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**Digitalno omrežje z integriranimi storitvami (ISDN) - Generični funkcijski protokol za podporo dopolnilnih storitev - Protokol digitalne naročniške signalizacije št. 1 (DSS1) - 4. del: Abstraktni preskušalni niz (ATS) in delna dodatna informacija za preskušanje izvedbe protokola (PIXIT) - Proforma specifikacije za uporabnika**

Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 4: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user

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Part 4: Abstract Test Suite (ATS) and partial Protocol  
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specification for the user**

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## Contents

Foreword .....	5
1 Scope .....	7
2 Normative references .....	7
3 Definitions and abbreviations .....	8
3.1 Definitions .....	8
3.2 Abbreviations .....	8
4 Abstract Test Method (ATM) .....	9
5 Untestable test purposes .....	9
6 ATS conventions .....	9
6.1 Declarations part .....	9
6.1.1 Type definitions .....	9
6.1.1.1 Simple type definitions .....	9
6.1.1.2 Structured type definitions .....	10
6.1.1.2.1 TTCN structured type definitions .....	10
6.1.1.2.2 ASN.1 structured type definitions .....	10
6.1.1.3 ASP type definitions .....	11
6.1.1.3.1 TTCN ASP type definitions .....	11
6.1.1.3.2 ASN.1 ASP type definitions .....	12
6.1.1.4 PDU type definitions .....	12
6.1.1.4.1 TTCN PDU type definitions .....	12
6.1.1.4.2 ASN.1 PDU type definitions .....	12
6.1.2 Test suite constants .....	12
6.1.3 Test suite parameters .....	12
6.1.4 Variables .....	12
6.1.4.1 Test suite variables .....	12
6.1.4.2 Test case variables .....	12
6.1.5 Test suite operation definitions .....	13
6.2 Constraints part .....	13
6.2.1 Structured type constraint declaration .....	13
6.2.2 ASN.1 type constraint declaration .....	13
6.2.2.1 Specification of encoding rules .....	14
6.2.3 ASP type constraint declaration .....	15
6.2.3.1 ASN.1 ASP type constraint declaration .....	15
6.2.3.2 TTCN ASP type constraint declaration .....	15
6.2.4 PDU type constraint declaration .....	15
6.2.4.1 ASN.1 PDU type constraint declaration .....	15
6.2.4.2 TTCN PDU type constraint declaration .....	15
6.2.5 Chaining of constraints .....	15
6.2.5.1 Static chaining .....	15
6.2.5.2 Dynamic chaining .....	15
6.2.6 Derived constraints .....	16
6.2.7 Parameterized constraints .....	16
6.2.8 Value assignment .....	16
6.2.8.1 Specific values .....	16
6.2.8.2 Matching values .....	16
6.3 Dynamic part .....	16
6.3.1 Test cases .....	16
6.3.2 Test steps .....	16
6.3.3 Defaults .....	16
7 ATS to TP map .....	17

8	PCTR conformance .....	17
9	PIXIT conformance .....	17
10	ATS conformance .....	17
	Annex A (normative): Protocol Conformance Test Report (PCTR) proforma .....	18
A.1	Identification summary .....	18
A.1.1	Protocol conformance test report .....	18
A.1.2	IUT identification .....	18
A.1.3	Testing environment .....	18
A.1.4	Limits and reservations .....	19
A.1.5	Comments .....	19
A.2	IUT Conformance status .....	19
A.3	Static conformance summary .....	19
A.4	Dynamic conformance summary .....	19
A.5	Static conformance review report .....	20
A.6	Test campaign report .....	20
A.7	Observations .....	23
	Annex B (normative): Partial PIXIT proforma .....	24
B.1	Identification summary .....	24
B.2	Abstract test suite summary .....	24
B.3	Test laboratory .....	24
B.4	Client (of the test laboratory) .....	25
B.5	System Under Test (SUT) .....	25
B.6	Protocol information .....	26
B.6.1	Protocol identification .....	26
B.6.2	Parameter values .....	26
B.6.3	Actions required to provoke the IUT .....	26
B.6.4	Options supported by the IUT .....	26
B.6.5	Timer values .....	27
	Annex C (normative): Abstract Test Suite (ATS) .....	28
C.1	The TTCN Graphical form (TTCN.GR) .....	28
C.2	The TTCN Machine Processable form (TTCN.MP) .....	28
	Annex D (informative): General structure of ATS .....	29
	History .....	30

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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 4 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) generic functional protocol for the support of supplementary services, 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: "TSS&TP specification for the network";

Part 6: "ATS and partial PIXIT proforma specification for the network".

