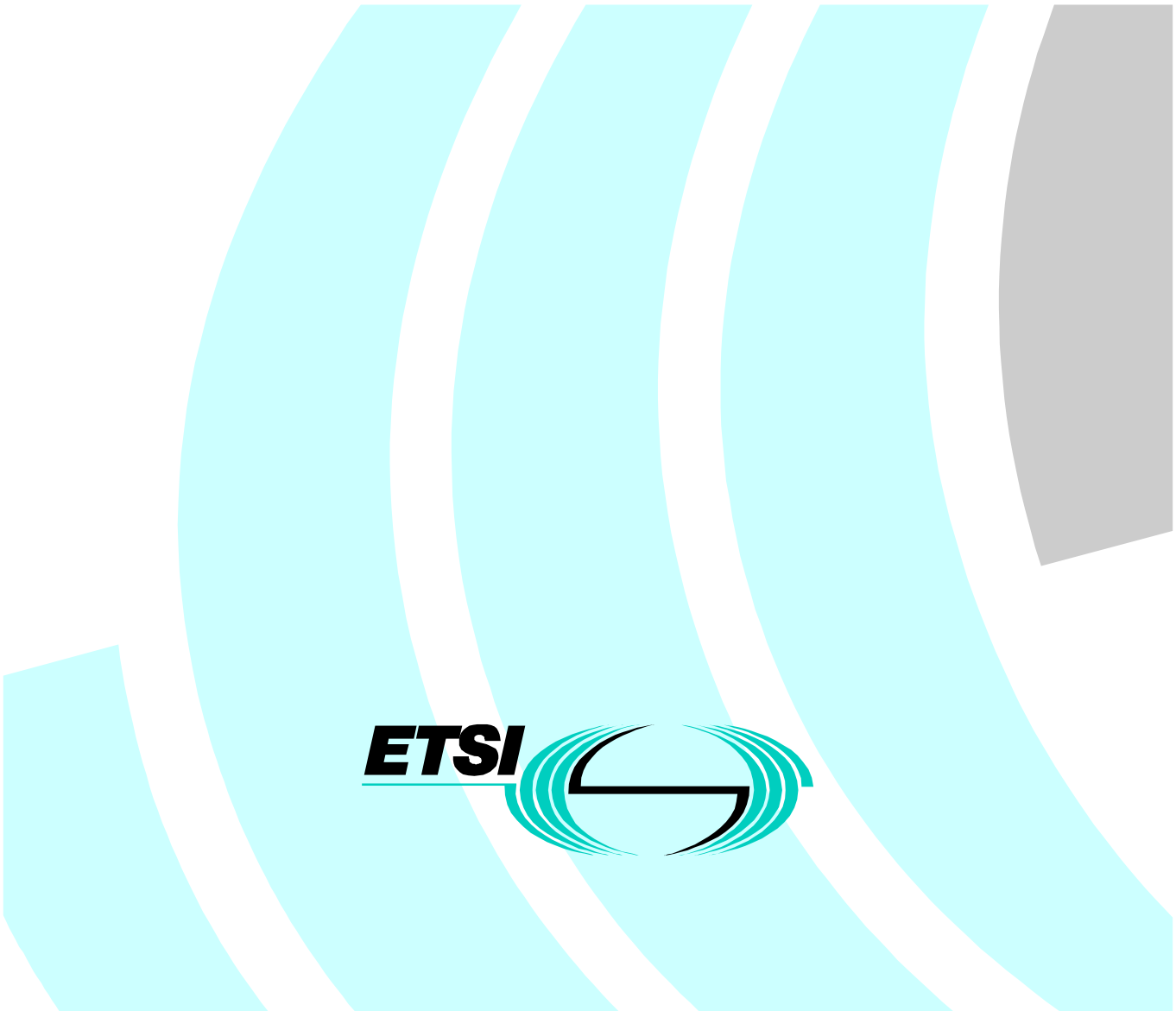
Final draft ETSI EN 300 359-4 V1.4.1 (2001-07)

European Standard (Telecommunications series)

Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) 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 Services and Protocols for Advanced Networks (SPAN), and is now submitted for the ETSI standards One-step Approval Procedure.

