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**Broadband Integrated Services Digital Network (B-ISDN);
Digital Subscriber Signalling System No. two (DSS2) protocol;
B-ISDN user-network interface layer 3 specification
for basic call/bearer control;
Part 6: Abstract Test Suite (ATS)
and partial Protocol Implementation eXtra Information
for Testing (PIXIT) proforma specification for the network**



Reference

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocols and Switching (SPS).

The present document is part 6 of a multi-part standard covering the Digital Subscriber Signalling System No. 2 (DSS2) protocol specification for the B-ISDN user-network interface layer 3 specification for basic call/bearer control, as identified below:

- Part 1: "Protocol specification [ITU-T Recommendation Q.2931 (1995), modified]";
- Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";
- Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";
- Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";
- Part 5: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network";
- Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".**

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1 Scope

This sixth part of EN 300 443 specifies the network Abstract Test Suite (ATS) for the T_B reference point or coincident S_B and T_B reference point (as defined in ITU-T Recommendation I.413 [9]) of implementations conforming to the standards for the signalling user-network layer 3 specification for basic call/bearer control of the Digital Subscriber Signalling System No. two (DSS2) protocol for the pan-European Broadband Integrated Services Digital Network (B-ISDN), EN 300 443-1 [1].

EN 300 443-5 [3] specifies the Test Suite Structure and Test Purposes (TSS&TP) related to this ATS and partial PIXIT proforma. Other parts specify the TSS&TP and the ATS and partial PIXIT proforma for the User side of the T_B reference point or coincident S_B and T_B reference point of implementations conforming to EN 300 443-1 [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] EN 300 443-1 (V1.3): "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; B-ISDN user-network interface layer 3 specification for basic call/bearer control; Part 1: Protocol specification [ITU-T Recommendation Q.2931 (1995), modified]".
- [2] EN 300 443-2 (V1.2): "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; B-ISDN user-network interface layer 3 specification for basic call/bearer control; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".
- [3] EN 300 443-5 (V1.1): "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; B-ISDN user-network interface layer 3 specification for basic call/bearer control; Part 5: Test Suite Structure and Test Purposes (TSS&TP) specification for the network".
- [4] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [5] ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [6] ISO/IEC 9646-3: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".
- [7] ISO/IEC 9646-4: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realization".
- [8] 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".
- [9] ITU-T Recommendation I.413 (1993): "B-ISDN user-network interface".

3 Definitions and abbreviations

3.1 Definitions

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

Implementation Under Test (IUT): see ISO/IEC 9646-1 [4]

System Under Test (SUT): see ISO/IEC 9646-1 [4]

Abstract Test Suite (ATS): see ISO/IEC 9646-1 [4]

Protocol Implementation Conformance Statement (PICS): see ISO/IEC 9646-1 [4]

PICS proforma: see ISO/IEC 9646-1 [4]

Protocol Implementation eXtra Information for Testing (PIXIT): see ISO/IEC 9646-1 [4]

PIXIT proforma: see ISO/IEC 9646-1 [4]

Lower Tester (LT): see ISO/IEC 9646-1 [4]

Upper Tester (UT): see ISO/IEC 9646-1 [4]

Point of Control and Observation (PCO): see ISO/IEC 9646-1 [4]

3.2 Abbreviations

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

ATM	Abstract Test Method
ATS	Abstract Test Suite
B-ISDN	Broadband Integrated Services Digital Network
CM	Co-ordination Message
CP	Co-ordination Point
DSS2	Digital Subscriber Signalling System No. two
ExTS	Executable Test Suite
ISDN	Integrated Services Digital Network
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
UT	Upper Tester

4 Abstract Test Method

4.1 Description of ATM used

The requirement for testing the network IUT is to focus on the behaviour of the network IUT at the user-network interface where a T_B reference point or coincident S_B and T_B reference point applies. Thus the IUT is the network DSS2 protocol entity at a particular user-network interface and is not the whole network.

It is possible to specify an ATS based on a single party (remote) test method for such an IUT. However, it is considered that an ATS based on such an approach is of limited use as the only way to specify IUT generated PDUs is to use the "implicit send" statement. Many users of such an ATS would replace the "implicit send" statements with descriptions of the behaviour at other interfaces.

An ATS based on a multi-party test method is considered to be more useful in that it is closer to how a real test suite would be constructed. Such a test method specifies behaviour at multiple network interfaces. One very important limitation here is that tests are focussed on one particular interface. Thus the test system is made up one Main Test Component (MTC) and one or more Parallel Test Components (PTC), see figure 1.

