

ETSI TS 101 818-6 V1.1.1 (2001-11)

Technical Specification

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



Reference

DTS/SPAN-130172-6

Keywords

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

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Contents

Intellectual Property Rights	5
Foreword.....	5
1 Scope	6
2 References	6
3 Definitions and abbreviations.....	7
3.1 Definitions	7
3.2 Abbreviations	7
4 Abstract Test Method (ATM).....	8
5 Untestable test purposes	8
6 ATS conventions	9
6.1 Version of TTCN used	9
6.2 Use of ASN.1	9
6.2.1 Situations where ASN.1 is used.....	9
6.2.2 Specification of encoding rules.....	9
7 ATS to TP map.....	10
8 PCTR conformance	10
9 PIXIT conformance.....	10
10 ATS conformance	10
Annex A (normative): Protocol Conformance Test Report (PCTR) proforma.....	11
A.1 Identification summary.....	11
A.1.1 Protocol conformance test report.....	11
A.1.2 IUT identification.....	11
A.1.3 Testing environment.....	12
A.1.4 Limits and reservations	12
A.1.5 Comments.....	12
A.2 IUT conformance status	12
A.3 Static conformance summary	13
A.4 Dynamic conformance summary.....	13
A.5 Static conformance review report.....	13
A.6 Test campaign report.....	14
A.7 Observations.....	15
Annex B (normative): Partial PIXIT proforma	16
B.1 Identification summary.....	16
B.2 Abstract test suite summary	16
B.3 Test laboratory.....	16
B.4 Client (of the test laboratory)	17
B.5 System Under Test (SUT).....	17
B.6 Protocol information.....	18
B.6.1 Protocol identification	18
B.6.2 Basic call parameter values	18

B.6.3	Actions required by IUT.....	18
B.6.4	Timer values.....	19
B.7	Basic call PIXIT items	19
B.7.1	Parameter values - information element codings.....	19
Annex C (normative):	Abstract Test Suite (ATS)	20
C.1	The TTCN Graphical form (TTCN.GR)	20
C.2	The TTCN Machine Processable form (TTCN.MP).....	20
History	21

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Foreword

This Technical Specification (TS) 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) Trunk Hunting (TH) 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".**

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 Trunk Hunting (TH) supplementary service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, TS 101 818-1 [3].

TS 101 818-5 [5] 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 TS 101 818-1 [3].

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 300 196-1: "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".
- [2] 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]".
- [3] ETSI TS 101 818-1 (V1.1.1): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1); Trunk Hunting (TH) supplementary service; Part 1: Protocol specification".
- [4] ETSI TS 101 818-2 (V1.1.1): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1); Trunk Hunting (TH) supplementary service; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".
- [5] ETSI TS 101 818-5: "Integrated Services Digital Network (ISDN); Trunk Hunting (TH) service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification for the network".
- [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: "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 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:

ASN.1	Abstract Syntax Notation One
ATM	Abstract Test Method
ATS	Abstract Test Suite
BER	Basic Encoding Rules
ExTS	Executable Test Suite
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
TH	Trunk Hunting
LT	Lower Tester
MOT	Means Of Testing
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
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 requirement for testing the network 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.

In practice the behaviour at a single user-network interface does not occur in isolation, but depends on the activity at other user-network interfaces. Therefore a multi-party test method is used.

The general configuration used is shown in figure 1. In this ATS the PTCs act as slaves to the MTC; all active behaviour at the PTCs is initiated by CMs sent by the MTC and all verdicts are assigned by the MTC (using information sent in CMs by the PTCs where appropriate). Not all components are used in every test case.

