



INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

# Q.2991.2

(12/1999)

SERIES Q: SWITCHING AND SIGNALLING

Broadband ISDN – B-ISDN application protocols for  
access signalling

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**Abstract test suite for the network integration  
testing for B-ISDN and B-ISDN/N-ISDN: ICS &  
IXIT and ATS**

ITU-T Recommendation Q.2991.2

(Formerly CCITT Recommendation)

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*For further details, please refer to the list of ITU-T Recommendations.*

**Abstract test suite for the network integration testing for  
B-ISDN and B-ISDN/N-ISDN: ICS & IXIT and ATS**

**Summary**

This ITU-T Recommendation contains the end-to-end test specification for the network integration testing within DSS2 based B-ISDN networks. The main body of the Recommendation presents the requirements regarding the ICS and IXIT.

This Recommendation includes an electronic attachment containing the ATS in machine processable form and in pdf form.

**Source**

ITU-T Recommendation Q.2991.2 was prepared by ITU-T Study Group 11 (1997-2000) and approved under the WTSC Resolution 1 procedure on 3 December 1999.

## FOREWORD

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### Abstract test suite for the network integration testing for B-ISDN and B-ISDN/N-ISDN: ICS & IXIT and ATS

#### 1 Scope

This ITU-T Recommendation contains the Implementation Conformance Statement (ICS) proforma and the Implementation Extra Information (IXIT) proforma for the End-to-end Network Integration Tests to verify the overall compatibility of B-ISDN and B-ISDN/N-ISDN over the national and international networks.

#### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- [1] ITU-T Recommendation Q.850 (1998), *Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part.*
- [2] ITU-T Recommendation Q.931 (1998), *ISDN user-network interface layer 3 specification for basic call control.*
- [3] ITU-T Recommendation Q.955, *Stage 3 description for community of interest supplementary services using DSS1.*
- [4] ITU-T Recommendation Q.2660 (1999), *Interworking between signalling system No. 7 broadband ISDN User Part (B-ISUP) and digital subscriber Signalling System No. 2.*
- [5] ITU-T Recommendation Q.2931 (1995), *Digital Subscriber Signalling System No. 2 (DSS2) – User-network Interface (UNI) Layer 3 specification for basic call/connection control.*
- [6] ITU-T Recommendation Q.2951, *Stage 3 description for number identification supplementary services using B-ISDN Digital Subscriber Signalling system No. 2 (DSS2) – Basic call.*
- [7] ITU-T Recommendation Q.2957.1 (1995), *Stage 3 description for additional information transfer supplementary services using B-ISDN Digital Subscriber Signalling System No. 2 (DSS2) – Basic Call: User-to-user signalling (UUS).*
- [8] ITU-T Recommendation Q.2961.1 (1995): *Digital Subscriber Signalling System No. 2 – Additional Traffic Parameters: Additional signalling capabilities to support traffic parameters for the tagging option and the sustainable cell rate parameter set.*
- [9] ITU-T Recommendation Q.2961.2 (1997), *Digital Subscriber Signalling System No. 2 – Additional Traffic Parameters: Support of ATM Transfer Capability in the Broadband Bearer Capability Information Element 2.*
- [10] ITU-T Recommendation Q.2962 (1998), *Digital Subscriber Signalling System No. 2 – Connection characteristics negotiation during call/connection establishment phase.*

- [11] ITU-T Recommendation Q.2971 (1995), *Digital Subscriber Signalling System No. 2 (DSS2) – User-network interface layer 3 specification for point-to-multipoint call/connection control.*
- [12] ISO/IEC 9646-1:1994, *Information Technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts.*
- [13] ISO/IEC 9646-2:1994, *Information Technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 2: Abstract Test Suite specification.*
- [14] ISO/IEC 9646-4:1994, *Information Technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 4: Test realization.*
- [15] 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.*

### 3 Definitions

This ITU-T Recommendations defines the following:

- terms defined in the B-ISDN/ISDN reference specifications [1-11];
- terms defined in ISO/IEC 9646-1 [12] and in ISO/IEC 9646-2 [13].

In particular, the following terms defined in ISO/IEC 9646-1 [12] apply:

- Abstract Test Case;
- PICS proforma;
- Test Purpose.

### 4 Abbreviations

This ITU-T Recommendation uses the following abbreviations:

|        |                                            |
|--------|--------------------------------------------|
| AAL    | ATM Adaptation Layer                       |
| ABR    | Available Bit Rate                         |
| ATC    | ATM Transfer capability                    |
| ATM    | Asynchronous Transfer Mode                 |
| ATS    | Abstract Test Suite                        |
| BTC    | Broadband Transfer Capability              |
| CLIP   | Calling Line Identification Presentation   |
| CLIR   | Calling Line Identification Restriction    |
| COLP   | Connected Line Identification Presentation |
| COLR   | Connected Line Identification Restriction  |
| CS-1   | Capability Set 1                           |
| CS-2.1 | Capability Set 2.1                         |
| CUG    | Closed User Group                          |
| DBR    | Deterministic Bit Rate                     |
| DDI    | Direct Dialling In                         |

|        |                                              |
|--------|----------------------------------------------|
| DSS1   | Digital Subscriber Signalling System No. 1   |
| DSS2   | Digital Subscriber Signalling System No. 2   |
| HLC    | High Layer Compatibility                     |
| HLI    | High Layer Information                       |
| ICS    | Implementation Conformance Statement         |
| ISDN   | Integrated Services Digital Network          |
| ISUP   | ISDN User Part                               |
| IUT    | Implementation Under Test                    |
| IWU    | Interworking Unit                            |
| IXIT   | Implementation eXtra Information for Testing |
| LLC    | Low Layer Compatibility                      |
| LLI    | Low Layer Information                        |
| MOT    | Means of Testing                             |
| MSN    | Multiple Subscriber Number                   |
| NIT    | Network Integration Testing                  |
| OSI    | Open Systems Interconnection                 |
| PCO    | Point of Control and Observation             |
| PDU    | Protocol Data Unit                           |
| PNO    | Public Network Operator                      |
| SBR    | Statistical Bit Rate                         |
| SUB    | Sub-addressing                               |
| SUT    | System Under Test                            |
| TSS&TP | Test Suite Structure & Test Purposes         |
| TTCN   | Tree and Tabular Combined Notation           |
| UUS    | User-to-User Signalling                      |

