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Integrated Services Digital Network (ISDN); Audiovisual services in-band signalling testing; Part 2: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma

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Contents

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Foreword

This draft Interim European Telecommunication Standard (I-ETS) has been produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Public Enquiry phase of the ETSI standards approval procedure.

An ETSI standard may be given I-ETS status either because it is regarded as a provisional solution ahead of a more advanced standard, or because it is immature and requires a "trial period". The life of an I-ETS is limited to three years after which it can be converted into an ETS, have it's life extended for a further two years, be replaced by a new version, or be withdrawn.

This is part 2 of a multipart standard covering "Integrated Services Digital Network (ISDN); Audiovisual services in-band signalling testing", as described below:

Part 1: "Test Suite Structure and Test Purpose (TSS & TP)";

Part 2: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) Proforma";

Part 3: "Protocol Implementation Conformance Statement (PICS) proforma specification".

Proposed announcement date	
Date of latest announcement of this I-ETS (doa):	3 months after ETSI publication

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1 Scope

This Interim European Telecommunication Standard (I-ETS) is part 2 of a three part I-ETS dealing with conformance testing of Integrated Services Digital Network (ISDN) Videotelephony terminals. Part 1 contains the Test Purposes and Test Suite Structure and part 3 contains the Protocol Implementation Conformance Statement (PICS) proforma.

This I-ETS contains the Abstract Test Suite (ATS) for conformance testing the in-band signalling aspects of an ISDN Videotelephony terminal which uses one or two B channels, and which implements the frame structure and associated syntax as specified in ETS 300 144 [2] and the in-band signalling procedures as specified in ETS 300 143 [1]. A partial Protocol Implementation eXtra Information for Testing (PIXIT) Proforma is also included in this I-ETS. No testing of data commands or applications is included among the tests. Test purposes for signal content of the B-channel are included in part 2 of the I-ETS but no corresponding test cases have been included. Restricted network operation is outside the scope of this I-ETS.

It may be possible to use this ATS in order to test a non-ISDN Videotelephony terminal, providing it provides one or two 64 kbit/s digital channels for transmission. It may also be possible to use the majority of these test purposes to test in-band signalling implementations according to ETS 300 143 [1] and ETS 300 144 [2] using single or multiple channels up to 1 920 kbit/s.

2 Normative references

This I-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 I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] ETS 300 143 (1994): "Integrated Services Digital Network (ISDN); Audiovisual services Inband signalling procedures for audiovisual terminals using digital channels up to 2 048 kbit/s".

[2] ETS 300 144 (1996): "Integrated Services Digital Network (ISDN); Audiovisual services, Frame structure for a 64 kbit/s to 1 920 kbit/s channel and associated syntax for inband signalling".

[3] ETS 300 145 (1996): "Integrated Services Digital Network (ISDN); Audiovisual services, Videotelephone systems and terminal equipment operating on one or two 64 kbit/s channels".

[4] ISO/IEC 9646 Parts 1 to 7: "Conformance Testing Methodology and Framework".

[5] CCITT Recommendation G.711 (1990); "Pulse code modulation (PCM) of voice frequencies".

[6] ITU-T Recommendation G.722 (1988): "7 KHz audio-coding within 64kbit/s".

[7] ITU-T Recommendation G.725 (1988): "System aspects for the use of the 7KHz audio codec within 64 kbit/s".

[8] ITU-T Recommendation G.728 (1988): "Coding of speech at 16 kbit/s using low-delay code excited linear prediction".

[9] ITU-T Recommendation H.261 (1993): "Video codec for audiovisual services at p x 64kbit/s".

3 Definitions

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

NOTE: In addition to the definitions shown in this clause, the definitions in ISO/IEC 9646 [4] also apply.

additional channel: The second or subsequent channels established in a Videophone call.

bit-rate allocation signal: Bit position within the frame structure to transmit commands, control and indication signals, capabilities.

capability marker; Cap marker: The first code in a capability set.

capability set; Cap set: A sequence of capability codes started by the capability marker code.

