



# SLOVENSKI STANDARD

## SIST ETS 300 402-6:1998

01-junij-1998

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**Digitalno omrežje z integriranimi storitvami (ISDN) - Protokol digitalne naročniške signalizacije št. 1 (DSS1) - Podatkovna povezovalna plast - 6. del: Zgradba preskušalnega niza in namen preskušanja (TSS&TP) - Specifikacija za splošni protokol**

Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 6: Test Suite Structure and Test Purposes (TSS&TP) specification for the general protocol

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specification for the general protocol**

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## Foreword

This European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS is part 6 of a multi-part standard covering the Integrated Services Digital Network (ISDN) Digital Subscriber Signalling System No. one (DSS1) data link layer specification as described below:

- Part 1: "General aspects [ITU-T Recommendation Q.920 (1993), modified]";
- Part 2: "General protocol specification [ITU-T Recommendation Q.921 (1993), modified]";
- Part 3: "Frame relay protocol specification";
- Part 4: "Protocol Implementation Conformance Statement (PICS) proforma specification for the general protocol";
- Part 5: "PICS proforma specification for the frame relay protocol";
- Part 6: "Test Suite Structure and Test Purposes (TSS&TP) specification for the general protocol";**
- Part 7: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the general protocol".

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## 1 Scope

This sixth part of ETS 300 402 specifies the Test Suite Structure and Test Purposes (TSS&TP) at 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 standard for the general data link layer protocol of Digital Subscriber Signalling System No. one (DSS1) for the pan-European Integrated Services Digital Network (ISDN), ETS 300 402-2 [1].

A further part of this ETS specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma based on this ETS.

## 2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETS 300 402-2 (1995): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 2: General protocol specification [ITU-T Recommendation Q.921 (1993), modified]".
- [2] ETS 300 402-4 (1996): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 4: Protocol Implementation Conformance statement (PICS) proforma for the general protocol".
- [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] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".
- [7] ITU-T Recommendation I.411 (1993): "ISDN user network interfaces - reference configurations".

## 3 Definitions

For the purposes of this ETS, the following definitions apply, in addition to those given in ETS 300 402-2 [1]:

### 3.1 Definitions related to conformance testing

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

**Abstract Test Method (ATM):** Refer to ISO/IEC 9646-1 [3].

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

**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].

**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 ETS 300 402-2

**Integrated Services Digital Network (ISDN):** See ITU-T Recommendation I.112 [6], 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.

**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 (user is the private ISDN).

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

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

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

## 4 Abbreviations

For the purposes of this ETS, the following abbreviations apply, in addition to those given in ETS 300 402-2 [1]:

ATM	Abstract Test Method
ATS	Abstract Test Suite
DSS1	Digital Subscriber Signalling System No. one
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
TP	Test Purpose
TSS	Test Suite Structure

## 5 Test Suite Structure (TSS)

- Layer management
  - User
    - DL state 1
      - Valid behaviour
      - Syntactically invalid
    - DL state 3
      - Valid behaviour
      - Syntactically invalid
      - Timers
      - Counters
    - DL state 4
      - Valid behaviour
      - Inopportune behaviour
      - Syntactically invalid
      - Timers
    - DL state 5.0
      - Valid behaviour
      - Inopportune behaviour
      - Counters
    - DL state 6.0
      - Valid behaviour
      - Inopportune behaviour
      - Counters
    - DL state 7.0
      - Valid behaviour
      - Inopportune behaviour
    - DL state 8.0
      - Valid behaviour
      - Inopportune behaviour
  - Network
    - DL state 1
      - Valid behaviour
      - Inopportune behaviour
      - Syntactically invalid
    - DL state 4
      - Valid behaviour
      - Inopportune behaviour
      - Syntactically invalid
      - Timers
    - DL state 5.0
      - Inopportune behaviour
      - Counters
    - DL state 6.0
      - Inopportune behaviour
      - Counters
    - DL state 7.0
      - Inopportune behaviour
    - DL state 8.0
      - Inopportune behaviour
- Data control
  - DL state 1
    - Valid behaviour
  - DL state 3
    - Valid behaviour
  - DL state 4
    - Valid behaviour
    - Inopportune behaviour
    - Syntactically invalid

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

- DL state 5.0
  - Valid behaviour
  - Inopportune behaviour
  - Syntactically invalid
  - Timers
- DL state 5.1
  - Valid behaviour
- DL state 6.0
  - Valid behaviour
  - Inopportune behaviour
  - Syntactically invalid
  - Timers
- DL state 7.0
  - Valid behaviour
  - Inopportune behaviour
  - Syntactically invalid
- DL state 7.0 with outstanding I frames
  - Valid behaviour
  - Inopportune behaviour
  - Timers
- DL state 7.1
  - Valid behaviour
  - Inopportune behaviour
- DL state 7.4
  - Valid behaviour
  - Inopportune behaviour
  - Syntactically invalid
- DL state 7.4 with outstanding I frames
  - Valid behaviour
  - Inopportune behaviour
  - Timers
- DL state 7.5
  - Valid behaviour
  - Inopportune behaviour
- DL state 8.0
  - Valid behaviour
  - Inopportune behaviour
  - Syntactically invalid
- DL state 8.0 with outstanding I frames
  - Valid behaviour
  - Inopportune behaviour
  - Timers
  - Counters
- DL state 8.1
  - Valid behaviour
  - Inopportune behaviour
- DL state 8.4
  - Valid behaviour
  - Inopportune behaviour
  - Syntactically invalid
- DL state 8.4 with outstanding I frames
  - Valid behaviour
  - Inopportune behaviour
  - Timers
  - Counters
- DL state 8.5
  - Valid behaviour
  - Inopportune behaviour

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

## 6 Test Purposes (TP)

### 6.1 Introduction

For each test requirement, a TP is defined.

