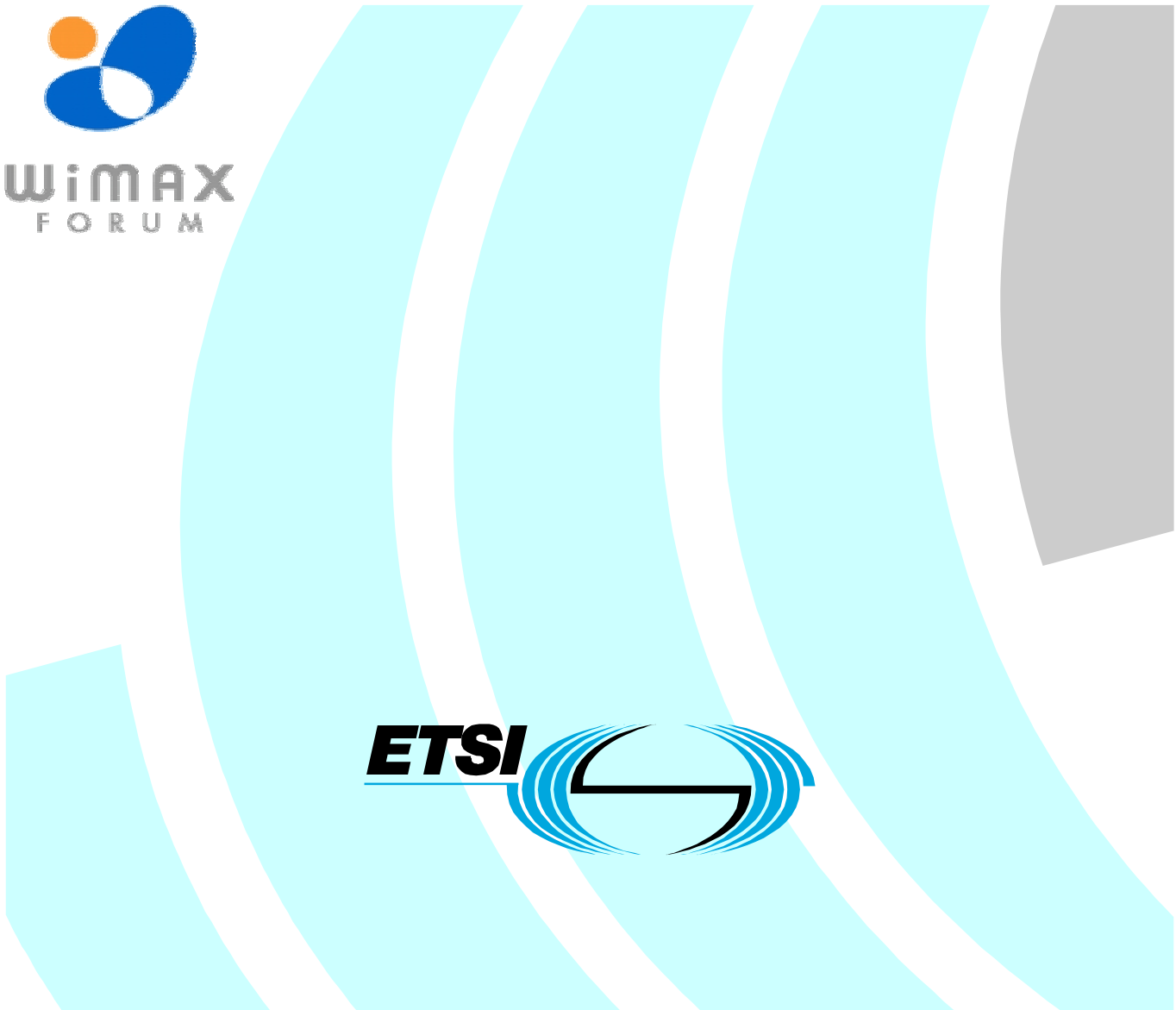
ETSI TS 102 385-3 V2.2.1 (2006-06)

Technical Specification

Broadband Radio Access Networks (BRAN);
HiperMAN/WiMAX;
Conformance testing for the Data Link Control Layer (DLC);
Part 3: Abstract Test Suite (ATS)



Reference
RTS/BRAN-004T002-3R2

Keywords
ATS, broadband, DLC, FWA, HiperMAN, Point-to-Multipoint, radio, testing

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Contents

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Broadband Radio Access Networks (BRAN).

The present document was developed on the basis of the Abstract Test Suite (ATS) specification for HiperMAN systems that was in the advanced stage of development when the work was reoriented to produce joint HiperMAN/WiMAX specifications.

The present document is part 3 of a multi-part deliverable covering Broadband Radio Access Networks (BRAN); HiperMAN/WiMAX; Conformance testing for the Data Link Control Layer (DLC), as identified below:

Part 1: "Procotol Implementation Conformance Statement (PICS) proforma";

Part 2: "Test Suite Structure and Test Purposes (TSS&TP) specification";

Part 3: "Abstract Test Suite (ATS)".

1 Scope

The present document contains the Abstract Test Suite (ATS) to test BRAN HiperMAN/WiMAX systems for conformance.

The objective of the present document is to provide a basis for conformance tests for BRAN HiperMAN/WiMAX equipment giving a high probability of air interface inter-operability between different manufacturer's BRAN HiperMAN/WiMAX equipment.

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [5] and ISO/IEC 9646-2 [6]) as well as the ETSI rules for conformance testing (ETS 300 406 [4]) are used as a basis for the test methodology.

Annex A provides the Tree and Tabular Combined Notation (TTCN) part of the ATS.

Annex B provides the Partial Protocol Implementation Extra Information for Testing (PIXIT) Proforma of the SS side ATS.

Annex C provides the Protocol Conformance Test Report (PCTR) Proforma of the SS side ATS.

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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[1] ETSI TS 102 178 (V1.2.1): "Broadband Radio Access Networks (BRAN); HiperMAN; Data Link Control (DLC) layer".

[2] IEEE 802.16-2004: "IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems".

[3] IEEE 802.16e-2005: "IEEE Standard for Local and metropolitan area networks - Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems. Amendment 2: Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands and Corrigendum 1".

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

[5] ISO/IEC 9646-1/ITU-T Recommendation X.290: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[6] ISO/IEC 9646-2/ITU-T Recommendation X.291: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".

[7] ISO/IEC 9646-6: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".

