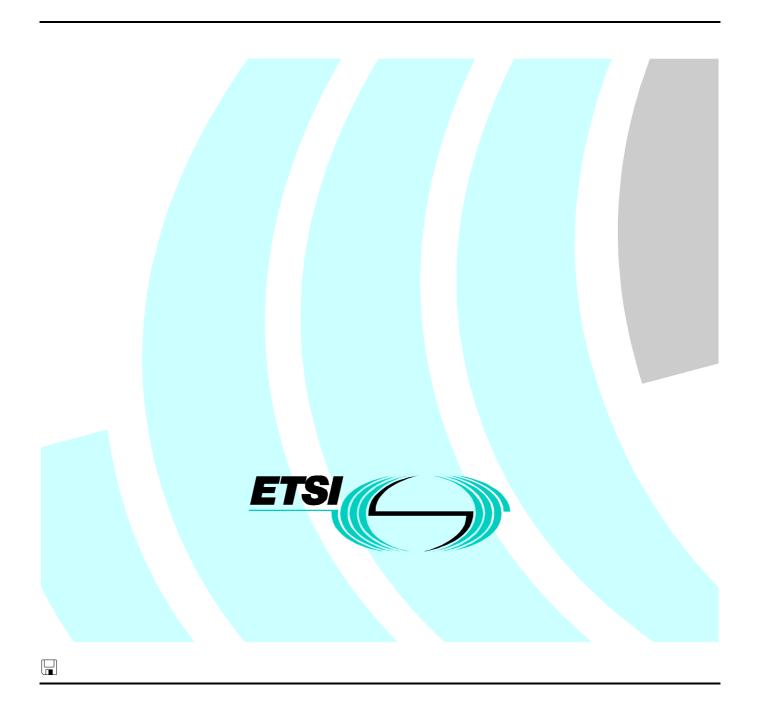
# Final draft ETSI EN 301 451-2 V1.3.1 (2000-10)

European Standard (Telecommunications series)

Private Integrated Service Network (PISN);
Cordless Terminal Mobility (CTM);
Inter-exchange signalling protocol;
Cordless terminal outgoing call additional network feature
for the VPN "b" service entry point;
Part 2: Abstract Test Suite (ATS) and partial Protocol
Implementation eXtra Information for Testing (PIXIT)
proforma



#### Reference

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Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

#### **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 Vote phase of the ETSI standards Two-step Approval Procedure.

The present document is part 2 for a multi-part deliverable covering the Cordless Terminal Mobility (CTM); Inter-exchange signalling protocol; Cordless terminal outgoing call additional network feature for the VPN "b" service entry point, as described below:

Part 1: "Test Suite Structure and Test Purposes (TSS&TP) specification";

Part 2: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".

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 second part of EN 301 451 specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the VPN "b" reference point of implementations conforming to the standard for the Cordless Terminal Outgoing Call Additional Network Feature (ANF-CTMO) as described in I-ETS 300 808 [1].

EN 301 451-1 [2] specifies the Test Suite Structure and Test Purposes (TSS&TP) related to this ATS and partial PIXIT proforma specification.

## 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] ETSI I-ETS 300 808 (1997): "Private Integrated Services Network (PISN); Cordless Terminal Mobility (CTM); Inter-exchange signalling protocol; Cordless terminal outgoing call additional network feature".
- [2] ETSI EN 301 451-1 (1.1.4): "Private Integrated Services Network (PISN); Cordless Terminal Mobility (CTM); Inter-exchange signalling protocol; Cordless terminal outgoing call additional network feature (ANF-CTMO) for the VPN b service entry point; Part 1: Test Suite Structure and Test Purposes (TSS&TP) specification".
- [3] ISO/IEC 9646 (all parts): "Information technology Open Systems Interconnection Conformance testing methodology and framework".
- [4] ETSI TR 101 101 (V1.1.1): "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)".
- [5] ISO/IEC 8825-1: "Information technology ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)" (See also ITU-T Recommendation X.690)".

## 3 Definitions and abbreviations

#### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO/IEC 9646 [3] apply.

#### 3.2 Abbreviations

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

ANF Additional Network Feature

ANF-CTMO Additional Network Feature Outgoing CTM Call Handling

ASP Abstract Service Primitive
ATM Abstract Test Method
ATS Abstract Test Suite
BER Basic Encoding Rules
CM Co-ordination Message
ETS Executable Test Suite
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

VPN Virtual Private Network

## 4 Abstract Test Method (ATM)

## 4.1 Description of ATM used

The multi-party test method is applied for testing the IUT. The Originating configuration used is shown in figure 1.

