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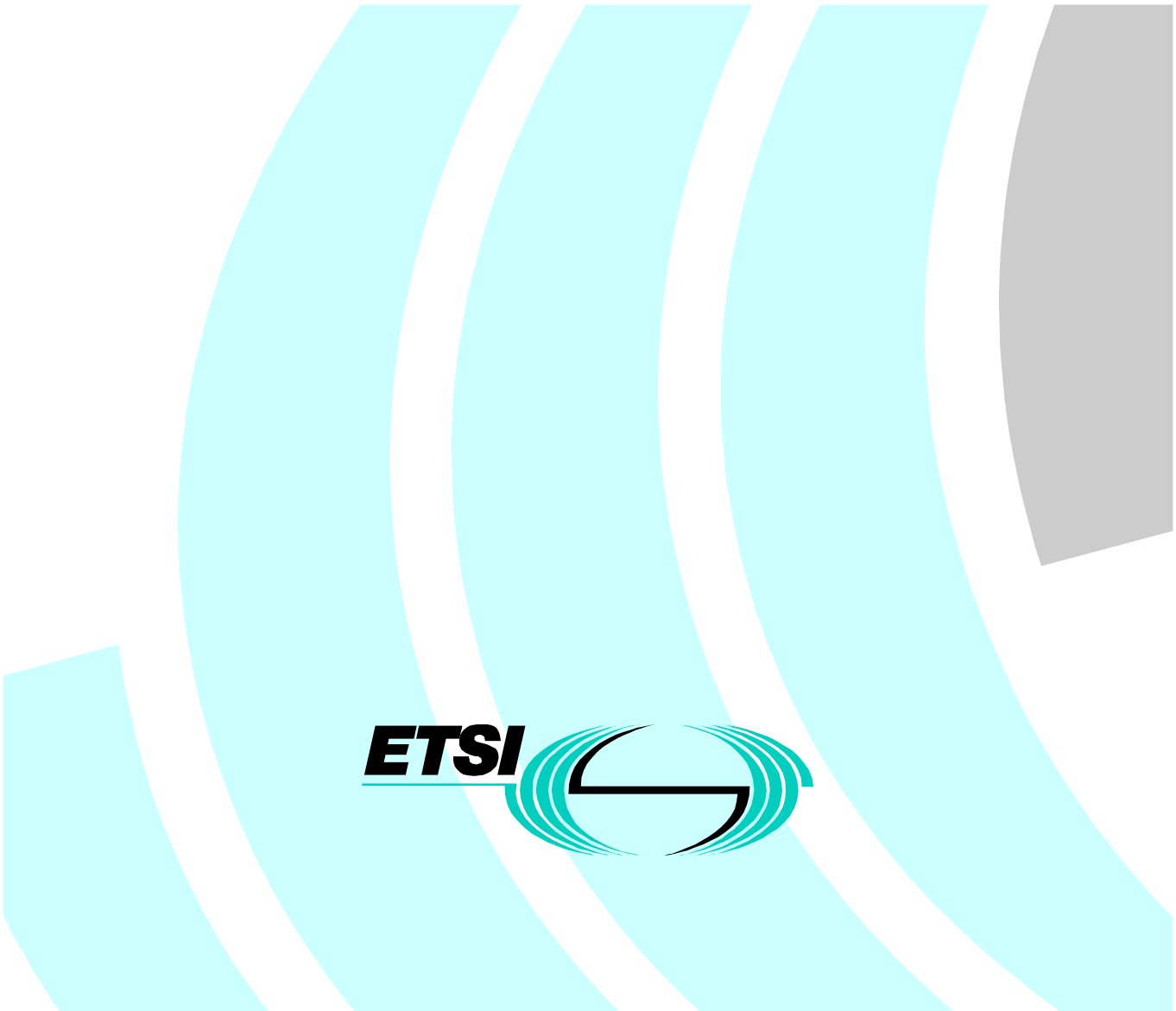
European Standard (Telecommunications series)

Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Teleaction service; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification for the End User Terminal (EUT)



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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), and is now submitted for the Public Enquiry phase of the ETSI standards Two-steps Approval Procedure.