4.2 Conventions for test components and PCOs

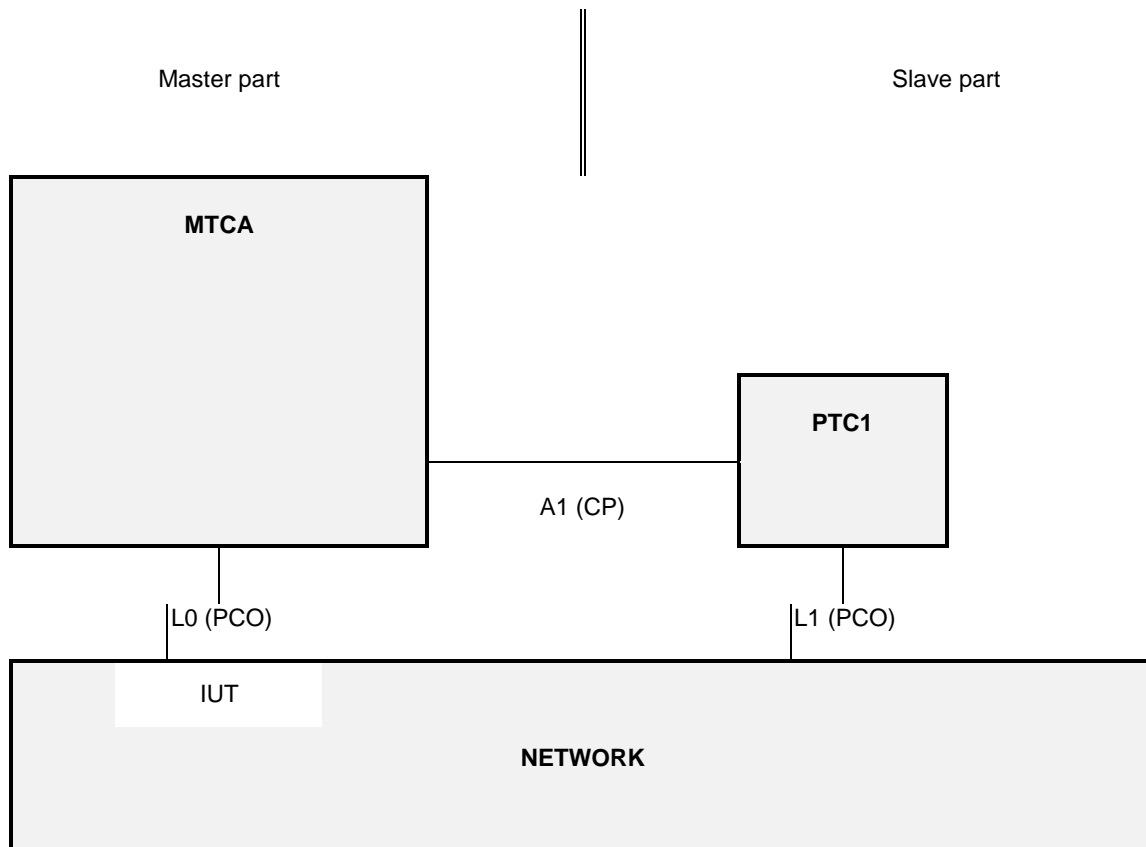


Figure 1: Multi-party test method

In a master/slave arrangement, the MTC is considered to be the master while the PTCs are the slaves. The "slave" testers are only an explicit description of how to deal with the remote interfaces during the testing process, i.e. "how to make the IUT send the required message".

This means, in particular, that the verdict will only be assigned from the protocol aspects observed on *the* interface under test (i.e. by the "master" tester), as it would be observed by a terminal connected to this interface. A failure in the correlation between the protocol at the different interfaces to which the different testers are connected, i.e. in the mechanism of the functional service itself, will not cause a FAIL verdict. For instance, if the IUT fails to send a message on the tested interface after another interface has received the proper stimulus, the verdict will be INCONCLUSIVE.

The MTC MTCA has two functions in this configuration. Firstly, it has the MTC function of controlling the one or more PTCs. Thus it is responsible for starting the PTCs and afterwards co-ordinates activities by exchanging Co-ordination Messages (CM) with the PTCs. Secondly it is responsible for the behaviour of the Lower Tester (LT) at PCO L0.

A combination of the remote and multi-party test methods is applied. As can be seen from figure 1, several PCOs are used. All PCOs reside at the service access points between layers 2 and 3.

