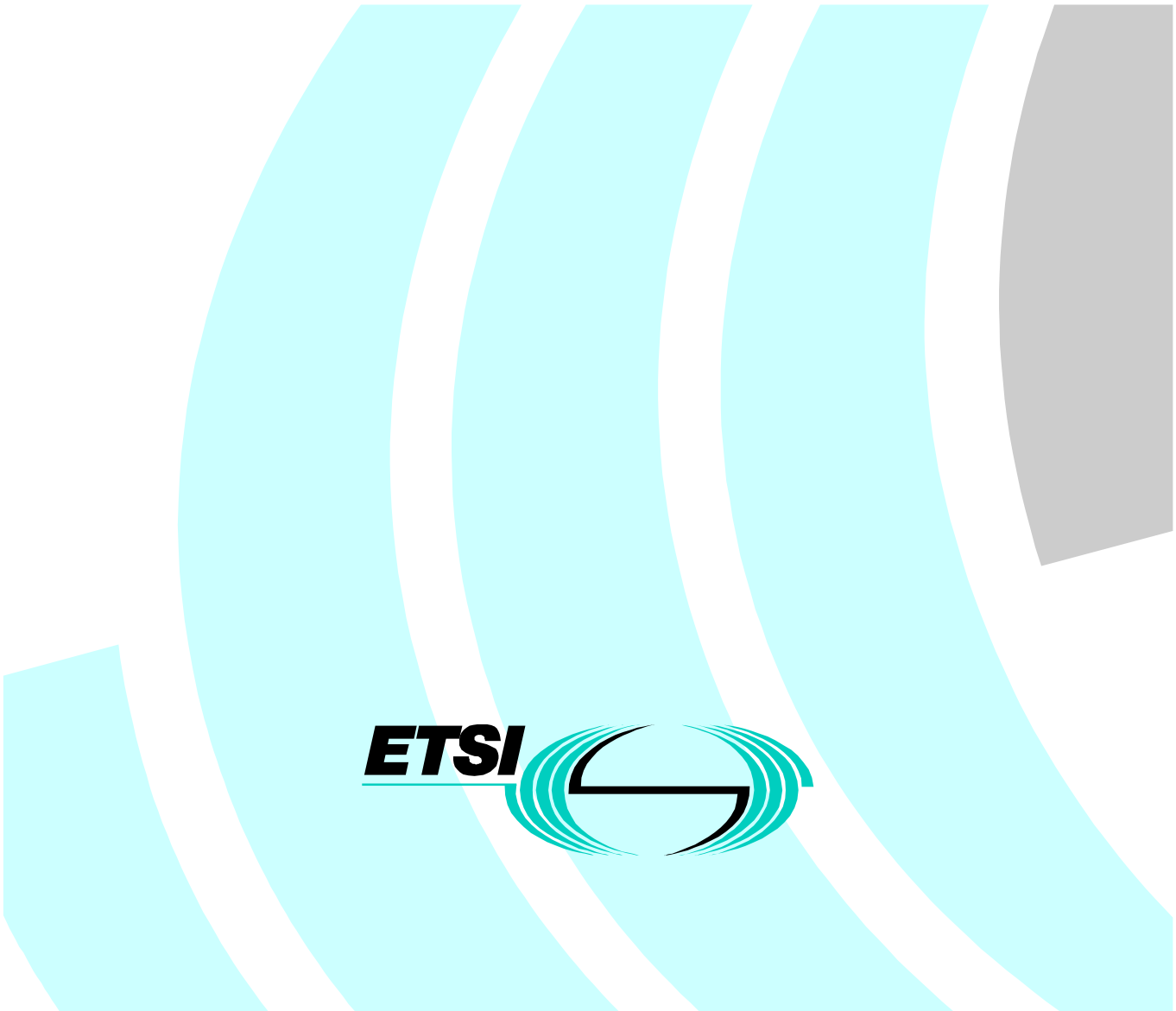
EN 300 210-5 V1.2.4 (1998-06)

European Standard (Telecommunications series)

Integrated Services Digital Network (ISDN); Freephone (FPH) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 5: Test Suite Structure and Test Purposes (TSS&TP) specification for the network



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Contents

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Foreword

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

The present document is part 5 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Freephone (FPH) supplementary service, as described below:

Part 1: "Protocol specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";

Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 5: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network";

Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".