ECS channel: Optional 800 kbit/s channel for use in encryption.

initial channel: The first channel established in a Videophone call.

mode 0F: Transmission mode in which the initial channel contains framing, and 7-bit CCITT Recommendation G.711 [5] audio signal is being transmitted.

mode 0U: Transmission mode in which the initial channel does not contain framing, and 8-bit CCITT Recommendation G.711 [5] audio signal is being transmitted.

remote terminal: The terminal with which the IUT is communicating, i.e. the test tool.

4 Abbreviations

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

ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
BAS	Bit rate Allocation Signal
C&I	Control and Indication
cap	capability
CIF	Common Intermediate Format (picture format defined in ITU-T Recommendation H.261 [9])
CM	Co-ordination Message
CP	Coordination Point
CRC	Cyclic Redundancy Check
CTP	Combined Test Purpose
ECS	Encryption Control Signal
FAW	Frame Alignment Word
FAS	Frame Alignment Signal
H-MLP	High speed Multi Layer Protocol
H0	384 kbit/s channel
H11	1 536 kbit/s channel
H12	1920 kbit/s channel
HSD	High Speed data
IUT	Implementation Under Test
ISDN	Integrated Services Digital Network
LCA	Loopback Command "Audio loop request"
LCD	Loopback Command "Digital loop request"
LCO	Loopback Command "Loop off request"
LCV	Loopback Command "Video loop request"
LSB	Least Significant Bit
LSD	Low Speed data
LT	Lower Tester
MBE	Multiple Byte Extension

MCC	Multipoint Command Conference
MCU	Multipoint Conference Unit
MLP	Multi Layer Protocol
MPI	Minimum Picture Interval
MTC	Master Test Component
PCO	Point of Control and Observation
PDU	Protocol data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PTC	Parallel Test Component
QCIF	Quarter Common Intermidiate Format (picture format defined in ITU-T Recommendation H.261 [9])
SBE	Single Byte Extension
SC	Service Channel
SP	Super Test Purpose
TEA	Terminal Equipment Alarm
TP	Test Purpose(s)
TSS	Test Suite Structure
TTCN	Tree & Tabular Combined Notation
VCF	Video Command "Freeze-picture request"
VCU	Video Command "fast-Update request"

5 Introductory notes

This second part of the multipart I-ETS contains the Abstract Test Suite used in conformance testing of Videotelephony in-band signalling procedures. The corresponding test purposes are defined in Part 1. The test cases are derived from the combined test purposes found in clauses 9 and 10 of Part 1. A PICS proforma, Part 3 of this I-ETS, and a partial PIXIT proforma, an annex to this Part 2, are referred to by the abstract test suite.

5.1 Multiparty testing method

This abstract test suite describes the testing specifications for testing in-band signalling in ISDN Videotelephony terminals using one or two B-Channels. Testing activity will take place on the D-channel (for call control) and on one or both B-channels. Consequently, a multiparty, or concurrent testing method is necessary.

The test method employed makes use of a Master Test Component (MTC), or controller, and three Parallel Test Components (PTCs), or slaves: one each for the D-channel and the two B-channels. No actual testing is performed by the MTC, as all Points of Control and Observation (PCO) are on the PTCs. Each PTC uses a remote test method in its testing, as described in ISO/IEC 9646 [4].

5.1.1 Sequencing and control of test components

There are communication paths between the MTC and each PTC, and also between the two B-channel PTCs, for transmission of co-ordination messages during test execution. The MTC handles all scheduling of test components, with the three PTCs running largely independent of each other. There is therefore, a minimal need for co-ordination messages to be passed between the PTCs and the MTC during a test case. In a real implementation of this ATS, it may not be possible to have four individual test scripts running on a test tool, it may therefore be necessary to combine the functions of the MTC and the D-channel PTC. This should be possible, if some care is taken. Likewise, the actual co-ordination message contents and the control structure may need to be changed according to test tool implementation. The final control structure used should not, however, change the sequence of test events specified in these abstract test cases.

