

ETSI EN 301 452-2 V1.3.1 (2000-12)

European Standard (Telecommunications series)

**Private Integrated Services Network (PISN);
Inter-exchange signalling protocol;
Call completion supplementary service
for the VPN "b" service entry point;
Part 2: Abstract Test Suite (ATS) and partial Protocol
Implementation eXtra Information for Testing (PIXIT)
proforma**



Reference

DEN/SPAN-05188-3

KeywordsPSS1, PISN, VPN, supplementary service,
CCBS, CCNR, testing, ATS, PIXIT**ETSI**

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Sous-Préfecture de Grasse (06) N° 7803/88

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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 2 for a multi-part deliverable covering the Inter-exchange signalling protocol; Call completion supplementary service for the VPN "b" service entry point, as described below:

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

Part 2: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".

National transposition dates	
Date of adoption of this EN:	8 December 2000
Date of latest announcement of this EN (doa):	31 March 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 September 2001
Date of withdrawal of any conflicting National Standard (dow):	30 September 2001

1 Scope

This second part of EN 301 452 specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the VPN "b" entry point of implementations conforming to the standard for the Call completion supplementary service (SS-CC) as described in ETS 300 366 [1].

EN 301 452-1 [2] specifies the Test Suite Structure and Test Purposes (TSS&TP) related to this ATS and partial PIXIT proforma specification.

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] ETSI ETS 300 366 (1995): "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Call completion supplementary services [ISO/IEC 13870 (1995) modified]".
- [2] ETSI EN 301 452-1 (V1.1.4) "Private Integrated Services Network (PISN); Inter-exchange signalling protocol: Call completion supplementary service for the VPN "b" service entry point; Test Suite and Test Purposes (TSS&TP)".
- [3] ISO/IEC 9646 (all parts): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework".
- [4] ETSI TR 101 101 (V1.1.1): "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)".
- [5] ISO/IEC 8825-1: "Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)" (See also ITU-T Recommendation X.690)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO/IEC 9646 [3] shall apply.

3.2 Abbreviations

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

APDU	Application Protocol Data Unit
ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite

BER	Basic Encoding Rules
CCBS	Call Completion to Busy Subscriber
CCNR	Call Completion on No Reply
CM	Co-ordination Message
ETS	Executable Test Suite
IUT	Implementation Under Test
LT	Lower Tester
MOT	Means Of Testing
MTC	Main Test Component
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PTC	Parallel Test Component
SUT	System Under Test
TP	Test Purpose
TTCN	Tree and Tabular Combined Notation
VPN	Virtual Private Network

4 Abstract Test Method (ATM)

4.1 Description of ATM used

The multi-party test method is applied for testing the IUT. The general configuration used is shown in figure 1.

A Point of Control and Observation (PCO) resides at the service access point between layers 2 and 3 in the test system. The PCO used by the MTC is named "LO" (for Lower). This PCO is used to control and observe the behaviour of the Implementation Under Test (IUT) and test case verdicts are assigned depending on the behaviour observed at this PCO.

A second "informal" PCO, called "O" (for Operator) is used to specify control but not observation above the IUT; events at this PCO are never used to generate test case verdicts. Messages sent by the tester at this PCO explicitly indicate to the operator actions which are to be performed on the SUT. This is regarded as a preferred alternative to the use of the implicit send event.

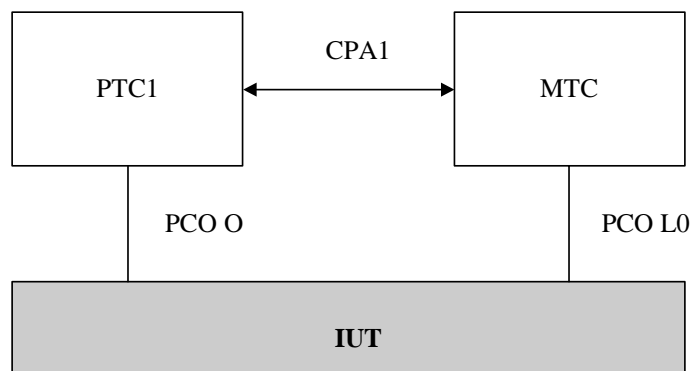


Figure 1: Multi-party test method

The relationship between the IUT and the tester is as follows:

- when the IUT is either in the Originating configuration or in the Terminating configuration, the IUT is connected to the MTC. The verdict depends on the behaviour observed at the PCO between the IUT and the MTC. The PCO O is used to specify control above the IUT, using the PTC process.

5 Untestable test purposes

There are no untestable test cases associated with this ATS and ATM.