[8] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[9] ETSI ES 201 873-1: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

[10] ETSI TS 102 210: "Broadband Radio Access Networks (BRAN); HIPERMAN; System profiles".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO/IEC 9646-7 [8], TS 102 178 [1], and IEEE 802.16-2004 [2] as corrected by Corrigendum 1 of IEEE 802.16e-2005 [3] (but not taking into account the Amendment 2) apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TS 102 178 [1], ISO/IEC 9646-1 [5], ISO/IEC 9646-6 [7], ISO/IEC 9646-7 [8] and IEEE 802.16-2004 [2] as corrected by Corrigendum 1 of IEEE 802.16e-2005 [3] (but not taking into account the Amendment 2) and the following apply:

ATS	Abstract Test Suite
BS	Base Station
BW	BandWidth
CID	Connection IDentifier
CS	Convergence Sublayer
IUT	Implentation Under Test
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
PIXIT	Partial Protocol Implementation Extra Information for Testing
REQ	REQuest
RNG	RaNGing
RSP	ReSPonse
RTG	Receive/Transmit Transition Gap
SS	Subscriber Station
SUT	System Under Test
TC	Test Case
TLV	Type, Length, Value
TP	Test Purposes
TTCN	Tree and Tabular Combined Notation
TTG	Transmit/Receive Transition Gap

4 Abstract Test Method (ATM)

This clause describes the ATM used to test the HiperMAN DLC layer at the BS side and at the SS side.

4.1 IEEE 802.16-2004 and ETSI HiperMAN protocol layers

Figure 1 shows the mapping of the protocol layers of IEEE 802.16-2004 [2] and ETSI HiperMAN. In the following clauses only the ETSI terminology will be referred to.

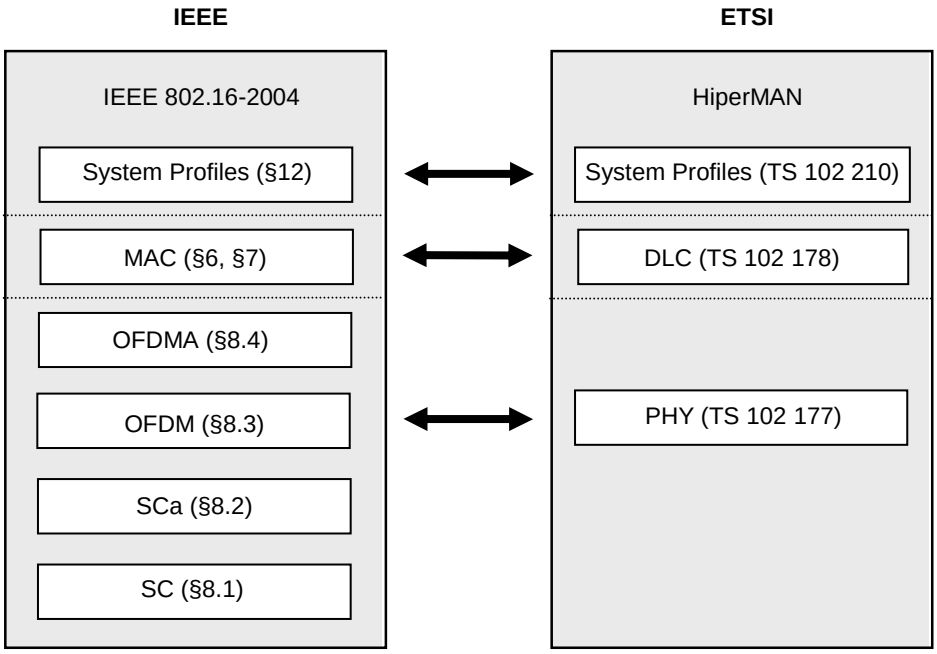

Figure 1: IEEE 802.16-2004 and ETSI HiperMAN protocol layers

4.2 SS Test architecture

Figure 2 describes the DLC SS Test Configuration for testing the DLC layer of a product implementing the HiperMAN base standard. More information for this architecture is provided below.

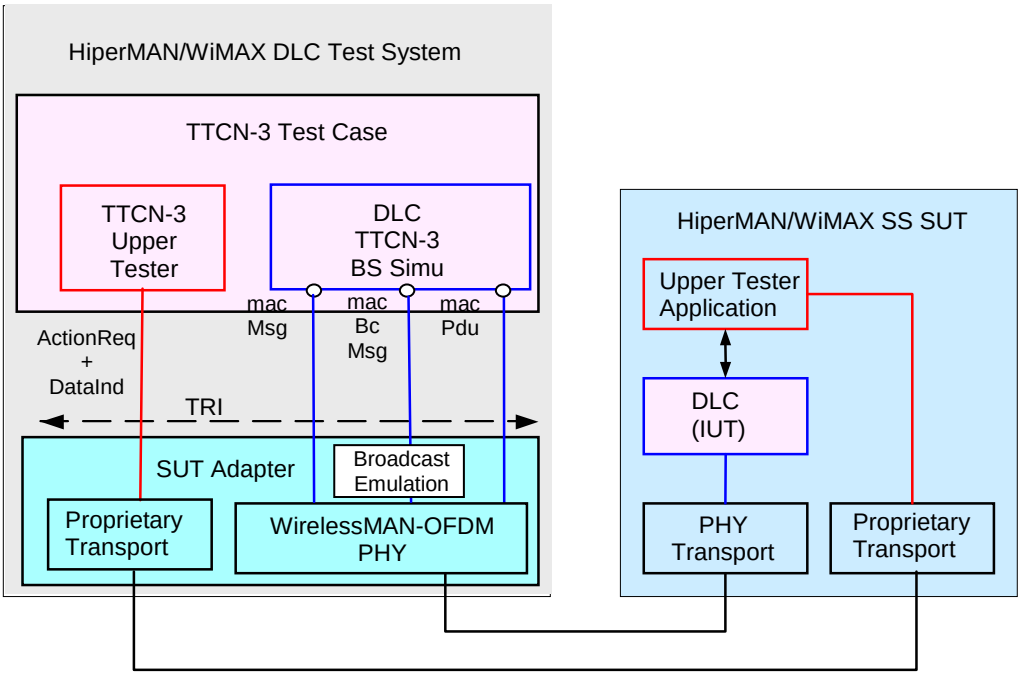

Figure 2: DLC SS Test Configuration

The DLC SS Test Configuration provides 1 test component:

- DLC TTCN-3 uses macMsg port to send and receive MAC management messages that belong to the Initial Ranging, Basic, Primary and Secondary connection. Final verdicts are set on the receive statements.

