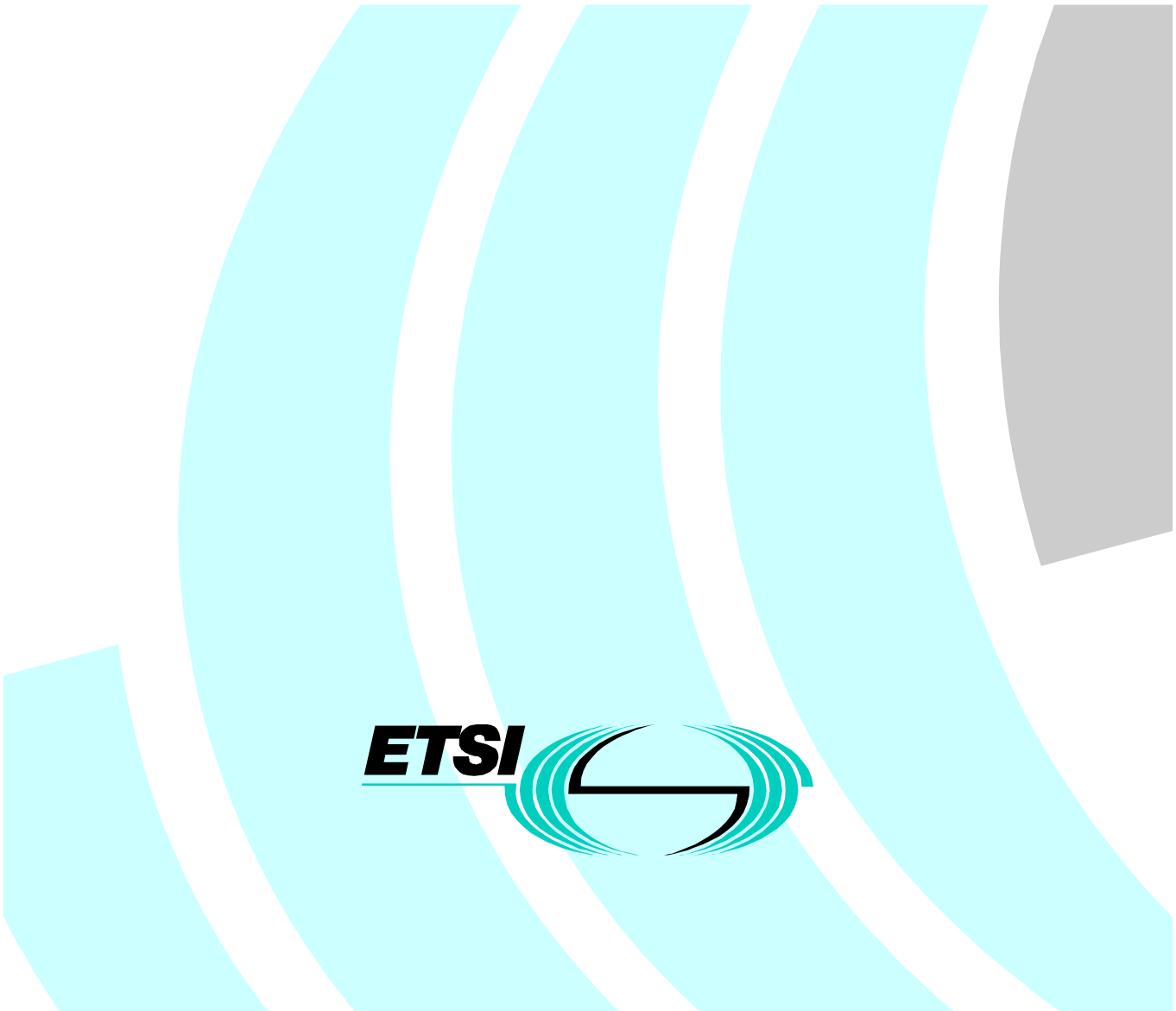
ETSI EN 301 062-4 V1.1.1 (2000-10)

European Standard (Telecommunications series)

**Integrated Services Digital Network (ISDN);
Signalling System No.7 (SS7);
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**



Reference
DEN/SPAN-01032-4

Keywords
ATS, ISDN, ISUP, PINX, PIXIT, SS7, VPN

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://www.etsi.org/ipr).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

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 4 of a multi-part EN covering the Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); 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) proforma specification".

