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Digitalno omrežje z integriranimi storitvami (ISDN) – Protokol digitalne naročniške signalizacije št. 1 (DSS1) – Signalizacijska omrežna plast za krmiljenje vodovnega osnovnega klica – 6. del: Zgradba preskušalnega niza in namen preskušanja (TSS&TP) – Specifikacija za omrežje

Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 6: Test Suite Structure and Test Purposes (TSS&TP) specification for the network

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Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 6: Test Suite Structure and Test Purposes (TSS&TP) specification for the network

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 6 of a multi-part EN covering the Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control, as identified below:

Part 1: "Protocol specification [ITU-T Recommendation Q.931 (1993), modified]";

Part 2: "Specification and Description Language (SDL) diagrams";

Part 3: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 4: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";

Part 5: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 6: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network";

Part 7: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".

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1 Scope

The present document specifies the network Test Suite Structure and Test Purposes (TSS&TP) for the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [9]) of implementations conforming to the standards for the signalling network layer for circuit-mode basic call control of the Digital Subscriber Signalling System No. one (DSS1) protocol for the pan-European Integrated Services Digital Network (ISDN), EN 300 403-1 [1] and ETS 300 403-2 [2].

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 300 403-1 [1] and ETS 300 403-2 [2].

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] EN 300 403-1 (V1.2): "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]".

[2] ETS 300 403-2 (1995): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 2: Specification and Description Language (SDL) diagrams".

[3] ETS 300 403-3 (1996): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 3: Protocol Implementation Conformance Statement (PICS) proforma specification".

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

[5] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".

[6] ISO/IEC 9646-3 (1997): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

[7] ITU-T Recommendation E.164 (1997): "The international public telecommunication numbering plan".

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

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

3 Definitions and abbreviations

3.1 Definitions

3.1.1 Definitions related to conformance testing

For the purposes of the present document, the following terms and definitions apply, in addition to those given in EN 300 403-1 [1].

abstract test case: refer to ISO/IEC 9646-1 [4].

Abstract Test Method (ATM): refer to ISO/IEC 9646-1 [4].

Abstract Test Suite (ATS): refer to ISO/IEC 9646-1 [4].

active test: 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 [4].

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

lower tester: refer to ISO/IEC 9646-1 [4].

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

point of control and observation: refer to ISO/IEC 9646-1 [4].

Protocol Implementation Conformance Statement (PICS): refer to ISO/IEC 9646-1 [4].

PICS proforma: refer to ISO/IEC 9646-1 [4].

Protocol Implementation eXtra Information for Testing (PIXIT): refer to ISO/IEC 9646-1 [4].

PIXIT proforma: refer to ISO/IEC 9646-1 [4].

system under test: refer to ISO/IEC 9646-1 [4].

Test Purpose (TP): refer to ISO/IEC 9646-1 [4].

3.1.2 Definitions related to EN 300 403-1

Integrated Services Digital Network (ISDN): see ITU-T Recommendation I.112 [8], definition 308.

ISDN number: number conforming to the numbering and structure specified in ITU-T Recommendation E.164 [7].

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

network (T): DSS1 protocol entity at the Network side of the user-network interface where a T reference point applies (user is the private ISDN).

3.2 Abbreviations

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

ATM	Abstract Test Method
ATS	Abstract Test Suite
CES	Connection Endpoint Suffix
DSS1	Digital Subscriber Signalling System No. one
I	Inopportune stimulus
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
N00	Null call state
N02	Overlap Sending call state
N03	Outgoing Call Proceeding call state
N04	Call Delivered call state
N06	Call Present call state
N07	Call Received call state
N09	Incoming Call Proceeding call state
N10	Active call state
N12	Disconnect Indication call state
N19	Release Request call state
N22	Call Abort call state
N25	Overlap Receiving call state
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
R00	Restart Null call state
R01	Restart Request call state
S	Syntactically invalid stimulus
SEG	message Segmentation procedure
TP	Test Purpose
TSS	Test Suite Structure
V	Valid stimulus

4 Test Suite Structure (TSS)

- Null call state N00
  - Valid
    - Outgoing call
    - Incoming call - point-to-point configuration
    - Incoming call - point-to-multipoint configuration
    - Call rearrangement
  - Inopportune
  - Syntactically invalid
- Overlap Sending call state N02
  - Valid
  - Inopportune
  - Syntactically invalid
- Outgoing Call Proceeding call state N03
  - Valid
  - Inopportune
  - Syntactically invalid
- Call Delivered call state N04
  - Valid
  - Inopportune
  - Syntactically invalid

