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Vmesniki V digitalnega storitvenega vozliġļ a (SN) - Vmesniki na referenļ ni toļ ki VB5.2 za podporo ġirokopasovnim ali kombiniranim ozkopasovnim in ġirokopasovnim dostopovnim omreġjem (AN) - 4. del: Abstraktni preskuġevalni niz (ATS) in dodatna informacija za preskuġanje delne izvedbe protokola (PIXIT)

V interfaces at the digital Service Node (SN); Interfaces at the VB5.2 reference point for the support of broadband or combined narrowband and broadband Access Networks (ANs); Part 4: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)

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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 standard covering the interfaces at the VB5.2 reference point as described below:

Part 1: "Interface specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) specification";

Part 3: "Test Suite Structure and Test Purposes (TSS&TP)";

Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)".

National transposition dates	
Date of adoption of this EN:	19 January 2001
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Introduction

General

The work on a new broadband VB reference point concept was initiated by ETSI Technical Committee SPS to consider possible new structures and reference points for the connection of new broadband and combined narrowband/broadband access arrangements to Service Nodes (SN), in co-operation with other TCs.

The VB5 reference point concept, based on ITU-T Recommendation G.902 [8], was split into two variants. The first variant based on an ATM cross-connect with provisioned connectivity, called the VB5.1 reference point, is described in the present document. The other variant which further enables on-demand connectivity within the AN, called the VB5.2 reference point, is by EN 301 217-1 [1].

Relationship between the VB5.1 and VB5.2 reference point concepts

VB5.2 extends the capabilities at the VB5.1 reference point to include on-demand connectivity in the AN under the control of SN. The major common features between the VB5.1 and VB5.2 interfaces are:

- both VB5 interfaces support B-ISDN as well as narrowband and other non-B-ISDN customer access types;
- both VB5 interfaces support ATM multiplexing/cross-connecting in the AN at the VP and/or VC level.

The Real Time Management Co-ordination (RTMC) protocol is common for the VB5.1 and the VB5.2 reference points.

1 Scope

The present document specifies the Abstract Test Suite (ATS), the Abstract Test Method (ATM), ATS conventions, the partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for testing the conformity of an implementation to the BBCC specification of interfaces at the VB5.2 reference point between an Access Network (AN) and a Service Node (SN). A proforma for the testing report (PCTR) is also included.

There are in fact two separate test suites, as well as two PCTR proformas, one version for testing the conformity of an AN implementation, the other one for a SN.

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 301 217-1 (V1.2.2): "V interfaces at the digital Service Node (SN); Interfaces at the VB5.2 reference point for the support of broadband or combined narrowband and broadband Access Networks (ANs); Part 1: Interface specification".

[2] ETSI EN 301 217-2 (V1.1.3): "V interfaces at the digital Service Node (SN); Interfaces at the VB5.2 reference point for the support of broadband or combined narrowband and broadband Access Networks (ANs); Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[3] ETSI EN 301 217-3 (V1.1.1): "V interfaces at the digital Service Node (SN); Interfaces at the VB5.2 reference point for the support of broadband or combined narrowband and broadband Access Networks (ANs); Part 3: Test Suite Structure and Test Purposes (TSS&TP)".

[4] ETSI ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[5] ISO/IEC 9646-1: "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[6] ISO/IEC 9646-2: "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 2: Abstract test suite specification".

[7] ISO/IEC 9646-7: "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 7: Protocol Implementation Conformance Statement".

[8] ITU-T Recommendation G.902: "Framework Recommendation on functional access networks (AN) Architecture and functions, access types, management and service node aspects".

[9] ISO/IEC 9646: "Information technology - Open systems interconnection - Conformance testing methodology and framework".

[10] ITU-T Recommendation M.3010: "Principles for a Telecommunications management network".

[11] ITU-T Recommendation Q.2931: "Broadband Integrated Services Digital Network (B-ISDN) - Digital Subscriber Signalling System No. 2 (DSS 2) - User-Network Interface (UNI) - Layer 3 specification for basic call/connection control".

[12] ETSI EN 300 443-1 (V1.3.5): "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; B-ISDN user-network interface layer 3 specification for basic call/bearer control; Part 1: Protocol specification [ITU-T Recommendation Q.2931 (1995), modified]".

[13] ETSI EN 301 067-1 (V1.1.3): "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; Connection characteristics; Negotiation during call/connection establishment phase; Part 1: Protocol specification [ITU-T Recommendation Q.2962 (1996), modified]".

[14] ITU-T Recommendation Q.2961.3: "Digital Subscriber Signalling System No. 2 - Additional traffic parameters: Signalling capabilities to support traffic parameters for the available bit rate (ABR) ATM transfer capability".

[15] ITU-T Recommendation Q.2961.5: "Digital subscriber signalling system No. 2 - Additional traffic parameters: Additional traffic parameters for cell delay variation tolerance indication".