The sequence of events at the start of testing the majority of test cases on one B-channel is as follows:

- all test components start simultaneously;
- B-channel and D-channel test components wait for co-ordination message from MTC;
- MTC sends message to D-channel requesting it to initiate a call;
- D-channel sends message to MTC when B-channel is established and waits for next message;
- MTC sends message to B channel to cause it to start the test activity;

- MTC waits until B-channel test component has finished executing or a long timer has timed out (B-channel has crashed);
- MTC sends message to D-channel to request clearing of B-channel;
- MTC waits until D-channel test script has finished.

As can be seen, most of the test cases are started with the B-channels being initiated by the test tool, not the Implementation Under Test (IUT).

5.2 Diagram of test method and test components

Figure 1 shows a logical view of the complete configuration of the MTC, PTCs, and PCOs. The Coordination Point relationships between the various components are also indicated.

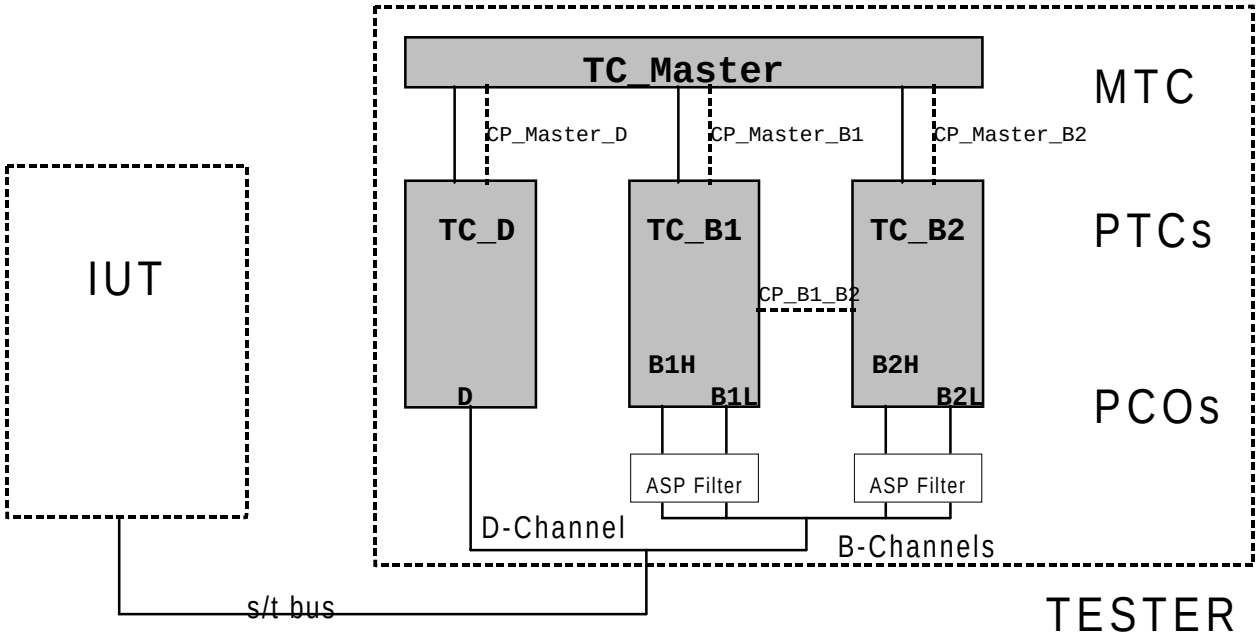

Figure 1: Testing configuration

5.3 Description of PCOs

The test method adopted employs separate parallel test components for the D-channel and two B-channels. Each B-channel test component has two PCOs or Points of Control and Observation. These are the points at which the IUT's behaviour is visible to the test script running on a test tool.