6 ATS conventions

6.1 Version of TTCN used

The version of TTCN used is that defined in TR 101 101 [4].

6.2 Use of ASN.1

6.2.1 Situations where ASN.1 is used

ASN.1 has been used for three major reasons. First, types defined in ASN.1 can model problems that "pure" TTCN cannot. For instance, data structures modelling ordered or unordered sequences of data are preferably defined in ASN.1. Second, ASN.1 provides a better restriction mechanism for type definitions by using sub-type definitions. Third, it is necessary to use ASN.1 to reproduce the type definitions for remote operation components as specified in the base standards in ASN.1.

The possibility to use TTCN and ASN.1 in combination is used, i.e. referring to an ASN.1 type from a TTCN type.

6.2.2 Specification of encoding rules

There is a variation in the encoding rules applied to ASN.1 types and constraints specified in this ATS and therefore a mechanism is needed to differentiate the encoding rules. However the mechanism specified in ISO/IEC 9646-3/AM2 [3] and in TR 101 101 [4] does not facilitate definition of the encoding rules as needed for this ATS. A solution is therefore used which is broadly in the spirit of ISO/IEC 9646-3/AM2 [3] in which comment fields have been used as a means of encoding rules.

For ASN.1 used in this ATS, two variations of encoding rules are used. One is the commonly known Basic Encoding Rules (BER) as specified in ISO/IEC 8825-1 [5]. In the second case the encoding is according to ISDN, i.e. the ASN.1 data types are a representation of structures contained within the ISDN specification (basic call, Generic functional protocol or individual supplementary service). For example, if octets of an information element are specified in ASN.1 as a SEQUENCE then this should be encoded in an Executable Test Suite (ETS) as any other ISDN information element specified using tabular TTCN. This ISDN encoding variation is the default encoding rule for this ATS. This means that all ASN.1 constraint tables are encoded using ISDN (non-BER) encoding unless stated otherwise. BER encoding should never be applied to an ASN.1 constraint where BER encoding has not been specified. This encoding rule is sometimes named "Direct Encoding".

For BER encoding, an indication is given in the comments field of the table header. For this ATS such indications appear in the ASN.1 type constraint declaration tables only. In the table header comment field, the notation "ASN1_Encoding: BER" is used.

In this particular ATS all ASN.1 type constraints which are of type "Component" are to be encoded using BER.

Table 1 shows an example of a ASN.1 type Constrained Declaration used in this ATS.

Table 1: ASN.1 type constraint declaration showing use of encoding variation

ASN.1 Type Constraint Declaration	
Constraint Name : CCBSRequestInv_S1 (INV_ID: InvokeIDType)	
ASN.1 Type : Component	
Derivation Path :	
Comments : Sent Component: CCBSRequest Invoke component, maintain signalling connection is required (i.e. retain_sig_connection TRUE)	
ASN1_Encoding: BER	
Description	
cCBSRequest_Comp	
cCBSRequest_InvokeComp	
{ invokeID	INV_ID, -- the invoke identifier
operation_value	localValue 40, -- value for operation
argument	{numberA
	PX_Number_A1,
	numberB
	PX_Number_B,
	service
	PX_PSS1_IE, -- BCAP/HLC/LLC embedded
	subaddrA
	OMIT,
	subaddrB
	OMIT,
	can_retain_service
	OMIT,
	retain_sig_connection
	TRUE,
	extension
	OMIT
	}
}	
Detailed comments :	

7 ATS to TP map

The identifiers used for the TPs are reused as test case names. Thus there is a straightforward one-to-one mapping.

8 PCTR conformance

A test laboratory, when requested by a client to produce a PCTR, is required, as specified in ISO/IEC 9646-5 [3], to produce a PCTR conformant with the PCTR template given in annex B of ISO/IEC 9646-5 [3].

Furthermore, a test laboratory, offering testing for the ATS specification contained in annex C, when requested by a client to produce a PCTR, is required to produce a PCTR conformant with the PCTR proforma contained in annex A.

A PCTR which conforms to this PCTR proforma specification shall preserve the content and ordering of the clauses contained in annex A. Clause A.6 of the PCTR may contain additional columns. If included, these shall be placed to the right of the existing columns. Text in italics may be retained by the test laboratory.

9 PIXIT conformance

A test realizer, producing an executable test suite for the ATS specification contained in annex C, is required, as specified in ISO/IEC 9646-4 [3], to produce an augmented partial PIXIT proforma conformant with this partial PIXIT proforma specification.