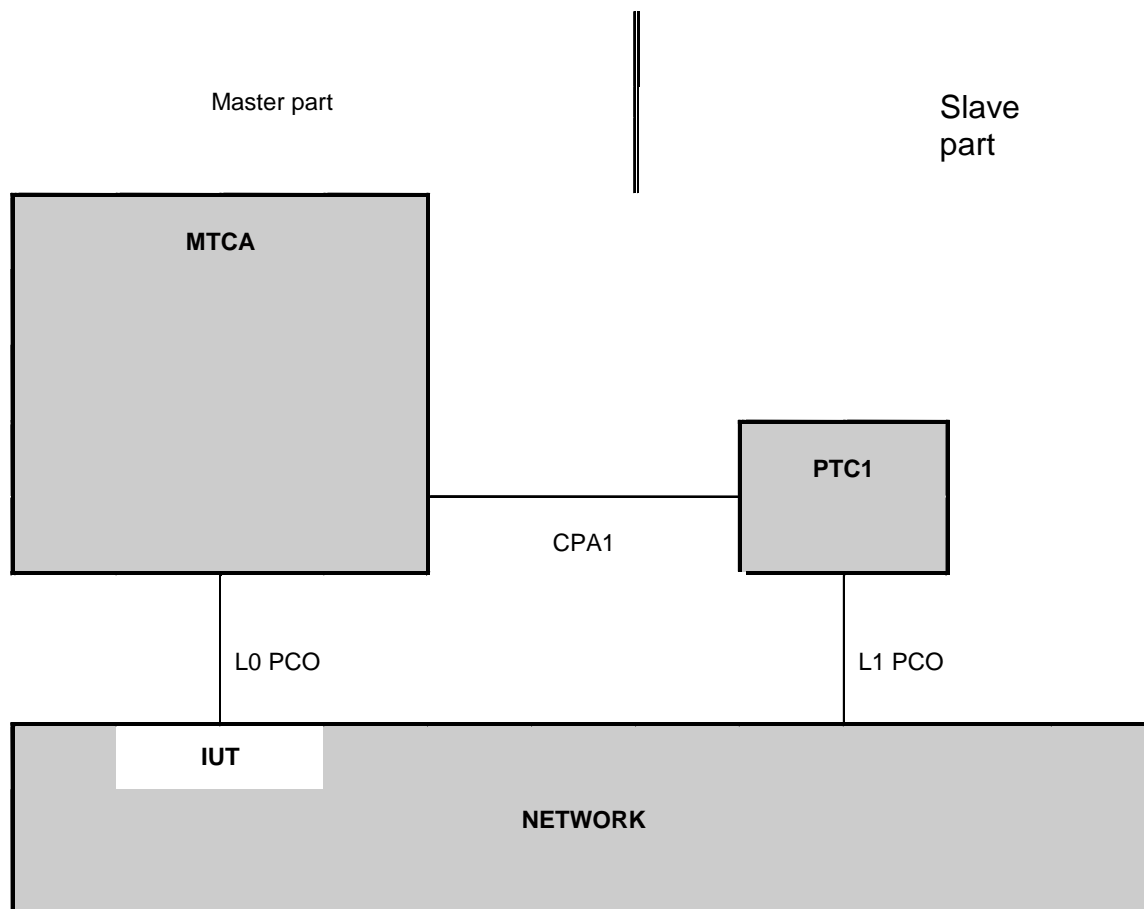


Figure 1: Multi-party test method

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 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 [1], 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 [1] 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	: CancelWithdrawTHG_Inv_S1 (inv : InvokeIDType)
ASN.1 Type	: Component
Derivation Path	:
Comments	: ASN1_Encoding: BER Send component: CancelWithdrawTHG invoke component
Description	
cancelWithdrawTHG_components cancelWithdrawTHG_InvokeComp { invokeID inv, operation_value globalValue { TSC_tHOID 2 } }	
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, to produce a PCTR conformant with the PCTR template given in annex B of ISO/IEC 9646-5.

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, 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, 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. 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. 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:	TS 101 818-1
PICS:	
Previous PCTRs (if any):	

A.1.3 Testing environment

PIXIT Reference number:	
ATS Specification:	TS 101 818-4
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 the present document) 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 the present document) 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
TH_N01_001				
TH_N01_002				
TH_N01_003				
TH_N01_004				
TH_N01_005				
TH_N01_006				
TH_N01_007				
TH_N01_008				
TH_N01_009				
TH_N01_010				
TH_N01_011				
TH_N02_001				
TH_N02_002				
TH_N02_003				
TH_N02_004				
TH_N02_005				
TH_N02_006				
TH_N02_007				
TH_N02_008				
TH_N03_001				
TH_N03_002				

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: TS 101 818-1

ATS specification: TS 101 818-4

Abstract test method: Remote 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: TS 101 818-1.

Protocol version: V1.1.1

PICS reference: TS 101 818-2

NOTE: The PICS reference should reference a completed PICS which is conformant with the PICS proforma contained in TS 101 818-2.

B.6.2 Basic call 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	Preferred B-channel for use in testing (Primary rate only) for MTC		1..30	
1.4	Preferred B-channel for use in testing (Primary rate only) for PTC		1..30	
1.5	Does the IUT send RESTART after re-establishment of multiple frame operation?		N/A	N/A

B.6.3 Actions required by IUT

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

Item	Action: What actions, if possible, have to be taken to configure the IUT...	Supported? (Y/N)	Stimulus (action taken)
2.1	the "Maximum number of hunt groups for which one access may be a member is equal to 1		
2.2	the "Maximum number of hunt groups" for which the access may be a member is more than 1 and the access has been defined as a member of only one hunt group		
2.3	the "Maximum number of hunt groups" for which the access may be a member is more than 1 and the access has been defined as a member of more than one hunt group		
2.4	the access has not be defined as a member of any hunt group		
2.5	the hunt group withdrawal option having not be subscribed to with the value "available" for the access		
2.6	if the hunt group withdrawal not being supported by the IUT		
2.7	the activation of the TH service is precluded by a supplementary service interaction procedure		
2.8	the TH service not subscribed		
2.9	no free access is available or all accesses have been withdrawn from the hunt group		
2.10	Layer 2 initialization shall take place at the start of each test case		

B.6.4 Timer values

Table B.3: Timer values

Item	Timer duration	Supported? (Y/N)	Allowed values	Value
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	Control that the IUT does not respond to a stimulus sent by the tester (TNOAC).			
3.4	wait for a RESTART message sent by the IUT (T_RESTART)			
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
4.1	Bearer Capability		
4.1.1	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		
4.1.2	The length of the bearer capability to be received and may be transmitted		
4.2	High layer compatibility information element		
4.2.1	A coding of a High layer compatibility information element, which the IUT is compatible with		
4.2.2	Length of the High layer compatibility information element, which the IUT is compatible with		
4.3	Low layer compatibility information element		
4.3.1	A coding of a Low layer compatibility information element, which the IUT is compatible with		
4.3.2	Length of the Low layer compatibility information element, which the IUT is compatible with		
4.4	Hunt group party number or any DDI number associated with the hunt group defined for the MTC access		
4.4.1	Length of a hunt group party number or any DDI number associated with the hunt group		
4.4.2	Octet 3 of the hunt group party number		
4.4.3	The hunt group party number value		
4.5	Hunt Group Number used in withdrawTH and cancelWithdrawTH invoke components		
4.6	Invalid Hunt Group Number used in withdrawTH and cancelWithdrawTH invoke components		

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 (TH_N_v111.PDF contained in archive ts_10181806v010101p0.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 (TH_N_v111.MP contained in archive ts_10181806v010101p0.zip) which accompanies the present document.

NOTE: The TTCN ATS contains references to TS 101 818-1, TS 101 818-2 and EN 300 403-1.

History

Document history		
V1.1.1	November 2001	Publication