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# Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 6: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network

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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 Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Call Waiting (CW) supplementary 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 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: | 23 May 1997 |
| Date of latest announcement of this ETS (doa): | 31 August 1997 |
| Date of latest publication of new National Standard or endorsement of this ETS (dop/e): | 28 February 1998 |
| Date of withdrawal of any conflicting National Standard (dow): | 28 February 1998 |

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# 1 Scope

This sixth part of ETS 300 058 specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the Network 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 Call Waiting (CW) supplementary service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, ETS 300 058-1 [2].

ETS 300 058-5 [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 User side of the T reference point or coincident S and T reference point of implementations conforming to ETS 300 058-1 [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 300 058-1 (1991): "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[3] ETS 300 058-2 (1995): "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[4] ETS 300 058-5: "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 5: Test Suite Structure and Test Purposes (TSS&TP) specification for the network".

[5] 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".

[6] ISO/IEC 9646-1: "Information technology - OSI Conformance Testing Methodology and Framework; Part 1: General Concepts".

[7] ISO/IEC 9646-2: "Information technology - OSI Conformance Testing Methodology and Framework; Part 2: Abstract Test Suite Specification".

[8] ISO/IEC 9646-3: "Information technology - OSI Conformance Testing Methodology and Framework; Part 3: The Tree and Tabular Combined Notation".

[9] ISO/IEC 9646-4: "Information technology - OSI Conformance Testing Methodology and Framework; Part 4: Test realization".

[10] 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".

[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 this ETS, the following 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 this ETS, the following abbreviations apply:

| | |
|---|---|
| ASP | Abstract Service Primitive |
| ATM | Abstract Test Method |
| ATS | Abstract Test Suite |
| BER | Basic Encoding Rules |
| CM | Co-ordination Message |
| CP | Co-ordination Point |
| CW | Call Waiting |
| ExTS | Executable Test Suite |
| IUT | Implementation Under Test |
| LT | Lower Tester |
| MOT | Means Of Testing |
| MTC | Main Test Component |
| 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 |
| PTC | Parallel Test Component |
| 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)

## 4.1 Description of ATM used

The requirement for testing the network IUT is to focus on the behaviour of the network IUT at the user-network interface where a T reference point or coincident S and T reference point applies. Thus the IUT is the network DSS1 protocol entity at a particular user-network interface and is not the whole network.

It is possible to specify an ATS based on a Single party (remote) test method for such an IUT. However, it is considered that an ATS based on such an approach is of limited use as the only way to specify IUT generated PDUs is to use the "implicit send" statement. Many users of such an ATS would replace the "implicit send" statements with descriptions of the behaviour at other interfaces.

An ATS based on a multi-party test method is considered to be more useful in that it is closer to how a real test suite would be constructed. Such a test method specifies behaviour at multiple network interfaces. One very important limitation here is that tests are focused on one particular interface. Thus the test system is made up one Main Test Component (MTC) and one or more Parallel Test Components (PTC), see figure 1.