- DLC TTCN-3 uses macPdu port to send and receive MAC PDUs. Final verdicts are set on the receive statements.
- The broadcast emulation handles the sending of broadcast messages. TTCN-3 does not build the broadcast messages. TTCN-3 selects via external function xf_enableProfile the profile that the broadcast emulation shall sent.
  DLC TTCN-3 does not use macBcMsg port. The macBcMsg port is mapped for test component reusability reasons.
- DLC TTCN-3 controls via external functions the Upper Tester Application. The Upper Tester Application allows triggering IUT actions. Final verdicts are set on the return status of the external functions.
- DLC TTCN-3 controls via external functions the configuration of the Test Adapter. Final verdicts are set on the return status of the external functions.

4.3 BS Test architecture

Figure 3 describes the DLC BS Test Configuration for testing the DLC layer of a product implementing the HiperMAN base standard. More information for this architecture is provided below.

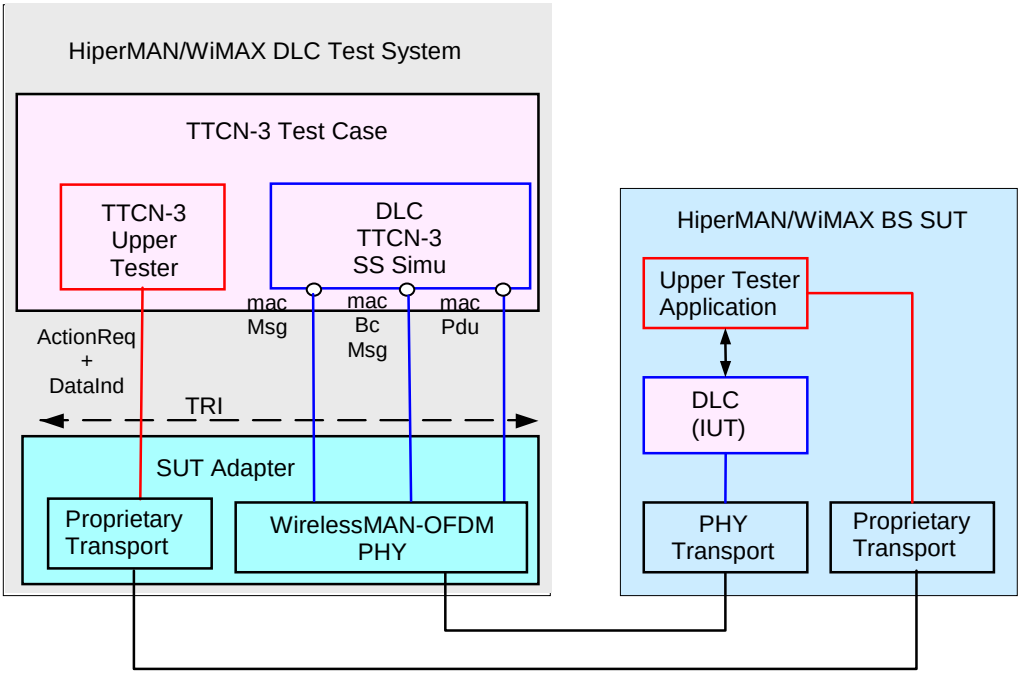

Figure 3: DLC BS Test Configuration

The DLC BS Test Configuration provides 1 test component:

- DLC TTCN-3 uses macMsg port to send and receive MAC management messages that belong to the Initial Ranging, Basic, Primary and Secondary connection. Final verdicts are set on the receive statements.
- DLC TTCN-3 uses macBcMsg port to receive MAC management messages that belong to the Broadcast connection. Final verdicts are set on the return status of the receive functions. The MAC management messages that the Test Adapter shall support are listed in table 1. The macBcMsg port is always mapped, but is used mutually exclusive with the macMsg Port.
- DLC TTCN-3 uses macPdu port to send and receive MAC PDUs. Final verdicts are set on the receive statements.
- The broadcast emulation handles the reception of the broadcast messages.

- DLC TTCN-3 controls via external functions the Upper Tester Application. Upper Tester Application allows triggering IUT actions. Final verdicts are set on the return status of the external functions.
- DLC TTCN-3 controls via external functions the configuration of the Test Adapter. Final verdicts are set on the return status of the external functions.

Table 1: Port macBcMsg

MAC management messages
DlMapMessage
UlMapMessage
DcdMessage
UcdMessage

5 Untestable Test Purposes

This clause gives a list of TP, which are not implemented in the ATS due to the chosen ATM or other restrictions.

Table 2: Untestable TP

Test Case Name	Reason
void	

6 ATS conventions

The ATS conventions are intended to give a better understanding of the ATS but they also describe the conventions made for the development of the ATS. These conventions shall be considered during any later maintenance or further development of the ATS.

The ATS conventions contain two clauses, the naming conventions and the implementation conventions. The naming conventions describe the structure of the naming of all ATS elements. The implementation conventions describe the functional structure of the ATS.

To define the ATS, the guidelines of the document ETS 300 406 [4] was considered.

6.1 Testing conventions

6.1.1 Testing States

BS Null: The BS is switched on and sends broadcast messages.

SS Null: The SS is switched on and is ready to receive broadcast messages.

6.1.2 HiperMAN default values: Reception and transmission at ATS level

IEEE 802.16-2004 [2] as corrected by Corrigendum 1 of IEEE 802.16e-2005 [3] (but not taking into account the Amendment 2) lists many default TLV values. The spec says that devices SHOULD NOT transmit TLVs if the default value applies. However, this is NOT a requirement. Thus, one tested device may not transmit the default TLVs (or a subset of these default TLVs) while another may transmit all TLVs including the defaults. Including all the possible combinations of sent and received default TLVs in an ATS is problematic.

- Therefore, for ATS purposes, all TLVs are assumed to be sent and received at the ATS level.
- The Test Adapter will fill in the missing received TLVs with a TLV containing the default value and pass it up to the ATS.
- The Test Adapter may or may not transmit default TLVs received from the ATS to the IUT. This is a test equipment vendor decision.

6.1.3 Templates

- Separate templates are defined for use in sending and receiving operations.
- Template definitions should avoid using matching attributes such as "*" or "?" for complete structured values, e.g. record or set of values.
- PIXIT parameter values are passed as parameters into templates.