National transposition dates	
Date of adoption of this EN:	13 October 2000
Date of latest announcement of this EN (doa):	31 January 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 July 2001
Date of withdrawal of any conflicting National Standard (dow):	31 July 2001

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 EN 301 062-1 [1]. 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.

The main body of the present document presents the PIXIT, PCTR and the ATS the last one being available on electronic media.

The document EN 301 062-2 [2] presents the PICS and EN 301 062-3 [3] presents the TSS&TP 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 [5] is required to complete a copy of the PICS proforma provided in annex A of EN 301 062-2 [2].

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 301 062-1 (V1.2): "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 1: Protocol specification [ITU-T Recommendations Q.765.1 and Q.699.1, modified]".

[2] 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".

[3] ETSI EN 301 062-3: "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".

[4] ITU-T Recommendation Q.762: "Signalling System No. 7 - ISDN User Part general functions of messages and signals".

[5] ITU-T Recommendation Q.765.1: "Signalling System No. 7 - Application transport mechanism: Support of VPN applications with PSS1 information flows".

[6] ETSI EN 300 356-1 (V3.2): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1997), modified]".

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

[8] ISO/IEC 9646-3: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

[9] ISO/IEC 9646-5: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".

[10] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[11] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

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 [1] and [6];
- terms defined in ISO/IEC 9646-1 [7], ISO/IEC 9646-3 [8] and in ISO/IEC 9646-7 [10].

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 [7], 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 [7], subclause 3.3.5).

Abstract Test Suite (ATS): test suite composed of abstract test cases (see ISO/IEC 9646-1 [7], 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 [7], subclause 3.3.43).

ISDN number: number conforming to the numbering and structure specified in ITU-T Recommendation E.164 [11].

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 [7], 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: 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 [7], 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 [7], 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 [7], 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 [7], subclause 3.3.103).

3.2 Abbreviations

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

ATM	Abstract Test Method
ATS	Abstract Test Suite
GPINX	Gateway PINX
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
IUT	Implementation Under Test
MOT	Means Of Testing
MTP	Message Transfer Part
PICS	Protocol Implementation Conformance Statement
PIN	Public Initiated 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
TP	Test Purpose (context dependent)
TSS	Test Suite Structure
TSS&TP	Test Suite Structure and Test Purposes
TTCN	Tree and Tabular Combined Notation
VPN	Virtual Private Network

The ISUP message acronyms can be found in table 2 of ITU-T Recommendation Q.762 [4].

The APM primitives acronyms can be found in the different tables of ITU-T Recommendation Q.765.1 [5].

The VPN primitives acronyms can be found in the different tables of ITU-T Recommendation Q.765.1 [5].

Annex A (normative): PIXIT proforma for Support of Virtual Private Network (VPN) applications

The PIXIT proforma enlists all the parameters and data that are needed to configure the ATS (and/or the IUT) before executing the testing campaign. It is to be filled out as part of the preparation for testing by e.g. the test client. The testing laboratory then inputs this data into the implementation of the ATS. More information about the purpose and intent of the PIXIT can be found in ISO 9646-5 [9] .

A.1 Identification summary

PIXIT Number:	
Test Laboratory Name:	
Date of Issue:	
Issued to:	

A.2 Abstract test suite summary

Protocol Specification:	
ATS Specification:	ISUPv3_vpn
Abstract Test Method:	Distributed multiparty test method

A.3 Test laboratory

Test Laboratory Identification:	
Test Laboratory Manager:	
Test Laboratory contact:	
Means of Testing:	
Instructions for completion:	

A.4 Client identification

Client Identification:	
Client Test manager:	
Test Facilities required:	

A.5 System under test

Name:	
Version:	
SCS Number:	
Machine configuration:	
Operating system identification:	
IUT Identification:	
PICS Reference for IUT:	
Limitations of the SUT:	
Environmental conditions:	

A.6 Ancillary protocols

Protocol name	Version No.	PICS Ref.	PIXIT Ref.	PCTR Ref.
MTP				
Access protocol				

A.7 Protocol information for ISUP

A.7.1 Protocol identification

Name:	ISDN User Part (ISUP) v3
Version:	
PICS references:	

A.7.2 IUT information - PIXIT proforma tables

The PIXIT information requested in the following tables is needed to provide the necessary information for the execution of the testing campaign. It is assumed that one exchange role is tested at one time. The answers to some PIXIT questions are related to an individual role. A typical example is the nature of address indicator of the called party number value, which is different in the case of international gateways and national exchanges. That is why if several roles are to be tested, one completed copy of the PIXIT proforma for each role is needed.