### 4.1.1 Conventions for test components and PCOs

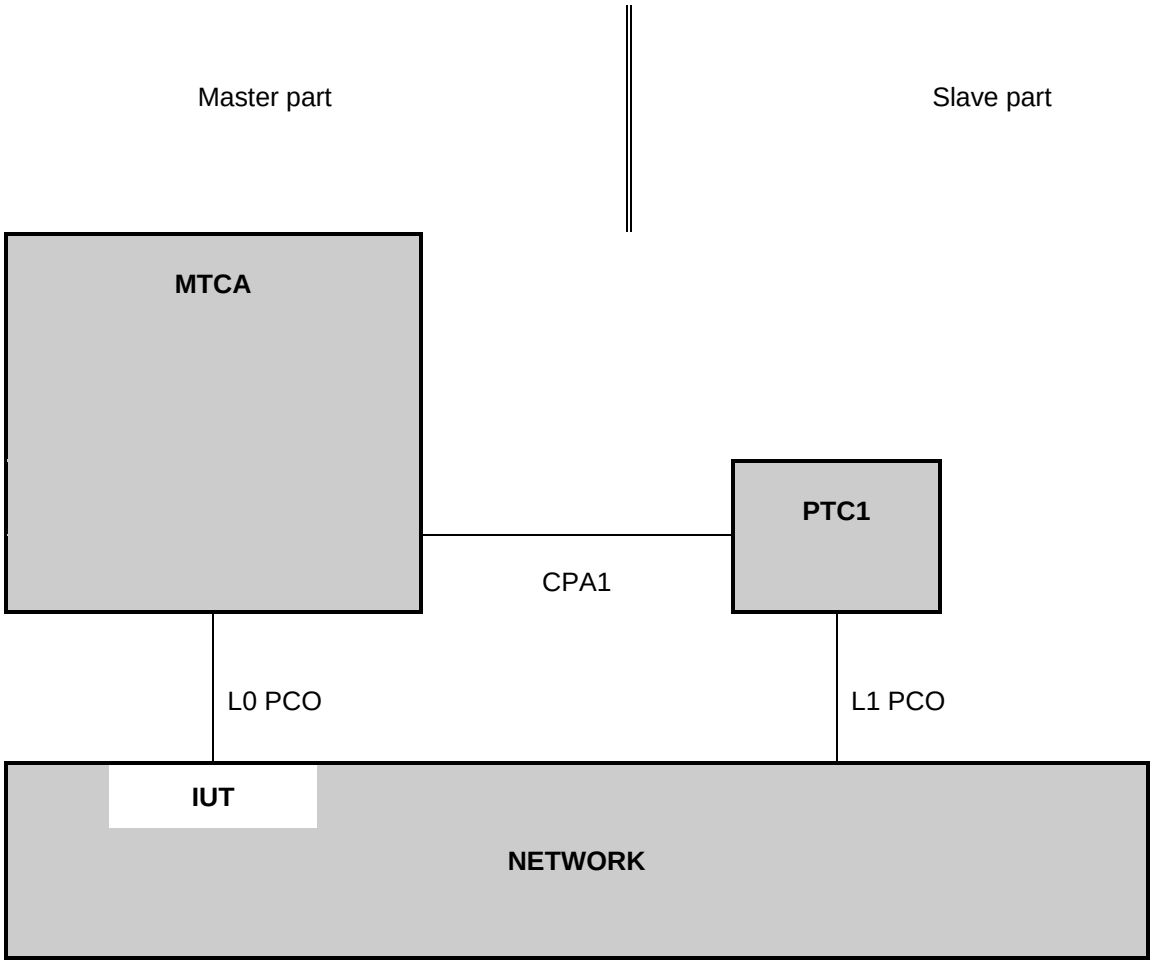


**Figure 1: Multi-party test method**

In a master/slave arrangement, the MTC is considered to be the master while the PTCs are the slaves. The "slave" testers are only an explicit description of how to deal with the "other" interfaces during the testing process, i.e. "how to make the IUT send the required message".

This means, in particular, that the verdict will only be assigned from the protocol aspects observed on the interface under test (i.e. by the "master" tester), as it would be observed by a terminal connected to this interface. A failure in the correlation between the protocol at the different interfaces to which the different testers are connected, i.e. in the mechanism of the functional service itself, will not cause a FAIL verdict. For instance, if the IUT fails to send a message on the tested interface after another interface has received the proper stimulus, the verdict will be INCONCLUSIVE.

The MTC MTCA has two functions in this configuration. Firstly, it has the MTC function of controlling the one or more PTCs. Thus it is responsible for starting the PTCs and afterwards co-ordinates activities by exchanging Co-ordination Messages (CM) with the PTCs. Secondly it is responsible for the behaviour of the Lower Tester (LT) at PCO L0.

A combination of the remote and multi-party test methods is applied. As can be seen from figure 1, several PCOs are used. All PCOs reside at the service access points between layers 2 and 3.

