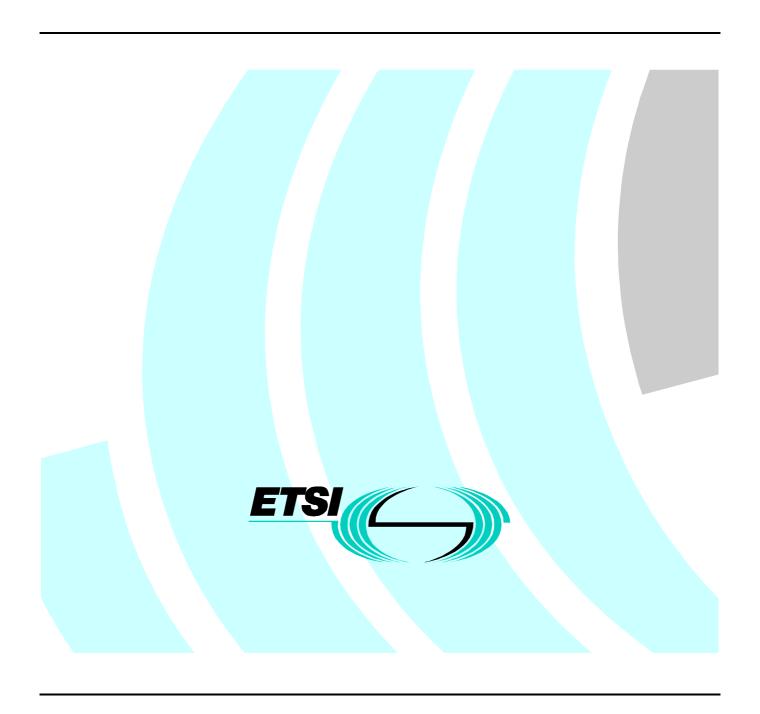# ETSI EN 301 451-1 V1.1.4 (2000-09)

European Standard (Telecommunications series)

**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**

Reference

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Keywords

ANF, CTM, mobility, PICS, PISN, QSIG, TSS&TP

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocol and Switching (SPS).

The present document covers the Private Integrated Service Network (PISN) Inter-exchange signalling protocol - Cordless Terminal Outgoing Call additional network feature - Test Suite Structure and Test Purposes (TSS&TP) specification.

The present document is part 1 of a multi-part deliverable covering Cordless terminal outgoing call additional network feature (ANF-CTMO) for the VPN b service entry point, as identified 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".

National transposition dates	
Date of adoption of this EN:	8 September 2000
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 June 2001
Date of withdrawal of any conflicting National Standard (dow):	30 June 2001

1 Scope

The present document specifies the Test Suite Structure and Test Purposes (TSS&TP) for the Cordless Terminal Location Registration supplementary service of the Inter-exchange signalling protocol for Private Integrated Services Networks (PISN).

The objective of the present document is to provide conformance tests, which give a greater probability of inter-operability. The TSS&TP specification covers the procedures described in I-ETS 300 808 [5].

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [2], ISO/IEC 9646-2 [3] and ISO/IEC 9646-3 [6]) is used as basis for the test methodology.

The Test Suite Structure and Test Purposes specified in the present document are only intended for VPN scenarios at the "b" service entry point.

The VPN "b" service entry point is defined in EN 301 060-1 [4] and ETR 172 [7].

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, the latest version applies.

[1]   ETSI ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[2]   ISO/IEC 9646-1 (1994): "Information technology; Open Systems Interconnection; Conformance testing methodology and framework; Part 1: General concepts".

[3]   ISO/IEC 9646-2 (1994): "Information technology; Open Systems Interconnection; Conformance testing methodology and framework; Part 2: Abstract test suite specification".

[4]   ETSI EN 301 060-1 (V1.2): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Basic call control; Enhancement at the "b" service entry point for Virtual Private Network (VPN) applications; Part 1: Protocol specification".

[5]   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".

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

[7]   ETSI ETR 172 (1995): "Business TeleCommunications (BTC); Virtual Private Networking (VPN); Services and networking aspects; Standardization requirements and work items".