#### 6.1.1 Test purpose 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:	<b>&lt;suite&gt;&lt;side&gt;_&lt;category&gt;&lt;state&gt;_&lt;group&gt;_&lt;n&gt;</b>		
<suite>	=	suite	L2 = layer 2
<side>	=	side	U = user N = network C = combined (user and network)
<category>	=	procedure category	L Layer management D Data control
<state>	=	data link entity state	e.g.: 70, 4, 81, etc.
<group>	=	group	one character representing group reference according to TSS: V: Valid stimulus I: Inopportune stimulus S: Syntactically stimulus T: timers C: counters
<n>	=	sequential number	(1-99)

#### 6.1.2 Source of TP definition

The TPs are based on ETS 300 402-2 [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 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
<b>Header</b>	<Identifier> <i>tab</i> <subclause number in base ETS 300 402-2> <i>tab</i> <reference to state transition table in base ETS> [ <i>opt.</i> ] <reference to I-ETS 300 313 test case> <i>or new TC</i>	see table 1 <b>subclause 5.3.1</b> <b>table D.1/2-1</b> (see note 2) <b>TC11001</b> (see note 3)
<b>Stimulus</b>	Ensure that the IUT in the <DL entity state> <trigger> <i>see below for message structure</i> <i>or &lt;goal&gt;</i>	(see note 4) receiving a XXXX frame to request a ...
<b>Reaction</b>	<action> <i>if the action is sending</i> <i>see below for frame structure</i> <next action>, <i>etc.</i> and enters state <i>and/or</i> and remains in the same state(s) <i>or</i> and enters state <state>	transmits, does, etc.
<b>Message structure</b>	<frame type> frame containing a a) <field name> field with <coding of the field> <i>and back to a)</i>	UI, I, SABME, etc. TEI, C/R, INFO, P/F, N(R), 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 references to state transition tables are to annex D of ITU Recommendation Q.921 as modified by ETS 300 402-2 [1] (e.g. "Table D.1/2-3" refers to the state transition table D.1, sheet 2, line 3).	
NOTE 3:	These references to I-ETS 300 313 helped in developing this ETS and are of a purely informative nature.	
NOTE 4:	The DL entity state by the start of the test case is the one corresponding to the test group. (e.g. in group L70, all the test cases shall be executed from the state 7.0).	

### 6.1.4 Test strategy

As the base standard ETS 300 402-2 [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 300 402-4 [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;
- as a consequence of the test method used, all information units shall be expressed in term of Protocol Data Units (PDUs). The use of primitives is considered to be not acceptable.

**6.2 TPs for DSS1 layer 2**

All PICS items referred to in this subclause are as specified in ETS 300 402-4 [2] unless indicated otherwise by another numbered reference.

**6.2.1 Layer Management**

**Selection:** IUT supports TEI management procedures. PICS: MCu 3.

**6.2.1.1 User**

**Selection:** IUT supports the user role. PICS: R 2.1

**6.2.1.1.1 DL state 1****6.2.1.1.1.1 Valid behaviour**

**L2U\_L10\_V\_1 subclause 5.3.2, table D.1/1-1 TC11004**

Ensure that the IUT, in the state 1, having been requested to establish the data link, transmits an UI frame with an Identity request message and enters the state 3.

**Selection:** IUT supports the automatic TEI assignment procedures. PICS: MCu 3.1.1.

**L2U\_L10\_V\_2 subclause 5.3.3.2 TC11001**

Ensure that the IUT, in the state 1, on receipt of an UI frame containing an Identity check request message with Ai = 127, transmits no frame and remains in the same state.

**L2U\_L10\_V\_3 subclause 5.3.3.2 TC11002**

Ensure that the IUT, in the state 1, on receipt of an UI frame containing an Identity check request message with Ai = automatic TEI value, transmits no frame and remains in the same state.

NOTE 1: A random function can be used to generate the Ai value between 64 and 126.

**L2U\_L10\_V\_4 subclause 5.3.3.2 TC11003**

Ensure that the IUT, in the state 1, on receipt of an UI frame containing an Identity check request message with Ai = non-automatic TEI value, transmits no frame and remains in the same state.

NOTE 2: A random function can be used to generate the Ai value between 0 and 63.

**L2U\_L10\_V\_5 subclause 5.3.4 TC11005**

Ensure that the IUT, in the state 1, on receipt of an UI frame containing an Identity remove message with Ai = 127, transmits no frame and remains in the same state.

**L2U\_L10\_V\_6 subclause 5.3.4 TC11006**

Ensure that the IUT, in the state 1, on receipt of an UI frame containing an Identity remove message with Ai = automatic TEI value, transmits no frame and remains in the same state.

NOTE 3: A random function can be used to generate the Ai value between 64 and 126.

**L2U\_L10\_V\_7 subclause 5.3.4 TC11007**

Ensure that the IUT, in the state 1, on receipt of an UI frame containing an Identity remove message with Ai = non-automatic TEI value, transmits no frame and remains in the same state.

NOTE 4: A random function can be used to generate the Ai value between 0 and 63.

**L2U\_L10\_V\_8 subclause 5.3.2 TC11008**

Ensure that the IUT, in the state 1, on receipt of an UI frame containing an Identity assigned message with Ai = automatic TEI value, transmits no frame and remains in the same state.

NOTE 5: A random function can be used to generate the Ai value between 64 and 126.