In ETS 300 143 [1] and ETS 300 144 [2], there is no explicit layered structure for the in-band signalling protocol. However, there is an implicitly defined structure: a lower layer dealing with frame and multiframe structure, bit encoding of Bit rate Allocation Signal (BAS) codes and their corresponding Cyclic Redundancy Check (CRC) codes, bit position of audio, video and data within a frame etc., and a higher layer dealing with the various sequences and procedures which make use of BAS codes to control the communication.

5.3.1 Description of higher layer PCO - received events

Sets of BAS codes are passed in Abstract Service Primitives (ASPs), through the higher layer PCO to the test script running on the tester. As the same BAS command codes are received continuously during normal operation of in-band signalling, a filtering operation needs to be performed in order to decide which BAS codes to pass up to the test script in an ASP. Without this filtering, the testing application could become overloaded with received BAS codes. If this filtering operation were to be encoded in TTCN as a Default Behaviour Tree or a Test Step Tree, it is possible that a test tool manufacturer would try to encode this filter operation in a high level language as part of the test script. This filter operation is best suited however, to being performed at a low level, directly on incoming BAS codes. Also, the TTCN description of

each test case would become so complicated that the original test purposes would be obscured, if the filter operation was included.

A pseudo-code description of the filter operation is given in subclause 5.3.2. Basically, it treats BAS commands which are being continually repeated as a single set, similar to a Capability set. It ensures that a set of BAS commands or a capability set is passed up to the testing application in an ASP only when there has been a change in the BAS commands or in the capability set received. It also ensures that an ASP would be forwarded if the received BAS codes had not changed, but one of the received A-bits had changed. Of course, the actual implementation of this PCO filter is not required to follow this routine exactly. It shall however, deliver the same result and pass exactly the same ASPs up to the test script. Although the description in subclause 5.3.2 may initially look complicated, it is very simple and a similar routine is implemented by some test tools at present.

There are two assumptions made about an IUT's behaviour, both of which are necessary for correct operation of this filter:

- when it is repeatedly sending the same Cap Set or group of commands, it does not change the order of transmission of the BAS codes contained within the set;

- it does not unnecessarily drop or include BAS codes in the list of commands being sent while not performing a mode switch.

5.3.2 Pseudo code description of PCO operation - received events

The following are the variables used in this description:

- BAS_code_rcvd: BAS code which has just been received;

- Current_BAS_set[ ]: Last complete BAS code set received (not necessarily forwarded as ASP), in array form;

- ASP: ASP containing a BAS code set forwarded to test application;

- X: Location in Current_BAS_set at which the match with BAS_code_rcvd is found

Pseudo code for VP-IBS upper PCO filter

```
Main Sequence
Receive a BAS code, Store in BAS_code_rcvd
IF BAS_code_rcvd is Cap Marker
     THEN If Current_BAS_set is empty
          THEN Current_BAS_set[first code] is set to BAS_code_rcvd
               Goto Main Sequence
          ELSE Goto Compare_Routine
IF BAS_code_rcvd is Current_BAS_set[first code]
     THEN Goto Compare_Routine
IF BAS_code_rcvd is Current_BAS_set[any other code]
     THEN ASP is set to Current_BAS_set[codes from 1 to X-1]
          Send ASP
          ASP is set to Current_BAS_set[codes from X to end]
          Send ASP
          Initialise Current_BAS_set
          Current_BAS_set[first code] is set to BAS_code_rcvd
          Goto Main Sequence
Current_BAS_set[next empty element] is set to BAS_code_rcvd
Goto Main Sequence

Compare_Routine
If Current_BAS_set is equal to ASP
     THEN Initialise Current_BAS_set
          Current_BAS_set[first code] is set to BAS_code_rcvd
          Goto Main Sequence
     ELSE ASP is set to Current_BAS_set
          Send ASP
          Initialise Current_BAS_set
          Current_BAS_set[first code] is set to BAS_code_rcvd
```

```
Goto Main Sequence
```

5.3.3 Description of higher layer PCO operation - transmitted events

When a Cap Set or group of commands are lined up for transmission by the test script, they are passed through the PCO using an ASP. The contents of the ASP are assumed to be transmitted as soon as the previous Cap Set or group of commands has been transmitted.