An augmented partial PIXIT proforma which conforms to this partial PIXIT proforma specification shall, as a minimum, have contents which are technically equivalent to annex B. The augmented partial PIXIT proforma may contain additional questions that need to be answered in order to prepare the Means Of Testing (MOT) for a particular IUT.

A test laboratory, offering testing for the ATS specification contained in annex C, is required, as specified in ISO/IEC 9646-5 [3], to further augment the augmented partial PIXIT proforma to produce a PIXIT proforma conformant with this partial PIXIT proforma specification.

A PIXIT proforma which conforms to this partial PIXIT proforma specification shall, as a minimum, have contents which are technically equivalent to annex B. The PIXIT proforma may contain additional questions that need to be answered in order to prepare the test laboratory for a particular IUT.

10 ATS conformance

The test realizer, producing MOT and ETS for this ATS specification, shall comply with the requirements of ISO/IEC 9646-4 [3]. In particular, these concern the realization of an ETS based on each ATS. The test realizer shall provide a statement of conformance of the MOT to this ATS specification.

An ETS which conforms to this ATS specification shall contain test groups and test cases which are technically equivalent to those contained in the ATS in annex C. All sequences of test events comprising an abstract test case shall be capable of being realized in the executable test case. Any further checking which the test system might be capable of performing is outside the scope of this ATS specification and shall not contribute to the verdict assignment for each test case.

Test laboratories running conformance test services using this ATS shall comply with ISO/IEC 9646-5 [3].

A test laboratory which claims to conform to this ATS specification shall use an MOT which conforms to this ATS.

Annex A (normative): Protocol Conformance Test Report (PCTR) proforma

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the PCTR proforma in this annex so that it can be used for its intended purposes and may further publish the completed PCTR.
--

A.1 Identification summary

A.1.1 Protocol conformance test report

PCTR number:	
PCTR date:	
Corresponding SCTR number:	
Corresponding SCTR date:	
Test laboratory identification:	
Test laboratory manager:	
Signature:	

A.1.2 IUT identification

Name:	
Version:	
Protocol specification:	ETS 300 366
PICS:	
Previous PCTRs (if any):	

A.1.3 Testing environment

PIXIT reference number:	
ATS specification:	EN 301 452-2
Abstract test method:	Multi-party test method (see ISO/IEC 9646-2)
Means of testing identification:	
Dates of testing:	
Conformance log reference(s):	
Retention date for log reference(s):	

A.1.4 Limits and reservations

Additional information relevant to the technical contents or further use of the test report, or to 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.

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A.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.

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A.2 IUT conformance status

This IUT has / has not been shown by conformance assessment to be non-conforming to the specified 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 A.3 of this report) and there are no "FAIL" verdicts to be recorded (in clause A.6) strike the words "has", otherwise strike the words "has not".

A.3 Static conformance summary

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

Strike the appropriate words in this sentence.

A.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 A.6 of this report) strike the word "did", otherwise strike the words "did not".

Summary of the results of groups of tests:

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A.5 Static conformance review report

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

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A.6 Test campaign report

ATS reference	Selected? (Y/N)	Run? (Y/N)	Verdict	Observations
Group Orig01				
CC_Orig01_001				
CC_Orig01_002				
CC_Orig01_003				
CC_Orig01_004				
CC_Orig01_005				
CC_Orig01_006				
Group Orig02				
CC_Orig02_001				
CC_Orig02_002				
CC_Orig02_003				
CC_Orig02_004				
CC_Orig02_005				
CC_Orig02_006				

ATS reference	Selected? (Y/N)	Run? (Y/N)	Verdict	Observations
Group Orig03				
CC_Orig03_001				
CC_Orig03_002				
CC_Orig03_003				
CC_Orig03_004				
CC_Orig03_005				
CC_Orig03_006				
CC_Orig03_007				
CC_Orig03_008				
CC_Orig03_009				
Group Orig04				
CC_Orig04_001				
CC_Orig04_002				
CC_Orig04_003				
CC_Orig04_004				
CC_Orig04_005				
CC_Orig04_006				
CC_Orig04_007				
CC_Orig04_008				
CC_Orig04_009				
CC_Orig04_010				
CC_Orig04_011				
CC_Orig04_012				
CC_Orig04_013				
CC_Orig04_014				
CC_Orig04_015				
CC_Orig04_016				
CC_Orig04_017				
CC_Orig04_018				
Group Orig05				
CC_Orig05_001				
CC_Orig05_002				
Group Orig06				
CC_Orig06_001				
CC_Orig06_002				
CC_Orig06_003				
CC_Orig06_004				
CC_Orig06_005				
CC_Orig06_006				
Group Orig07				
CC_Orig07_001				
CC_Orig07_002				
CC_Orig07_003				
CC_Orig07_004				
CC_Orig07_005				
CC_Orig07_006				
CC_Orig07_007				
CC_Orig07_008				
CC_Orig07_009				
Group Orig08				
CC_Orig08_001				
CC_Orig08_002				