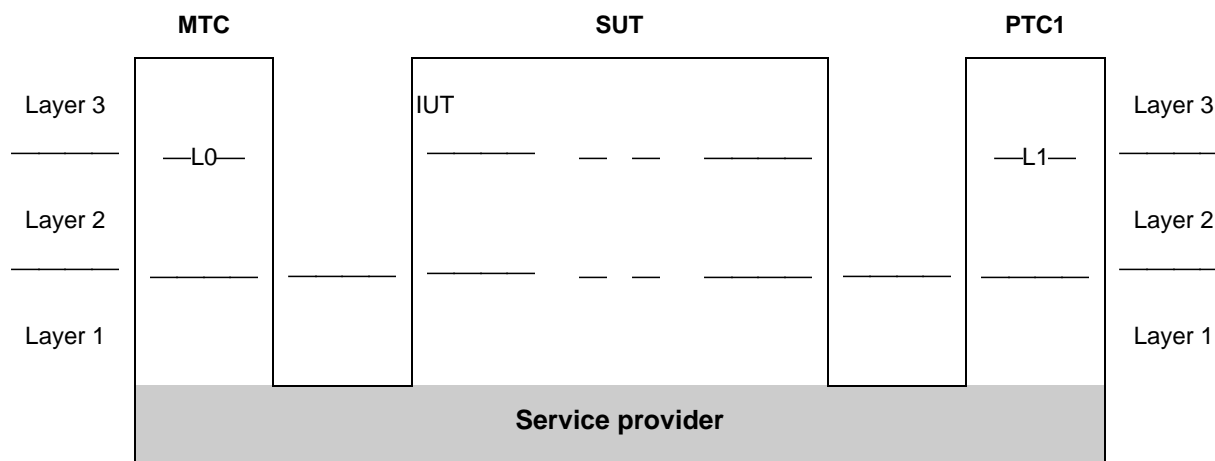


Figure 2: Combination of the remote and multi-party test methods

The MTC PCO is named "L0" ("L" for Lower). The L0 PCO is used to control and observe the behaviour of the IUT and test case verdicts are assigned depending on the behaviour observed at this PCO. The PTC PTC1 uses PCOs L1. These PCO is used to control and, in a limited way, observe the behaviour of the network equipment at interface other than the one under test. No verdicts are assigned at this PCO.

As stated in a previous paragraph, the non-receipt of network generated messages at L0, which are stimulated by events at the L1, will result in INCONCLUSIVE rather than FAIL verdicts being assigned.

In test cases which verify that the IUT rejects invalid or unacceptable SETUP messages and in the majority of the test cases for the restart procedures, no PTC is activated at all, as these procedures are considered local to the access between IUT and MTC.

5 Untestable test purposes

There are no untestable test purposes associated with this ATS.

6 ATS to TP map

The identifiers used for the TPs (see EN 300 443-5 [3]) are reused as test case names. Thus there is a straightforward one-to-one mapping.

7 PCTR conformance

A test laboratory, when requested by a client to produce a PCTR, is required, as specified in ISO/IEC 9646-5 [8], to produce a PCTR conformant with the PCTR template given in annex B of ISO/IEC 9646-5 [8].

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 of the present document.

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.

8 PIXIT conformance

A test realizer, producing an executable test suite for the Abstract Test Suite (ATS) specification contained in annex C, is required, as specified in ISO/IEC 9646-4 [7], 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 Implementation Under Test (IUT).

A test laboratory, offering testing for the ATS specification contained in annex C, is required, as specified in ISO/IEC 9646-5 [8], 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.

9 ATS conformance

The test realizer producing a Means Of Testing (MOT) and Executable Test Suite (ExTS) for this Abstract Test Suite (ATS) specification shall comply with the requirements of ISO/IEC 9646-4 [7]. In particular, these concern the realization of an ExTS based on each ATS. The test realizer shall provide a statement of conformance of the MOT to this ATS specification.

An ExTS 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 [8].

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:	EN 300 443-1
PICS:	
Previous PCTRs (if any):	

A.1.3 Testing environment

PIXIT Reference number:	
ATS Specification:	EN 300 443-6
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.

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.

A.2 IUT Conformance status

This IUT has or 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 or", otherwise strike the words "or has not".

A.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.

A.4 Dynamic conformance summary

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

Strike out the appropriate words in this sentence. If there are no "FAIL" verdicts to be recorded (in clause A.6 of this report) strike the words "did or", otherwise strike the words "or did not".