3   Definitions and abbreviations

3.1   Definitions

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

abstract test case: Refer to ISO/IEC 9646-1 [2]

Abstract Test Suite (ATS): Refer to ISO/IEC 9646-1 [2]

Implementation Under Test (IUT): Refer to ISO/IEC 9646-1 [2]

implicit send event: Refer to ISO/IEC 9646-3 [6]

lower tester: Refer to ISO/IEC 9646-1 [2]

Protocol Implementation Conformance Statement (PICS): Refer to ISO/IEC 9646-1 [2]

PICS proforma: Refer to ISO/IEC 9646-1 [2]

Protocol Implementation eXtra Information for Testing (PIXIT): Refer to ISO/IEC 9646-1 [2]

Test Purpose (TP): Refer to ISO/IEC 9646-1 [2]

Virtual Private Network (VPN): Refer to EN 301 060-1 [4] and ETR 172 [7]

3.2   Abbreviations

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

ANF	Additional Network Feature
ANF-CTMI	Cordless Terminal Incoming Call Additional Network Feature
ANF-CTMO	Additional Network Feature Outgoing CTM Call Handling
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
ATS	Abstract Test Suite
CDIV	Call DIVersion
CTHO	Cordless Terminal Mobility Outgoing
CTM	Cordless Terminal Mobility
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
NFE	Network Facility Extension
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated Services Network eXchange
PISN	Private Integrated Services Network
PIXIT	Protocol Implementation eXtra Information for Testing
TP	Test Purpose
TSS	Test Suite Structure
VPN	Virtual Private Network

4 Test Suite Structure (TSS)

Signalling procedures at the Q Reference Point	**Group**
Signalling procedures at the Originating PINX	Orig01
Signalling procedures at the Home PINX	Home01

Figure 1: Test suite structure

5 Test Purposes (TP)

5.1 Introduction

For each test requirement a TP is defined.

5.1.1 TP naming convention

TPs are numbered, starting at 001, within each group. Groups are organized according to the TSS. Additional references are added to identify the actual test suite and whether it applies to the network or the user (see table 1).

Table 1: TP identifier naming convention scheme

Identifier: **<anf>_<iut><group>_<nnn>**

<anf>	=	ANF	"CTMO"	
<iut>	=	type of IUT:	Orig	Originating PINX
			Home	Home PINX
<group>	=	group	2 digit field representing group reference according to TSS	
<nnn>	=	sequential number	(001-999)	

5.1.2 Source of TP definition

The TPs are based on I-ETS 300 808 [5].

5.1.3 TP structure

Each TP has been written in a manner, which is consistent with all other TPs. The intention of this is to make the TPs more readable and checkable. A particular structure has been used and this is illustrated in table 2. This table should be read in conjunction with any TP, i.e. use a TP as an example to fully understand the table.

Table 2: Structure of a single TP for CTMO

TP part	Text	Example
Header	**<Identifier>** *tab* **<paragraph number in base ETS>** *tab*	See table 1 **Subclause 0.0.0**
Stimulus	Ensure that the IUT in the <basic call state> or <ANF-CTMO state> <trigger> *see below for message structure* *or* <goal>	N10 etc. Receiving a XXXX message to request a ...
Reaction	<action> <conditions> *if the action is sending* *see below for message structure* <next action>, *etc.* and remains in the same state *or* and enters state <state>	Sends, saves, does, etc. Using en bloc sending, ...
Message structure	<message type> message containing a *a)* <info element> information element with *b)* a <field name> encoded as *or* including <coding of the field> and *back to a or b,*	SETUP, FACILITY, CONNECT, ... Bearer capability, Facility, ...
Selection	Selection criteria reference	PINX can act as Originating PINX for basic calls. PICS: A1
NOTE 1:	In order to use the same structure as for test group selection, the selection criteria is indicated at the bottom of the test purpose.	
NOTE 2:	Unless specified the messages are valid and contain at least the mandatory information elements and possibly optional information elements, the information elements are valid and contain at least the mandatory parameters and possibly optional parameters.	

5.1.4   Test strategy

As the base standard I-ETS 300 808 [5] contains no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the corresponding PICS proforma.

The TPs are only based on conformance requirements related to the externally observable behaviour of the IUT, and are limited to conceivable situations to which a real implementation is likely to be faced (ETS 300 406 [1]).

All the test purposes are mandatory unless they have a selection criteria. Optional test purposes (with selection criteria), are applicable according to the configuration options of the IUT. The configuration option shall be covered by a PICS item.

5.2   TPs for ANF-CTMO

All PICS items referred to in this subclause are as specified in I-ETS 300 808 [5] unless indicated otherwise by another numbered reference.