[16] ETSI EN 301 005-4 (V1.1.2): "V Interfaces at the Digital Service Node (SN); Interfaces at the VB5.1 Reference Point for the Support of Broadband or Combined Narrowband and Broadband Access Networks (ANs); Part 4: Abstract Test Suite (ATS) and Partial Protocol Implementation eXtra Information for Testing (PIXIT) Proforma Specification".

[17] ETSI EN 301 068: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. Two (DSS2) Protocol; Connection Characteristics; ATM Transfer Capability and Traffic Parameter Indication".

3 Definitions and abbreviations

3.1 Definitions

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

- terms defined in EN 301 217-1 [1];
- terms defined in ISO/IEC 9646-1 [5] and in ISO/IEC 9646-2 [6].

In particular, the following terms defined in ISO/IEC 9646 [9] apply:

Abstract Test Suite (ATS)
Abstract Test Method (ATM)
Implementation Conformance Statement (ICS)
Implementation Under Test (IUT)
Implementation eXtra Information for Testing (IXIT)
Lower Tester (LT)
PICS proforma
PIXIT proforma
Point of Control and Observation (PCO)
Protocol Implementation Conformance Statement (PICS)
Protocol Implementation eXtra Information for Testing (PIXIT)
Service Access Point (SAP)
Single Party Testing (SPyT)
System Under Test (SUT)
Upper Tester (UT)
TTCN.GR
TTCN.MP
Protocol Conformance Test Report (PCTR)
PCTR proforma

3.2 Abbreviations

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

AAL	ATM Adaptation Layer
AAL-SAP	AAL - Service Access Point
AN	Access Network
ATM	Asynchronous Transfer Mode
BBCC	Broadband Bearer Connection Control
B-ISDN	Broadband ISDN
B-ISUP	Broadband ISDN Signalling User Part
B-UNI	Broadband UNI
BA	Basic (rate) Access
CPE	Customer Premises Equipment
CPN	Customer Premises Network
ET	Equipment Terminal
FSM	Finite State Machine
ID	Identity
IE	Information Element
INI	Inter-Network Interface
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LE	Local Exchange
LME	Layer Management Entity
LMI	Local Management Interface
LSP	Logical Service Port
LUP	Logical User Port
MIB	Management Information Base
MSC	Message Sequence Chart
N-ISDN	Narrowband ISDN
NNI	Network-to-Network Interface
OAM	Operations Administration and Maintenance
PDH	Plesiochronous Digital Hierarchy
PDU	Protocol Data Units
PSP	Physical Service Port
PSTN	Public Switched Telephone Network
PUP	Physical User Port
Q3	"Q" management interface reference point as ITU-T Recommendation M.3010 [10]
RTMC	Real Time Management Co-ordination
SAAL	Signalling ATM Adaptation Layer
SAP	Service Access Point
SAR	Segmentation and Reassembly
SDH	Synchronous Digital Hierarchy
SDL	Specification and Description Language
SDU	Service Data Units
SN	Service Node
SNI	Service Node Interface
SP	Service Port
SPS	Signalling Protocols and Switching
SSCF	Service Specific Co-ordination Function
SSCOP	Service Specific Connection Oriented Protocol
TC	Technical Committees
TE	Terminal Equipment
TMN	Telecommunication Management Network
TP	Transmission Path
UNI	User-Network Interface
VB	Broadband "V" reference point
VC	Virtual Channel (ATM)
VCC	VC Connection
VCCT	VCC Termination
VCE	Virtual Channel Entity

VCI	VC Identifier
VCL	VC Link
VCME	VC Multiplex Entity
VP	Virtual Path
VPC	VP Connection
VPCI	VP Connection Identifier
VPCT	VPC Termination
VPE	VP Entity
VPI	VP Identifier
VPL	VP Link
VPME	VP Multiplex Entity
VUP	Virtual User Port

4 Test architecture

4.1 Abstract Test Method (ATM)

This clause describes the Abstract Test Method (ATM) and the Point of Control and Observation (PCO) used to test the VB5.2 BBCC protocol for the AN and SN components.

The remote test method is used for VB5.2 BBCC conformance testing, since the VB5.2 implementations are not mandated to offer a direct access to the upper service boundary (i.e. to the "mee" and "cee" service primitives). The co-ordination procedures can only be expressed in an informal way.

