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Digitalno omreġje z integriranimi storitvami (ISDN) ï Dopolnilna storitev: obvestilo o ceni (AOC) ï Protokol digitalne naroļ niġke signalizacije ġt. 1 (DSS1) ï 4. del: Abstraktni preskuġalni niz (ATS) in delna dodatna informacija za preskuġanje izvedbe protokola (PIXIT) ï Proforma specifikacija za uporabnika

Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service; 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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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 4 of a multi-part EN covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Advice of Charge (AOC) supplementary service, as identified 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:	28 April 2000
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1 Scope

The present document 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 [11]) of implementations conforming to the stage three standard for the Advice of Charge (AOC) supplementary service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, EN 300 182-1 [2].

EN 300 182-3 [4] specifies the Test Suite Structure and Test Purposes (TSS&TP) related to this ATS and partial PIXIT proforma specification. 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 EN 300 182-1 [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] ETSI 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]".

[2] ETSI EN 300 182-1 (V1.2): "Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[3] ETSI EN 300 182-2 (V1.2): "Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[4] ETSI EN 300 182-3 (V1.2): "Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification for the user".

[5] ETSI 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".

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

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

[8] ISO/IEC 9646-3 (1998): "Information technology; Open Systems Interconnection; Conformance testing methodology and framework; Part 3: The Tree and Tabular Combined Notation (TTCN)".

[9] ISO/IEC 9646-4 (1994): "Information technology; Open Systems Interconnection; Conformance testing methodology and framework; Part 4: Test realization".

[10] ISO/IEC 9646-5 (1994): "Information technology; Open Systems Interconnection; Conformance testing methodology and framework; Part 5: Requirements on test laboratories and clients for the conformance assessment process".

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

[12] 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 the present document, the following terms and definitions apply:

Abstract Test Suite (ATS): see ISO/IEC 9646-1 [6]

Implementation Under Test (IUT): see ISO/IEC 9646-1 [6]

Lower Tester (LT): see ISO/IEC 9646-1 [6]

Point of Control and Observation (PCO): see ISO/IEC 9646-1 [6]

Protocol Implementation Conformance Statement (PICS): see ISO/IEC 9646-1 [6]

PICS proforma: see ISO/IEC 9646-1 [6]

Protocol Implementation eXtra Information for Testing (PIXIT): see ISO/IEC 9646-1 [6]

PIXIT proforma: see ISO/IEC 9646-1 [6]

System Under Test (SUT): see ISO/IEC 9646-1 [6]

Upper Tester (UT): see ISO/IEC 9646-1 [6]

3.2 Abbreviations

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

AOC	Advice of Charge
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
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

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.

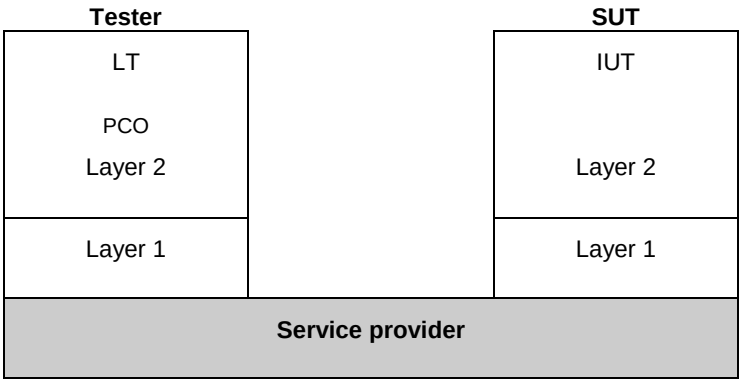

Figure 1: Remote test method

ISO/IEC 9646-2 [7] 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

There are no untestable test purposes associated with this ATS.

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 the present document.

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.

Tables 1 and 2 show the typical use of ASN.1. The FIE type in table 1 is written in ASN.1 to permit the use of the SET OF construction in the components field. Constraints of the FIE type can therefore be written using the SUPERSET function which allows to match a single component which may be delivered together with a set of other components. Table 2 shows the reject component type which is defined following the ASN.1 declaration in EN 300 196-1 [5].