## 5 Abstract Test Method (ATM)

The remote test method is applied for the user ATS. The Point of Control and Observation (PCO) resides at the service access point between layers 2 and 3. This PCO is named "L0" (for Lower). The L0 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.

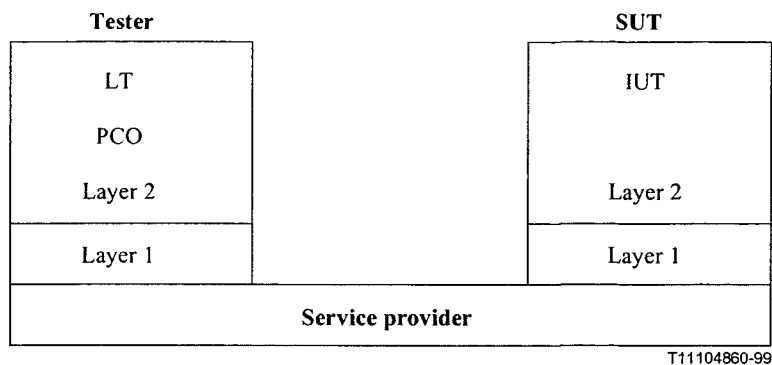


**Figure 1/Q.2991.2 – Remote test method**

ISO/IEC 9646-2 [13] allows the informal expression of Test Coordination 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.

## 6 Untestable test purposes

There are no untestable test purposes associated with this ATS.

## 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 [15], to produce a PCTR conformant with the PCTR template given in Annex B of ISO/IEC 9646-4 [14].

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 Recommendation.

A PCTR which conforms to this PCTR proforma specification shall preserve the content and ordering of the subclauses contained in Annex A. Subclause 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 releaser, producing an executable test suite for the Abstract Test Suite (ATS) specification contained in Annex C, is required, as specified in ISO/IEC 9646-4 [14], 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 Implementation Under Test (IUT).

A test laboratory, offering testing for the ATS specification contained in Annex C, is required, as specified in ISO/IEC 9646-5 [15], 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 releaser, producing a Means Of Testing (MOT) and Executable Test Suite (ExTS) for this Abstract Test Suite (ATS) specification, shall comply with the requirements of ISO/IEC 9646-4 [14]. In particular, these concern the realization of an Executable Test Suite (ExTS) based on each ATS. The test releaser 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 [15].

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

## ANNEX A

### Implementation Conformance Statement (ICS) proforma for Broadband End-to-end tests<sup>1</sup>

#### A.1 Guidance for completing the ICS proforma

##### A.1.1 Purposes and structure

The purpose of this ICS proforma is to provide a mechanism whereby a network provider of an implementation of the requirements for the network side for the Broadband Integrated Services Digital Network (B-ISDN), may provide information about the implementation in a standardized manner.

The proforma is subdivided into subclauses for the following categories of information:

- guidance for completing the proformas;
- identification of the implementation;
- global statement of conformance.

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<sup>1</sup> Copyright release for ICS proforma

Users of this Recommendation may freely reproduce the ICS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed ICS.

### A.1.2 Abbreviations and conventions

The ICS proforma contained in Annex B is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7.

#### Item column

The item column contains a number which identifies the item in the table.

#### Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

#### Status column

The following notations, defined in ISO/IEC 9646-7, are used for the status column:

- m mandatory – the capability is required to be supported.
- o optional – the capability may be supported or not.
- n/a not applicable – in the given context, it is impossible to use the capability.
- x prohibited (excluded) – there is a requirement not to use this capability in the given context.
- o.i qualified optional – for mutually exclusive or selectable options from a set. "i" is an integer which identifies a unique group of related optional items and the logic of their selection which is defined immediately following the table.
- ci conditional – the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying an unique conditional status expression which is defined immediately following the table.

#### Support column

The support column shall be filled in by the network provider of the implementation. The following common notations, defined in ISO/IEC 9646-7, are used for the support column:

Y or y supported by the implementation;

N or n not supported by the implementation;

N/A, n/a or – no answer required (allowed only if the status is n/a, directly or after evaluation of a conditional status).

It is also possible to provide a comment to an answer in the space provided at the bottom of the table.

#### Values allowed column

The values allowed column contains the type, the list, the range, or the length of values allowed. The following notations are used:

- range of values: <min value> .. <max value>  
example: 5 .. 20
- list of values: <value1>, <value2>, ....., <valueN>  
example: 2, 4, 6, 8, 9  
example: '1101'B, '1011'B, '1111'B  
example: '0A'H, '34'H, 2F'H
- list of named values: <name1>(<val1>), <name2>(<val2>), ..., <nameN>(<valN>)  
example: reject(1), accept(2)
- length: size (<min size> .. <max size>)  
example: size (1 ... 8)