The present version updates the references to the basic call specifications.

National transposition dates	
Date of adoption of this EN:	19 June 1998
Date of latest announcement of this EN (doa):	30 September 1998
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Date of withdrawal of any conflicting National Standard (dow):	31 March 1999

1 Scope

This fifth part of EN 300 210 specifies the Test Suite Structure and Test Purposes (TSS&TP) for the Network side of the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [7]) of implementations conforming to the stage three standard for the Freephone (FPH) supplementary service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, EN 300 210-1 [1].

A further part of the present document specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma based on the present document. 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 300 210-1 [1].

2 Normative references

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

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] EN 300 210-1 (V1.2): "Integrated Services Digital Network (ISDN); Freephone (FPH) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[2] EN 300 210-2 (V1.2): "Integrated Services Digital Network (ISDN); Freephone (FPH) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[3] ISO/IEC 9646-1: "Information technology - OSI Conformance Testing Methodology and Framework; Part 1: General Concepts".

[4] ISO/IEC 9646-2: "Information technology - OSI Conformance Testing Methodology and Framework; Part 2: Abstract Test Suite specification".

[5] ISO/IEC 9646-3: "Information technology - OSI Conformance Testing Methodology and Framework; Part 3: The Tree and Tabular Combined Notation".

[6] 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".

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

[8] 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]".

[9] ITU-T Recommendation I.112: "Vocabulary and terms for ISDNs".

[10] CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[11] ITU-T Recommendation I.210: "Principles of the telecommunication services supported by an ISDN and the means to describe them".

3 Definitions

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

3.1 Definitions related to conformance testing

abstract test case: Refer to ISO/IEC 9646-1 [3].

Abstract Test Suite (ATS): Refer to ISO/IEC 9646-1 [3].

active test: A test case where the IUT is required to send a particular message, but not in reaction to a received message. This would usually involve the use of PIXIT information to see how this message can be generated and quite often is specified in an ATS using an implicit send event.

Implementation Under Test (IUT): Refer to ISO/IEC 9646-1 [3].

implicit send event: Refer to ISO/IEC 9646-3 [5].

lower tester: Refer to ISO/IEC 9646-1 [3].

passive test: A test case where the IUT is required to respond to a protocol event (e.g. received message) with another protocol event (e.g. send message) which normally does not require any special operator intervention as associated with the implicit send event.

point of control and observation: Refer to ISO/IEC 9646-1 [3].

Protocol Implementation Conformance Statement (PICS): Refer to ISO/IEC 9646-1 [3].

PICS proforma: Refer to ISO/IEC 9646-1 [3].

Protocol Implementation eXtra Information for Testing (PIXIT): Refer to ISO/IEC 9646-1 [3].

PIXIT proforma: Refer to ISO/IEC 9646-1 [3].

system under test: Refer to ISO/IEC 9646-1 [3].

Test Purpose (TP): Refer to ISO/IEC 9646-1 [3].

3.2 Definitions related to EN 300 210-1

call held auxiliary state: See EN 300 196-1 [6], subclause 7.1.2.

call reference: See EN 300 403-1 [8], subclause 4.3.

component: See EN 300 196-1 [6], subclause 11.2.2.1.

idle auxiliary state: See EN 300 196-1 [6], subclause 7.1.2.

Integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [9], definition 308.

ISDN number: A number conforming to the numbering and structure specified in CCITT Recommendation E.164 [10].

invoke component: See EN 300 196-1 [6], subclause 11.2.2.1.

network: The DSS1 protocol entity at the Network side of the user-network interface where a T reference point or coincident S and T reference point applies.

network (S/T): The DSS1 protocol entity at the Network side of the user-network interface where a coincident S and T reference point applies.

network (T): The DSS1 protocol entity at the Network side of the user-network interface where a T reference point applies (Network connected to Private ISDN).

return error component: See EN 300 196-1 [6], subclause 11.2.2.1.

return result component: See EN 300 196-1 [6], subclause 11.2.2.1.

served user: The served user is the user who invokes the FPH supplementary service.

service; telecommunication service: See ITU-T Recommendation I.112 [9], definition 201.