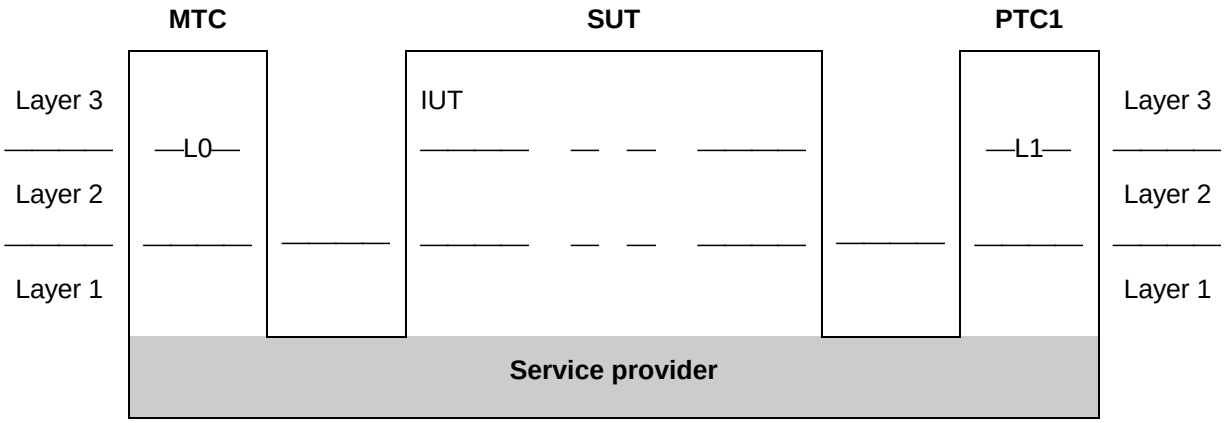


**Figure 2: Combination of the remote and multi-party test methods**

The MTC PCO is named "L0" ("L" for Lower). PCO L0 is used to control and observe the behaviour of the IUT and test case verdicts are assigned depending on the behaviour observed at this PCO. The PTC PTC1 uses PCO L1. This PCO is used to control and, in a limited way, observe the behaviour of the network equipment at interfaces other than the one under test. No verdicts are assigned at this PCO.

As stated in a previous paragraph, the non-receipt of network generated messages at L0, which are stimulated by events at the L1, will result in INCONCLUSIVE rather than FAIL verdicts being assigned.

### 4.1.2 Conventions for variables and parameters

**MTCA**

| | | |
|---|---|---|
| call reference | CREF1 | |
| B channel (basic) | bch_num1 | (to PTC1) |
| channel nr (primary) | CH_NUM1 | |
| PCO L0 | IPN0, LIPN0 | |

**PTC1**

| | |
|---|---|
| call reference | P1CREF |
| B channel (basic) | P1_bch_num |
| channel nr (primary) | P1_CH_NUM |
| PCO L1 | IPN1, LIPN1 |

### 4.2 Alternative ATM

As stated in subclause 4.1, an ATS based on a single-party (remote) ATM is possible. Such an ATS may be generated from the one specified in this ETS. The following general steps should be taken:

1) remove all PTC behaviour;
2) remove all CREATE statements;
3) replace CMs which are used to provoke PDUs at the MTC, with implicit send statements.

An example, showing the difference between the multi-party ATM and single-party ATM for a single test case, is given in tables 1 and 2.

**Table 1: Test case dynamic behaviour table using multi-party ATM**

| TEST CASE DYNAMIC BEHAVIOUR | | | | |
|---|---|---|---|---|
| Test Case Name | HOLD_N04_001 | | | |
| Group | RemoteUser_ST_OR_T/Holding/ | | | |
| Purpose | Ensure that the IUT, while in the Active call state N10, to notify the non-served user that the call is held sends a NOTIFY message with a notification indicator coded as "remote hold" to user B and remains in the Active call state. | | | |
| Default | DF69901(1) | | | |
| Configuration | CONFIG1 | | | |
| Comments | 9.2.1 valid optional | | | |
| Nr \| Label | BEHAVIOUR DESCRIPTION | CREF | V | COMMENTS |
| 1 \| | CREATE ( PTC1: PTC1_IN_servedUser) | | | |
| 2 \| | +PR31002 | | | preamble N10 |
| 3 \| | CPA1!CP_M START TWAIT | S_HL | | |
| 4 \| | L0?NOTIFYr | A_NO20(CREF1,hold_NID) | (P) | |
| 5 \| | +CS59901(10,1) | | | check N10 |
| 6 \| | ?TIMEOUT TWAIT | | (I) | |
| 7 \| | +PO49901(1) | | | postamble N0 |
| DETAILED COMMENTS: | | | | |

**Table 2: Test case dynamic behaviour table using single-party ATM**

| TEST CASE DYNAMIC BEHAVIOUR | | | | |
|---|---|---|---|---|
| Test Case Name | HOLD_N04_001 | | | |
| Group | RemoteUser_ST_OR_T/Holding/ | | | |
| Purpose | Ensure that the IUT, while in the Active call state N10, to notify the non-served user that the call is held sends a NOTIFY message with a notification indicator coded as "remote hold" to user B and remains in the Active call state. | | | |
| Default | DF69901(1) | | | |
| Configuration | | | | |
| Comments | 9.2.1 valid optional | | | |
| Nr \| Label | BEHAVIOUR DESCRIPTION | CREF | V | COMMENTS |
| 1 \| | +PR31002 | | | preamble N10 |
| 2 \| | <IUT!NOTIFY> | NO20(CREF1,hold_NID) | | |
| 3 \| | L0?NOTIFYr | A_NO20(CREF1,hold_NID) | (P) | |
| 4 \| | +CS59901(10,1) | | | check N10 |
| 5 \| | ?TIMEOUT TWAIT | | (I) | |
| 6 \| | +PO49901(1) | | | postamble N0 |
| DETAILED COMMENTS: | | | | |

## 5 Untestable test purposes

There are no untestable test cases associated with this ATS and ATM.