A.7.2.1 General configuration

Signalling point codes

Two signalling point codes - one incoming and one outgoing have to be defined for the IUT. For an international intermediate exchange the incoming and outgoing point codes are the same, whereas for an international gateway exchange there are two different signalling point codes because they belong to two separate networks (international and national).

Circuit identification codes

From a formal point of view, in most test cases it is sufficient to use only one CIC per signalling link in order to execute the testing. From a practical point of view the tester could select any CIC within a range of CICs belonging to a route, when initiating a call set-up. The tester can, however, use the first CIC in the circuit group, without reducing the generality. The ATS requires the first CIC in the group as an answer to the PIXIT questions A.1/5 and A.1/12 in table A.1.

Table A.1: General configuration

Item	Parameter	Parameter Type	Explanation	Value
1	TSP_SPA_R	BIT_14	SS No. 7 Signalling point code of the SUT on the AB interface (right side)	
2	TSP_SPB	BIT_14	SS No. 7 Signalling point code of the tester on the AB interface	
3	TSP_NI_R	BIT_2	SS No. 7 Network indicator on the AB interface	
4	TSP_SLS_R	BIT_4	SS No. 7 Signalling link selection on the AB interface	
5	TSP_CIC_R	BIT_12	SS No. 7 Circuit identification code on the AB interface	
6	TSP_NB_CICS	BIT_12	Number of SS No. 7 Circuit identification codes on the AB and AC interfaces	
7	TSP_SPA_L	BIT_14	SS No. 7 Signalling point code of the SUT on the AC interface (left side)	
8	TSP_SPC	BIT_14	SS No. 7 Signalling point code of the tester on the AC interface	
9	TSP_NI_L	BIT_2	SS No. 7 Network indicator on the AC interface	
10	TSP_SLS_L	BIT_4	SS No. 7 Signalling link selection on the AC interface	
11	TSP_CIC_L	BIT_12	SS No. 7 Circuit identification code on the AC interface	
12	TSP_Link_R	BIT_12	CIC for the signalling link on the AB interface	
13	TSP_Link_L	BIT_12	CIC for the signalling link on the AC interface	

A.7.2.2 Parameter values

Called party numbers

The called party numbers have to be specified for each role which is to be tested.

Table A.2: Parameter values

Item	Parameter	Parameter Type	Explanation	Value
1	TSP_Nb_SPA	HEX_N	Subscriber number for which the call will be routed to signalling point A (SP A)	
2	TSP_Nb_SPB	HEX_N	Subscriber number for which the call will be routed to signalling point B (SP B)	
3	TSP_Nb_SPC_ non_ISUP	HEX_N	Subscriber number for which the call will be routed to signalling point C (SP C) via non-ISUP (e.g. R2 or TUP)	
4	TSP_Nb_Operator	HEX_N	Subscriber number which has to be called to reach the operator located at the IUT (SP A)	

A.7.2.3 Timer values

Table A.3: Timer values

Item	Parameter	Parameter Type	Type	Value
1	TSP_T7	INTEGER	Wait for some event timer (20 - 30 s)	
2	TSP_TearlyACM	INTEGER	Early ACM (5 - 20 s)	
3	T_A_STEP	INTEGER	Test step execution control timer	
4	T_B_STEP	INTEGER	Test step execution control timer	
5	T_WAIT	INTEGER	Local timer	

A.7.2.4 Procedural information

Table A.4: Procedural information

Item	Parameter	Parameter Type	Explanation	Value

Annex B (normative): Protocol Conformance Test Report (PCTR) Proforma for Support of Virtual Private Network (VPN) applications

The PCTR Proforma is based on ISO/IEC 9646-5 [9] . Any additional information needed can be found in the present document.

B.1 Identification summary

B.1.1 Protocol conformance test report

PCTR Number:	
PCTR Date:	
Test Laboratory Identification:	
Test Laboratory Manager:	
Signature:	

B.1.2 IUT identification

Name:	
Version:	
Protocol specification:	
PICS:	
Previous PCTR if any:	

B.1.3 Testing environment

PIXIT Number:	
ATS Specification:	
Abstract Test Method:	Distributed multiparty test method
Means of Testing identification:	
Date of testing:	
Conformance Log reference(s):	
Retention Date for Log reference(s):	

B.1.4 Limits and reservation

Additional information relevant to the technical contents or further use of the test report, or the rights and obligations of the test laboratory and the client, may be given here. Such information may include restriction on the publication of the report.