Summary of the results of groups of tests:

A.5 Static conformance review report

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

A.6 Test campaign report

ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
L3BN_01_01				
L3BN_02_01				
L3BN_02_02				
L3BN_02_03				
L3BN_02_04				
L3BN_03_01				
L3BN_03_02				
L3BN_03_03				
L3BN_03_04				
L3BN_03_05				
L3BN_03_06				
L3BN_03_07				
L3BN_03_08				
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L3BN_17_01				
L3BN_18_01				
L3BN_18_02				
L3BN_18_03				

ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
L3BN_18_04				
L3BN_18_05				
L3BN_18_06				
L3BN_19_01				
L3BN_19_02				
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L3BN_24_17				
L3BN_24_18				

ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
L3BN_24_19				
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L3BN_24_21				
L3BN_24_22				
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L3BN_26_07				
L3BN_26_08				
L3BN_26_09				
L3BN_26_10				
L3BN_26_11				

ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
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L3BN_28_16				
L3BN_28_17				
L3BN_28_18				

ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
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ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
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ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
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ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
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ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
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L3BN_36_08				
L3BN_37_01				
L3BN_37_02				
L3BN_38_01				
L3BN_38_02				
L3BN_38_03				

A.7 Observations

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

Annex B (normative): Partial PIXIT 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 PIXIT proforma in this annex so that it can be used for its intended purposes and may further publish the completed PIXIT.

B.1 Identification summary

PIXIT Number:

Test laboratory name:

Date of issue:

Issued to:

B.2 Abstract test suite summary

Protocol Specification: EN 300 443-1

ATS Specification: EN 300 443-6

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:

Test facilities required:

B.5 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: EN 300 443-1

Protocol Version:

PICS Reference:

NOTE: The PICS Reference should reference a completed PICS which is conformant with the PICS proforma contained in EN 300 443-2

B.6.2 Configuration to be tested

Table B.1: Configuration to be tested

Item	Configuration The access to be tested ...	Supported Y/N
1.1	releases the layer 2 connection after entering the Null call state N0?	
Associated signalling at the originating side (only, if PICS MCn 1.1 is supported)		
1.2	can be configured so that a specific VCI (given in PIXIT 4.22) in the VPC carrying the signalling VC is not available for switched connections?	
1.3	can be configured so that all VCIs in the VPC carrying the signalling VC are not available for switched connections?	
Non-associated signalling at the originating side		
1.4	can be configured so that a specific VCI (given in PIXIT 4.23) in a specific VPC (given in PIXIT 4.19) is not available for switched connections?	
1.5	can be configured so that a specific VPC (given in PIXIT 4.24) is not available for switched connections?	
1.6	can be configured so that no VCI is available?	
Non-associated signalling at the destination side		
1.7	sends SETUP messages with the coding "exclusive VPCI, any VCI" in the preferred/exclusive field of the Connection identifier information element?	
1.8	sends SETUP messages with the coding "exclusive VPCI, exclusive VCI" in the preferred/exclusive field of the Connection identifier information element?	
Restart procedures		
1.9	sends a RESTART message on the second expiry of timer T308 (no answer to RELEASE message)?	
1.10	sends a RESTART message with the coding "indicated virtual channel" in the class field of the Restart indicator information element on the second expiry of timer T308?	
1.11	can be stimulated to send RESTART messages in incoming (answer YES) or outgoing calls (answer NO). This PIXIT item affects the preamble to all tests in the test groups 21 and 35?	

B.6.3 Stimuli for the IUT

Table B.2: Actions required to stimulate the IUT

Item	Action What actions, if possible, have to be taken to ...	Supported Y/N	Stimulus (action taken)
2.1	cause the IUT to send a NOTIFY message towards the MTC (actions to be performed at the PTC)?		
Provision of 64 kbit/s circuit mode-services (only, if PICS MCn 9 is supported)			
2.2	initiate a call originating in the N-ISDN towards the MTC?		
2.3	initiate a call originating in the N-ISDN that carries high layer compatibility information towards the MTC?		
2.4	initiate a call originating in the N-ISDN that carries low layer compatibility information towards the MTC?		