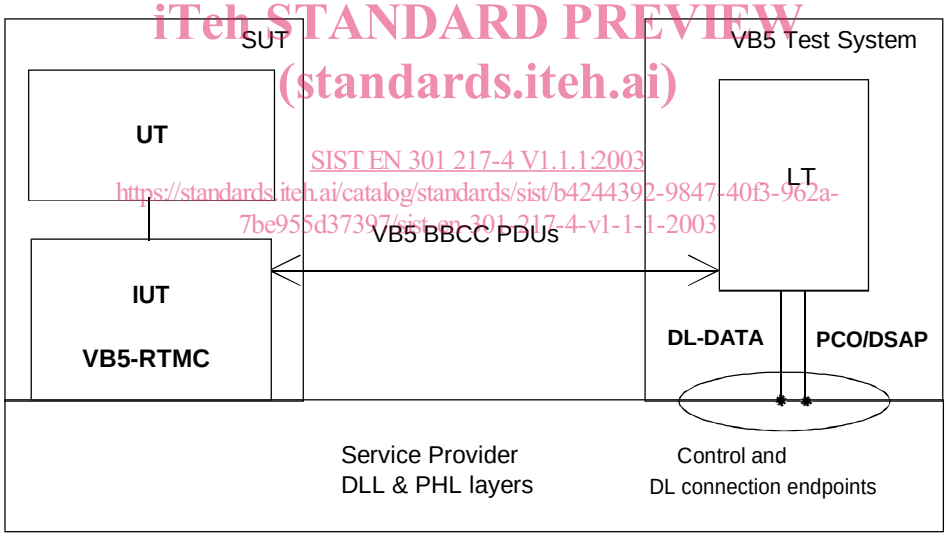


Figure 1: Remote single layer test method applied to the VB5.2 BBCC testing

LT: A Lower Tester (LT) is located in the VB5.2 test system. It controls and observes the behaviours of the IUT.

DSAP: A unique Data link Service Access Point (DSAP) is defined at the VB5.2 interface and commonly used for exchanging service data of the BBCC protocol functional entities.

PCO: The PCO for BBCC testing is located on the DSAP. All test events at the PCO are specified in terms of data link Abstract Service Primitives (ASPs) and network layer PDUs.

UT: No explicit Upper Tester (UT) exists in the test system. However, the SUT needs to carry out some UT functions to achieve some effects of test co-ordination procedures. Designing ATS, the capability of the VB5.2 application functions may be taken into account. The controls of the IUT will be implied or informally expressed in the ATS, but no assumption shall be made regarding their feasibility or realization. An example of such informal controls could be to provoke start up of the IUT in the SN. An example of implied controls is the automatic response of VB5.2 application functions in the AN.

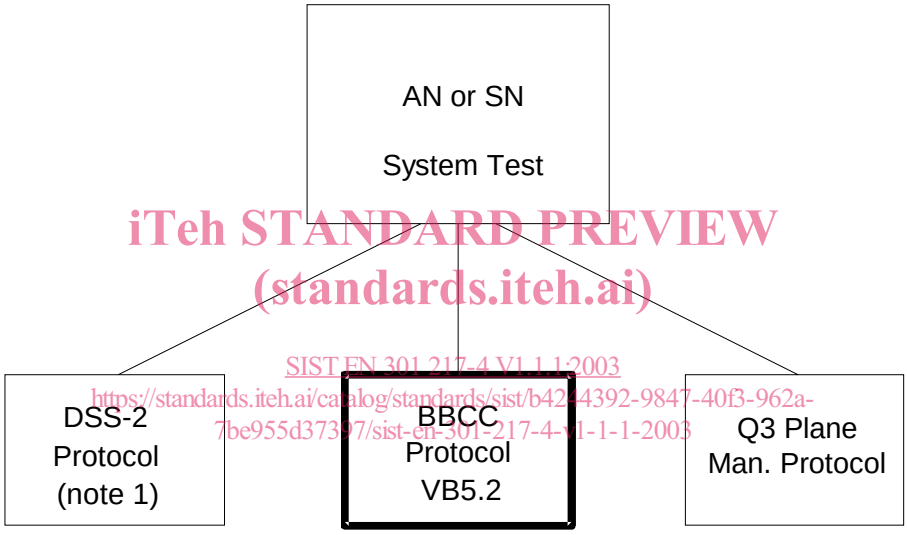
VB5-BBCC: The PDU conveying this information will be transferred to and from the tester via a single, dedicated virtual connection.

4.2 Scope of test purposes / test cases and additional testing

The specified IUT behaviour cannot be fully controlled and observed via a single PCO. Additional testing is thus required to cover such behaviour (in some cases a short description of such additional testing requirements has been appended to the related BBCC test purposes).

The actual testing of these requirements can only be performed if additional means are provided to access internal data, which cannot be interrogated via BBCC messages. One way of performing this is to use an ad-hoc tester loaded into the SUT, if available. This is not typically the case. A practical approach is to consider that any Network Element comprises several protocol interfaces, each of which is first tested at the individual protocol level (again, these tests typically have to leave out a number of protocol requirements, if a remote test method is used).

A second hierarchical level of testing (see figure 2) could cover a substantial number of such untested requirements by checking interactions between two or more protocols, which have passed individual conformance testing. This is however outside the scope of the present document.



NOTE: The DSS-2 protocol is not terminated in the AN.

Figure 2: Example of hierarchical test architecture applied beyond VB5.2 testing