6.1.4 Functions

The WMx ATS differentiates between external functions for which only the signature is specified and functions completely defined in the ATS. The completely defined functions are separated according to their use for SS or BS testing and preamble and postamble functions.

The SS and BS testing functions are grouped in a general configurations functions group and separate groups with functions used for testing different types of functionality.

Each type of function is implemented in a separate module, although there may be multiple modules for each function type. The following general rules apply:

- Functions use the "*runs on"* statement wherever this is possible.
- Each function provides a return value wherever this is possible. The return value used is the enumeration type "FncRetCode" defined in the WMx_Types.ttcn file.

EXAMPLE: WMx_Types.FncRetCode.

- The *stop* statement is used only for controlled test component shutdown.

6.2 Naming conventions

6.2.1 General guidelines

The naming convention is based on the following underlying principles:

- in most cases, identifiers should be prefixed with a short alphabetic string (specified in table 3) indicating the type of TTCN-3 element it represents;
- suffixes should not be used except in those specific cases identified in table 7;
- prefixes and suffixes should be separated from the body of the identifier with an underscore ("_");

EXAMPLE 1: `c_sixteen, t_wait_max`.

- only module names, data type names and module parameters should begin with an upper-case letter. All other names (i.e. the part of the identifier following the prefix) should begin with a lower-case letter;
- the start of second and subsequent words in an identifier should be indicated by capitalizing the first character. Underscores should not be used for this purpose.

EXAMPLE 2: `f_authenticateUser`.

Table 3 specifies the naming guidelines for each element of the TTCN-3 language indicating the recommended prefix, suffixes (if any) and capitalization.

Table 3: IPv6 TTCN-3 naming convention

Language element	Naming convention	Prefix	Suffix	Example	Notes
Module	Use upper-case initial letter	*none*	*none*	WMx_Templates	
TSS grouping	Use all upper-case letters	*none*	*none*	TP_RT_PS_TR	
Item group within a module	Use lower-case initial letter	*none*	*none*	messageGroup	
Data type	Use upper-case initial letter	*none*	*none*	SetupContents	
List type identifiers	Use upper-case initial letter	none	*none*	DlMapIeList	
Message template	Use lower-case initial letter	m_	none	m_setupInit	
Message template with wildcard or matching expression	Use lower-case initial letters	mw_	none	mw_setupBasic	
Port instance	Use lower-case initial letter	*none*	*none*	signallingPort	
Test component ref	Use lower-case initial letter	*none*	*none*	userTerminal	
Signature	Use lower-case initial letter	s_	*none*	s_callSignature	
External function	Use lower-case initial letter	xf_	*none*	xf_calculateLength()	
Constant	Use lower-case initial letter	c_	*none*	c_maxRetransmission	
Function	Use lower-case initial letter	f_	*none*	f_authentication()	
Altstep	Use lower-case initial letter	a_	*none*	a_receiveSetup()	
Altstep (Default)	Use lower-case initial letter	d_	*none*	d_receiveOtherMessages()	
Variable	Use lower-case initial letter	v_	*none*	v_basicCid	
Variable, global to component	Use lower-case initial letter	g_	*none*	g_ssSimu.basicCid	
Timer	Use lower-case initial letter	t_	_min _max	t_wait t_auth_min	Note 1
Module parameters PICS values PIXIT values	Use all upper case letters	*none*	*none*	PIC_T7PXT_TNOAC	Note 2
External constant	Use lower-case initial letter	xc_	*none*	xc_macId	
Parameterization	Use lower-case initial letter	p_	*none*	p_macId	
Enumerated Value	Use lower-case initial letter	e_	*none*	e_synCpk	
NOTE 1: If a time window is needed, the suffixes "_min" and "_max" should be appended. NOTE 2: In this case it is acceptable to use underscore as a word delimiter.					

6.2.2 Test Case (TC) identifier

Table 4: TC naming convention

TC_<st>_<pg>_<fg>_<sg>_<ini>_<x>_H<nnn>		
<st> = side type	BS	Base Station
	SS	Subscriber Station
<pg> = protocol group	CDM	Channel Descriptors and Maps
	RLC	Radio Link Control
	INI	Registration, IP Connectivity, and Parameter Transfer
	PKM	Privacy and Key Management
	DS	Dynamic Services
	BWA	Bandwidth Allocation and Polling
	RER	Reset and Re-registration
	CCC	Clock Comparison
	MAC	MAC PDU Construction
	PCS	Packet CS
<fg> = function group	MAP	Map and Frame Structure
	CD	Channel Descriptors
	CDC	Channel Descriptor Change
	IRNG	Initial Ranging
	PRNG	Periodic Ranging
	DBPC	Downlink Burst Profile Management
	SBC	Negotiate Basic Capabilities

TC_<st>_<pg>_<fg>_<sg>_<ini>_<x>_H<nnn>		
	REG	Registration
	IPC	IP Connectivity
	AUTH	Authentication/Authorization
	TEK	Encryption Key Transfer
	SAM	Security Association Management
	EKS	Encryption and Key Scheduling
	DSA	Dynamic Service Addition
	DSC	Dynamic Service Change
	DSD	Dynamic Service Deletion
	REQ	Request/Grant
	MCP	Multicast Polling
	PACK	Packing
	FRAG	Fragmentation
	CAT	PDU Concatenation
	CRC	Cyclic Redundancy Check (CRC)
	ARQ	ARQ
	PCU	Packet CS Usage
	CLS	Classification
	CDS	Classifier DSx Signalling
	PHS	Payload Header Suppression
<sg> = subfunction group	INIT	Initialization
	OPN	Operation
	RLV	Relevance
	KU	Key Usage
	ENC	Encryption
	DEC	Decryption
<ini> = initiator of procedure or direction of flow	BsIni	Procedure is initiated by BS
	SsIni	Procedure is initiated by SS
	DL	Downlink
	UL	Uplink
<x> = type of testing	BV	Valid Behavior Tests
	BI	Invalid Syntax or Behavior Tests
	BO	Inopportune Behavior Tests
	TI	Timer and Counter Tests
<nnn> = sequential number	Hnnn	(H000, H001, …)

EXAMPLE: TP identifier: TP/SS/RLC/IRNG/BV-H002
TC identifier: TC_SS_RLC_IRNG_BV_H002.

Annex A (normative): Abstract Test Suite (ATS)

This ATS has been produced using the Testing and Test Control Notation (TTCN-3) according to ES 201 873-1 [9].