B.6.4 Test management timers

Table B.3: Timer values

Item	Timer Give a value for the timer that is used ...	Value (in seconds)
3.1	as user side value for T313 (default value 4 seconds)?	
3.2	to wait for the IUT to respond to a stimulus sent by the tester (TAC)?	
3.3	to control that the IUT does not respond to a stimulus sent by the tester (TNOAC)?	
3.4	to wait for the test operator to perform an implicit send action or to wait for a PTC to react (TWAIT)?	
NOTE:	The IUT provider may 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.6.5 Parameter Values

Table B.4: Parameter values

Item	Parameter values Give ...	Value
ATM adaption layer parameters		
4.1	a coding of an AAL parameters information element, which the IUT is compatible with, for the purpose of accepting outgoing calls.	
Broadband bearer capability		
4.2	a coding of a Broadband bearer capability information element, which the IUT is compatible with, for the purpose of accepting outgoing calls.	
4.3	a coding of a Broadband bearer capability information element for the provision of 64 kbit/s circuit mode services (BCOB-A, susceptible to clipping), which the IUT is compatible with, for the purpose of accepting outgoing calls.	
4.4	a coding of a Broadband bearer capability information element indicating a service that is not authorized, for the purpose of rejecting outgoing calls. (see note)	
4.5	a coding of a Broadband bearer capability information element indicating a service that is not available, for the purpose of rejecting outgoing calls. (see note)	
Narrowband bearer capability		
4.6	a coding of a Narrowband bearer capability information element, which the IUT is compatible with, for the purpose of accepting outgoing calls. (only, if PICS MCn 9 is supported)	
Broadband low layer compatibility		
4.7	a coding of a Broadband Low layer compatibility information element, which the IUT is compatible with, for the purpose of accepting outgoing calls.	
Called party number		
4.8	a coding of the Type of number and the Addressing/Numbering plan identification fields of the Called party number information elements to be sent to the IUT.	
4.9	a coding of the number digits of the access related to the PTC1.	
4.10	a coding of the number digits of a subscriber at the access related to the MTC.	
4.11	a coding of an invalid set of number digits for the purpose of rejecting outgoing calls. (see note)	
ATM traffic descriptor		
4.12	a coding of an ATM traffic descriptor information element, which the IUT is compatible with, for the purpose of accepting outgoing calls.	
4.13	a coding of an ATM traffic descriptor information element indicating a peak cell rate that can not be not provided, for the purpose of rejecting outgoing calls. (see note)	
Quality of service		
4.14	a coding of a Quality of service information element indicating a QOS class that can not be not provided, for the purpose of rejecting outgoing calls. (see note)	
Transit network selection (only, if PICS MCn 11 is supported)		
4.15	a coding of a Transit network selection information element indicating a transit network that is not recognized by the IUT, for the purpose of rejecting outgoing calls. (see note)	
4.16	a coding of a Transit network selection information element indicating a transit network selection in an incorrect format, for the purpose of rejecting outgoing calls. (see note)	
Notification indicator		
4.17	a coding of a Notification indicator information element to be sent to the IUT.	
4.18	an invalid coding of a Notification indicator information element to be sent to the IUT for the purpose of testing the IUT's reaction on the receipt of an information element with content error. (see note)	

Item	Parameter values Give ...	Value
Connection identifier		
4.19	a value for the preferred VPCI.	
4.20	a value for the preferred VCI.	
4.21	the value for the VPCI carrying the signalling VCI.	
4.22	the value for the signalling VCI.	
4.23	a value for a VCI in the VPCI carrying the signalling VCI that has been made unavailable. (Associated signalling, only if PIXIT 1.2 is supported)	
4.24	a value for a VCI in the VPCI given by PIXIT item 4.19 that has been made unavailable. (Non-associated signalling, only if PIXIT 1.4 is supported)	
4.25	a value for a VPCI that has been made unavailable. (Associated signalling, only if PIXIT 1.5 is supported)	
4.26	a value for a VPCI that is not recognized by the IUT when received in a RESTART messages. (see note)	
Error values		
4.27	a value for an unrecognized message type.	
4.28	a value for an unrecognized information element identifier.	
4.29	a value for an unrecognized protocol discriminator.	
NOTE: These fields need only be completed, if the specified coding exists.		

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 [6].

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 (443_6_2.PDF contained in archive en_30044306v010103p0.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 (443_6_2.MP contained in archive en_30044306v010103p0.ZIP) which accompanies the present document.

History

Document history			
V1.1.1	April 1999	Public Enquiry	PE 9935: 1999-04-30 to 1999-08-27
V1.1.2	October 1999	Vote	V 9951: 1999-10-05 to 1999-12-03
V1.1.3	December 1999	Publication	