The present document is part 3 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Teleaction 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 End User Terminal (EUT)";

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

Part 5: "Test Suite Structure and Test Purposes (TSS&TP) specification for the Service Provider Terminal (SPT)";

Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the Service Provider Terminal (SPT)";

Part 7: "Test Suite Structure and Test Purposes (TSS&TP) specification for the Teleaction Management Function (TMF)";

Part 8: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the Teleaction Management Function (TMF)".

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

The present document specifies the Test Suite Structure and Test Purposes (TSS&TP) for the End User Terminal (EUT) of the T reference point or coincident S and T reference point (as defined in CCITT Recommendation I.411 [3]) of implementations conforming to the stage three standard for the Teleaction service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, EN 301 145-1 [6].

Test Purposes described in this specification do not apply to Data Link establishment and Disconnection procedures contained in ETS 300 402-2 [5].

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 Service Provider Terminal (SPT) and the Teleaction Management Function (TMF) of the T reference point or coincident S and T reference point of implementations conforming to EN 301 145-1 [6].

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.
- 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] CCITT Recommendation I.112 (1993): "Vocabulary and terms for ISDNs".

[2] CCITT Recommendation I.210 (1993): "Principles of the telecommunication services supported by an ISDN and the means to describe them".

[3] CCITT Recommendation I.411 (1993): "ISDN user-network interfaces - reference configurations".

[4] ETS 300 099: "Integrated Services Digital Network (ISDN); Specification of the Packet Handler access point Interface (PHI)".

[5] ETS 300 402-2: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 2: General protocol specification [IUT-T Recommendation Q.921 (1993) modified]".

[6] EN 301 145-1 (V1.1): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Teleaction service; Part 1: Protocol specification".

[7] EN 301 145-2 (V1.1): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Teleaction service; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

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

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

3 Definitions and abbreviations

3.1 Definitions

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

3.1.1 Definitions related to conformance testing

abstract test suite: refer to ISO/IEC 9646-1 [8].

implementation under test: refer to ISO/IEC 9646-1 [8].

Protocol Implementation Conformance Statement (PICS): refer to ISO/IEC 9646-1 [8].

PICS proforma: refer to ISO/IEC 9646-1 [8].

Protocol Implementation eXtra Information for Testing (PIXIT): refer to ISO/IEC 9646-1 [8].

PIXIT proforma: refer to ISO/IEC 9646-1 [8].

test purpose: refer to ISO/IEC 9646-1 [8].

3.1.2 Definitions related to EN 300 142-1

Bd channel: a 64 kbit/s timeslot over which multiple D channel connections are multiplexed using the procedures of ETS 300 099 [4], clause 9.

bearer service: see CCITT Recommendation I.112 [1], definition 202.

End User (EU): entity to whom a teleaction application service is provided or who is affected by that application service.

End User Terminal (EUT): a device (or location of a device) that, depending on the application (e.g. by monitoring of subdevices):

- on the basis of local conditions or by interrogation, generates information and presents this information for transmission by the network to a service provider (SP);
- receives information from a SP in order to affect local conditions;
- upon polling requests, received from a Teleaction Management Function (TMF), executes the requested local actions (e.g. authorization, functionality checks, etc.) and sends appropriate response to the TMF.

EU access capability: the telecommunication means used between an EUT and a TMF (e.g. ISDN bearer service, dedicated connection, etc.).

integrated services digital network: see CCITT Recommendation I.112 [1], definition 308.

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.

Service Provider (SP): entity which, by using one or more TMFs, provides a teleaction application service to one or more EUTs.

NOTE: The SP may be the Basic Network Provider (BNP), the TMFP, or another organization responsible for one or more SPTs.

Service Provider Terminal (SPT): a device (or location of such a device) which, depending on the application:

- receives information from one or more EUTs for handling and processing in accordance with the application service offered by the SPT;
- generates control messages and information requests and presents that information for transmission for one or more EUTs;
- monitors EUTs on the network, either by retrieving EUT status information stored in TMFs, and/or by receiving status information automatically from the TMFs (e.g. alarms);
- receives polling requests from TMFs and sends appropriate response to the TMF. Execution of local procedures such as authorization and functionality check are outside the scope of the specification [1];
- transfers to the TMF information to be broadcasted to the EUTs, if the broadcast functionality is supported by the TMF.