# 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 two 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.

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

In table 3 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 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 3: ASN.1 type definition BIT7OR15**

| ASN.1 Type Definition |
|---|
| **Type Name** : BIT7OR15<br>**Comments** : |
| **Type Definition** |
| BIT STRING(SIZE(CR_LENGTH)) |

Table 4 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 shall 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.

**Table 4: ASN.1 type definition CHI**

| ASN.1 Type Definition |
|---|
| **Type Name** : CHI<br>**Comments** : Info Element Channel Identification<br>ETS 300 102-1 clause 4.5.13 |
| **Type Definition** |
| CHOICE {<br>basic BASIC_CHI,<br>primary PRIMARY_CHI<br>}<br><br>-- Local Type Definitions --<br><br>BASIC_CHI ::= SEQUENCE {<br>chi_i CHI_I, -- Identifier<br>chi_l BIT STRING(SIZE(8)), -- Length<br>chi_e3_cs BIT STRING(SIZE(8)) -- Channel selection<br>}<br><br>PRIMARY_CHI ::= SEQUENCE {<br>chi_i CHI_I, -- Identifier<br>chi_l BIT STRING(SIZE(8)), -- Length<br>chi_e3_p1 BIT STRING(SIZE(4)), -- First nibble of Channel selection<br>chi_e3_pe BIT STRING(SIZE(1)), -- Preferred/Exclusive Bit<br>chi_e3_p3 BIT STRING(SIZE(3)), -- Last three bits of Channel selection<br>chi_e4 BIT STRING(SIZE(8)), -- Channel type<br>chi_e5_chl BIT STRING(SIZE(1)),<br>chi_e5_ch2 BIT STRING(SIZE(7)) -- Channel number<br>} |

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 5. Such ASPs are only used for requesting or receiving service from the lower layer.

**Table 5: TTCN ASP type definition DL_REL_IN**

| TTCN ASP Type Definition | | |
|---|---|---|
| **ASP NAME** : DL_REL_IN<br>(DL_RELEASE_INDICATION)<br>**PCO Type** : SAP<br>**Comments** : | | |
| **Parameter Name** | **Parameter Type** | **Comments** |
| **Detailed Comments** : | | |

Table 6 shows an example of a parameterized ASP. All ASPs containing PDUs contain only that PDU and no other parameters.

**Table 6: TTCN ASP type definition DL_DATA_RQ_ALERT**

| TTCN ASP Type Definition | | |
|---|---|---|
| **ASP NAME** : DL_DATA_RQ_ALERT (DL_DATA_REQUEST)<br>**PCO Type** : SAP<br>**Comments** : | | |
| **Parameter Name** | **Parameter Type** | **Comments** |
| mun (MessageUnit) | ALERT_PDU | |
| **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.

#### 6.1.1.4.2 ASN.1 PDU type definitions

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

## 6.1.2 Test suite constants

No test suite constants are used or defined in this ATS.

## 6.1.3 Test suite parameters

Each test suite parameter is defined in terms of a predefined type or a referenced type. A referenced type is used when it is necessary to attach restrictions to these type definitions (it is not allowed to include restrictions directly in the test suite parameter table). The referenced type can have a length or value restriction attached to it in its declaration table.

## 6.1.4 Variables

### 6.1.4.1 Test suite variables

No test suite variables are used or defined in this ATS.

### 6.1.4.2 Test case variables

Each test case variable is defined in terms of a predefined type or a referenced type. A referenced type is used when it is necessary to attach restrictions to these type definitions (it is not allowed to include restrictions directly in the test case variable table). The referenced type can have a length or value restriction attached to it in its declaration table.

Where test case variables are used in constraints, they are passed as formal parameters.

### 6.1.5 Test suite operation definitions

The description part of a test suite operation definition uses either natural language or meta C.

**Table 7: Test suite operation definition ASSIGN_CHI**

| **Test Suite Operation Definition** |
|---|
| **Operation Name** : ASSIGN_CHI(basic, primary : CHI; basic_flag : BOOLEAN)<br>**Result Type** : CHI<br>**Comments** : This operation is used to assign a correct Channel identification information element to PDUs dependent on the type of access that is tested. |
| **Description** |
| {<br>if(basic_flag)<br>  return basic;<br>else<br>  return primary<br>} |
| **Detailed comments** : |

The test suite operation definition shown in table 7 is used in the constraints part when assigning an element of type CHI a value. As previously described, the CHI type can be defined in two ways depending on whether the ATS is testing basic or primary rate access. To avoid duplicate types and thereby duplicate test cases the CHI type is defined in ASN.1. This operation is used to assign a value to an element of CHI type. It takes three parameters:

```
primary:        a constraint of type CHI valid for primary rate access;
basic:          a constraint of type CHI valid for basic access;
basic_flag:     a boolean value: TRUE if basic access is applicable, FALSE otherwise.
```

This operation returns the correct constraint according to the Boolean flag basic_flag. That constraint will then be assigned to the specific element of type CHI.

