# ETSI EN 300 058-6 V1.4.1 (2002-04)

European Standard (Telecommunications series)

Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Call Waiting (CW) supplementary service; Part 6: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network

ETSI

Reference

REN/SPAN-130271-6

Keywords

ATS, CW, DSS1, ISDN, network, PIXIT,
supplementary service

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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).

The present document is part 6 of a multi-part deliverable covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Call Waiting (CW) supplementary service, as identified 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".

National transposition dates	
Date of adoption of this EN:	26 April 2002
Date of latest announcement of this EN (doa):	31 July 2002
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2003
Date of withdrawal of any conflicting National Standard (dow):	31 January 2003

1   Scope

The present document specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the Network 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 Call Waiting (CW) supplementary service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, EN 300 058-1 [1].

EN 300 058-5 [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 User side of the T reference point or coincident S and T reference point of implementations conforming to EN 300 058-1 [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 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 300 058-1 (V1.2.4): "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[2]   ETSI EN 300 058-2 (V1.2.4): "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[3]   ETSI EN 300 058-5 (V1.2.4): "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 5: Test Suite Structure and Test Purposes (TSS&TP) specification for the network".

[4]   ETSI EN 300 141-1: "Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

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

[6]   ETSI EN 300 403-1 (V1.3.2): "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]".

[7]   ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract test suite specification".

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

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

[10]   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".

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

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 [5].

Implementation Under Test (IUT): See ISO/IEC 9646-1 [5].

Lower Tester (LT): See ISO/IEC 9646-1 [5].

Point Of Control And Observation (PCO): See ISO/IEC 9646-1 [5].

Protocol Implementation Conformance Statement (PICS): See ISO/IEC 9646-1 [5].

PICS proforma: See ISO/IEC 9646-1 [5].

Protocol Implementation Extra Information For Testing (PIXIT): See ISO/IEC 9646-1 [5].

PIXIT proforma: See ISO/IEC 9646-1 [5].

System Under Test (SUT): See ISO/IEC 9646-1 [5].

Upper Tester (UT): See ISO/IEC 9646-1 [5].

3.2   Abbreviations

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

ATM	Abstract Test Method
ATS	Abstract Test Suite
CM	Co-ordination Message
CP	Co-ordination Point
CW	Call Waiting
DSS1	Digital Subscriber Signalling No1
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 (ATM)

4.1   Description of ATM used

The requirement for testing the network Implementation Under Test (IUT) is to focus on the behaviour of the network IUT at the user-network interface where a T reference point or coincident S and T reference point applies. Thus the IUT is the network DSS1 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 focused 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.