The present document is part 4 of a multi-part EN covering the Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) 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

The present document 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 (as defined in ITU-T Recommendation I.411 [11]) of implementations conforming to the stage three standard for the Completion of Calls to Busy Subscriber (CCBS) supplementary service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, EN 300 359-1 [2].

EN 300 359-3 [4] 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 300 359-1 [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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ETSI 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]".

[2] ETSI EN 300 359-1 (V1.3.2): "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[3] ETSI EN 300 359-2 (V1.4.1): "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[4] ETSI EN 300 359-3 (V1.4.1): "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification for the user".

[5] ETSI 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 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[7] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".

[8] ISO/IEC 9646-3 (1998): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

[9] ISO/IEC 9646-4 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realization".

[10] ISO/IEC 9646-5 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".

[11] ITU-T Recommendation I.411 (1993): "ISDN user-network interfaces - Reference configurations".

[12] ITU-T Recommendation X.209 (1988): "Specification of basic encoding rules for Abstract Syntax Notation One (ASN.1)".

3 Definitions and abbreviations

3.1 Definitions

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

Abstract Test Suite (ATS): See ISO/IEC 9646-1 [6].

Implementation Under Test (IUT): See ISO/IEC 9646-1 [6].

Lower Tester (LT): See ISO/IEC 9646-1 [6].

Point of Control and Observation (PCO): See ISO/IEC 9646-1 [6].

Protocol Conformance Test Report (PCTR): See ISO/IEC 9646-1 [6].

Protocol Implementation Conformance Statement (PICS): See ISO/IEC 9646-1 [6].

PICS proforma: See ISO/IEC 9646-1 [6].

Protocol Implementation eXtra Information for Testing (PIXIT): See ISO/IEC 9646-1 [6].

PIXIT proforma: See ISO/IEC 9646-1 [6].

System Under Test (SUT): See ISO/IEC 9646-1 [6].

Upper Tester (UT): See ISO/IEC 9646-1 [6].

3.2 Abbreviations

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

ATM	Abstract Test Method
ATS	Abstract Test Suite
BER	Basic Encoding Rules
CCBS	Completion of Calls to Busy Subscriber
ExTS	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
TP	Test Purpose
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester

4 Abstract Test Method (ATM)

The remote test method is applied for the CCBS user ATS. A Point of Control and Observation (PCO) resides at the service access point between layers 2 and 3. 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.

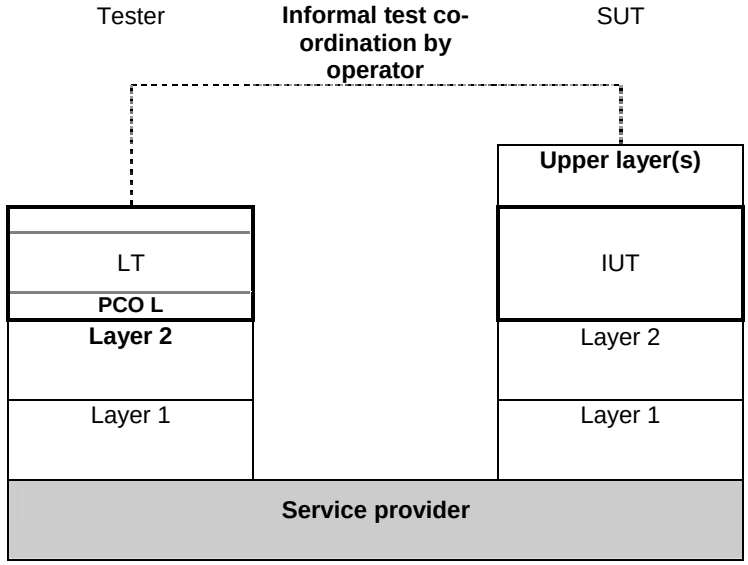

Figure 1: Remote test method with PCO O for test co-ordination

5 Untestable test purposes

CCBS_U01_013: The described behaviour is not observable at the user network interface.

