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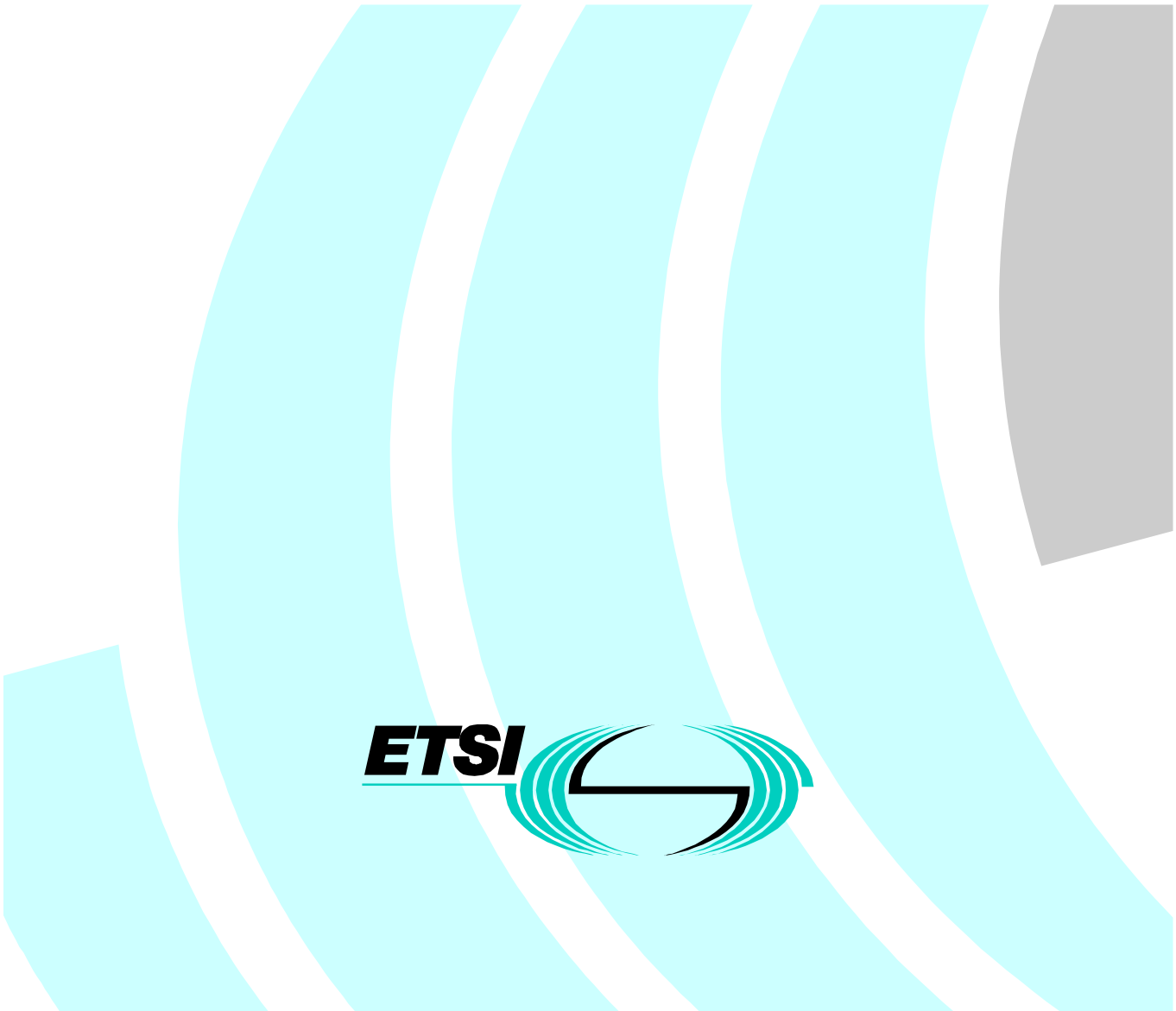
European Standard (Telecommunications series)

Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 4: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user



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Contents

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocols and Switching (SPS), and is now submitted for the Voting phase of the ETSI standards Two-step Approval Procedure.

The present document is part 4 of a multi-part standard covering the Explicit Call Transfer (ECT) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; as described below:

Part 1: "Protocol specification";

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".

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

1 Scope

This fourth part of EN 300 369 specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the User side of the T reference point or coincident S and T reference point of implementations conforming to the stage three standard for the Explicit Call Transfer (ECT) supplementary service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, EN 300 369-1 [1].

EN 300 369-3 [3] specifies the Test Suite Structure and Test Purposes (TSS&TP) related to this ATS and partial PIXIT proforma specification. Other parts specify the TSS&TP and the ATS and partial PIXIT proforma for the Network side of the T reference point or coincident S and T reference point of implementations conforming to EN 300 369-1 [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, 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] EN 300 369-1 (V1.2): "Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[2] EN 300 369-2 (V1.2): "Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[3] EN 300 369-3 (V1.2): "Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification for the user".