4.1.1   Conventions for test components and PCOs

Master part   Slave part

MTCA

PTC1

CPA1

L0 PCO   L1 PCO

IUT

NETWORK
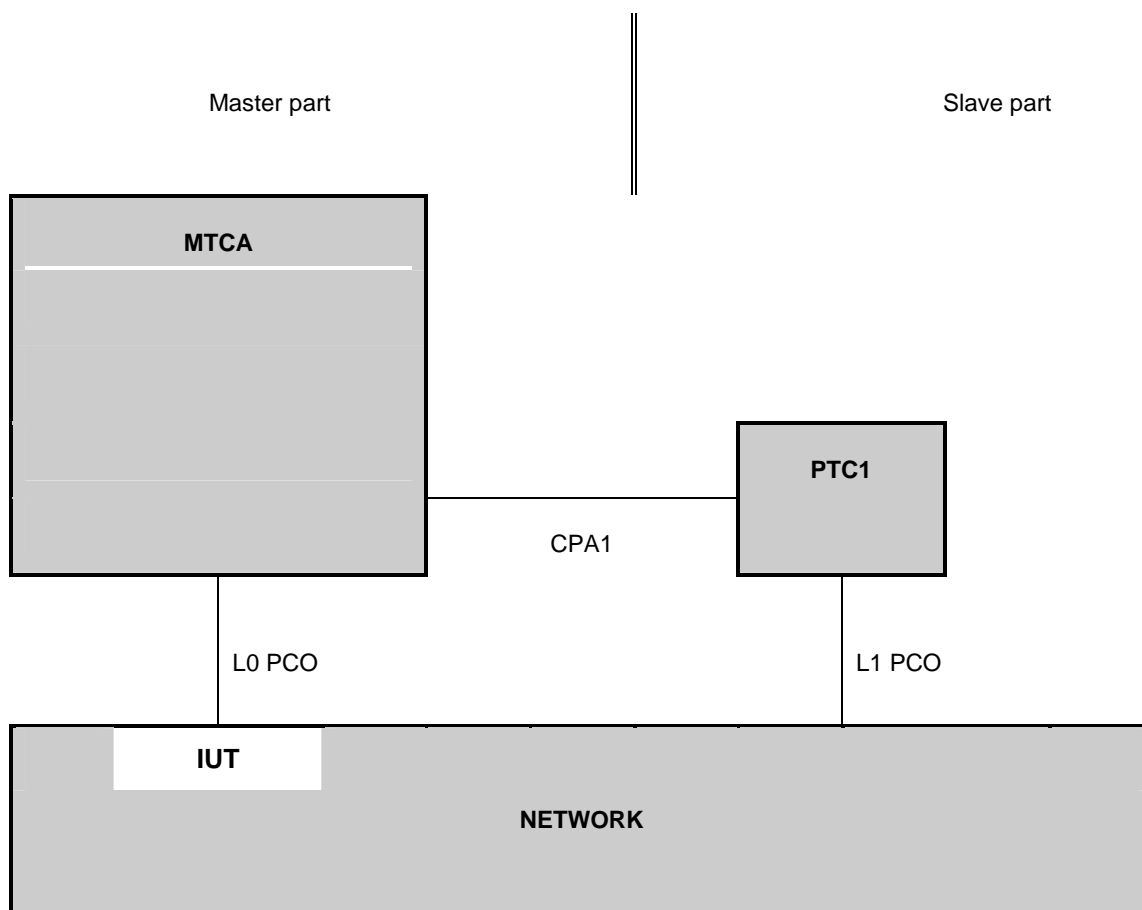
Figure 1: Multi-party test method

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 "other" 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 Point of Control and Observation (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.
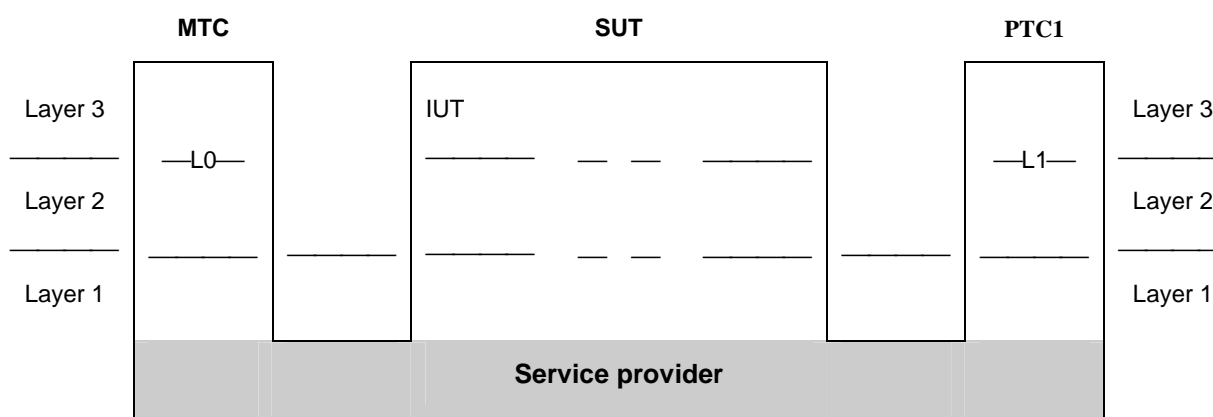
Figure 2: Combination of the remote and multi-party test methods

The MTC PCO is named "L0" ("L" for Lower). PCO L0 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 PCO L1. This PCO is used to control and, in a limited way, observe the behaviour of the network equipment at interfaces other than the one under test. No verdicts are assigned at this PCO.