Transposition dates	
Date of adoption of this ETS:	20 March 1998
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Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 January 1999
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## 1 Scope

This fourth part of ETS 300 196 specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the User side of the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [10]) of implementations conforming to the stage three standard for the generic functional protocol for the support of supplementary services for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, ETS 300 196-1 [2].

ETS 300 196-3 [4] specifies the Test Suite Structure and Test Purposes (TSS&TP) related to this ATS and partial PIXIT proforma. Other parts specify the TSS&TP and the ATS and partial PIXIT proforma for the Network side of the T reference point or coincident S and T reference point of implementations conforming to ETS 300 196-1 [2].

## 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 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".
- [2] ETS 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".
- [3] ETS 300 196-2 (1996): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".  
<https://standards.itec.ai/catalog/standards/sist/3e11967-ee95-449a-9c09-c1565eb9deef/sist-ets-300-196-4-1998>
- [4] ETS 300 196-3: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification for the user".
- [5] ISO/IEC 9646-1: "Information technology - OSI Conformance Testing Methodology and Framework; Part 1: General Concepts".
- [6] ISO/IEC 9646-2: "Information technology - OSI Conformance Testing Methodology and Framework; Part 2: Abstract Test Suite Specification".
- [7] ISO/IEC 9646-3: "Information technology - OSI Conformance Testing Methodology and Framework; Part 3: The Tree and Tabular Combined Notation".
- [8] ISO/IEC 9646-4: "Information technology - OSI Conformance Testing Methodology and Framework; Part 4: Test realization".
- [9] ISO/IEC 9646-5: "Information technology - OSI Conformance Testing Methodology and Framework; Part 5: Requirements on test laboratories and clients for the conformance assessment process".
- [10] ITU-T Recommendation I.411 (1993): "ISDN user-network interfaces - Reference configurations".
- [11] CCITT Recommendation X.209 (1988): "Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)".

### 3 Definitions and abbreviations

#### 3.1 Definitions

For the purposes of this ETS, the following definitions apply:

**Abstract Test Suite (ATS):** See ISO/IEC 9646-1 [5].

**Implementation Under Test (IUT):** See ISO/IEC 9646-1 [5].

**Lower Tester (LT):** See ISO/IEC 9646-1 [5].

**Point of Control and Observation (PCO):** See ISO/IEC 9646-1 [5].

**Protocol Implementation Conformance Statement (PICS):** See ISO/IEC 9646-1 [5].

**PICS proforma:** See ISO/IEC 9646-1 [5].

**Protocol Implementation eXtra Information for Testing (PIXIT):** See ISO/IEC 9646-1 [5].

**PIXIT proforma:** See ISO/IEC 9646-1 [5].

**System Under Test (SUT):** See ISO/IEC 9646-1 [5].

**Upper Tester (UT):** See ISO/IEC 9646-1 [5].

#### 3.2 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
BER	Basic Encoding Rules
ExTS	Executable Test Suite
FIE	Facility Information Element
IUT	Implementation Under Test
LT	Lower Tester
MOT	Means Of Testing
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
SUT	System Under Test
TCP	Test Co-ordination Procedures
TP	Test Purpose
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester
UUS	User-to-User Signalling

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## 4 Abstract Test Method (ATM)

The remote test method is applied for the AOC user ATS. The Point of Control and Observation (PCO) resides at the service access point between layers 2 and 3. This PCO is named "L" (for Lower). The L PCO is used to control and observe the behaviour of the Implementation Under Test (IUT) and test case verdicts are assigned depending on the behaviour observed at this PCO.

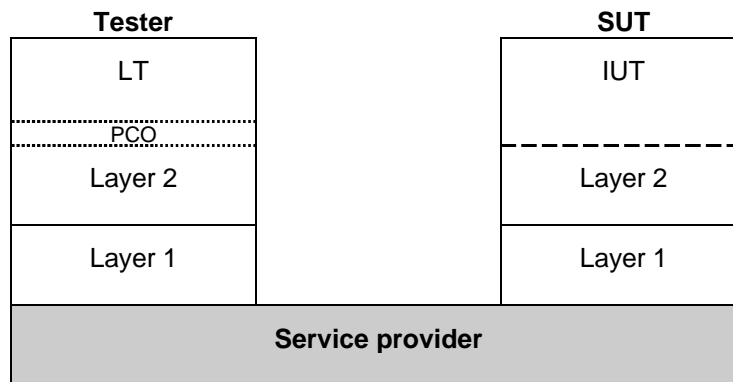


Figure 1: Remote test method

ISO/IEC 9646-2 [6] allows the informal expression of Test Co-ordination Procedures (TCP) between the System Under Test (SUT) upper layer(s) and the Lower Tester (LT). In the ATS contained in annex C, TCP is achieved by use of a second "informal" PCO, called "O" (for Operator). This PCO is used to specify control but not observation above the IUT and consequently, events at this PCO are never used to generate test case verdicts. The use of this O PCO is regarded as a preferred alternative to the use of the implicit send event, in that it allows the ATS to specify in a clear and meaningful way what actions are required to be performed on the IUT.