[4] Void.

[5] EN 300 196-1: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[6] ISO/IEC 9646: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework" (all parts).

[7] TR 101 101 (V1.1): "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)".

[8] ISO/IEC 8825-1 (1994): "Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO/IEC 9646 [6] apply.

3.2 Abbreviations

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

ASP	Abstract Service Primitive
ATS	Abstract Test Suite
BER	Basic Encoding Rules
ECT	Explicit Call Transfer
ETS	Executable Test Suite
IUT	Implementation Under Test
LT	Lower Tester
MOT	Means Of Testing
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
SUT	System Under Test
TCP	Test Co-ordination Procedures
TP	Test Purpose
TTCN	Tree and Tabular Combined Notation

4 Abstract Test Method

The remote test method is applied for the ECT user ATS.

A Point of Control and Observation (PCO) resides at the service access point between layers 2 and 3 in the test system. This PCO is named "L" (for Lower). The L 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.

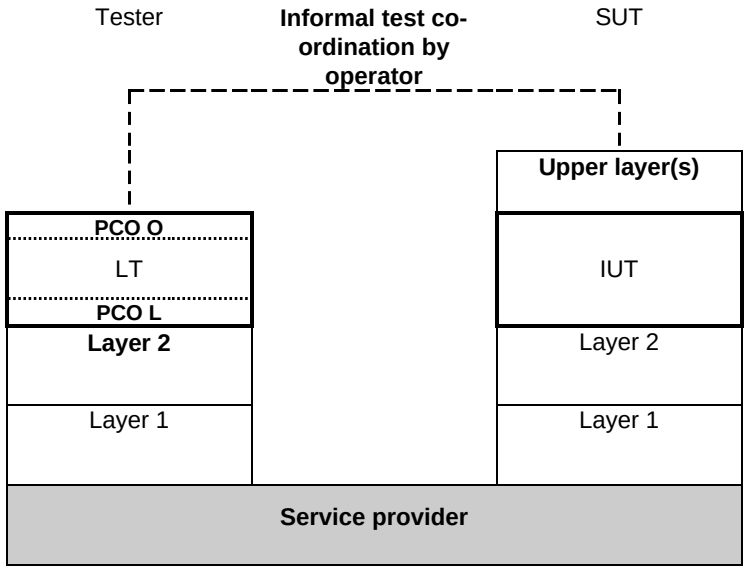

Figure 1: Remote test method with PCO O for test co-ordination

5 Untestable test purposes

There are no untestable test purposes associated with this ATS.

6 ATS conventions

6.1 Version of TTCN used

The version of TTCN used is that defined in TR 101 101 [7].

6.2 Use of ASN.1

6.2.1 Situations where ASN.1 is used

ASN.1 has been used for three major reasons:

1) 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;

2) ASN.1 provides a better restriction mechanism for type definitions by using sub-type definitions;

3) it is necessary to use ASN.1 to reproduce the type definitions for remote operation components 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 [6] and in TR 101 101 [7] 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 [6] 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 [8]. 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 first line of the table header comment field, the notation "ASN1_Encoding: *BER*" is used.

NOTE: Within BER, there are a number of variations for the encoding of lengths of fields.

According to EN 300 196-1 [5], an IUT should be able to interpret all length forms within BER for received PDUs. When sending PDUs containing BER encoding, EN 300 196-1 [5] gives guidelines but makes no restrictions on the length forms within BER which an IUT may apply.

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

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

ASN.1 Type Constraint Declaration
Constraint Name : Beg3PTYinv **ASN.1 Type** : Component **Derivation Path** : **Comments** : ASN1_Encoding: BER Receive component: BeginECT invoke component
Description
begin3PTY_Components begin3PTY_InvokeComp { invokeID ? , operation_value localValue 4}
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 [6], to produce a PCTR conformant with the PCTR template given in annex B of ISO/IEC 9646-5 [6].

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 [6], 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 [6], 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 [6]. 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 EN 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 [6].

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

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 300 369-1
PICS:	
Previous PCTRs (if any):	

A.1.3 Testing environment

PIXIT reference number:	
ATS specification:	EN 300 369-4
Abstract test method:	Remote 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
ECT_U01_001				
ECT_U01_002				
ECT_U01_003				
ECT_U01_004				
ECT_U01_005				
ECT_U01_006				
ECT_U01_007				
ECT_U01_008				
ECT_U01_009				
ECT_U02_001				
ECT_U02_002				
ECT_U02_003				
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ECT_U03_024				
ECT_U03_025				
ECT_U03_026				
ECT_U03_027				
ECT_U04_001				
ECT_U04_002				
ECT_U04_003				
ECT_U04_004				
ECT_U04_005				
ECT_U04_006				
ECT_U04_007				
ECT_U04_008				
ECT_U04_009				
ECT_U04_010				
ECT_U04_011				
ECT_U04_012				
ECT_U04_013				
ECT_U05_001				
ECT_U05_002				
ECT_U05_003				
ECT_U05_004				
ECT_U05_005				
ECT_U05_006				
ECT_U05_007				
ECT_U05_008				