## 6.2 Constraints part

### 6.2.1 Structured type constraint declaration

For every structured type definition there exists one or more structured type constraint.

### 6.2.2 ASN.1 type constraint declaration

Constraints of this type are used to assign the corresponding type a specific value. These constraints are used for the purpose of modelling unordered data or specific types that cannot be expressed in TTCN.

#### 6.2.2.1 Specification of encoding rules

All ASN.1 constraints contained in this ATS are encoded according to ISDN, i.e. the ASN.1 data types are a representation of structures contained within the ISDN specification (basic call, Generic functional protocol or individual supplementary service). For example, if octets of an information element are specified in ASN.1 as a SEQUENCE then this should be encoded in an Executable Test Suite (ExTS) as any other ISDN information element specified using tabular TTCN. Encoding associated with the Basic Encoding Rules (BER), as specified in CCITT Recommendation X.209 [12], should not be applied to any of the ASN.1 constraints specified in this ATS.

### 6.2.3 ASP type constraint declaration

#### 6.2.3.1 ASN.1 ASP type constraint declaration

No ASN.1 ASP type constraint declarations exist in this ATS.

#### 6.2.3.2 TTCN ASP type constraint declaration

For TTCN ASP constraint declarations there is a one-to-one relationship between its type and the constraint. That is, there is only one constraint for each TTCN ASP Type Declaration. The reason for this is that the ASPs are used only for carrying a specific PDU value. The many ASP constraints (and types) could have been avoided by using the meta type **PDU**, but that was not suitable as values inside a specific PDU have to be referenced. To reference elements inside a value of meta type **PDU** is not allowed according to ISO/IEC 9646-3 [8], so each ASP has to be defined as having a parameter of a specific PDU type.

In all ASP constraints the embedded PDU constraint is either chained static or "semi-dynamic". That is, the PDU constraint is always fixed to a specific ASP constraint but it (the PDU) may be parameterized.

All ASP constraints have a specific value for its parameter. No matching symbols are used in ASPs.

### 6.2.4 PDU type constraint declaration

#### 6.2.4.1 ASN.1 PDU type constraint declaration

No ASN.1 PDU type constraint declaration exists in this ATS.

#### 6.2.4.2 TTCN PDU type constraint declaration

PDU constraints are used for assigning values or patterns to the data being sent or received.

### 6.2.5 Chaining of constraints

#### 6.2.5.1 Static chaining

Static chaining, that is a fixed reference to a specific constraint, is used in this ATS. The static chaining is used for static binding of both variables and sub-structures.

#### 6.2.5.2 Dynamic chaining

Dynamic chaining is achieved when having a reference to a value which is unknown. The only thing known (before run-time) is the type of that reference. The reference is passed as a parameter. Strict dynamic chaining is not used in this ATS. What is used is something that is called "semi-dynamic chaining". The definition of semi-dynamic chaining is that the fixed reference is parameterized with an unknown value. That value is received as a parameter.

**Table 8: TTCN ASP constraint declaration A_RST1**

| **TTCN ASP Constraint Declaration** | | |
|---|---|---|
| **Constraint Name** : A_RST1(FLAG : INTEGER)<br>**ASN.1 Type** : DL_DAT_IN_RESTARTr<br>**Derivation Path** :<br>**Comments** : | | |
| **Parameter Name** | **Parameter Value** | **Comments** |
| mun | RST1(FLAG) | RST1(FLAG) |
| **Detailed comments** : | | |

Table 8 is an example of semi-dynamic chaining. The TTCN ASP constraint is parameterized with an INTEGER value named FLAG. That value is passed further down in the structure as a parameter to a static named PDU constraint reference.

### 6.2.6 Derived constraints

No derivation of any constraints is used. All constraints are considered to be base constraints.

### 6.2.7 Parameterized constraints

Parameterized constraints are used in this ATS.

#### 6.2.8 Value assignment

##### 6.2.8.1 Specific values

For specific value assignment both explicit values and references to explicit values are used.

##### 6.2.8.2 Matching values

As matching values the following mechanisms are used:

Instead of Value:
- AnyOrOmit "*"
- AnyValue "?"
- SuperSet SUPERSET
- Omit "-"

Inside value:
- AnyOne "?"
- AnyOrNone "*"

### 6.3 Dynamic part

#### 6.3.1 Test cases

Each test case contains the test purpose text from ETS 300 058-5 [4]. To be able to read and understand the test case dynamic behaviour it is recommended that the test steps are understood first.