6 ATS conventions

6.1 Version of TTCN used

The version of TTCN used is that defined in ISO/IEC 9646-3 [8].

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.

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 [8] 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 [8] 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 ITU-T Recommendation X.209 [12]. 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 (ExTS) 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.

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 that 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: Begin3PTY 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 re-used 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 [10], to produce a PCTR conformant with the PCTR template given in annex B of ISO/IEC 9646-5 [10].

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.

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 [9], 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 [10], 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 ExTS for this ATS specification, shall comply with the requirements of ISO/IEC 9646-4 [9]. 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 [10]. 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 300 359-1
PICS:	
Previous PCTRs (if any):	

A.1.3 Testing environment

PIXIT reference number:	
ATS specification:	EN 300 359-4
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 word "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
CCBS_U01_001				
CCBS_U01_002				
CCBS_U01_003				
CCBS_U01_004				
CCBS_U01_005				
CCBS_U01_006				
CCBS_U01_007				
CCBS_U01_008				
CCBS_U01_009				
CCBS_U01_010				
CCBS_U01_011				
CCBS_U01_012				
CCBS_U01_013				
CCBS_U02_001				
CCBS_U02_002				
CCBS_U02_003				
CCBS_U02_004				
CCBS_U02_005				
CCBS_U02_006				
CCBS_U03_001				
CCBS_U03_002				
CCBS_U03_003				
CCBS_U03_004				
CCBS_U03_005				
CCBS_U03_006				
CCBS_U03_007				
CCBS_U03_008				
CCBS_U03_009				
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CCBS_U04_017				
CCBS_U04_018				
CCBS_U05_001				
CCBS_U05_002				
CCBS_U05_003				
CCBS_U07_001				
CCBS_U07_002				
CCBS_U07_003				
CCBS_U07_004				
CCBS_U07_005				
CCBS_U07_006				

ATS Reference	Selected ? (Y/N)	Run ? (Y/N)	Verdict	Observations
CCBS_U08_001				
CCBS_U08_002				
CCBS_U08_003				
CCBS_U08_004				
CCBS_U08_005				
CCBS_U08_006				
CCBS_U08_007				
CCBS_U08_008				
CCBS_U08_009				
CCBS_U08_010				
CCBS_U08_011				
CCBS_U08_012				
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CCBS_U10_016				
CCBS_U10_017				
CCBS_U11_001				
CCBS_U11_002				
CCBS_U11_003				
CCBS_U11_004				
CCBS_U11_005				
CCBS_U11_006				
CCBS_U11_007				
CCBS_U11_008				

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 300 359-1
ATS specification:	EN 300 359-4
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 300 359-1.

Protocol version:

PICS reference:

NOTE: The PICS reference should reference a completed PICS which is conformant with the PICS proforma contained in EN 300 359-2.

B.6.2 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 value is used?		1, 2	
1.3	What is the value of the subscription option Recall Mode?			
1.4	What is the number of the non-served user?			
1.5	What is the number and type of the non-served user whose type is incorrect?			
1.6	What is the suborders of the non-served user?			
1.7	What is the subaddress of the served user?			
1.8	Answer YES, if the IUT shall be tested as connected to a point-to-multipoint configuration (i.e. connectionless FACILITY messages delivered in UI frames). Answer NO, if the IUT shall be tested as connected to a point-to-point configuration (i.e. connectionless FACILITY messages delivered in I frames). This question is only relevant for the tests of the behaviour at the coincident S and T reference point.		N/A	N/A

B.6.3 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 send a ...	Supported? (Y/N)	Stimulus (action taken)
2.1	FACILITY message including a Facility information element coded as CCBSRequest invoke component in order to activate the CCBS supplementary service?		
2.2	FACILITY message including a Facility information element coded as CCBSDeactivate invoke component in order to deactivate a CCBS request?		
2.3	FACILITY message including a Facility information element coded as CCBSDeactivate invoke component in order to deactivate a number of CCBS requests?		
2.4	SETUP message with a CCBSCall invoke component in order to establish the CCBS call?		