- Call Present call state N06
  - Valid
    - Point-to-point configuration
    - Point-to-multipoint configuration
  - Inopportune
  - Syntactically invalid
- Call Received call state N07
  - Valid
    - Point-to-point configuration
    - Point-to-multipoint configuration
  - Inopportune
  - Syntactically invalid
- Incoming Call Proceeding call state N09
  - Valid
    - Point-to-point configuration
    - Point-to-multipoint configuration
  - Inopportune
  - Syntactically invalid
- Active call state N10 (Incoming call)
  - Valid
  - Inopportune
  - Syntactically invalid
- Active call state N10 (Outgoing call)
  - Valid
  - Inopportune
  - Syntactically invalid
- Disconnect Indication call state N12 (Incoming call)
  - Valid
  - Inopportune
  - Syntactically invalid
- Disconnect Indication call state N12 (Outgoing call)
  - Valid
  - Inopportune
  - Syntactically invalid
- Release Request call state N19 (Incoming call)
  - Valid
  - Inopportune
  - Syntactically invalid

Figure 1 (sheet 1 of 2): Test suite structure

- Release Request call state N19 (Outgoing call)
    - Valid
    - Inopportune
    - Syntactically invalid
- Call Abort call state N22
- Overlap Receiving call state N25
    - Valid
        - Point-to-point configuration
        - Point-to-multipoint configuration
    - Inopportune
    - Syntactically invalid
- Restart Null call state R00 (Incoming call)
    - Valid
    - Inopportune
    - Syntactically invalid
- Restart Null call state R00 (Outgoing call)
    - Valid
    - Inopportune
    - Syntactically invalid
- Restart Request call state R01
    - Valid
    - Inopportune
    - Syntactically invalid
- Message segmentation procedure
    - Valid
    - Inopportune
    - Syntactically invalid

Figure 1 (sheet 2 of 2): 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:	**<layer iut>_<state>_<group>_<nnn>**		
<layer iut>	=	layer + type of IUT:	e.g. "L3N" for layer 3, IUT = network
<state>	=	call state:	e.g. N10 for Active call state
<group>	=	group:	one character field representing the group reference according to TSS V: Valid stimulus I: Inopportune stimulus S: Syntactically invalid stimulus
<nnn>	=	sequential number:	(001-999)

5.1.2 Source of TP definition

The TPs are based on EN 300 403-1 [1] and ETS 300 403-2 [2].

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 which is illustrated in table 2. This table should be read in conjunction with any TP, i.e. please use a TP as an example to facilitate the full comprehension of table 2.

Table 2: Structure of a single TP

TP part	Text	Example
Header	**<Identifier>** *tab* **<subclause number in base EN 300 403-1 [1]>**	see table 1 **subclause 2.3.4**
Stimulus	Ensure that the IUT in the <basic call state> <trigger> *see below for message structure* *or* <goal>	N00, N10, etc. on receipt of 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.* *and* remains in the same state *or* and enters state <state>	sends, saves, does, etc. using en bloc sending, etc.
Message structure	<message type> message *a)* with a <info element> information element *b)* indicating in the <field name> <coding of the field> and *back to a) or b)*	SETUP, FACILITY, CONNECT, etc. (see note 2) Bearer capability, Facility, etc.
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 300 403-1 [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 ETS 300 403-3 [3]. 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 Test of call states

Many TPs include a reference to the IUT's final call state after the realization of the TP. In these cases the TP includes the requirement to ensure that the IUT has entered this particular final call state. Ensuring that the IUT is in a particular call state shall be realized by following the procedures described in subclause 5.8.10 of EN 300 403-1 [1]. According to these procedures, the IUT on receipt of a STATUS ENQUIRY message, shall respond with a STATUS message indicating, in the third octet of the Call state information element, the current call state of the IUT. This exchange of messages is not mentioned explicitly in each TP but is considered to be implicit in the reference to the final call state. This way of phrasing the TPs has been used to avoid over-complicating the text and structure of the TPs and to improve the readability.

5.1.6 Test of point-to-multipoint configurations

In subclauses 5.2.1, 5.2.5, 5.2.6, 5.2.7 and 5.2.15 (call states Null N00, Call Present N06, Call Received N07, Incoming Call Proceeding N09 and Overlap Receiving N25) a distinction is made between point-to-point and point-to-multipoint configurations. In the case of a point-to-multipoint configuration several terminals may be attached to one basic access interface. Each terminal will use a different Connection Endpoint Suffix (CES). To reflect this in the TPs the CES for which a message is received or sent (e.g. "... on receipt of an ALERTING message for CES1...") is named explicitly where this clarification is needed.