A.1 The TTCN-3 Module

The TTCN-3 module corresponding to the ATS is contained in a compressed file named WMx_ATS_20060405.zip contained in archive ts_10238503v020201p0.zip which accompanies the present document.

Annex B (normative): Partial PIXIT proforma for HiperMAN DLC

The PIXIT Proforma is based on ISO/IEC 9646-6 [7]. Any needed additional information can be found in this international standard document.

B.1 Identification summary

Table B.1

PIXIT Number:	
Test Laboratory Name:	
Date of Issue:	
Issued to:	

B.2 ATS summary

Table B.2

Protocol Specification:	TS 102 178, TS 102 210 Or IEEE 802.16-2004 as corrected by Corrigendum 1 of IEEE 802.16e-2005 (but not taking into account the Amendment 2)
Protocol to be tested:	
ATS Specification:	TS 102 385-3 (V2.2.1)
Abstract Test Method:	TS 102 385-3(V2.2.1) clause 4

B.3 Test laboratory

Table B.3

Test Laboratory Identification:	
Test Laboratory Manager:	
Means of Testing:	
SAP Address:	

B.4 Client identification

Table B.4

Client Identification:	
Client Test manager:	
Test Facilities required:	

B.5 SUT

Table B.5

Name:	
Version:	
SCS Number:	
Machine configuration:	
Operating System Identification:	
IUT Identification:	
PICS Reference for IUT:	
Limitations of the SUT:	
Environmental Conditions:	

B.6 Protocol layer information

B.6.1 Protocol identification

Table B.6

Name:	BRAN HM - DLC layer TS 102 178 BRAN HM - System Profiles TS 102 210 Or IEEE 802.16-2004 as corrected by Corrigendum 1 of IEEE 802.16e-2005 (but not taking into account the Amendment 2)
Version:	
PICS References:	

B.6.2 IUT information

For type and value definition consult the TTCN-3 module WMx_Pixits.ttcn.

B.6.2.1 Timers

Table B.7: Timers

Name	Comment	Value
PXT_TDONE	Guard timer when MTC waits for all component done	
PXT_TSYNC	Guard timer when MTC syncs the PTC	
PXT_TRIGGER	Guard timer when MTC triggers the PTC	
PXT_TAC	Guard timer to control a reaction	
PXT_TNOAC	Guard timer to control a non-reaction	
PXT_TWAIT	Wait for an implicit send	
PXT_TDCD_INTERVAL	The time between transmission of DCD messages	
PXT_TUCD_INTERVAL	The time between transmission of UCD messages	
PXT_LOST_ULMAP_INTERVAL	The time between transmission of UL-MAP messages	
PXT_LOST_DLMAP_INTERVAL	The time between transmission of DL-MAP messages	
PXT_TLOOP	t_loop is used to control reception of messages via external functions. The external function is called every t_loop time, until external function returns success or t_wait guard timer expires.	

B.6.2.2 Common Configuration

Table B.8: Common configuration

Name	Comment	Value
PXT_WAVE	Which wave is tested?	
PXT_DEREGISTER	Shall the postamble be used to: in case of SS = IUT: deregister IUT in case of BS = IUT: deregister Tester	

B.6.2.3 DL-MAP message

Table B.9: DL-Map message

Name	Comment	Value
PXT_MAX_NR_OF_DLMAP_RCV	Number of times that DL-MAP shall be received in order to assure periodic reception	

B.6.2.4 DCD message

Table B.10: DCD message

Name	Comment	Value
PXT_MAX_NR_OF_DCD_RCV	Number of times that DCD shall be received in order to assure periodic reception	
PXT_BS_ID	TE sends this BaseStationId in DL-MAP and DCD to SS(IUT)	

B.6.2.5 UCD message

Table B.11: UCD message

Name	Comment	Value
PXT_SS_SIMU_MAX_NR_OF_UCD_RCV	Number of times that UCD shall be received in order to assure periodic reception	

B.6.2.6 Common RNG Pixits

Table B.12: Common RNG Pixits

Name	Comment	Value
PXT_POWER_LEVEL_ADJUST	Initial power level adjust	
PXT_TIMING_ADJUST	Initial timing adjust	
PXT_PRNG_POWER_LEVEL_ADJUST	Power level adjust for PRNG	
PXT_PRNG_TIMING_ADJUST	Timing adjust for PRNG	

B.6.2.7 RNG-REQ message

Table B.13: RNG-REQ message

Name	Comment	Value
PXT_MAC_ADDRESS	TE sends this MAC Address in RNG-REQ to BS (IUT).	
PXT_MAC_VERSION	TE sends this MAC version in RNG-REQ to BS (IUT).	
PXT_ROBUST_DIUC	TE sends this DIUC in RNG-REQ to BS (IUT). This Diuc shall indicate a robust profile.	
PXT_RNG_ANO	TE sends this Ranging Anomaly in RNG-REQ to BS (IUT).	
PXT_MAX_POWER_ADJUST	TE checks if requested power adjust in RNG-RSP is greater than the one that SS sent in RNG-REQ to BS (IUT).	
PXT_MIN_POWER_ADJUST	TE checks if requested power adjust in RNG-RSP is smaller than the one SS sent in RNG-REQ to BS (IUT).	
PXT_MAX_TIMING_ADJUST	TE checks if requested timing adjust in RNG-RSP is greater than the one SS sent in RNG-REQ to BS (IUT).	

B.6.2.8 RNG-RSP message

Table B.14: RNG-RSP message

Name	Comment	Value
PXT_BASIC_CID	TE sends this Basic Cid in RNG-RSP to SS(IUT).	
PXT_PRIM_CID	TE sends this Primary Cid in RNG-RSP to SS(IUT).	
PXT_SEC_CID	TE sends this Secondary Cid in RNG-RSP to SS(IUT).	
PXT_PHY_PARAMS_ADJUST_TIMING_TOLERANCE	Tolerance limit used for indicating timing adjustment in RNG-RSP to IUT.	
PXT_PHY_PARAMS_ADJUST_SIGN	Adjustment sign, indicates whether to use complement or actual adjustment value in frame specific header in RNG-RSP to request the SS to do adjustments. 0 indicates actual value. 1 indicates complement.	
PXT_PHY_PARAMS_ADJUST_POWER_TOLERANCE	Tolerance limit used for indicating power adjustment in RNG-RSP sent to IUT.	
PXT_PHY_PARAMS_ADJUST_FREQ_TOLERANCE	tolerance limit used for indicating frequency adjustment in RNG-RSP to IUT.	
PXT_DELTA_POWER_LEVEL_ADJUST	TE requests increase in power by this amount in RNG-RSP sent to SS(IUT).	
PXT_DELTA_TIMING_ADJUST	TE requests timing adjust by this amount in RNG-RSP sent to SS(IUT).	