If a Cap Set is being transmitted, a parameter identifying the number of times it is to be transmitted is also passed in the ASP. If this parameter is set to 0, the transmission is to be continuous, or until another ASP is lined up for transmission.

If a group of commands are being transmitted, the transmission is assumed to be continuous, or until another ASP is lined up for transmission. If two send events occur one following the other, it is assumed that the second event occurs immediately following one transmission of the first.

5.4 Naming convention

The naming convention used for the test groups is part of the test suite structure. It may be found in clause 6.

Test cases have a numbering scheme which exactly matches the numbering of the corresponding test purposes or combined test purposes, but replacing the prefix TP or CTP with TC. For example:

- TC1-1-001 or TC2-3-001:

  a) the first digit following TC refers to whether the test is for 1 B-channel operation or 2 B-channel operation (1 or 2);
  b) the second digit refers to:

     1 Capability tests (1);
     2 Valid behaviour tests (2);
     3 Invalid behaviour tests (3).

  c) The number following that is a sequence number.

Of the two examples above, the first refers to a test purpose in 1B Capability section, the second refers to a test from 2B Invalid behaviour section.

Test steps which are defined in their own tables have titles in upper case. Test steps which are defined as local trees in a dynamic behaviour table have their titles in lower case.

All test suite variables and test case variables have names in lower case, prefixed by tsv_ and tcv_ respectively.

All test suite constants have names in upper case.

Test suite parameters have names in upper case, prefixed with PC_ if they refer to PICS items, and with PX_ if they refer to PIXIT items.

All test case selection expressions have names in upper case beginning with SEL_.

All co-ordination point names are prefixed by CP.

All timer names begin with T.

All structured type definitions have names ending in _Type.

All ASPs and PDUs for sending and receiving have names beginning with Send_ or Receive_, depending on their purpose.

All BAS code constraints have names beginning with Cap_, Com_, C&I_, Esc_ or SBE_, depending on the type of BAS code being referred to.

5.5 Audio and video signal content and coding

Correct signal content tests are outside the scope of this in-band signalling ATS therefore no audio or video signal content specifications are included. However, test purposes for signal content tests have been included in Part 1 of this I-ETS. It may be possible to combine these test purposes with test cases for the corresponding commands, and to implement them on a test tool which can test for correct audio and video signal format and coding.

When executing the tests contained in this ATS, it is recommended that a test tool sends audio, video and data signals which match the BAS commands being transmitted by the test tool as specified in the test case. This will prevent an IUT from implementing a Mode Mismatch procedure on receipt of commands which do not describe the contents of the B-channel. Such a Mode Mismatch would prevent many of the tests from being carried out.

5.6 Description of D-channel activity

There is a separate test component to control the D-channel behaviour. This test component sends and receives co-ordination messages to and from the MTC only. D-channel test step dynamic behaviour description tables have been created for each of the D-channel test steps, but no formal description of the D-channel behaviour is included in them. The primary reason for this is that the purpose of the ATS is not to test D-channel activity, but rather in-band signalling, and it would have been a waste of resources to spend time writing D-channel behaviour descriptions. The exact D-channel behaviour is in fact unimportant, as long as the required action on the D-channel is accomplished. To this end, only a description of the required action in the comments field is included in each table. The typical required actions are very simple: the establishment or clearing of a B-channel, usually initiated by the test tool, but occasionally by the IUT. This approach permits the use of either basic or primary rate D-channel behaviour (see annex C). Indeed, non-ISDN videophones could be tested according to this test suite if they provided some means of controlling the establishment and clearing of the 64 kbit/s digital channels. There are many ISDN D-channel test suites available publicly, and behaviour descriptions for controlling operation on the D-channel could be taken from any of these in order to implement this abstract test suite.