B.6.4 Provoking the CCBS interrogation

Table B.3: Actions required to provoke the IUT

Item	Action: What actions, if possible, have to be taken to provoke the IUT to ...	Supported? (Y/N)	Stimulus (action taken)
3.1	perform an interrogation of all CCBS requests ("don't care" if partyNumberOfA is present or not)?		
3.2	perform an interrogation of a specific active CCBS request?		

B.6.5 Configuration of the IUT

Table B.4: Actions required to configure the IUT

Item	Action: What actions, if possible, have to be taken to configure the IUT so that ...	Supported? (Y/N)	Stimulus (action taken)
4.1	it has subscribed to the specific recall option?		
4.2	it has subscribed to the global recall option?		
4.3	it retains the CallLinkageID?		
4.4	it releases the CallLinkageID?		
4.5	it needs to suspend CCBS?		
4.6	it does not need to suspend CCBS?		
4.7	it resumes CCBS?		

B.6.6 Configuration of the IUT for connection to a private ISDN

Table B.5: Actions required to configure the IUT (private ISDN)

Item	Action: What actions, if possible, have to be taken to configure the IUT so that ...	Supported? (Y/N)	Stimulus (action taken)
5.1	it is ready to accept a CCBS call?		
5.2	it sets up the signalling connection with the public network and to request the activation of CCBS?		
5.3	it clears the signalling connection with the public network?		
5.4	the destination is busy?		
5.5	CCBS is available to the destination?		
5.6	CCBS is not available to the destination?		
5.7	CCBS is not available to the destination at this time?		
5.8	the call fails at the destination side due to any reason other than the user at that side is busy?		
5.9	the call fails before reaching the destination?		

B.6.7 Support of options

Table B.6: Options supported by the IUT

Item	Action: Does the IUT...	Supported? (Y/N)	Stimulus (action taken)
6.1	automatically respond to a CallInfoRetain invoke component?		
6.2	support general interrogation?		
6.3	support specific interrogation?		
6.4	include the partyNumberOfA in CCBSInterrogate invoke component when performing general interrogation?		
6.5	remain stable in state U07?		

B.6.8 Timer values

Table B.7: Timer values

Item	Timer: Give a value for the timer that is used to ...	Value (in seconds)
7.1	wait for the test operator to perform an implicit send action (TWAIT).	
7.2	wait for the IUT to respond to a stimulus sent by the tester (TAC).	
7.3	control 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.		

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 [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 (see also annex D).

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

The TTCN.GR representation of this ATS is contained in an Adobe Portable Document Format™ file (ccbs_42.PDF contained in archive en_30035904v010401o0.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 (ccbs_u42.MP contained in archive en_30035904v010401o0.zip) which accompanies the present document.

Annex D (informative): Change record

D.1 Changes with respect to EN 300 359-4 V1.3.2

- Updating of references to the base standard, PICS and TSS&TP (no technical changes for user side).
- Revision including removal of superfluous and out of date material from clauses 4 and 6 and old annex D.

D.2 Changes with respect to EN 300 359-4 V1.2.4

To handle corrections to the ATS.

D.3 Changes with respect to the previous ETS 300 359-4

The following changes have been done:

- conversion to EN layout;
- replacement of references to ETS 300 102 [1] with EN 300 403-1 [1];
- substitution of non-specific references to basic standards where the intention is to refer to the latest version.

History

Document history		
Edition 1	September 1997	Publication as ETS 300 359-4
V1.2.4	June 1998	Publication
V1.3.2	June 2000	Publication
V1.4.1	July 2001	One-step Approval Procedure OAP 20011116: 2001-07-18 to 2001-11-16