SPT access capability: the telecommunication means used between a SPT and a TMF (e.g. ISDN Bearer service, dedicated connection, etc.).

service; telecommunication service: see CCITT Recommendation I.112 [1], subclause 2.2, definition 201.

supplementary service: see CCITT recommendation I.210 [2] subclause 2.4.

teleaction application: one specific end-to-end application offered by a service provider using the teleaction service.

teleaction service: the teleaction service is the transport mechanism used by a teleaction application.

teleservice: see CCITT Recommendation I.112 [1], subclause 2.2, definition 203.

Teleaction Management Function (TMF): set of network functions added to either the public ISDN or assigned to a separate public, or private, network entity. The tasks of the TMF are:

- to ensure reliable communication paths between the EUTs and the SPT, i.e. to ensure available and secure access for the EUTs to the network and communication paths for the SPT in the ISDN, respectively;
- authorization of connected EUTs/SPTs;
- EUT/SPT functionality check;
- to address the appropriate EUT/SPT for transfer of information generated by SPT/EUT;
- as a TMFP option, to broadcast appropriate EUTs for transfer of information generated by a SPT.

Teleaction Management Function Provider (TMFP): entity responsible for the installation and maintenance of one or more of the TMFs. A TMFP may be the same as BNP.

user: the DSS1 Protocol entity at the user side of the user-network interface.

3.2 Abbreviations

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

ATM	Abstract Test Method
ATS	Abstract Test Suite
BNP	Basic Network Provider
DSS1	Digital Subscriber Signalling System No. one
EUT	End User Terminal
ISDN	Integrated Services Digital Network
IUT	Implementation under test
LAPD	Link Access Procedure for the D-Channel
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
SAPI	Service Access Point Identifier

SPT	Service provider Terminal
TE1	Terminal Equipment type 1
TMF	Teleaction Management Function
TMFP	Teleaction Management Function Provider
TP	Test Purpose
TSS	Test Suite Structure

4 Test Suite Structure (TSS)

Clause/Subclause	**Group**
Procedures at the coincident S and T reference point (clause 9)	
- Data link establishment at EU/SP interface (subclause 9.1)	
- Normal procedures (subclause 9.1.1)	00
- Exceptional procedures (subclause 9.1.2)	01
- Data link disconnection at EU/SP interface (subclause 9.2)	
- Normal procedures (subclause 9.2.1)	02
- Exceptional procedures (subclause 9.2.2)	03
- Error procedures (subclause 9.3)	04
Maintenance, polling and broadcast procedures (clause 13)	
- Procedures (subclause 13.2)	
- Loop procedure (subclause 13.2.2)	05
- Alarm reporting procedures (subclause 13.2.3)	06
- Alarm clearance (subclause 13.2.4)	07
- Broadcast procedures (subclause 13.3)	08
- Status request procedure (subclause 13.4)	09

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 service and whether it applies to the EUT, the SPT or the TMF (see table 1).

Table 1: TP identifier naming convention scheme

Identifier: **<service>_<iut group>_<nnn>**				
<service>	=	basic service:	e.g. "TELEACTION"	
<iut>	=	type of IUT:	E	End User Terminal
			S	Service Provider Terminal
			T	Teleaction Management Function
<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 EN 301 145-1 [6].

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

TP Part	Text	Example
Header	**<Identifier>**	see table 1
Stimulus	Ensure that the IUT, <initial condition (preamble)> <trigger> *see below for message structure* *or* <goal>	 having received a XXXX message receiving a XXXX message (see note 2) to request a ...
Reaction	<action> <conditions> *if the action is sending* *see below for message structure* <next action>, *etc.*	sends, processes, discards, etc. ...
Message structure	<message type> message *a)* including (*or* without) <information element> information element indicating <coding of the field> and *back to a or b,*	LOOP REQUEST, REPORT, ... Loop Originator, Diagnostic, ... the diagnostic value *val*, "*Argument value*", …
NOTE 1: 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. NOTE 2: All messages shall be considered as "valid and compatible" unless otherwise specified in the test purpose.		

5.1.4 Test strategy

As the base standard EN 301 145-1 [6] 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 301 145-2 [7]. 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.

5.1.5 Data link procedures.

Following features of the specification are not covered by the test purposes:

Clause 9: link establishment and disconnection procedures contained in ETS 300 402-2 [5] subclause 5.5 using SAPI = 12;

Clause 9: semi-permanent B Channels in-band procedures in accordance with ETS 300 099 [4];

Subclause 9.1.1.2: network layer communication procedures (network protocol dependent).