6 Test suite structure

The test suite structure has been broken into two distinct sections: tests for single channel operation and tests for two channel operation. The tests for single channel operation are almost all performed on both single channel and two channel terminals. Many of the commands and sequences used in two channel communications can be tested during single channel operation, before the establishment of a second channel. Consequently, there is no duplication of tests between both sections.

6.1 Test suite structure - listing of test groups

ISDN_VP_IBS

Single Channel Communication (SC):

- Capability Tests (CA)
  - Frame and Multiframe Structure and Alignment (FAS)
  - BAS Codes (BAS)
  - Basic Sequences and Procedures (SEQ)
    - Capability Exchange (Sequence A)/Initialisation (SA)
      - Audio capabilities (100) (AUCAP)
      - Transfer-rate capabilities (100) (TRCAP)
      - Video capabilities (100) (VICAP)
    - Mode Switching (Sequence B) (SB)

  - Valid Behaviour Tests (VB)
  - Frame and Multiframe Structure and Alignment (No testable test cases) (FAS)
  - BAS Codes (BAS)
    - Transfer-rate capabilities (100) (TRCAP)

- Video and MBE capabilities (101) (VICAP)
- LSD/MLP capabilities (101) (DCAP)
- Escape table values (111) (ESC)
- Aggregate Capabilities (111) {15}-(100) (AGCAP1)
- Aggregate Capabilities (111) {15}-(101) (AGCAP2)
- Escape_16 Capabilities (111) {16}-(100) (E16CAP1)
- Escape_16 Capabilities (111) {16}-(101) (E16CAP2)
- Escape_16 Capabilities (111) {16}-(110) (E16CAP3)
- Audio command values (000) (AUCMD)
- Video, loopback and other commands (010) (VICMD)
- Escape_16 Commands (111) {16}-(001) (E16CMD)
- C&I related to video (111) {17}-(000) (VICI)
- C&I related to audio (111) {17}-(000) (AUCI)
- C&I related to simple multipoint conferences not using MLP (111) {17}-(001) (MCCI)
- data-apps (111) {18}-(101) (DAPP)
- NUM (111) {19} (NUM)
- CHAR (111) {20} (CHAR)

Basic Sequences and Procedures (SEQ)
- Capability Exchange (Sequence A) (SA)
- Mode Switching (Sequence B) (SB)
- Frame Reinstatement (Sequence C) (SC)
- Mode Forcing (MF)

Encryption Control Signal (ECS)

Invalid Behaviour Tests (IB)

Frame and Multiframe Structure and Alignment (FAS)

Basic Sequences and Procedures (SEQ)
- Capability Exchange (Sequence A) (SA)
- Mode Switching (Sequence B) (SB)
- Mode Initialisation (MI)

Two Channels Communication (TC):

Capability Tests (CA)

Frame and Multiframe Structure and Alignment (FAS)

BAS Codes (BAS)

Basis Sequences and Procedures (SEQ)
- Capability Exchange (Sequence A) (SA)
- Mode Switching (Sequence B) (SB)
- Mode Initialization Procedure

Valid Behaviour Tests (VB)

Frame and Multiframe Structure and Alignment (FAS)

BAS Codes (BAS)
- Audio command values (000) (AUCMD)
- Video, loopback and other commands (010) (VICMD)
- C&I related to simple multipoint conferences not using MLP (111) [17]-(001) (MCCI)

Basic Sequences and Procedures (SEQ)
- Mode Switching (Sequence B) (SB)
- Mode Initialisation (MI)
- Mode Forcing (MF)