Unless specified:

- Only the requirements from the point of view of the VPN "b" service entry point are considered. This implies that the interactions with other networks are out of scope of the present document and causes that the corresponding Test Purposes are not included in the present document.

- The messages indicated are valid and contain at least the mandatory information elements and possibly optional information elements.

- The information elements indicated are valid and contain at least the mandatory parameters and possibly optional parameters.

The following wording convention was defined to make the test purposes more readable:

- When a message is to be sent or received on a call independent signalling connection, the message name shall be followed by a '(sc)', e.g. CONNECT (sc) means that the CONNECT message is conveyed on a call independent signalling connection.

- All the test purposes are valid for both user and network side of the VPN b interface. In order to simplify the text and to make the test purposes more readable, only the User side Call states (Ux) are indicated in the test purposes. For the network side of the VPNb interface, the mapping table below indicates which network call state (Ny) corresponds to the user call state used in the test purpose. Equivalent call state means there that the same message flow applies from the IUT point of view (e.g.: IUT sends a SETUP message gives the call state U01 or N06).

User side call state	Equivalent network side call state
U00	N00
U03	N09
U04	N07
U06	N01
U07	N04
U09	N03
U10	N10

EXAMPLE:

Ensure that the IUT in the call state U01 …

is equivalent to the following network side test purpose:

Ensure that the IUT in the call state N06 …

5.2.1 Signalling procedures at Originating PINX

Selection: IUT supports the Originating PINX role (PICS A1)

CTMO_Orig01_001   subclauses 6.3.2.1, 6.5.1.1

Ensure that the IUT in the call state U00 and in the CTMO-Idle state, to pass to the Home PINX a call request that was initiated by a CTM user,

sends a SETUP message containing a ctmoCall invoke APDU with a NFE encoded as "endPINX" and the Interpretation APDU encoded as "clearCallIfAnyInvokePDUNotRecognized"

and enters the call state U01.

CTMO_Orig01_002   subclause 6.5.1.1

Ensure that the IUT in the call state U00 and in the CTMO-Idle state, to pass to the Home PINX a call request that was initiated by a CTM user when the intended destination number is completely available,

sends a SETUP message containing a ctmoCall invoke APDU including the destination number in the destinationNumber argument and also including the sendingComplete argument

and enters the call state U01.

CTMO_Orig01_003   subclause 6.5.1.1

Ensure that the IUT in the call state U03 and in the CTMO-Idle state, having sent a SETUP message containing a ctmoCall invoke APDU including the incomplete destination number in the destinationNumber argument and having received a CALL PROCEEDING message,

sends additional address information from the CTM user in the argument of a ctmoCall invoke APDU in a FACILITY message with the Interpretation APDU omitted or included with the value rejectAnyUnrecognizedInvokePdu

and remains in the call state U03.

CTMO_Orig01_004   subclause 6.5.1.1

Ensure that the IUT in the call state U03 and in the CTMO-Idle state, having sent a SETUP message containing a ctmoCall invoke APDU including the incomplete destination number in the destinationNumber argument and having received a CALL PROCEEDING message and a PROGRESS message with progress description number 8,

sends additional address information from the CTM user in the argument of a ctmoCall invoke APDU in a FACILITY message with the Interpretation APDU omitted or included with the value rejectAnyUnrecognizedInvokePdu

and remains in the call state U03.

CTMO_Orig01_005   subclause 6.5.1.1

Ensure that the IUT in the call state U03 and in the CTMO-Idle state, having sent a SETUP message containing a ctmoCall invoke APDU including the complete destination number in the destinationNumber argument and having received a CALL PROCEEDING, on receipt of the ALERTING message followed by the CONNECT message,

sends a CONNECT ACKNOWLEDGE message

and enters the call state U10.

CTMO_Orig01_006   subclause 6.5.1.1

Ensure that the IUT in the call state U03 and in the CTMO-Idle state, having sent a SETUP message containing a ctmoCall invoke APDU including the incomplete destination number in the destinationNumber argument and having received a CALL PROCEEDING message and having sent the additional address information from the CTM user in the argument of ctmoCall invoke APDU in a FACILITY message, on receipt of the ALERTING message followed by the CONNECT message,

sends a CONNECT ACKNOWLEDGE message

and enters the call state U10.

5.2.2   Signalling procedures at Home PINX

Selection: IUT supports the Home PINX role (PICS A2)

CTMO_Home01_001 subclause 6.5.2.1

Ensure that the IUT in the call state U00 and in the CTMO-Idle state, on receipt of a SETUP PDU containing a ctmoCall invoke APDU including the complete destination number in the destinationNumber argument,

sends a SETUP PDU to the destinating PINX and a CALL PROCEEDING PDU to the originating PINX.