ATS reference	Selected? (Y/N)	Run? (Y/N)	Verdict	Observations
ECT_U06_001				
ECT_U06_002				
ECT_U06_003				
ECT_U06_004				
ECT_U06_005				
ECT_U06_006				
ECT_U06_007				
ECT_U06_008				
ECT_U07_001				
ECT_U08_001				
ECT_U08_002				
ECT_U09_001				
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ECT_U11_002				
ECT_U11_003				
ECT_U11_004				
ECT_U11_005				
ECT_U11_006				
ECT_U11_007				
ECT_U11_008				
ECT_U11_001				
ECT_U12_002				
ECT_U13_003				
ECT_U14_004				

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

B.1 Identification summary

PIXIT number:

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Test laboratory name:

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Date of issue:

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Issued to:

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B.2 Abstract test suite summary

Protocol specification:	EN 300 369-1
ATS specification:	EN 300 369-4
Abstract test method:	Remote test method (see ISO/IEC 9646-2)

B.3 Test laboratory

Test laboratory identification:

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Accreditation status of the test service:

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Accreditation reference:

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Test laboratory manager:

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Test laboratory contact:

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Means of testing:

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Test laboratory instructions for completion:

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B.4 Client (of the test laboratory)

Client identification:

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Client test manager:

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Client contact:

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Test facilities required:

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B.5 System Under Test (SUT)

Name:

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Version:

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SCS reference:

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Machine configuration:

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Operating system identification:

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IUT identification:

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PICS (all layers):

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Limitations of the SUT:

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Environmental conditions:

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B.6 Protocol information

B.6.1 Protocol identification

Specification reference: EN 300 369-1.

Protocol version:

PICS reference:

NOTE: The PICS reference should reference a completed PICS which is conformant with the PICS proforma contained in EN 300 369-2.

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	Does the IUT support basic access?		N/A	N/A
1.2	What length of Call Reference is used?		1, 2	
1.3	Does the IUT support three calls (two in the Idle, one in the Held auxiliary state) at a time?		N/A	N/A

B.6.2.2 Sending of messages by IUT

Table B.2: Actions required to stimulate IUT to send messages

Item	Action: What actions, if possible, have to be taken to cause the IUT to …	Supported? (Y/N)	Stimulus (action taken)
2.1	invoke ECT using implicit linkage		
2.2	invoke ECT using explicit linkage		
2.3	invoke HOLD		
2.4	perform transfer in the private network between two calls with users in the public network, both active.		
2.5	perform transfer in the private network between two calls with users in the public network, one active and one alerting		
2.6	perform transfer in the private network between one call with a user in the public network (active) and one call with a user in the private network (active)		
2.7	perform transfer in the private network between one call with a user in the public network (active) and one call with a user in the private network (alerting)		
2.8	perform transfer in the private network between one call with a user in the public network (alerting) and one call with a user in the private network (active)		
2.9	invoke transfer in the public network between two calls with users in the public network, both active.		
2.10	invoke transfer in the public network between two calls with users in the public network, one active and one alerting		
2.11	send an ALERTING message and to remain stable in the call state U7		
NOTE:	Items 2.1 to 2.3 are applicable to the S/T reference point; items 2.4 to 2.10 are applicable to the T reference point.		

B.6.2.3 Timer values

Table B.3: Timer values

Item	Timer: Give a value for the timer that is used to ...	Value (in seconds)
3.1	wait for the test operator to perform an implicit send action (TWAIT)	
3.2	wait for the IUT to respond to a stimulus sent by the tester (TAC)	
3.3	check that the IUT does not respond to a stimulus sent by the tester (TNOAC)	
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.6.2.4 Information element codings

Table B.4: Information element codings

Item	Provide, if possible, …	Value
4.1	a coding of a Bearer Capability information element, which the IUT is compatible with, for the purpose of accepting incoming calls	
4.2	a coding of a Low layer compatibility information element, which the IUT is compatible with, for the purpose of accepting incoming calls	
4.3	a coding of a High layer compatibility information element, which the IUT is compatible with, for the purpose of accepting incoming calls	
4.4	a Called party number information element, which the IUT is compatible with, for the purpose of accepting incoming calls	
4.5	preferred channel number (used in Channel identification information element) to be used for Incoming calls (applicable to primary rate access only)	

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 (ECT_U09.PDF contained in archive 3f100iq0.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 (ECT_U09.MP contained in archive 3f100iq0.ZIP) which accompanies the present document.

NOTE: According to ISO/IEC 9646-3 [6], in case of a conflict in interpretation of the operational semantics of TTCN.GR and TTCN.MP, the operational semantics of the TTCN.GR representation takes precedence.

Bibliography

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

- ETS 300 196-2 (1996): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".
- EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".
- EN 300 141-2 (V1.2): "Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".
- ITU-T Recommendation X.690 (1997): "Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)".

History

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