Encryption Control Signal (ECS)

Invalid Behaviour Tests (IB)
Frame and Multiframe Structure and Alignment (FAS)
Basic Sequences and Procedures (SEQ)
Capability Exchange (Sequence A) (SA)
Mode Initialisation (MI)
Loss of Connection (LOC)

6.2 Test Suite Structure - diagram

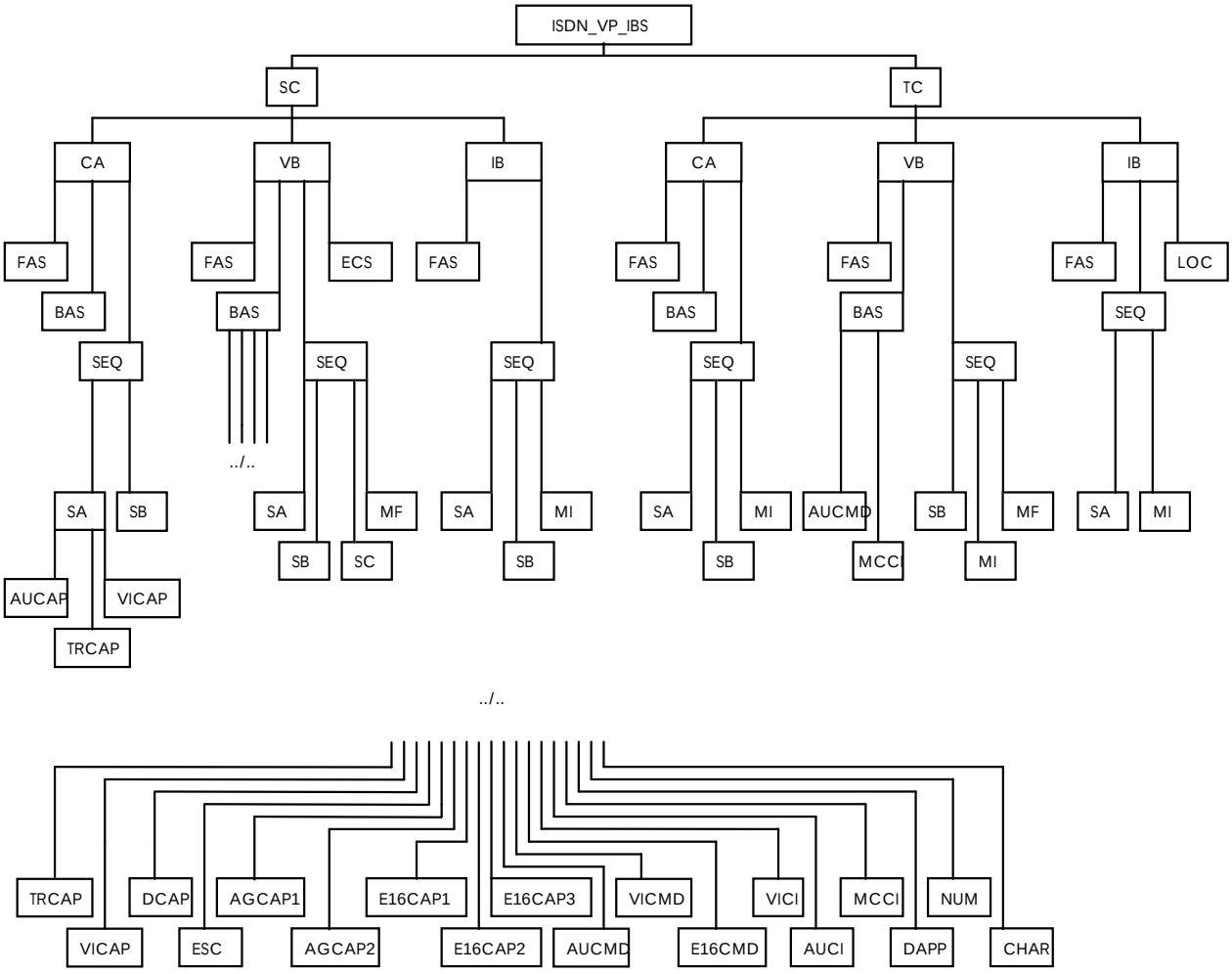

Figure 2: Test suite structure

Annex A (normative): Partial Pixit Proforma

Table A.1

ITEM	PIXIT Questions	Answer (Y/N)
PX.1	Does the IUT check frame alignment only in the initial channel during 1B communication ?	
PX.2	Does the IUT send Single Byte Extension (SBE) code in its capability set ?	
PX.3	Does the IUT send SBE command ?	
PX.4	Does the IUT answer to a TCI command ?	
PX.5	Can the IUT be forced to send the Control and Indication (C&I) TCI command to a Multipoint Conference Unit (MCU) ?	
PX.6	Can the IUT initiate a mode forcing procedure to reach the CCITT Recommendation G.711 μ-law audio mode ?	
PX.7	Can the IUT initiate a mode forcing procedure to reach the CCITT Recommendation G.711 [5] μ-law audio mode from CCITT Recommendation G.722 [6] m3?	
PX.8	Can the IUT initiate a mode 0 forcing procedure?	
PX.9	Can the IUT initiate a further sequence A ?	
PX.10	Can the IUT perform unframed transmission ?	
PX.11	Can the IUT initiate sequence C to cause the remote terminal to insert framing?	
PX.12	Can the IUT initiate a mode forcing in order to change the video mode from Common Intermediate Format (CIF) to Quarter Common Intermediate Format (QCIF) in 1B videocommunication ?	
PX.13	Can the IUT initiate a mode forcing in order to change the video mode from CIF to QCIF in 2B videocommunication ?	
PX.14	Can the IUT initiate, during 1B videocommunication, a mode forcing in order to change the video mode (CIF or QCIF) from a Minimum Picture Interval (MPI) value less than 4/29,97 to 4/29,97 ?	