CTMO_Home01_002 subclause 6.5.2.1

Ensure that the IUT in the call state U00 and in the CTMO-Idle state, on receipt of a SETUP PDU containing a ctmoCall invoke APDU including the incomplete destination number in the destinationNumber argument,

sends a CALL PROCEEDING PDU to the originating PINX and optionally a PROGRESS PDU, and does not send a SETUP PDU to the destinating PINX.

CTMO_Home01_003 subclause 6.5.2.1

Ensure that the IUT in the call state U09 and in the CTMO-Idle state, having received a SETUP PDU containing a ctmoCall invoke APDU including the incomplete destination number in the destinationNumber argument, having sent a CALL PROCEEDING PDU to the originating PINX and optionally a PROGRESS PDU, on receipt of a FACILITY PDU containing the ctmoCall invoke APDU with the end of the destination number,

sends a SETUP PDU to the destinating PINX.

CTMO_Home01_004 subclause 6.5.2.1

Ensure that the IUT in the call state U00 and in the CTMO-Idle state, on receipt of a SETUP PDU containing a ctmoCall invoke APDU including the incomplete destination number in the destinationNumber argument, but containing enough numbers to route the call,

sends a SETUP PDU to the destinating PINX and a CALL PROCEEDING PDU and optionally a PROGRESS PDU to the originating PINX.

CTMO_Home01_005 subclause 6.5.2.1

Ensure that the IUT in the call state U06 and in the CTMO-Idle state, having received a SETUP PDU containing a ctmoCall invoke APDU including the complete destination number in the destinationNumber argument, having sent the SETUP PDU to the destinating PINX, on receipt of a CONNECT PDU from the destinating PINX,

establishes successfully the call, joins the 2 calls and

enters to call state U10.

CTMO_Home01_006 subclause 6.5.2.1

Ensure that the IUT in the call state U06 and in the CTMO-Idle state, having received a SETUP PDU containing a ctmoCall invoke APDU including the incomplete destination number in the destinationNumber argument, having received a FACILITY PDU containing the ctmoCall invoke APDU with the end of the destination number, having sent the SETUP PDU to the destinating PINX, on receipt of a CONNECT PDU from the destinating PINX,

establishes successfully the call, joins the 2 calls and

enters to call state U10.

CTMO_Home01_007 subclause 6.5.2.2

Ensure that the IUT in the call state U06 and in the CTMO-Await-Info state, on expiry of timer T1,

sends a DISCONNECT PDU with the cause value #28 to the originating PINX.

CTMO_Home01_008 subclause 6.5.2.2

Ensure that the IUT in the call state U09 and in the CTMO-Await-Info state, having received a SETUP PDU containing a ctmoCall invoke APDU including the incomplete destination number in the destinationNumber argument, but containing enough numbers to route the call, having sent the SETUP PDU to the destinating PINX, and a CALL PROCEEDING PDU and optionally a PROGRESS PDU to the originating PINX, on expiry of timer T1,

does not take any action.

6 Compliance

An ATS which complies with the present document shall:

a) consist of a set of test cases corresponding to the set or to a subset of the TPs specified in clause 5;

b) use a TSS which is an appropriate subset of the whole of the TSS specified in clause 4;

c) use the same naming conventions for the test groups and test cases;

d) maintain the relationship specified in clause 5 between the test groups and TPs and the entries in the PICS proforma to be used for test case deselection;

e) comply with ISO/IEC 9646-2 [3].

In the case of a) or b), a subset shall be used only where a particular Abstract Test Method (ATM) makes some TPs untestable. All testable TPs from clause 5 shall be included in a compliant ATS.

7 Requirements for a comprehensive testing service

As a minimum the Remote test method, as specified in ISO/IEC 9646-2 [3], shall be used by any organization claiming to provide a comprehensive testing service for network equipment claiming conformance to I-ETS 300 808 [5].

Bibliography

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

- ETSI EN 300 172 (V1.4): "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 [ISO/IEC 11582 (1995), modified]".

- ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

- ITU-T Recommendation I.210 (1993): "Principles of the telecommunication services supported by an ISDN and the means to describe them".

- ETSI EN 301 061-1 (V1.2): 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 applications; Part 1 Protocol specification".

History

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