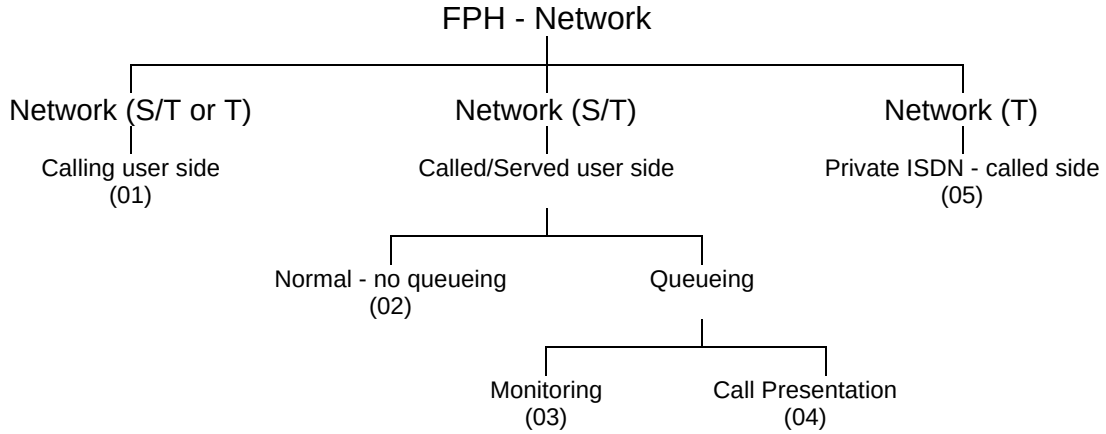
supplementary service: See ITU-T Recommendation I.210 [11], subclause 2.4.

4 Abbreviations

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

(Held)	Call Held Auxiliary state
(Idle)	Idle Auxiliary state
ATM	Abstract Test Method
ATS	Abstract Test Suite
CR	Call Reference
FPH	Freephone
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
TP	Test Purpose
TSS	Test Suite Structure
N00	Null call state
N04	Call Delivered call state
N06	Call Present call state
N07	Call Received call state
N09	Incoming Call Proceeding call state
N19	Release Request call state
N31	Bearer Independent Transport call state

5 Test Suite Structure (TSS)



NOTE: Numbers in brackets represent group numbers and are used in TP identifiers.

Figure 1: Test suite structure

6 Test Purposes (TP)

6.1 Introduction

For each test requirement a TP is defined.

6.1.1 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: **<ss>_<iut><group>_<nnn>**				
<ss>	=	supplementary service:	e.g. "FPH"	
<iut>	=	type of IUT:	U N	User Network
<group>	=	group	2 digit field representing group reference according to TSS	
<nnn>	=	sequential number	(001-999)	

6.1.2 Source of TP definition

The TPs are based on EN 300 210-1 [1].

6.1.3 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

TP part	Text	Example
Header	<Identifier> *tab* <paragraph number in base ETS> *tab* <PICS reference (if any)> *tab* <type of test> *tab* <condition> *CR.*	see table 1 subclause 0.0.0 XY 0.0 valid, invalid, inopportune mandatory, optional, conditional
Stimulus	Ensure that the IUT in the <basic call state> / <supplementary service state> <trigger> *see below for message structure* *or* <goal>	 N10 etc. /FPH Idle, ... 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, ...
NOTE: Text in italics will not appear in TPs and text between <> is filled in for each TP and may differ from one TP to the next.		

6.1.4 Test strategy

As the base standard EN 300 210-1 [1] contains no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the PICS specification EN 300 210-2 [2]. The criteria applied include the following:

- only the requirements from the point of view of the T or coincident S and T reference point are considered;
- whether or not a test case can be built from the TP is not considered.

6.2 Network TPs for FPH

6.2.1 Network (S/T or T)

6.2.1.1 Calling user side

NOTE: These procedures are also applicable where a Private ISDN exists at the calling side (see subclause 10.1) i.e. where the access to the IUT (Public ISDN) is configured for communication with a Private ISDN (T reference point only).

FPH_N01_001 subclause 9.2.1.1 SC 1.1 valid mandatory
Ensure that the IUT in state N00 on receipt of a SETUP message with a Called Party number information element indicating a freephone service access code, and with a valid freephone number,
sends a CALL PROCEEDING and subsequently an ALERTING message and enters state N04.