#### 6.3.2 Test steps

##### 6.3.2.1 PTC1_IN

This test step describes the behaviour of the PTC1 for support of an incoming call at the MTC (served user side). Thus PTC1 is the originator of the call. The PTC1 receives a CM from the MTC in order to send the SETUP message which begins the call establishment. The test step is terminated by receipt of a RELEASE message or by appropriate CM from the MTC.

##### 6.3.2.2 PTC1_OUT

This test step describes the behaviour of the PTC1 for support of an outgoing call at the MTC (served user side). Thus PTC1 is at the destination side of the call. The test step is terminated by receipt of a RELEASE message or by appropriate CM from the MTC.

The behaviour is regulated from the MTC by means of CMs sent via CPA1 co-ordination point. Thus if the PTC is expected to receive a message it receives a CM beforehand telling it what message to expect. On the other hand if the MTC wishes to receive a message from the IUT it may do this by first sending a CM to PTC1. Depending on the contents of the CM PTC1 may then send a message to the IUT eventually provoking the IUT to send a message at the side of the MTC.

#### 6.3.3 Defaults

Note the use of the RETURN statement which is defined in DAM1 of ISO/IEC 9646-3 [8]. This allows valid background behaviour to be handled in the default tree with a possibility to return to the original set of alternatives in the test case.

## 7 ATS to TP map

The identifiers used for the TPs are reused as test case names. Thus there is a straightforward one-to-one mapping.

## 8 PCTR conformance

A test laboratory, when requested by a client to produce a PCTR, is required, as specified in ISO/IEC 9646-5 [10], to produce a PCTR conformant with the PCTR template given in annex B of ISO/IEC 9646-5 [10].

Furthermore, a test laboratory, offering testing for the ATS specification contained in annex C, when requested by a client to produce a PCTR, is required to produce a PCTR conformant with the PCTR proforma contained in annex A of this ETS.

A PCTR which conforms to this PCTR proforma specification shall preserve the content and ordering of the clauses contained in annex A. Clause A.6 of the PCTR may contain additional columns. If included, these shall be placed to the right of the existing columns. Text in italics may be retained by the test laboratory.

## 9 PIXIT conformance

A test realizer, producing an executable test suite for the ATS specification contained in annex C, is required, as specified in ISO/IEC 9646-4 [9], to produce an augmented partial PIXIT proforma conformant with this partial PIXIT proforma specification.

An augmented partial PIXIT proforma which conforms to this partial PIXIT proforma specification shall, as a minimum, have contents which are technically equivalent to annex B. The augmented partial PIXIT proforma may contain additional questions that need to be answered in order to prepare the Means Of Testing (MOT) for a particular IUT.

A test laboratory, offering testing for the ATS specification contained in annex C, is required, as specified in ISO/IEC 9646-5 [10], to further augment the augmented partial PIXIT proforma to produce a PIXIT proforma conformant with this partial PIXIT proforma specification.

A PIXIT proforma which conforms to this partial PIXIT proforma specification shall, as a minimum, have contents which are technically equivalent to annex B. The PIXIT proforma may contain additional questions that need to be answered in order to prepare the test laboratory for a particular IUT.

## 10 ATS conformance

The test realizer, producing MOT and ExTS for this ATS specification, shall comply with the requirements of ISO/IEC 9646-4 [9]. In particular, these concern the realization of an ExTS based on each ATS. The test realizer shall provide a statement of conformance of the MOT to this ATS specification.

An ExTS which conforms to this ATS specification shall contain test groups and test cases which are technically equivalent to those contained in the ATS in annex C. All sequences of test events comprising an abstract test case shall be capable of being realized in the executable test case. Any further checking which the test system might be capable of performing is outside the scope of this ATS specification and shall not contribute to the verdict assignment for each test case.

Test laboratories running conformance test services using this ATS shall comply with ISO/IEC 9646-5 [10].

A test laboratory which claims to conform to this ATS specification shall use an MOT which conforms to this ATS.

# Annex A (normative): Protocol Conformance Test Report (PCTR) proforma



## A.1 Identification summary

### A.1.1 Protocol conformance test report

| | |
|---|---|
| PCTR number: | |
| PCTR date: | |
| Corresponding SCTR number: | |
| Corresponding SCTR date: | |
| Test laboratory identification: | |
| Test laboratory manager: | |
| Signature: | |

### A.1.2 IUT identification

| | |
|---|---|
| Name: | |
| Version: | |
| Protocol specification: | ETS 300 058-1 |
| PICS: | |
| Previous PCTRs (if any): | |

### A.1.3 Testing environment

| | |
|---|---|
| PIXIT reference number: | |
| ATS specification: | ETS 300 058-6 |
| Abstract test method: | Multi-party test method (see ISO/IEC 9646-2) |
| Means of testing identification: | |
| Dates of testing: | |
| Conformance log reference(s): | |
| Retention date for log reference(s): | |

### A.1.4 Limits and reservations

*Additional information relevant to the technical contents or further use of the test report, or to the rights and obligations of the test laboratory and the client, may be given here. Such information may include restriction on the publication of the report.*

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### A.1.5 Comments

*Additional comments may be given by either the client or the test laboratory on any of the contents of the PCTR, for example, to note disagreement between the two parties.*

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## A.2 IUT conformance status

This IUT has / has not been shown by conformance assessment to be non-conforming to the specified protocol specification.