PX.15	Can the IUT initiate, during 2B videocommunication, a mode forcing in order to change the video mode (CIF or QCIF) from a MPI value less than 4/29.97 to 4/29.97 ?	
PX.16	Can the IUT initiate the call ?	
PX.17 PX.18	SBE command sends by the IUT: Escape Code: Escaped Value:	
PX.19 PX.20	SBE capability associated to the previous SBE command sent by the IUT : Escape Code: Escaped Value:	
PX.21 PX.22	SBE capability which can be sent by the IUT: Escape Code: Escaped Value:	
PX.23	Value of a NS-Cap code which can be sent by the IUT:	
PX.24	First Byte for the country code in the previous NS-Cap:	
PX.25	Second Byte for the country code in the previous NS-Cap:	
PX.26	Manufacturer code in the previous NS-Cap:	

Annex B (normative): Abstract Test Suite in TTCN graphical form

This ATS has been produced using the Tree and Tabular Combined Notation (TTCN) according to ISO/IEC 9646-3 [4].

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.

B.1 The TTCN Graphical form (TTCN.GR)

The TTCN.GR representation of this ATS is contained in a Postscript file (XIP07632.PS) which can be found on the diskette which is attached to the last page of this ETS.

B.2 The TTCN Machine Processable form (TTCN.MP)

The TTCN.MP representation corresponding to this ATS is contained in an ASCII file (XIP07632.MP) which can be found on the diskette which is attached to the last page of this ETS.

NOTE: According to ISO/IEC 9646-3 [4], 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.

Annex C (informative): Bibliography

- ITU-T Recommendation H.221 (1995): "Frame structure for 64 to 1920 kbit/s channel in audiovisual teleservices".

- ITU-T Recommendation H.230 (1995): "Frame-synchronous control and indication signals for audiovisual systems".

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History

Document history			
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