Data link establishment at EU/SP interface is a mandatory preamble to each test of subclause 9.3 and clause 13.

For link establishment by EUT, procedures in accordance with ETS 300 402-2 [5] (SAPI = 12) are to be considered.

Data link disconnection shall be performed after each test (procedures of ETS 300 402-2 [5], to put the EU/SP interface in a stable state.

5.2 EUT TPs for Teleaction bearer service

All PICS items referred to in this subclause are as specified in EN 301 145-2 [7] unless indicated otherwise by another numbered reference.

Selection: Does the IUT perform as a EUT. PICS: R4.1.

5.2.1 Procedures at the coincident S and T reference point (clause 9)

5.2.1.1 Data link establishment at EU/SP interface (subclause 9.1)

5.2.1.1.1 Normal procedures (subclause 9.1.1)

No test purposes for this group. See ETS 300 402-2 specifications (SAPI 12) [5].

5.2.1.1.2 Exceptional procedures (subclause 9.1.2)

No test purposes for this group. See ETS 300 402-2 specifications [5].

5.2.1.2 Data link disconnection at EU/SP interface (subclause 9.2)

5.2.1.2.1 Normal procedures (subclause 9.2.1)

No test purposes for this group. See ETS 300 402-2 [5] and ETS 300 099 [4] specifications.

5.2.1.2.2 Exceptional procedures (subclause 9.2.2)

No test purposes for this group. See ETS 300 402-2 specifications [5].

5.2.1.3 Error procedures (subclause 9.3)

TELEACTION_E04_001 syntactically invalid mandatory
Ensure that the IUT, on receipt of an unrecognized message,
discards the received message.

TELEACTION_E04_002 inopportune mandatory
Ensure that the IUT, on receipt of an unexpected message (LOOP RESPONSE),
discards the received message.

TELEACTION_E04_003 syntactically invalid mandatory
Ensure that the IUT, on receipt of a message (LOOP REQUEST message indicating the destination value #15 "LAPD termination") with an unrecognized information element,
ignores the unrecognized information element and processes the message as valid.

TELEACTION_E04_004 inopportune mandatory
Ensure that the IUT, on receipt of a message (LOOP REQUSET message indicating the destination value #15 "LAPD termination") with an unexpected information element (Report type),
ignores the unexpected information element and processes the message as valid.

TELEACTION_E04_005 inopportune mandatory
Ensure that the IUT, on receipt of a message (LOOP REQUEST message indicating the destination value #15 "LAPD termination") with a duplicated information element (second occurrence of Loop destination indicating a destination different from #1 "TE1" and #15 "LAPD termination"),
ignores the second occurrence of the information element and processes the message as valid.

TELEACTION_E04_006 inopportune mandatory
Ensure that the IUT, on receipt of a message (LOOP REQUEST message indicating the destination value #15 "LAPD termination") with an optional information element out of sequence (Diagnostic),
ignores the out of sequence information element and processes the message as valid.

TELEACTION_E04_007 inopportune mandatory
Ensure that the IUT, on receipt of a message (LOOP REQUEST message indicating the destination value #15 "LAPD termination") with an optional information element content error (Diagnostic),
ignores the erroneous information element and processes the message as valid.

5.2.2 Maintenance, polling and broadcast procedures (clause 13)

5.2.2.1 Procedures (subclause 13.2)

5.2.2.1.1 Loop Procedures (subclause 13.2.2)

TELEACTION_E05_001
Ensure that the IUT, on receipt of a LOOP REQUEST message including a Loop destination information element indicating a destination value which is different from #1 "TE1" and different from #15 "LAPD termination",
discards the received message.

TELEACTION_E05_002
Ensure that the IUT, on receipt of a LOOP REQUEST message including a Loop originator information element, including a Loop destination information element indicating destination value #1 "TE1" and without a Test data information element, when it has no information about faults,
sends a LOOP RESPONSE message including a Loop originator information element indicating origination value #96 "TMF", including a Loop destination information element indicating destination value #1 "TE1", including a Diagnostic information element indicating the diagnostic value #0 "Loop successful" and without Test data information element.