FPH_N01_002 subclause 9.2.1.1 SC 1.2 valid optional
Ensure that the IUT in state N00 on receipt of a valid SETUP message for a freephone number and the call is queued (because the destination user is busy),
sends a CALL PROCEEDING message followed by an ALERTING message containing a Notification information element indicating "call completion delay" and enters state N04.

Selection: call queueing supported by network.

FPH_N01_003 subclause 9.2.1.1 SC 1.2 valid optional
Ensure that the IUT in state N04, having sent an ALERTING message containing a Notification information element indicating "call completion delay", on subsequent presentation of a freephone call to the destination user,
does not send a second ALERTING message.

Selection: call queueing supported by network.

6.2.2 Network (S/T)

6.2.2.1 Called/Served user side

6.2.2.1.1 Normal (no queueing)

Selection: call queueing not supported OR PIXIT provides means to turn-off queueing.

FPH_N02_001 subclause 9.2.2.1 SC 2.1,2.2 valid optional
Ensure that the IUT in state N00 and FPH(Idle) state in order to present a freephone call,
sends a SETUP message containing a facility information element with CallFPH invoke component, enters state N06 and remains in FPH(Idle) state.

Selection: CallFPH invoke component included in SETUP.
Selection: calledFreephoneNr parameter NOT included in CallFPH invoke component.

FPH_N02_002 subclause 9.2.2.1 SC 2.1,2.2 valid optional
Ensure that the IUT in state N00 and FPH(Idle) state in order to present a freephone call,
sends a SETUP message containing a facility information element with CallFPH invoke component including a calledFreephoneNr parameter indicating the ISDN number (freephone service access code and freephone number), enters state N06 and remains in FPH(Idle) state.

Selection: CallFPH invoke component included in SETUP.
Selection: calledFreephoneNr parameter included in CallFPH invoke component.

FPH_N02_003 subclause 9.2.2.1 SC 2.1,2.2 valid optional
Ensure that the IUT in state N00 and FPH(Idle) state in order to present a freephone call,
sends a SETUP message, enters state N06 and remains in FPH(Idle) state.

Selection: CallFPH invoke component NOT included in SETUP.

FPH_N02_004 subclause 9.2.2.2 SC 2.3 valid optional
Ensure that the IUT in state N06 and FPH(Idle) state on receipt of a CALL PROCEEDING message containing a reject component (in response to a SETUP message containing a facility information element with a CallFPH invoke component),
sends no message and enters state N09.

Selection: CallFPH invoke component included in SETUP.

FPH_N02_005 subclause 9.2.2.2 SC 2.3 valid optional
Ensure that the IUT in state N06 and FPH(Idle) state on receipt of an ALERTING message containing a reject component (in response to a SETUP message containing a facility information element with a CallFPH invoke component),
sends no message and enters state N07.

Selection: CallFPH invoke component included in SETUP.

FPH_N02_006 subclause 9.2.2.2 SC 2.3 valid optional
Ensure that the IUT in state N06 and FPH(Idle) state on receipt of a CONNECT message containing a reject component (in response to a SETUP message containing a facility information element with a CallFPH invoke component),
sends a CONNECT ACKNOWLEDGE message and enters state N10.

Selection: CallFPH invoke component included in SETUP.

FPH_N02_007 subclause 9.2.2.2 SC 2.3 valid optional
Ensure that the IUT in state N06 and FPH(Idle) state on receipt of a FACILITY message containing a reject component (in response to a SETUP message containing a facility information element with a CallFPH invoke component),
sends no message and remains in state N06.

Selection: CallFPH invoke component included in SETUP.

6.2.2.1.2 Queueing

Selection: call queueing supported by network.

6.2.2.1.2.1 Monitoring

FPH_N03_001 subclause 9.2.3.3.1 SC 2.8 valid mandatory
Ensure that the IUT, in state N00 and FPH(Busy Monitoring) state and StatusRequest(Idle) state, in order to perform monitoring and there is a free B-channel available,
reserves a B-channel and then sends a FACILITY message containing a facility information element with StatusRequest invoke component, remains in state N00 and FPH(Busy Monitoring) state and enters Status Request(Waiting Status) state.