B.6.2.9 Common SBC Pixits

Table B.15: Common SBC Pixits

Name	Comment	Value
PXT_AUTHORIZATION_POLICY_SUPPORT	Indicates support of IEEE 802.16 security policy.	
PXT_BANDWIDTH_ALLOCATION_SUPPORT	Bandwidth Allocation Support.	
PXT_TTG	Transmit/receive transition gap TTG (in PSs).	
PXT_RTG	Receive/transmit transition gap RTG (in PSs).	
PXT_MAC_PDU_CONSTRUCTION_CAP	Capabilities for Construction and Transmission of MAC PDUs.	
PXT_MAX_TX_POWER	Max power support.	
PXT_PKM_FLOW_CONTROL	The max number of outstanding PKM transactions supported.	
PXT_MAX_NR_SEC_ASSOCIATIONS	The max number of simultaneous security associations.	
PXT_OFDM_FFT_SIZES	The FFT sizes supported.	
PXT_OFDM_DEMODULATOR	The demodulator options supported.	
PXT_OFDM_MODULATOR	The modulator options supported.	
PXT_FOCUSED_CONTENTION	The Focused Contention supported.	
PXT_TC_SPT	TC layer support.	

B.6.2.10 SBC-RSP message

Table B.16: SBC-RSP message

Name	Comment	Value
PXT_SET_OPTIONS_IN_SBC_RSP_WITH_ PIXITS	The TE sends in the SBC-RSP, in the case of [false] the received values from the SBC-REQ in the case of [true] new values.	

B.6.2.11 AUTH and KEY messages

Name	Comment	Value
PXT_NEW_SAID	New Security Association Id.	
PXT_UNAUTHORIZED_SAID	Unauthorized Security Association Id.	
PXT_UNKNOWN_AK_SEQ_NR	Unknown Authorization Key.	
PXT_INVALID_TEK	Invalid Tek.	
PXT_CA_CERTIFICATE	X.509 certification authority (CA) certificate.	
PXT_SS_CERTIFICATE	TE sends this certificate in AUTH-REQ to BS(IUT).	
PXT_CERTIFICATE_BASIC_UNICAST_SERVICE_NOT_AUTHORIZED	TE sends this certificate in AUTH-REQ to BS(IUT). The certificate indicates that SS is not authorized for basic unicast service.	
PXT_CERTIFICATE_INCORRECT_ASN1_DER_ENCODING	TE sends this certificate in AUTH-REQ to BS(IUT). The certificate contains an incorrect ASN1 DER encoding.	
PXT_CERTIFICATE_INVALID_SIGNATURE	TE sends this certificate in AUTH-REQ to BS(IUT). The certificate contains an invalid signature.	
PXT_CERTIFICATE_ON_HOT_LIST	TE sends this certificate in AUTH-REQ to BS(IUT). The SS certificate is on the hot list.	
PXT_CERTIFICATE_FROM_UNKNOWN_MANUFACTURER	TE sends this certificate in AUTH-REQ to BS(IUT). The SS certificate is on from an unknown manufacturer.	
PXT_CERTIFICATE_WITH_DATA_INCONSISTENCIES	TE sends this certificate in AUTH-REQ to BS(IUT). The SS certificate contains inconsistencies between certificate data and data in accompagnying PKM attributes.	
PXT_SS_PUBLIC_KEY	Public Key of SS.	
PXT_CRYPTO_SUITES	Enc algos that BsSimu supports.	
PXT_CRYPTO_SUITES_NOT_SUPPORTED_BY_IUT	Enc algos that BS dpoes not support.	
PXT_PKM_VERSION	PKM Version that SS Simu supports.	

B.6.2.12 Common REG Pixits

Table B.17: Common REG Pixits

Name	Comment	Value
PXT_UL_TRANSPORT_CID_SUPPORT	This field shows the number of Uplink CIDs the SS can support. The minimum value is three for managed SSs and two for unmanaged SSs. An SS shall support a Basic CID, a Management CID, and 0 or more Transport CIDs. A managed SS shall also support a Secondary Management CID.	
PXT_DL_TRANSPORT_CID_SUPPORT	This field shows the number of Downlink transport CIDs the SS can support.	
PXT_SS_MNGT_SPT	This field indicates whether or not the SS is managed by standard-based IP messages over the secondary management connection.	
PXT_IP_MNGT_MODE	The IP management mode parameter dictates whether the provider intends to manage the SS on an ongoing basis via IP-based mechanisms.	
PXT_IP_VERSION	This field indicates the version of IP used on the Secondary Management Connection.	
PXT_CS_SPT	This parameter indicates which classification/PHS options and SDU encapsulation the SS supports. By default, Packet, IPv4 and 802.3/Ethernet shall be supported.	
PXT_MAX_CLASSIFIER_NMBR	This is the maximum number of admitted Classifiers that the SS supports.	

Name	Comment	Value
PXT_PHS_SPT	This parameter indicates the level of PHS support.	
PXT_ARQ_SPT	This field indicates the availability of SS support for ARQ.	
PXT_DSX_FLOW_CONTROL	This field specifies the maximum number of concurrent DSA, DSC, or DSD transactions that may be outstanding.	
PXT_MCA_FLOW_CONTROL	This field specifies the maximum number of concurrent MCA transactions that may be outstanding.	
PXT_PG_CID_SUPPORT	This field indicates the maximum number of simultaneous Multicast Polling Groups the SS is capable of belonging to.	
PXT_VENDOR_ID	Vendor Id.	
PXT_VENDOR_INFO	Vendor Info.	

B.6.2.13 REG-RSP message

Table B.18: REG-RSP message

Name	Comment	Value
PXT_SET_OPTIONS_IN_REG_RSP_WITH_PIXITS	TE sends in the REG-RSP, in the case of [false] the received values from the REG-REQ, in the case of [true] new values.	