As stated in a previous clause, 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.

4.1.2   Conventions for variables and parameters

MTCA

call reference	CREF1	
B channel (basic)	bch_num1	(to PTC1)
channel nr (primary)	CH_NUM1	
PCO L0	IPN0, LIPN0	

PTC1

call reference	P1CREF
B channel (basic)	P1_bch_num
channel nr (primary)	P1_CH_NUM
PCO L1	IPN1, LIPN1

4.2   Alternative ATM

As stated in clause 4.1, an ATS based on a single-party (remote) ATM is possible. Such an ATS may be generated from the one specified in the present document. The following general steps should be taken:

1) remove all PTC behaviour;

2) remove all CREATE statements;

3) replace CMs which are used to provoke PDUs at the MTC, with implicit send statements.

An example, showing the difference between the multi-party ATM and single-party ATM for a single test case, is given in tables 1 and 2.

Table 1: Test case dynamic behaviour table using multi-party ATM

TEST CASE DYNAMIC BEHAVIOUR					
Test Case Name HOLD_N04_001					
Group RemoteUser_ST_OR_T/Holding/					
Purpose Ensure that the IUT, while in the Active call state N10, to notify the non-served user that the call is held					
sends a NOTIFY message with a notification indicator coded as "remote hold" to user B and remains in the Active call state.					
Default DF69901(1)					
Configuration CONFIG1					
Comments 9.2.1 valid optional					
Nr	Label	BEHAVIOUR DESCRIPTION	CREF	V	COMMENTS
1		CREATE (PTC1: PTC1_IN_servedUser)			
2	+PR31002				preamble N10
3		CPA1!CP_M START TWAIT	S_HL		
4		L0?NOTIFYr	A_NO20(CREF1,hold_NID)	(P)	
5		+CS59901(10,1)			check N10
6		?TIMEOUT TWAIT		(I)	
7		+PO49901(1)			postamble N0
DETAILED COMMENTS:					

Table 2: Test case dynamic behaviour table using single-party ATM

TEST CASE DYNAMIC BEHAVIOUR					
Test Case Name HOLD_N04_001					
Group RemoteUser_ST_OR_T/Holding/					
Purpose Ensure that the IUT, while in the Active call state N10, to notify the non-served user that the call is held					
sends a NOTIFY message with a notification indicator coded as "remote hold" to user B and remains in the Active call state.					
Default DF69901(1)					
Configuration					
Comments 9.2.1 valid optional					
Nr	Label	BEHAVIOUR DESCRIPTION	CREF	V	COMMENTS
1	+PR31002				preamble N10
2	<IUT!NOTIFY>	NO20(CREF1,hold_NID)			
3		L0?NOTIFYr	A_NO20(CREF1,hold_NID)	(P)	
4		+CS59901(10,1)			check N10
5		?TIMEOUT TWAIT		(I)	
6		+PO49901(1)			postamble N0
DETAILED COMMENTS:					

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 ISO/IEC 9646-3 [8].

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 Protocol Conformance Test Report (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 Protocol Implementation eXtra Information for Testing (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 Executable Test Suite (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

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 300 058-1
PICS:	
Previous PCTRs (if any):	

A.1.3 Testing environment

PIXIT reference number:	
ATS specification:	EN 300 058-6
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.

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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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....

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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 the present document) 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 the present document) strike the word "did", otherwise strike the words "did not".

Summary of the results of groups of tests:

....

....

....

....

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
CW_N01_001				
CW_N01_002				
CW_N01_003				
CW_N01_004				
CW_N01_005				
CW_N01_006				
CW_N01_007				
CW_N01_008				
CW_N01_009				
CW_N01_010				
CW_N01_011				
CW_N01_012				
CW_N02_001				
CW_N02_002				
CW_N03_001				
CW_N04_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

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 partial 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 300 058-1

ATS specification: EN 300 058-6

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   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: EN 300 058-1

Protocol version:

PICS reference:

> NOTE: The PICS reference should reference a completed PICS which is conformant with the PICS proforma contained in EN 300 058-2.