FPH_N03_002 subclause 9.2.3.3.1 SC 2.10 valid mandatory
Ensure that the IUT, in state N00 and FPH(Busy Monitoring) state and StatusRequest(Waiting Status) state, on receipt of a FACILITY message containing a StatusRequest return result component with a "compatibleAndBusy" statusResult parameter,
cancels the B-channel reservation, remains in state N00, re-enters FPH(Busy Monitoring) state and enters StatusRequest(Idle) state.

FPH_N03_003 subclause 9.2.3.3.2 SC 2.11 valid mandatory
Ensure that the IUT, in state N00 and FPH(Busy Monitoring) state and StatusRequest(Waiting Status) state, on receipt of a FACILITY message containing a StatusRequest return result component with an "incompatible" statusResult parameter,
cancels the B-channel reservation and the monitoring, remains in state N00, enters FPH(Idle) state and StatusRequest(Idle) state.

FPH_N03_004 subclause 9.2.3.3.2 SC 2.12 valid mandatory
Ensure that the IUT, in state N00 and FPH(Busy Monitoring) state and StatusRequest(Waiting Status) state, on receipt of a FACILITY message containing a StatusRequest return result component with a "compatibleAndFree" statusResult parameter and a B-channel is not available,
cancels the B-channel reservation and restarts queue processing, remains in state N00 and re-enters FPH(Busy Monitoring) state and enters StatusRequest(Idle) state.

6.2.2.1.2.2 Call presentation

FPH_N04_001 subclause 9.2.3.4.1 SC 2.13 valid optional
Ensure that the IUT, in state N00 and FPH(Idle) state and StatusRequest(Idle) state having received a FACILITY message containing a StatusRequest return result component with a "compatibleAndFree" statusResult parameter and having started timer T-FPH1, in order to establish the queued call,
sends a SETUP message, containing a facility information element with CallFPH invoke component, and enters state N06 and remains in FPH(Idle) state and StatusRequest(Idle) state.

Selection: CallFPH invoke component included in SETUP
Selection: calledFreephoneNr parameter NOT included in CallFPH invoke component

FPH_N04_002 subclause 9.2.3.4.1 SC 2.13 valid optional
Ensure that the IUT in state N00 and FPH(Idle) state and StatusRequest(Idle) state having received a FACILITY message containing a StatusRequest return result component with a "compatibleAndFree" statusResult parameter and having started timer T-FPH1, in order to establish the queued call,
sends a SETUP message containing a facility information element with CallFPH invoke component including a calledFreephoneNr parameter indicating the ISDN number (freephone service access code and freephone number), and enters state N06 and remains in FPH(Idle) state and StatusRequest(Idle) state.

Selection: CallFPH invoke component included in SETUP.
Selection: calledFreephoneNr parameter included in CallFPH invoke component.

FPH_N04_003 subclause 9.2.3.4.1 SC 2.13 valid optional
Ensure that the IUT in state N00 and FPH(Idle) state and StatusRequest(Idle) state having received a FACILITY message containing a StatusRequest return result component with a "compatibleAndFree" statusResult parameter and having started timer T-FPH1, in order to establish the queued call,
sends a SETUP message, and enters state N06 and remains in FPH(Idle) state and StatusRequest(Idle) state.

Selection: CallFPH invoke component NOT included in SETUP.

6.2.3 Network (T)

6.2.3.1 Private ISDN at called side

FPH_N05_001 subclause 10.2.1 SC 1.3 valid mandatory
Ensure that the IUT in state N00 in order to request monitoring,
sends a REGISTER message containing a facility information element with a Monitor-T-FPH invoke component including a q931InfoElement parameter with details of the queued freephone call and a servedUserDestination parameter and enters the Bearer Independent Transport call state N31.

FPH_N05_002 subclause 10.2.1 no PICS valid mandatory
Ensure that the IUT in state N31, having sent a Monitor-T-FPH invoke component, on receipt of a FACILITY message containing a Monitor-T-FPH return result component,
takes no action and remains in state N31.

FPH_N05_003 subclause 10.2.1 no PICS invalid mandatory
Ensure that the IUT in state N31, having sent a Monitor-T-FPH invoke component, on receipt of a FACILITY message containing an invalid Monitor-T-FPH return result component,
sends a FACILITY message containing a reject component and remains in state N31.