*Strike the appropriate words in this sentence. If the PICS for this IUT is consistent with the static conformance requirements (as specified in clause A.3 of this report) and there are no "FAIL" verdicts to be recorded (in clause A.6) strike the words "has", otherwise strike the words "has not".*

## A.3 Static conformance summary

The PICS for this IUT is / is not consistent with the static conformance requirements in the specified protocol.

*Strike the appropriate words in this sentence.*

## A.4 Dynamic conformance summary

The test campaign did / did not reveal errors in the IUT.

*Strike the appropriate words in this sentence. If there are no "FAIL" verdicts to be recorded (in clause A.6 of this report) strike the word "did", otherwise strike the words "did not".*

Summary of the results of groups of tests:

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.....

## A.5 Static conformance review report

*If clause A.3 indicates non-conformance, this clause itemizes the mismatches between the PICS and the static conformance requirements of the specified protocol specification.*

.....

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## A.6 Test campaign report

| ATS reference | Selected? (Y/N) | Run? (Y/N) | Verdict | Observations |
|---|---|---|---|---|
| CW_N01_001 | | | | |
| CW_N01_002 | | | | |
| CW_N01_003 | | | | |
| CW_N01_004 | | | | |
| CW_N01_005 | | | | |
| CW_N01_006 | | | | |
| CW_N01_007 | | | | |
| CW_N01_008 | | | | |
| CW_N01_009 | | | | |
| CW_N01_010 | | | | |
| CW_N01_011 | | | | |
| CW_N01_012 | | | | |
| CW_N02_001 | | | | |
| CW_N02_002 | | | | |
| CW_N03_001 | | | | |
| CW_N04_001 | | | | |

## A.7 Observations

*Additional information relevant to the technical content of the PCTR are given here.*

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# Annex B (normative): Partial PIXIT proforma



## B.1 Identification summary

PIXIT number:

.....

Test laboratory name:

.....

Date of issue:

.....

Issued to:

.....

## B.2 Abstract test suite summary

Protocol specification: ETS 300 058-1

ATS specification: ETS 300 058-6

Abstract test method: Multi-party test method (see ISO/IEC 9646-2)

## B.3 Test laboratory

Test laboratory identification:

.....

Accreditation status of the test service:

.....

Accreditation reference:

.....

Test laboratory manager:

.....

Test laboratory contact:

.....

Means of testing:

.....

Test laboratory instructions for completion:

.....

## B.4 Client (of the test laboratory)

Client identification:

.....

Client test manager:

.....

Client contact:

.....

Test facilities required:

.....

## B.5 System Under Test (SUT)

Name:

.....

Version:

.....

SCS reference:

.....

Machine configuration:

.....

Operating system identification:

.....

IUT identification:

.....

PICS (all layers):

.....

.....

Limitations of the SUT:

.....

Environmental conditions:

.....

## B.6 Protocol information

### B.6.1 Protocol identification

Specification reference: ETS 300 058-1

Protocol version:

PICS reference:

NOTE: The PICS reference should reference a completed PICS which is conformant with the PICS proforma contained in ETS 300 058-2.

### B.6.2 Parameter values

**Table B.1: Parameter values**

| Item | Question | Supported? (Y/N) | Allowed values | Value |
|---|---|---|---|---|
| 1.1 | Does the IUT support basic access? | | N/A | N/A |
| 1.2 | What length of Call Reference value is used? | | 1, 2 | |
| 1.3 | What is the accuracy (%) of timers (T-CW or T 301)? | | | ± % |
| 1.4 | Timer T-CW, if supported, in milliseconds | | | ms |
| 1.5 | Timer T 301, if supported, in seconds | | max. 180 s | s |

### B.6.3 Configuration of IUT

**Table B.2: Actions required to configure the IUT**

| Item | Action:<br>What actions, if possible, have to be taken to configure the IUT for ... | Supported? (Y/N) | Stimulus (action taken) |
|---|---|---|---|
| 2.1 | only one B-channel available at the called user access? | | |
| 2.2 | access subscribed to Call Hold supplementary service (as specified in ETS 300 141-1)? | | |