Table 1: ASN.1 type definition FIE

ASN.1 Type Definition	
Type Name :	ΦΙΕ
Comments :	Φαχιλιτψ ινφορματιον ελεμεντ τακεν φρομ EN 300 196–1 [5] ; 11.2.2.1. Σπεχιφιεδ ηερε φορ βοτη σενδ & ρεχειϖε εϖεντ.
Type Definition	
ΣΕΘΥΕΝΧΕ {	
ινφορματιονΕλεμεντΙδεντιφιερ	ΦΙΕ_Ι,
λενγτη	ΦΙΕ_ΛενγτηΤψπε,
εξτΒιτ	ΒΙΤ ΣΤΡΙΝΓ (ΣΙΖΕ (1)),
σπαρεΒιτσ	ΒΙΤ ΣΤΡΙΝΓ (ΣΙΖΕ (2)),
προτοχολΠροφιλε	ΒΙΤ ΣΤΡΙΝΓ (ΣΙΖΕ (5)),
χομπονεντσ	ΣΕΤ ΟΦ Χομπονεντ }

Table 2: ASN.1 type definition RejectComponent

ASN.1 Type Definition	
Type Name :	ΡεφεχτΧομπονεντ
Comments :	Ρεφεχτ Χομπονεντ ισ νοτ σπεχιφιχ το ανψ παρτιχυλαρ οπερατιον. Τηε ινϖοκεΙΔ μαψ βε υσεδ το ιδεντιφψ α σπεχιφιχ οπερατιον.
Type Definition	
ΣΕΘΥΕΝΧΕ {	
ινϖοκεδΙΔ ΧΗΟΙΧΕ {	
ινϖοκεΙΔ	ΙνϖοκεΙΔΤψπε,
νυλλ	ΝΥΛΛ },
προβλεμ ΧΗΟΙΧΕ {	
γενεραλΠροβλεμ	[0] ΙΜΠΛΙΧΙΤ ΓενεραλΠροβλεμ,
ινϖοκεΠροβλεμ	[1] ΙΜΠΛΙΧΙΤ ΙνϖοκεΠροβλεμ,
ρετυρνΡεσυλτΠροβλεμ	[2] ΙΜΠΛΙΧΙΤ ΡετυρνΡεσυλτΠροβλεμ,
ρετυρνΕρρορΠροβλεμ	[3] ΙΜΠΛΙΧΙΤ ΡετυρνΕρρορΠροβλεμ } }

Table 3 shows an example of how ASN.1 can be used to model unordered sequences.

Table 3: ASN.1 type definition FIES

ASN.1 Type Definition
Type Name : ΦΙΕΣ **Comments** :
Type Definition
ΣΕΤ_ΟΦ_ΦΙΕ

The possibility to use TTCN and ASN.1 in combination is used, i.e. referring to an ASN.1 type from a TTCN type.

6.1.1.3 ASP type definitions

6.1.1.3.1 TTCN ASP type definitions

TTCN ASP type definitions only contain one PDU or no PDU at all. The relationship between an ASP type and a PDU type is one-to-one. That is, there exists one ASP type definition for each PDU type definition (if that ASP type contains a PDU).

All TTCN ASP type definitions are provided with a full identifier.

Some ASPs are not parameterized as shown in the example in table 4. Such ASPs are only used for requesting or receiving service from the lower layer.

Table 4: TTCN ASP type definition DL_REL_IN

TTCN ASP Type Definition		
ASP NAME : ΔΛ_ΡΕΛ_ΙΝ (ΔΛ_ΡΕΛΕΑΣΕ_ΙΝΔΙΧΑΤΙΟΝ) **PCO Type** : ΣΑΠ **Comments** :		
Parameter Name	**Parameter Type**	**Comments**
Detailed Comments :		

Table 5 shows an example of a parameterized ASP. All ASPs containing PDUs contain only that PDU and no other parameters.

Table 5: TTCN ASP type definition DL_DATA_RQ_ALERT

TTCN ASP Type Definition		
ASP NAME : ΔΛ_ΔΑΤΑ_ΡΘ_ΑΛΕΡΤ (ΔΛ_ΔΑΤΑ_ΡΕΘΥΕΣΤ) **PCO Type** : ΣΑΠ **Comments** :		
Parameter Name	**Parameter Type**	**Comments**
μυν (Μεσσαγε Ύνι τ)	ΑΛΕΡΤ_ΠΔΥ	
Detailed Comments :		

6.1.1.3.2 ASN.1 ASP type definitions

There are no ASN.1 ASP type definitions in the ATS.

6.1.1.4 PDU type definitions

6.1.1.4.1 TTCN PDU type definitions

The TTCN PDU type reflects the actual data being transferred or received. All PDUs are embedded in ASPs.

If a specific PDU type definition contains elements defined in terms of a pre-defined type, that element has a restriction attached to it.