FPH_N05_004 subclause 10.2.1 SC 1.4 valid mandatory
Ensure that the IUT in state N31, in order to cancel a previously successfully requested monitoring,
sends a RELEASE message and enters the Release Request state N19.

FPH_N05_005 subclause 10.2.1 no PICS valid mandatory
Ensure that the IUT in state N31, on receipt of a RELEASE message cancelling a previously successfully requested monitoring,
sends a RELEASE COMPLETE message and enters state N00.

FPH_N05_006 subclause 10.2.1 SC 1.5 valid mandatory
Ensure that the IUT in state N31, on receipt of a valid FACILITY message containing a Free-T-FPH invoke component,
sends a RELEASE message and enters the Release Request state N19.

FPH_N05_007 subclause 10.2.1 SC 1.6 valid optional
Ensure that the IUT in state N00, on successful termination of the bearer-independent transport mechanism following receipt of a valid FACILITY message containing a Free-T-FPH invoke component,
sends a SETUP message containing a facility information element with a Call-T-FPH invoke component including a fPHReference parameter containing the same value as received in the fPHReference parameter of the Free-T-FPH invoke component and including a calledFreephoneNr parameter indicating the ISDN number (freephone service access code and freephone number) and enters state N06.

Selection: calledFreephoneNr parameter included in Call-T-FPH invoke component.

FPH_N05_008 subclause 10.2.1 SC 1.6 valid optional
Ensure that the IUT in state N00, on successful termination of the bearer-independent transport mechanism following receipt of a valid FACILITY message containing a Free-T-FPH invoke component,
sends a SETUP message containing a facility information element with a Call-T-FPH invoke component including a fPHReference parameter containing the same value as received in the fPHReference parameter of the Free-T-FPH invoke component and NOT including a calledFreephoneNr parameter indicating the ISDN number (freephone service access code and freephone number) and enters state N06.

Selection: calledFreephoneNr parameter NOT included in Call-T-FPH invoke component.

FPH_N05_009 subclause 10.2.2 SC 1.7 valid mandatory
Ensure that the IUT in state N31, having sent a REGISTER message containing a facility information element with a Monitor-T-FPH invoke component, on receipt of a FACILITY message containing a Monitor-T-FPH return error component with error indicating "notAvailable",
sends a RELEASE message and enters the Release Request state N19.

FPH_N05_010 subclause 10.2.2 SC 1.7 valid mandatory
Ensure that the IUT in state N31, having sent a REGISTER message containing a facility information element with a Monitor-T-FPH invoke component, on receipt of a FACILITY message containing a Monitor-T-FPH return error component with error indicating "notImplemented",
sends a RELEASE message and enters the Release Request state N19.

FPH_N05_011 subclause 10.2.2 SC 1.7 invalid mandatory
Ensure that the IUT in state N31, having sent a REGISTER message containing a facility information element with a Monitor-T-FPH invoke component, on receipt of a FACILITY message containing an invalid Monitor-T-FPH return error component,
sends a FACILITY message containing a reject component and remains in state N31.

FPH_N05_012 subclause 10.2.2 SC 1.8 valid mandatory
Ensure that the IUT in state N31, having sent a REGISTER message containing a facility information element with a Monitor-T-FPH invoke component, on receipt of a FACILITY message containing a Monitor-T-FPH reject component,
sends a RELEASE message and enters the Release Request state N19.

7 Compliance

An ATS which complies with this TSS&TP specification shall:

a) consist of a set of test cases corresponding to the set or to a subset of the TPs specified in clause 6;

b) use a TSS which is an appropriate subset of the whole of the TSS specified in clause 5;

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

d) maintain the relationship specified in clause 6 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 [4].

In the case of a) or b) above, a subset shall be used only where a particular Abstract Test Method (ATM) makes some TPs untestable. All testable TPs from clause 6 shall be included in a compliant ATS.

8 Requirements for a comprehensive testing service

As a minimum the Remote test method, as specified in ISO/IEC 9646-2 [4], shall be used by any organization claiming to provide a comprehensive testing service for network equipment claiming conformance to EN 300 210-1 [1].

Annex A (informative): Changes with respect to the previous ETS 300 210-5

The following changes have been done:

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

History

Document history		
Edition 1	May 1997	Publication as ETS 300 210-5
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