### B.6.4 Timer values

**Table B.3: Timer values**

| Item | Timer:<br>Give a value for the timer that is used to ... | Value (in seconds) |
|---|---|---|
| 3.1 | wait for the test operator to perform an implicit send action or to wait for a PTC to react (TWAIT) | |
| 3.2 | wait for the IUT to respond to a stimulus sent by the tester (TAC) | |
| 3.3 | control that the IUT does not respond to a stimulus sent by the tester (TNOAC) | |
| NOTE: | The IUT provider may fill in a value range rather than a fixed value for the test management timers. During test execution the test laboratory will choose specific values for the timers dependant on the means of testing used. These specific values may even be beyond the range given by the IUT provider, if this is necessary for achieving satisfactory test results. | |

## B.7 Basic call PIXIT items

### B.7.1 Parameter values - information element codings

**Table B.4: Codings of information elements**

| Item | Information element: provide, if possible, ... | Supported? (Y/N) | Value |
|---|---|---|---|
| N1.1 | a coding of a Bearer Capability information element, which the IUT is compatible with, for the purpose of accepting received SETUP messages and which may be used in SETUP messages to be transmitted | | |
| N1.2 | a coding of a High layer compatibility information element, which the IUT is compatible with, for the purpose of accepting received SETUP messages and which may be used in SETUP messages to be transmitted | | |
| N1.3 | a coding of a Low layer compatibility information element, which the IUT is compatible with, for the purpose of accepting received SETUP messages and which may be used in SETUP messages to be transmitted | | |
| N1.4 | a Called party number information element, which the IUT is compatible with, for ... | | |
| N1.4.1 | served user access | | |
| N1.4.2 | first remote user access | | |
| N1.4.3 | second remote user access | | |
| N1.4.4 | third remote user access | | |
| N1.5 | preferred channel number to be used for the purpose of accepting received SETUP messages, for ... (note 1) | | |
| N1.5.1 | single call at served user side | | |
| N1.5.2 | second call at served user side | | |
| N1.5.3 | first call at remote user side | | |
| N1.5.4 | second call at remote user side | | |
| N1.5.5 | third call at remote user side | | |
| NOTE 1: | Items N1.5.1 to N1.5.5 are applicable for primary rate access only. | | |
| NOTE 2: | As this is a general table used for all supplementary services, all items N1.4.1 to N1.4.4, and N1.5.1 to N1.5.5 (if primary rate access is supported), are not always required, but should be supplied if possible. | | |

# Annex C (normative): Abstract Test Suite (ATS)

This ATS has been produced using the Tree and Tabular Combined Notation (TTCN) according to ISO/IEC 9646-3 [8].

The ATS was developed on a separate TTCN software tool and therefore the TTCN tables are not completely referenced in the contents table. The ATS itself contains a test suite overview part which provides additional information and references (see also annex D).

## C.1 The TTCN Graphical form (TTCN.GR)

The TTCN.GR representation of this ATS is contained in a Postscript file (CW_N04.PS[1)]) which accompanies this ETS.

## C.2 The TTCN Machine Processable form (TTCN.MP)

The TTCN.MP representation corresponding to this ATS is contained in an ASCII file (CW_N04.MP[1)]) which accompanies this ETS.

NOTE: According to ISO/IEC 9646-3 [8], in case of a conflict in interpretation of the operational semantics of TTCN.GR and TTCN.MP, the operational semantics of the TTCN.GR representation takes precedence.

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1) This file is located in an archive file named 0586_E1.LZH.

## Annex D (informative): General structure of ATS

This annex gives a simple listing of the order of types of tables which appear in a typical supplementary service ATS. This is intended as an aid in helping readers find particular sections quickly.

**Test Suite Overview**

Test Suite Structure

Test Case Index

Test Step Index

Default Index

**Declarations Part**

Simple Type Definitions

Structured Type Definitions

ASN.1 Type Definitions

Test Suite Operation Definitions

Test Suite Parameter Declarations

Test Case Selection Expression Definitions

Test Suite Constant Declarations

Test Case Variable Declarations

PCO Declarations

Co-ordination Point Declarations

Timer Declarations

Test Component Declarations

Test Components Configuration Declarations

TTCN ASP Type Definition

TTCN PDU Type Definition

TTCN CM Type Definition

Alias Definitions

**Constraints Part**

Structured Type Constraint Declarations

ASN.1 Type Constraint Declarations

TTCN ASP Constraint Declarations

TTCN PDU Constraint Declarations

TTCN CM Constraint Declarations

**Dynamic Part**

Test Case Dynamic Behaviour

Test Step Dynamic Behaviour

Default Dynamic Behaviour

## History

| Document history | | | |
|---|---|---|---|
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