.....

.....

.....

.....

B.1.5 Comments

Additional comments may be given by either the client or the test laboratory on any of the contents of the PCTR, for example, to note disagreement between the two parties.

.....

.....

.....

.....

B.2 IUT Conformance status

This IUT has/has not been shown by conformance assessment to be non-conforming to the referenced protocol specification.

Strike the appropriate words in this sentence. If the PICS for this IUT is consistent with the static conformance requirements (as specified in clause B.3 in this report) and there are no "FAIL" verdicts to be recorded (in clause B.6) strike the word "has/". Otherwise strike the words "/has not".

B.3 Static conformance summary

The PICS for this IUT is or is not consistent with the static conformance requirements in the specified protocol.

Strike the appropriate words in this sentence.

B.4 Dynamic conformance summary

The test campaign did/did not reveal errors in the IUT.

Strike the appropriate words in this sentence. If there are no "FAIL" verdicts to be recorded (in clause B.6 of this report) strike the word "did/". Otherwise strike the words "/did not".

Summary of the results of groups of test:

.....

.....

.....

.....

B.5 Static conformance review report

If clause B.3 indicates non-conformance, this subclause itemizes the mismatches between the PICS and the static conformance requirements of the specified protocol specification.

.....

.....

.....

.....

B.6 Test campaign report

Table B.1: Test campaign report - PINP

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_1_1_1				
VPN_V_1_1_2				
VPN_V_1_1_3				

Table B.2: Test campaign report - PANP

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_1_2_1				
VPN_V_1_2_2				
VPN_V_1_2_3				

Table B.3: Test campaign report - CNID

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_2_1				
VPN_V_2_2				

Table B.4: Test campaign report - ATII

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_3_1				
VPN_V_3_2				

Table B.5: Test campaign report - OVER

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_4_1				
VPN_V_4_2				

Table B.6: Test campaign report – VPN_SUP

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_5_1				
VPN_V_5_2				
VPN_V_5_3				
VPN_V_5_4				
VPN_V_5_5				
VPN_V_5_6				
VPN_V_5_7				
VPN_V_5_8				

Table B.7: Test campaign report – NOT_SUP

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_6_1				
VPN_V_6_2				
VPN_V_6_3				
VPN_V_6_4				
VPN_V_6_5				
VPN_V_6_6				

Table B.8: Test campaign report - GPINX

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_7_1				
VPN_V_7_2				
VPN_V_7_3				
VPN_V_7_4				
VPN_V_7_5				

Table B.9: Test campaign report - ERROR

ATS Reference	Selected [Y/N]	Run [Y/N]	Verdict [P/F/I]	Observations (Reference to any observations made in clause B.7)
VPN_V_8_1				
VPN_V_8_2				
VPN_V_8_3				
VPN_V_8_4				

B.7 Observations

Additional information relevant to the technical content of the PCTR is given here.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Annex C (normative): ATS for support of Virtual Private Network (VPN) applications

This ATS has been produced using the Tree and Tabular Combined Notation (TTCN) according to ISO/IEC 9646-3 [8].

The ATS was developed on a separate TTCN software tool and therefore the TTCN tables are not completely referenced in the table of contents. The ATS itself contains a test suite overview part which provides additional information and references.

C.1 The TTCN Graphical form (TTCN.GR)

The TTCN.GR representation of this ATS is contained in an Adobe Portable Document Format™ file (sps1032_4.PDF contained in archive en_30106204v010101p0.ZIP) which accompanies the present document.

C.2 The TTCN Machine Processable form (TTCN.MP)

The TTCN.MP representation corresponding to this ATS is contained in an ASCII file (sps1032_4.MP contained in archive en_30106204v010101p0.ZIP) which accompanies the present document.

NOTE: Where an ETSI Abstract Test Suite (in TTCN) is published in both .GR and .MP format these two forms shall be considered equivalent. In the event that there appears to be syntactical or semantic differences between the two then the problem shall be resolved and the erroneous format (whichever it is) shall be corrected.

Bibliography

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

- ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- ITU-T Recommendation Q.784.2: "ISUP basic call test specification: Abstract test suite for ISUP'92 basic call control procedures".

History

Document history			
V1.1.1	January 2000	Public Enquiry	PE 200018: 2000-01-05 to 2000-05-05
V1.1.1	August 2000	Vote	V 20001013: 2000-08-14 to 2000-10-13
V1.1.1	October 2000	Publication	