A Point of Control and Observation (PCO) resides at the service access point between layers 2 and 3 in the test system. The PCO used by the MTC is named "L0" (for Lower). This 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.

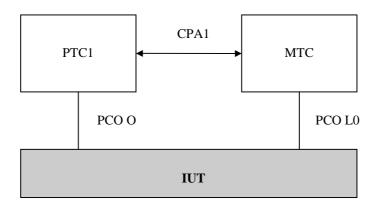


Figure 1: Multi-party test method

The relationship between the IUT and the tester is as follows:

• when the IUT is in the Originating configuration, the IUT is connected to the MTC. The verdict depends on the behaviour observed at the PCO between the IUT and the MTC. The PCO O is used to specify control above the IUT, using the PTC process.

The Home configuration used is shown in figure 2.

A Point of Control and Observation (PCO) resides at the service access point between layers 2 and 3 in the test system. The PCO used by the MTC is named "L0" (for Lower), the PCO used by the PTC is named "L1". These PCOs are 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 these PCOs.

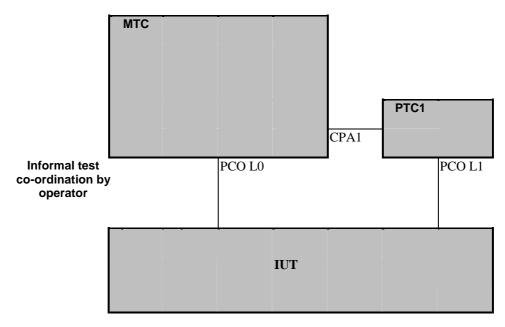


Figure 2: Multi-party test method

Not all components are used in every test case and the relationship between the IUT and the tester depends on the test group:

• when the IUT is in the Home configuration, the PTC and the MTC are both used. The verdict is assigned by the MTC or the PTC depending on the test purpose.

# 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 TR 101 101 [4].

### 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 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 [3] and in TR 101 101 [4] 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 ISOIEC 9646-3/AM2 [3] 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 [5]. 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.

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
                  ctmo_inv_S2
                  Component
ASN.1 Type
Derivation Path
                  ASN1 Encoding: BER
Comments
                  Send ctmoCall InvokeComm
                                            Description
ctmoCall_Comp
ctmoCall InvokeComp
     invokeID inv_ID,
      operation_value lovalValue 71,
      argument { destinationNumber PX_DestNumbComp, sendingComplete OMIT, extension OMIT}
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 [3], to produce a PCTR conformant with the PCTR template given in annex B of ISO/IEC 9646-5 [3].

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 [3], 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 [3], 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 [3]. 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 ETS 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 [3].

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:	I-ETS 300 808
PICS:	
Previous PCTRs (if any):	

# A.1.3 Testing environment

PIXIT reference number:	
ATS specification:	EN 301 451-2
Abstract test method:	Multi-party test method (see ISO/IEC 9646-2)
Means of testing identification:	
Dates of testing:	
Conformance log reference(s):	
Retention date for log reference(s):	

## A.1.4 Limits and reservations

Additional information relevant to the technical contents or further use of the test report, or to the rights and obligations of the test laboratory and the client, may be given here. Such information may include restriction on the publication of the report.
A.1.5 Comments  Additional comments may be given by either the client or the test laboratory on any of the contents of the PCTR, for example, to note disagreement between the two parties.
A.2 IUT conformance status
This IUT has / 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:

# 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.

# A.6 Test campaign report

ATS reference	Selected? (Y/N)	Run? (Y/N)	Verdict	Observations
CTMO_Orig01_001				
CTMO_Orig01_002				
CTMO_Orig01_003				
CTMO_Orig01_004				
CTMO_Orig01_005				
CTMO_Orig01_006				
CTMO_Home01_001				
CTMO_Home01_002				
CTMO_Home01_003				
CTMO_Home01_004				
CTMO_Home01_005				
CTMO_Home01_006				
CTMO_Home01_007				
CTMO_Home01_008				

A.7	Observations	
Additional information relevant to the technical content of the PCTR are given here.		

# Annex B (normative): Partial PIXIT proforma

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the 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 Identific	cation summary
PIXIT number:	
Test laboratory name:	
Date of issue:	
Issued to:	
B.2 Abstrac	ct test suite summary
Protocol specification:	I-ETS 300 808
ATS specification:	EN 301 451-2
Abstract test method:	Multi-party test method (see ISO/IEC 9646-2)
B.3 Test lab	ooratory
Test laboratory identification	ı:
Accreditation status of the te	st 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: I-ETS 300 808

Protocol version: 1.4.1

PICS reference:

NOTE: The PICS reference should reference a completed PICS which is conformant with the PICS proforma

contained in I-ETS 300 808.