ATS reference	Selected? (Y/N)	Run? (Y/N)	Verdict	Observations
CC_Orig08_003				
CC_Orig08_004				
CC_Orig08_005				
CC_Orig08_006				
CC_Orig08_007				
CC_Orig08_008				
CC_Orig08_009				
CC_Orig08_010				
CC_Orig08_011				
CC_Orig08_012				
CC_Orig08_013				
CC_Orig08_014				
CC_Orig08_015				
CC_Orig08_016				
CC_Orig08_017				
CC_Orig08_018				
Group Term01				
CC_Term01_001				
CC_Term01_002				
CC_Term01_003				
CC_Term01_004				
Group Term02				
CC_Term02_001				
CC_Term02_002				
CC_Term02_003				
CC_Term02_004				
Group Term03				
CC_Term03_001				
CC_Term03_002				
Group Term04				
CC_Term04_001				
CC_Term04_002				
CC_Term04_003				
CC_Term04_004				
CC_Term04_005				
Group Term05				
CC_Term05_001				
CC_Term05_002				
CC_Term05_003				
CC_Term05_004				
CC_Term05_005				
CC_Term05_006				
CC_Term05_007				
CC_Term05_008				
CC_Term05_009				
CC_Term05_010				
Group Term06				
CC_Term06_001				
CC_Term06_002				
CC_Term06_003				
Group Term07				
CC_Term07_001				

ATS reference	Selected? (Y/N)	Run? (Y/N)	Verdict	Observations
CC_Term07_002				
CC_Term07_003				
CC_Term07_004				
CC_Term07_005				
CC_Term07_006				
CC_Term07_007				
CC_Term07_008				
CC_Term07_009				
Group Int01				
CC_Int01_001				
Group Int02				
CC_Int02_001				

A.7 Observations

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

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Annex B (normative): Partial PIXIT proforma

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B.1 Identification summary

PIXIT number:

.....

Test laboratory name:

.....

Date of issue:

.....

Issued to:

.....

B.2 Abstract test suite summary

Protocol specification:

ETS 300 366

ATS specification:

EN 301 452-2

Abstract test method:

Multi-party test method (see ISO/IEC 9646-2)

B.3 Test laboratory

Test laboratory identification:

.....

Accreditation status of the test service:

.....

Accreditation reference:

.....

Test laboratory manager:

.....

Test laboratory contact:

.....

Means of testing:

.....

Test laboratory instructions for completion:

.....

B.4 Client (of the test laboratory)

Client identification:

.....

Client test manager:

.....

Client contact:

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Test facilities required:

.....

B.5 System Under Test (SUT)

Name:

.....

Version:

.....

SCS reference:

.....

Machine configuration:

.....

Operating system identification:

.....

IUT identification:

.....

PICS (all layers):

.....

.....

Limitations of the SUT:

.....

Environmental conditions:

.....

B.6 Protocol information

B.6.1 Protocol identification

Specification reference: ETS 300 366

Protocol version: 1.3.1

PICS reference:

NOTE: The PICS reference should reference a completed PICS which is conform with the PICS proforma contained in EN 301 452-2.

B.6.2 IUT information

B.6.2.1 Parameter values

Table B.1: Parameter values

Item	Question	Supported? (Y/N)	Allowed values	Value
1.1	A value for the length of the Business Group Identification		BITSTRING	
1.2	A value for the Business Group Identifier		BITSTRING	
1.3	A value for the Business Group Identification		OCTETSTRING	
1.4	A value of the PSS1 information element		OCTETSTRING	

B.6.2.2 Timer values

Table B.2: Timer values

Item	Timer duration	Supported? (Y/N)	Allowed values	Value
2.1	Wait for the test operator to perform an implicit send action or to wait for a PTC to react (TWAIT). Duration in s.		Integer	
2.2	Wait for the IUT to respond to a stimulus sent by the tester (TAC). Duration in s.		Integer	
2.3	Control that the IUT does not respond to a stimulus sent by the tester (TNOAC). Duration in s.		Integer	
2.4	Timer that is used to wait for a RESTART PDU(T_RESTART). Duration in s		Integer	

NOTE: The IUT provider fill in a value range rather than a fixed value for the test management timers. During test execution the test laboratory will choose specific values for the timers dependant on the means of testing used. These specific values may even be beyond the range given by the IUT provider, if this is necessary for achieving satisfactory test results.