TELEACTION_E05_003
Ensure that the IUT, on receipt of a LOOP REQUEST message including a Loop originator information element, including a Loop destination information element indicating destination value #15 "LAPD termination" and without a Test data information element, when it has no information about faults,

sends a LOOP RESPONSE message including a Loop originator information element indicating origination value #96 "TMF", including a Loop destination information element indicating destination value #1 "TE1", including a Diagnostic information element indicating the diagnostic value #0 "Loop successful" and without Test data information element.

TELEACTION_E05_004
Ensure that the IUT, on receipt of a LOOP REQUEST message including a Loop destination information element, including a Loop destination information element indicating destination value #1 "TE1" and without a Test data information element, when it has information about faults,

sends a LOOP RESPONSE message including a Loop originator information element indicating origination value #96 "TMF", including a Loop destination information element indicating destination value #1 "TE1" and including a Diagnostic information element indicating a diagnostic value greater or equal to #128 "Network dependent diagnostics" and without Test data information element.

TELEACTION_E05_005
Ensure that the IUT, on receipt of a LOOP REQUEST message including a Loop destination information element, including a Loop destination information element indicating destination value #15 "LAPD termination" and without a Test data information element, when it has information about faults,

sends a LOOP RESPONSE message including a Loop originator information element indicating origination value #96 "TMF", including a Loop destination information element indicating destination value #1 "TE1" and including a Diagnostic information element indicating a diagnostic value greater or equal to #128 "Network dependent diagnostics" and without Test data information element.

TELEACTION_E05_006
Ensure that the IUT, on receipt of a LOOP REQUEST message including a Loop originator information element, including a Loop destination information element indicating destination value #1 "TE1" and including a Test data information element, when it has no information about faults.

sends a LOOP RESPONSE message including a Loop originator information element indicating origination value #96 "TMF", including a Loop destination information element indicating destination value #1 "TE1", including a Diagnostic information element indicating the diagnostic value #0 "Loop successful" and including a Test data information element identical to the received.

TELEACTION_E05_007
Ensure that the IUT, on receipt of a LOOP REQUEST message including a Loop originator information element, including a Loop destination information element indicating destination value #15 "LAPD termination" and including a Test data information element, when it has no information about faults.

sends a LOOP RESPONSE message including a Loop originator information element indicating origination value #96 "TMF", including a Loop destination information element indicating destination value #1 "TE1", including a Diagnostic information element indicating the diagnostic value #0 "Loop successful" and including a Test data information element identical to the received.

5.2.2.1.2 Alarm reporting Procedures (subclause 13.2.3)

TELEACTION_E06_001
Ensure that the IUT, to indicate that an alarm generating event has occurred,

sends a REPORT message including a Report type information element indicating type value #0 "Alarm event", including a Diagnostic information element indicating the cause of the alarm (value greater or equal to #128 "Network dependent diagnostics", and optionally including a Terminal data information element, to the TMF.

TELEACTION_E06_002
Ensure that the IUT, on receipt of a REPORT message including a Report type information element indicating type value #0 "Alarm event" and including a Diagnostic information element indicating the diagnostic value #3 "Transmission path unavailable due to network element failure", from a TMF,

accepts the received REPORT message, suspends all attempts to establish communication through the network and sends no message.

5.2.2.1.3 Alarm clearance (subclause 13.2.4)

TELEACTION_E07_001
Ensure that the IUT, to indicate the clearing of an internal alarm situation,
sends a REPORT message including a Report type information element indicating type value #1 "Alarm cleared", to the TMF.

TELEACTION_E07_002
Ensure that the IUT, on receipt of a REPORT message including a Report type information element indicating type value #1 "Alarm cleared",
accepts the received REPORT message and sends no message.

5.2.2.2 Broadcast procedures (subclause 13.3)

TELEACTION_E08_001
Ensure that the IUT, on receipt of a REPORT message including a Report type information element indicating type value #2 "Broadcast request",
accepts the received REPORT message and sends no message.

5.2.2.3 Status request procedure (subclause 13.4)

Not relevant for EUT.

6 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 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 [9].

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 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 [9], shall be used by any organization claiming to provide a comprehensive testing service for network equipment claiming conformance to EN 301 145-1 [6].

Bibliography

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

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

ETS 300 402-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 1: General aspects [IUT-T Recommendation Q.920 (1993) modified]".

EN 301 131 (V1.1): "Integrated Services Digital Network (ISDN); Teleaction teleservice; Service description".

History

Document history				
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