5.1.7 Test of inopportune and syntactically invalid behaviour

In the test groups for inopportune and syntactically invalid behaviour the procedures as described in subclause 5.8 of EN 300 403-1 [1] are tested. This is done in each call state with one message for each of the described error cases. Messages have been chosen that are, if they are received without the inopportune or erroneous coding, expected messages in the call states under test.

Test purposes for inopportune behaviour that is described outside the subclause 5.8 of EN 300 403-1 [1] are found in the valid test groups. This was done, as these procedures are seen more as a part of the basic call procedures than as a part of the error handling procedures.

5.2 TPs for the basic call control, layer 3, network

All PICS items referred to in this subclause are as specified in ETS 300 403-3 [3] unless indicated otherwise by another numbered reference.

5.2.1 Null call state N00

5.2.1.1 Valid

5.2.1.1.1 Outgoing call

L3N_N00_V_001 subclause 5.1.1

Ensure that the IUT in the Null call state N00, on receipt of a SETUP message during an all channels busy condition, sends a RELEASE COMPLETE message with a Cause information element indicating the cause value 34 "no circuit/channel available" and remains in the Null call state N00.

L3N_N00_V_002 subclauses 5.1.2 a) and 5.1.3

Ensure that the IUT in the Null call state N00, on receipt of a SETUP message without Called party number and Sending complete information element and with the Channel identification information element indicating a B-channel that is available and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable", sends SETUP ACKNOWLEDGE message with the Channel identification information element indicating the requested B-channel and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable" and enters the Overlap Sending call state N02.

L3N_N00_V_003 subclauses 5.1.2 a) and 5.1.5.1

Ensure that the IUT in the Null call state N00, on receipt of a SETUP message with a Called party number information element providing the complete called party information, with a Sending complete information element and with the Channel identification information element indicating a B-channel that is available and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable", sends CALL PROCEEDING message with the Channel identification information element indicating the requested B-channel and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable" and enters the Outgoing Call Proceeding call state N03.

L3N_N00_V_004 subclause 5.1.2 a)

Ensure that the IUT in the Null call state N00, on receipt of a SETUP message with the Channel identification information element indicating a B-channel that is not available and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable", sends a RELEASE COMPLETE message with a Cause information element indicating the cause value 34 "no circuit/channel available" or 44 "requested circuit/channel not available" and remains in the Null call state.

L3N_N00_V_005 subclause 5.1.2 a)

Ensure that the IUT in the Null call state N00, on receipt of a SETUP message with the Channel identification information element indicating a B-channel that is not subscribed and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable", sends a RELEASE COMPLETE message with a Cause information element indicating the cause value 82 "identified channel does not exist" and remains in the Null call state.

Selection: IUT is a primary rate access. PICS: R 6.2.

L3N_N00_V_006 subclauses 5.1.2 b) and 5.1.3

Ensure that the IUT in the Null call state N00, on receipt of a SETUP message without Called party number and Sending complete information element and with the Channel identification information element indicating a B-channel that is available and indicating in the preferred/exclusive bit "indicated channel is preferred", sends a SETUP ACKNOWLEDGE message with the Channel identification information element indicating the requested B-channel and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable" and enters the Overlap Sending call state N02.

L3N_N00_V_007 subclauses 5.1.2 b) and 5.1.3

Ensure that the IUT in the Null call state N00, on receipt of a SETUP message without Called party number and Sending complete information element and with the Channel identification information element indicating a B-channel that is not available and indicating in the preferred/exclusive bit "indicated channel is preferred", sends a SETUP ACKNOWLEDGE message with the Channel identification information element indicating a B-channel that is available and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable" and enters the Overlap Sending call state N02.

L3N_N00_V_008 subclauses 5.1.2 b) and 5.1.5.1

Ensure that the IUT in the Null call state N00, on receipt of a SETUP message with a Called party number information element providing the complete called party information, with a Sending complete information element and with the Channel identification information element indicating a B-channel that is available and indicating in the preferred/exclusive bit "indicated channel is preferred", sends CALL PROCEEDING message with the Channel identification information element indicating the requested B-channel and indicating in the preferred/exclusive bit "exclusive: only the indicated channel is acceptable" and enters the Outgoing Call Proceeding call state N03.