B.6.2.14 Common DSA Pixits

Table B.19: Common DSA Pixits

Name	Comment	Value
PXT_SET_OPTIONS_IN_DSA_RSP_WITH_PIXITS	The TE sends in the DSA-RSP, in the case of [false] the received values from the DSA-REQ [true] new values.	
PXT_SFID	Service Flow Identifier.	
PXT_SFID_2	Service Flow Identifier for 2nd connection.	
PXT_TRAFFIC_RATE	Peak Traffic Rate in bits per second.	
PXT_PKT_CLASS_RULE_INDEX	Identifies a Packet Classifier Rule.	
PXT_PKT_CLASS_RULE_PRIORITY	Identifies a Packet Priority Rule.	
PXT_SCHEDULING_TYPE	Scheduling Type.	
PXT_CS_LAYER	Convergence Layer.	
PXT_TRANSPORT_CID	Transport Cid. Data will be sent on this Cid.	
PXT_TRANSPORT_CID_2	2nd Transport Cid. Data will be sent on this Cid.	

B.6.2.15 DSA RSP message

Table B.20: DSA RSP message

Name	Comment	Value
PXT_SET_OPTIONS_IN_DSA_RSP_WITH_PIXITS	The TE sends in the DSA-RSP, in the case of [false] the received values from the DSA-REQ [true] new values.	
PXT_SFID	Service Flow Identifier.	
PXT_SFID_2	Service Flow Identifier for 2nd connection.	
PXT_TRAFFIC_RATE	Peak Traffic Rate in bits per second.	
PXT_PKT_CLASS_RULE_INDEX	Identifies a Packet Classifier Rule.	
PXT_PKT_CLASS_RULE_PRIORITY	Identifies a Packet Priority Rule.	
PXT_SCHEDULING_TYPE	Scheduling Type.	
PXT_CS_LAYER	Convergence Layer.	
PXT_TRANSPORT_CID	Transport Cid. Data will be sent on this Cid.	
PXT_TRANSPORT_CID_2	2nd Transport Cid. Data will be sent on this Cid.	

B.6.2.16 BWA

Table B.21: BWA

Name	Comment	Value
PXT_BW_REQ	Bandwidth request in units of Bytes/second.	
PXT_DATA_PACKET_SDU	Data to be sent on the Transport Cid.	
PXT_MAX_NR_OF_GRANT_RECEPTION_TRIES	How many times is f_getFsh executed in order to receive the UIUC information.	

Annex C (normative): PCTR Proforma for HiperMAN DLC

The PCTR proforma is based on ISO/IEC 9646-6 [7]. Any needed additional information can be found in this International standard document.

C.1 Identification summary

C.1.1 Protocol conformance test report

Table C.1

PCTR Number:	
PCTR Date:	
Corresponding SCTR Number:	
Corresponding SCTR Date:	
Test Laboratory Identification:	
Test Laboratory Manager:	
Signature:	

C.1.2 IUT identification

Table C.2

Name:	
Version:	
Protocol specification:	
PICS:	
Previous PCTR if any:	

C.1.3 Testing environment

Table C.3

PIXIT Number:	
ATS Specification:	TS 102 385-3 (V2.2.1)
Abstract Test Method:	TS 102 385-3 (V2.2.1) clause 4
Means of Testing identification:	
Date of testing:	
Conformance Log reference(s):	
Retention Date for Log reference(s):	

C.1.4 Limits and reservation

Additional information relevant to the technical contents or further use of the test report, or 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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C.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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C.2 IUT Conformance status

This IUT has or 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 C.3 in this report) and there are no "FAIL" verdicts to be recorded (in clause C.6 in this report) strike the words "has or", otherwise strike the words "or has not".

C.3 Static conformance summary

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

Strike the appropriate words in this sentence.

C.4 Dynamic conformance summary

The test campaign did or 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 C.6 of this report) strike the words "did or" otherwise strike the words "or did not".

Summary of the results of groups of test:

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C.5 Static conformance review report

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

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C.6 Test campaign report

Table C.4: SS test cases

ATS Reference	Selected?	Run?	Verdict	Observations (Reference to any observations made in clause C.7)
TC_SS_CDM_MAP_INIT_BV_H000	Yes/No	Yes/No		
TC_SS_CDM_MAP_INIT_BV_H002	Yes/No	Yes/No		
TC_SS_CDM_MAP_RLV_BV_H000	Yes/No	Yes/No		
TC_SS_CDM_MAP_RLV_BV_H001	Yes/No	Yes/No		
TC_SS_CDM_MAP_OPN_BV_H000	Yes/No	Yes/No		
TC_SS_CDM_CD_BV_H000	Yes/No	Yes/No		
TC_SS_CDM_CD_BV_H001	Yes/No	Yes/No		
TC_SS_RLC_IRNG_BV_H000	Yes/No	Yes/No		
TC_SS_RLC_IRNG_BV_H001	Yes/No	Yes/No		
TC_SS_RLC_IRNG_BV_H015	Yes/No	Yes/No		
TC_SS_RLC_IRNG_BV_H100	Yes/No	Yes/No		
TC_SS_RLC_IRNG_BV_H101	Yes/No	Yes/No		
TC_SS_RLC_IRNG_BV_H102	Yes/No	Yes/No		
TC_SS_RLC_IRNG_BV_H002	Yes/No	Yes/No		
TC_SS_RLC_SBC_BV_H000	Yes/No	Yes/No		
TC_SS_RLC_SBC_BV_H001	Yes/No	Yes/No		
TC_SS_INI_REG_BV_H000	Yes/No	Yes/No		
TC_SS_DS_DSA_BV_H000	Yes/No	Yes/No		
TC_SS_DS_DSA_BV_H002	Yes/No	Yes/No		
TC_SS_DS_DSA_BV_H001	Yes/No	Yes/No		
TC_SS_DS_DSA_BV_H003	Yes/No	Yes/No		
TC_SS_DS_DSD_BV_H000	Yes/No	Yes/No		
TC_SS_DS_DSD_BV_H001	Yes/No	Yes/No		
TC_SS_BWA_REQ_BV_H000	Yes/No	Yes/No		
TC_SS_BWA_REQ_BV_H001	Yes/No	Yes/No		
TC_SS_BWA_REQ_BV_H002	Yes/No	Yes/No		
TC_SS_BWA_REQ_BV_H003	Yes/No	Yes/No		
TC_SS_BWA_REQ_BV_H004	Yes/No	Yes/No		