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 accuracy (%) of timers (T-CW or T 301)?			± %
1.4	Timer T-CW, if supported, in milliseconds			ms
1.5	Timer T 301, if supported, in seconds		max. 180 s	s
1.6	Does the IUT allow the release and re-establishment of the layer 2 multiple frame established operation at the start of each test case? (see note)		N/A	N/A
NOTE:	This procedure is used to re-initialize all layer 2 counters before starting a test case. The value of this PIXIT item can be set to "No" for accesses where the layer 2 multiple frame established operation release and re-establishment may cause problems.			

B.6.3 Configuration of IUT

Table B.2: Actions required to configure the IUT

Item	Action: What actions, if possible, have to be taken to configure the IUT for ...	Supported? (Y/N)	Stimulus (action taken)
2.1	only one B-channel available at the called user access?		
2.2	access subscribed to Call Hold supplementary service (as specified in EN 300 141-1)?		

B.6.4   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 or to wait for a PTC to react (TWAIT)	
3.2	wait for the IUT to respond to a stimulus sent by the tester (TAC)	
3.3	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.	

B.7   Basic call PIXIT items

B.7.1   Parameter values - information element codings

Table B.4: Codings of information elements

Item	Information element: provide, if possible, ...	Supported? (Y/N)	Value
N1.1	a coding of a Bearer Capability information element, which the IUT is compatible with, for the purpose of accepting received SETUP messages and which may be used in SETUP messages to be transmitted		
N1.2	a coding of a High layer compatibility information element, which the IUT is compatible with, for the purpose of accepting received SETUP messages and which may be used in SETUP messages to be transmitted		
N1.3	a coding of a Low layer compatibility information element, which the IUT is compatible with, for the purpose of accepting received SETUP messages and which may be used in SETUP messages to be transmitted		
N1.4	a Called party number information element, which the IUT is compatible with, for ...		
N1.4.1	served user access		
N1.4.2	first remote user access		
N1.4.3	second remote user access		
N1.4.4	third remote user access		
N1.5	preferred channel number to be used for the purpose of accepting received SETUP messages, for ... (note 1)		
N1.5.1	single call at served user side		
N1.5.2	second call at served user side		
N1.5.3	first call at remote user side		
N1.5.4	second call at remote user side		
N1.5.5	third call at remote user side		
NOTE 1:	Items N1.5.1 to N1.5.5 are applicable for primary rate access only.		
NOTE 2:	As this is a general table used for all supplementary services, all items N1.4.1 to N1.4.4, and N1.5.1 to N1.5.5 (if primary rate access is supported), are not always required, but should be supplied if possible.		

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.

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 (cw_n07.PDF contained in archive en_30005806v010401p0.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 a text file (cw_n07.MP contained in archive en_30005806v010401p0.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.

Annex D (informative):
Change record

D.1 Changes between EN 300 058-6 V1.3.3 and EN 300 058-6 V1.4.1

The following changes have been done in the ATS:

- Update PDU constraints where fields were missing. (e.g. no Id in HOLD message constraints).

- Delete unused objects.

In addition, revisions including removal of superfluous and out of date material from clause 6 and old annex D were done.

D.2 Changes with respect to the previous ETS 300 058-6

The following changes have been done:

- conversion to EN layout;

- replacement of references to ETS 300 102 with EN 300 403-1;

- substitution of non-specific references to basic standards where the intention is to refer to the latest version.

Annex E (informative):
Bibliography

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

ETSI ETS 300 102: "Integrated Services Digital Network (ISDN); User-network interface layer 3".

History

Document history		
Edition 1	May 1997	Publication as ETS 300 058-6
V1.2.4	June 1998	Publication
V1.3.3	November 1999	Publication
V1.4.1	December 2001	One-step Approval Procedure OAP 20020426: 2001-12-26 to 2002-04-26
V1.4.1	April 2002	Publication