B.6.2.3 Information parameter values

Table B.3: Information parameter values

Item	Question	Supported? (Y/N)	Value
3.1	Length of the Called Party Number information element		
3.2	Octet 3 of the Called Party Number information element		
3.3	Number digits of the Called Party Number information element		
3.4	Length of the Called Party Number information element with incomplete number information		
3.5	Number digits of the Called Party Number information element with incomplete number information		
3.6	ASN1 parameter: PresentedNumberUnscreened of user A		
3.7	ASN1 parameter: PartyNumber of user A		
3.8	ASN1 parameter: PartyNumber of user B		
3.9	ASN1 parameter: PartyNumber of the Diverted-To user (user B)		
3.10	CC-CDIV interworking: when the DivertedToNr shall be equal to the Called party number; Length of the Called party number information element to be sent to the IUT		
3.11	CC-CDIV interworking: when the DivertedToNr shall be equal to the Called party number; Octet 3 (Type of number, Numbering plan identification) of the Called party number information elements to be sent to the IUT		
3.12	CC-CDIV interworking: when the DivertedToNr shall be equal to the Called party number; Number digits (IA5) for the Called party number information element to be sent to the IUT		
3.13	Which Diversion Reason is tested		

B.6.2.4 Configuration Options

Table B.4: Configuration Options

Item	Question	Supported? (Y/N)	Allowed values	Value
4.1	A value to select if the IUT chooses to retain the signalling connection		Y/N	
4.2	a value to select if simulation of network congestion is possible		Y/N	
4.3	a value to select if user A is able to cancel the CC Request		Y/N	
4.4	a value indicating if the timeout of the implementation dependent timer T310 is higher than the timeout of timer T2		Y/N	
4.5	a value to select if the IUT cancels the CC Request after timeout of T2		Y/N	
4.6	a value to select if simulation that user B has not subscribed SS-CC is possible		Y/N	
4.7	a value to select if the IUT releases first the alerting call before the call independent signalling connection for CCNR Request can be established		Y/N	
4.8	a value to select if the IUT (in Terminating PINX configuration) is able to cancel the CC Request		Y/N	

B.7 Basic call PIXIT items

B.7.1 Parameter values - information element coding

Table B.5: Coding of information elements

Item	Information element: provide, if possible, ...	Supported? (Y/N)	Value
5.1	a value for the length of the Call Reference (bitstring[4])		
5.2	a value to select if the IUT sends RESTART PDUs after re-establishment of the multiple frame operation		
5.3	a value to select if the IUT initiates release of the multiple frame established operation after entering U00		
5.4	a value for the length of the Bearer Capability information element		
5.5	a coding of the content of the Bearer Capability information element		
5.6	a value for the preferred channel number		
5.7	a value for the preferred channel number for the second call		
5.8	a value for the length of the High Layer Compatibility information element		
5.9	a coding of the content of the High Layer Compatibility information element		
5.10	a value for the length of the Low Layer Compatibility information element		
5.11	a coding of the content of the Low Layer Compatibility information element		

Annex C (normative): Abstract Test Suite (ATS)

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

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 (sp518833 v1.3.1.PDF contained in archive en_30145202v010301p0.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 (sp518833 v1.3.1.MP contained in archive en_30145202v010301p0.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

ETSI EN 300 171 (V1.2.1): "Private Integrated Services Network (PISN); Specification, functional models and information flows; Control aspects of circuit-mode basic services [ISO/IEC 11574 (1994) modified]".

ETSI EN 300 172 (V1.4.1): "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Circuit-mode basic services [ISO/IEC 11572 (1996) modified]".

ETSI ETS 300 239 (1995): "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Generic functional protocol for the support of supplementary services".

ETSI EN 301 060-1 (1.2.2): "Integrated Services Digital Network (ISDN): Digital Subscriber System No. one (DSS1) protocol; Basic call control; Enhancement at the "b" service entry point for Virtual Private Network applications; Part 1: Protocol specification".

ETSI EN 301 061-1 (1.2.2): "Integrated Services Digital Network (ISDN): Digital Subscriber System No. one (DSS1) protocol; Generic functional protocol for the support of supplementary service at the "b" service entry point for Virtual Private Network (VPN) applications; Part 1: Protocol specification".

History

Document history			
V1.2.2	November 1999	Public Enquiry	PE 200009: 1999-11-03 to 2000-03-03
V1.3.1	October 2000	Vote	V 20001208: 2000-10-09 to 2000-12-08
V1.3.1	December 2000	Publication	