## 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	a value for the length of the Business Group Identification			
1.2	a value for the Business Group Identificator			
1.3	a value for the Business Group Identification			

#### B.6.2.2 Timer values

Table B.2: Timer values

Item	Timer duration	Supported? (Y/N)	Allowed values	Value
2.1	Wait for the test operator to perform an implicit send action or to wait for a PTC to react (TWAIT). Duration in s.		integer	
2.2	Wait for the IUT to respond to a stimulus sent by the tester (TAC). Duration in s.		integer	
2.3	Control that the IUT does not respond to a stimulus sent by the tester (TNOAC). Duration in s.		integer	
2.4	Timer that is used to wait for a RESTART PDU(T_RESTART). Duration in s		integer	
2.5	Timer that is used to receive additional FAC PDUs ( T_FAC). Duration in s.		integer	
2.6	Timer that is used to receive optional PDUs (T_WAIT_OPT). Duration in s.		integer	
2.7	Timer that is used to control the exceptional procedures ( T1MIN). Duration in s.		integer	
2.8	Timer that is used to control the exceptional procedures ( T1MAX). Duration in s.		integer	

## B.6.2.3 Information parameter values

**Table B.3: Parameter values** 

Item	Question	Supported? (Y/N)	Value	
3.1	Numberdigits of the complete Destination Number			
3.2	Numberdigits of the incomplete, nonrouteable Destination Number			
3.3	Numberdigits of the end of the incomplete Destination Number			
3.4	Numberdigits of the incomplete, but routeable Destination Number			
3.5	Length of the Called Party Number information element			
3.6	Octet 3 of the Called Party Number information element			
3.7	Numberdigits of the Called Party Number information element			
3.8	Length of the Calling Party Number information element			
3.9	Octet 3 of the Calling Party Number information element			
3.10	Octet 4 of the Calling Party Number information element			
3.11	Numberdigits of the Calling Party Number information element			

# 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	a value for the length of the Call Reference (bitstring nbr.4)		
4.2	a value to select if the IUT sends RESTART PDUs after re-establishment of the multiple frame operation		
4.3	a value to select if the IUT initiates release of the multiple frame established operation after entering U00		
4.4	a value for the length of the Bearer Capability information element		
4.5	a coding of the content of the Bearer Capability information element		
4.6	a value for the preferred channel number		
4.7	a value for the preferred channel number for the second call		
4.8	a value for the length of the High Layer Compatibility information element		
4.9	a coding of the content of the High Layer Compatibility information element		
4.10	a value for the length of the Low Layer Compatibility information element		
4.11	a coding of the content of the Low Layer Compatibility information element		

# 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 [3].

The ATS was developed on a separate TTCN software tool and therefore the TTCN tables are not completely referenced in the contents table. 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<sup>TM</sup> file (sp519533 v1.3.1.PDF contained in archive en\_30145102v010301v0.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 (sp519533 v1.3.1.MP contained in archive en\_30145102v010301v0.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.

## **Bibliography**

ETSI EN 300 171 (V1.2.1): "Private Integrated Services Network (PISN); Specification, functional models and information flows; Control aspects of circuit-mode basic services [ISO/IEC 11574 (1994) modified]".

ETSI EN 300 172 (V1.4.1): "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Circuit-mode basic services [ISO/IEC 11572 (1996) modified]".

ETSI ETS 300 239 (1995): "Private Integrated Services Network (PISN); Inter-exchange signalling protocol; Generic functional protocol for the support of supplementary services".

ETSI EN 301 060-1 (1.2.2): "Integrated Services Digital Network (ISDN): Digital Subscriber System No. one (DSS1) protocol; Basic call control; Enhancement at the "b" service entry point for Virtual Private Network applications; Part 1 Protocol specification".

ETSI EN 301 061-1 (1.2.2): "Integrated Services Digital Network (ISDN): Digital Subscriber System No. one (DSS1) protocol; Generic functional protocol for the support of supplementary service at the "b" service entry point for Virtual Private Network (VPN) applications; Part 1: Protocol specification".

# History

Document history				
V1.2.2	November 1999	Public Enquiry	PE 200009:	1999-11-03 to 2000-03-03
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