ATS Reference	Selected?	Run?	Verdict	Observations (Reference to any observations made in clause C.7)
TC_SS_BWA_REQ_BV_H203				
TC_SS_BWA_REQ_BV_H204				
TC_SS_BWA_REQ_BV_H400				
TC_SS_BWA_REQ_BV_H401				
TC_SS_BWA_REQ_BV_H402				
TC_SS_PKM_AUTH_INIT_BV_H000				
TC_SS_PKM_AUTH_INIT_BV_H001				
TC_SS_PKM_TEK_INIT_BV_H000				
TC_SS_PKM_TEK_INIT_BV_H001				
TC_SS_PKM_TEK_INIT_BV_H002				
TC_SS_PKM_TEK_INIT_BV_H003				
TC_SS_PKM_TEK_INIT_BV_H004				
TC_SS_PKM_AUTH_OPN_BV_H000				
TC_SS_PKM_AUTH_OPN_BV_H001				
TC_SS_PKM_AUTH_OPN_BV_H002				
TC_SS_PKM_TEK_OPN_BV_H000				
TC_SS_PKM_TEK_OPN_BV_H001				
TC_SS_PKM_TEK_OPN_BV_H002				
TC_SS_PKM_TEK_OPN_BV_H003				
TC_SS_PKM_TEK_OPN_BV_H004				
TC_SS_PKM_TEK_OPN_BV_H005				
TC_SS_PKM_EKS_BV_H000				
TC_SS_PKM_EKS_BV_H001				
TC_SS_PKM_EKS_KU_BV_H000				
TC_SS_PKM_EKS_KU_BV_H001				
TC_SS_PKM_EKS_ENC_BV_H000				
TC_SS_PKM_EKS_ENC_BV_H001				
TC_SS_PKM_EKS_ENC_BV_H004				
TC_SS_PKM_SAM_BV_H000				
TC_SS_MAC_CRC_BV_H000				
TC_SS_MAC_CRC_BV_H002				
TC_SS_PCS_PCU_BV_H000				

Table C.5: BS test cases

ATS Reference	Selected?	Run?	Verdict	Observations (Reference to any observations made in clause C.7)
TC_BS_CDM_MAP_BV_H000	Yes/No	Yes/No		
TC_BS_CDM_MAP_BV_H001	Yes/No	Yes/No		
TC_BS_CDM_MAP_BV_H002	Yes/No	Yes/No		
TC_BS_CDM_CD_BV_H000	Yes/No	Yes/No		
TC_BS_CDM_CD_BV_H001	Yes/No	Yes/No		
TC_BS_CDM_CD_BV_H002	Yes/No	Yes/No		
TC_BS_RLC_IRNG_BV_H000	Yes/No	Yes/No		
TC_BS_RLC_IRNG_BV_H001	Yes/No	Yes/No		
TC_BS_RLC_IRNG_BV_H002	Yes/No	Yes/No		
TC_BS_RLC_IRNG_BV_H009	Yes/No	Yes/No		
TC_BS_RLC_IRNG_BV_H010	Yes/No	Yes/No		
TC_BS_RLC_IRNG_BV_H011	Yes/No	Yes/No		
TC_BS_RLC_IRNG_TI_H000	Yes/No	Yes/No		
TC_BS_RLC_IRNG_TI_H001	Yes/No	Yes/No		
TC_BS_RLC_PRNG_BV_H002	Yes/No	Yes/No		
TC_BS_RLC_SBC_BV_H000	Yes/No	Yes/No		
TC_BS_DS_DSA_BV_H000	Yes/No	Yes/No		
TC_BS_DS_DSA_BV_H003	Yes/No	Yes/No		
TC_BS_DS_DSA_BV_H001	Yes/No	Yes/No		
TC_BS_DS_DSA_BV_H004	Yes/No	Yes/No		
TC_BS_DS_DSD_BV_H000	Yes/No	Yes/No		
TC_BS_DS_DSD_BV_H001	Yes/No	Yes/No		
TC_BS_BWA_REQ_BV_H000	Yes/No	Yes/No		
TC_BS_BWA_REQ_BV_H001	Yes/No	Yes/No		
TC_BS_BWA_REQ_BV_H002	Yes/No	Yes/No		
TC_BS_BWA_REQ_BV_H003	Yes/No	Yes/No		
TC_BS_BWA_REQ_BV_H004	Yes/No	Yes/No		
TC_BS_PKM_AUTH_INIT_BV_H001				
TC_BS_PKM_AUTH_INIT_BV_H007				
TC_BS_PKM_AUTH_INIT_BV_H008				
TC_BS_PKM_AUTH_INIT_BV_H009				
TC_BS_PKM_AUTH_INIT_BV_H011				
TC_BS_PKM_TEK_INIT_BV_H000				
TC_BS_PKM_TEK_INIT_BV_H004				
TC_BS_PKM_TEK_INIT_BV_H005				
TC_BS_PKM_AUTH_OPN_BV_H000				
TC_BS_PKM_AUTH_OPN_BV_H001				
TC_BS_PKM_TEK_OPN_BV_H000				
TC_BS_PKM_TEK_OPN_BV_H001				
TC_BS_PKM_TEK_OPN_BV_H003				
TC_BS_PKM_EKS_BV_H000				
TC_BS_PKM_EKS_BV_H001				
TC_BS_PKM_EKS_BV_H002				
TC_BS_PKM_EKS_KU_BV_H000				
TC_BS_PKM_EKS_KU_BV_H005				
TC_BS_PKM_EKS_KU_BV_H006				
TC_BS_PKM_EKS_ENC_BV_H000				
TC_BS_PKM_EKS_ENC_BV_H001				
TC_BS_PKM_EKS_ENC_BV_H005				
TC_BS_BWA_REQ_BV_H007				
TC_BS_BWA_REQ_BV_H008				
TC_BS_BWA_REQ_BV_H009				
TC_BS_BWA_REQ_BV_H010				
TC_BS_PKM_SAM_BV_H000				
TC_BS_PKM_SAM_BV_H002				
TC_BS_PCS_PCU_BV_H002				

C.7 Observations

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

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Annex D (informative): Bibliography

IETF RFC 2131: "Dynamic Host Configuration Protocol".

IETF RFC 868: "Time Protocol".

IETF RFC 1123: "Requirements for Internet Hosts - Application and Support".

IETF RFC 2349: "TFTP Timeout Interval and Transfer Size Options".

ISO/IEC 9646-3 / ITU-T Recommendation X.292: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

History

Document history		
V2.1.1	December 2005	Publication
V2.1.2	March 2006	Publication
V2.2.1	June 2006	Publication