## 5 Untestable test purposes

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Only subclause 6.2.2 of ETS 300 196-3 [4] contains testable test purposes. All other test purposes are too generic and parameterized. These test purposes rather provide a general example for the behaviour that should be tested in the ATSs for supplementary services which use the generic functional protocol.

Some of the tests contained in subclause 6.2.2 of ETS 300 196-3 [4] are also untestable due to the fact that the call state in which the test should be performed is unstable. These are:

GFP\_U7\_01\_003, GFP\_U7\_02\_003, GFP\_U7\_03\_003, GFP\_U7\_04\_003, GFP\_U7\_05\_003,  
GFP\_U7\_07\_017, GFP\_U7\_07\_022, GFP\_U7\_09\_017, GFP\_U7\_09\_021.

## 6 ATS conventions

This clause is structured similarly to the structure of a TTCN ATS. However, the names of the subclauses are arranged in a way more suitable to this ETS.

### 6.1 Declarations part

#### 6.1.1 Type definitions

##### 6.1.1.1 Simple type definitions

Where appropriate, simple types have a length, a value list or a range restriction attached.

Simple types defined as being of some string type (e.g. BIT STRING, OCTET STRING), have a length restriction or a value list attached.

Simple types, defined as being of INTEGER type, have a value list or a range restriction attached.

### 6.1.1.2 Structured type definitions

#### 6.1.1.2.1 TTCN structured type definitions

All structured type definitions are provided with a full name.

All elements in every structured type definition, defined as being of some string type (e.g. BIT STRING, OCTET STRING), have a length restriction attached.

If an element in a structured type definition is defined as being of a referenced type, the (possible) restriction is defined in that referenced type.

For information elements the identifier, which is unique for each element, has its type defined as a simple type where the value list is restricted to the single value which is the identifier itself. This has the advantage that it allows a test system derived from this ATS to easily identify information elements embedded in messages. An ATS where information element identifiers are represented as unrestricted types can present difficulties for a derived test system in the case where it needs to find one information element embedded in a number of others and the constraints for the other elements have the any-or-omit value. In such a case the test system cannot easily find the beginning of each information element.

#### 6.1.1.2.2 ASN.1 structured type definitions

ASN.1 has been used for three major reasons. First, types defined in ASN.1 can model problems that "pure" TTCN cannot. For instance, data structures modelling ordered or unordered sequences of data are preferably defined in ASN.1. Second, ASN.1 provides a better restriction mechanism for type definitions by using sub-type definitions. Third, it is necessary to use ASN.1 to reproduce the type definitions for remote operation components as specified in the base standards.

The fact that ASN.1 provides a better restriction mechanism for type definitions is used for the purpose of achieving type-compatibility.

In table 1, the ASN.1 type BIT7OR15 is defined as being of type BIT STRING with a size constraint attached to it. The size is determined by the value of CR\_LENGTH, a test suite parameter. It can have the value of either 7 or 15. The type BIT7OR15 is used in the structured type CR, field cr\_r allowing this type to represent a Basic Access or a Primary Rate Access call reference. By using this type definition the field cr\_r is always type compatible with values of type BIT STRING (SIZE(7)) and BIT STRING (SIZE(15)). Another approach to solve this type problem would be to define the type BIT7OR15 as BIT STRING (SIZE(7 | 15)). This type has a small disadvantage compared with the previous one. It is impossible, in run-time, to determine the actual length of any instance of this type.

**Table 1: ASN.1 type definition BIT7OR15**

ASN.1 Type Definition	
Type Name :	BIT7OR15
Comments :	
Type Definition	
BIT STRING(SIZE(CR_LENGTH))	

Table 2 shows a typical use of ASN.1. The CHI element will have two different type definitions depending on whether it represents basic or primary rate access. In TTCN, this needs to be defined as two different types. In ASN.1 this can be done in one, the type being a choice of either BASIC\_CHI or PRIMARY\_CHI. These two types are then (locally) defined in the same table and according to the standard.