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Technical Specification

Broadband Radio Access Networks (BRAN); HiperMAN; Conformance Testing for WiMAX/HiperMAN 1.3.1; Part 2: Test Suite Structure and Test Purposes (TSS&TP)



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Foreword

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

The present document is part 2 of a multi-part deliverable covering Broadband Radio Access Networks (BRAN); HiperMAN; Conformance Testing for WiMAX/HiperMAN 1.3.1, as identified below:

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

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

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

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1 Scope

The present document contains the Test Suite Structure (TSS) and Test Purposes (TP) to test the BRAN HiperMAN Data Link Control (DLC) layer.

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

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

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2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI TS 102 178 (V1.3.1): "Broadband Radio Access Networks (BRAN); HiperMAN; Data Link Control (DLC) Layer".
- [2] IEEE P802.16 (2004): "Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems".
- [3] IEEE 802.16e-2005 and IEEE 802.16-2004/Cor 1-2005: "IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems. Amendment for Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands".
- [4] ETSI ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [5] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts". (See also ITU-T Recommendation X.290 (1991)).
- [6] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification". (See also ITU-T Recommendation X.291 (1991)).

- [7] ISO/IEC 9646-6 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification".
- [8] ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [9] IEEE 802.3: "IEEE Standard for Information technology-Telecommunications and information exchange between systems-Local and metropolitan area networks-Specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications".
- [10] ISO 3166: "Codes for the representation of names of countries and their subdivisions".
- [11] ETSI TS 102 545-1: "Broadband Radio Access Networks (BRAN); HiperMAN; Conformance Testing for WiMAX/HiperMAN 1.3.1; Part 1: Protocol Implementation Conformance Statement (PICS) proforma".
- [12] IEEE 802.16-Rev2/D7 (October 2008): "Standard for Local and metropolitan area networks – Part 16: Air Interface for Broadband Wireless Access Systems".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Not applicable.

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], IEEE P802.16-2004 [2] and IEEE 802.16e-2005 [3] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ISO/IEC 9646-1 [5], ISO/IEC 9646-6 [7], ISO/IEC 9646-7 [8], TS 102 178 [1], IEEE P802.16-2004 [2], IEEE 802.16e-2005 [3] and the following apply:

AAS	Adaptive Antenna System
ACK	ACKnowledgment
AES	Advanced Encryption Standard
AK	Authorization Key
ARQ	Automatic Repeat reQuest
ATM	Asynchronous Transfer Mode
AUTH	AUTHentication/AUTHorization
BE	Best Effort
BI	Invalid Behaviour
BO	inOpportune Behaviour
BPSK	Binary Phase Shift Keying
BS	Base Station
BSN	Block Sequence Number
BV	Valid Behaviour
BW	BandWidth
CBC	Cipher Block Chaining
CC	Chase Combining
CD	Channel Descriptors

CDC	Channel Descriptor Change
CDM	Channel Descriptors and Maps
CDS	Classifier DSx Signalling
CERT	Certificates
CID	Connection IDentifier
CINR	Carrier to noise and INterference Ratio
CRC	Cyclic Redundancy Check
CS	Convergence Sublayer
DBPC	Downlink Burst Profile Change Request
DCD	Downlink Channel Descriptor
DEC	Decryption
DES	Data Encryption Standard
DIUC	Downlink Interval Usage Code
DL	DownLink
DLC	Data Link Control layer
DS	Dynamic Services
DSA	Dynamic Service Addition
DSC	Dynamic Service Change
DSD	Dynamic Service Deletion
DSx	Dynamic Service addition, change or deletion
ECB	Electronic Control Block
EKS	Encryption and Key Scheduling
ENC	Encryption
ENET	Ethernet
FC	Frame Count
FDD	Frequency Division Duplexing
FPC	Fast Power Control
FRAG	Fragmentation
FSM	Finite State Machine
FWA	Fixed Wireless Access
HARQ	Hybrid Automatic Repeat Request
HMAC	Hashed Message Authentication Code
HT	Header Type
IE	Information Element
INI	Registration, IP Connectivity, and Parameter Transfer
INIT	Initialization
IP	IPv4 and IPv6
IPC	IP Connectivity
IRNG	Initial Ranging
IUT	Implementation Under Test
KEK	Key Encryption Key
KU	Key Usage
LRP	To a Less Robust Profile
MAC	Medium Access Control
MAP	Map and Frame Structure
MCP	Multicast Polling
MRP	To a More Robust Profile
NACK	Negative ACKnowledgment
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
OPN	Operation
PACK	Packing
PDU	Protocol Data Unit
PHS	Payload Header Suppression
PKM	Privacy and Key Management
PMP	Point-to-MultiPoint
PRNG	Periodic Ranging
QoS	Quality of Service
QPS	QoS Parameter Sets
RE	Reset
REG	REGistration
REQ	REQuest

RER	Reset and Re-registration
RLC	Radio Link Control
RLV	Relevance
RNG	RaNGing
RSP	ReSPonse
RXD	Receive Data
SA	Security Association
SAID	Security Association IDentity
SAM	Security Association Management
SAP	Service Access Point
SBS	Serving Base Station
SBC	Negotiate Basic Capabilities
SDU	Service Data Unit
SET	Setup
SF	Service Flow
SS	Subscriber Station
TBS	Target Base Station
TDD	Time Division Duplexing
TEK	Encryption Key Transfer
TFTP	Trivial File Transfer Protocol
TI	Timer and counter
TLV	Type, Length, Value
TP	Test Purposes
TSS	Test Suite Structure
TXD	Transmit Data
UCD	Uplink Channel Descriptor
UGS	Unsolicited Grant Service
UL	Uplink
VLAN	Virtual Local Area Network

4 Test Suite Structure (TSS)

4.1 Structure

Figure 1 shows the DLC Test Suite Structure (TSS) including its subgroups defined for conformance testing.

Group	Function	Sub-function
CS options: Encapsulation	Ipv4	
	Ipv6	
	Ipv4 with ROHC / EC RTP	
	Ipv6 with ROHC / EC RTP	
	Ethernet	
	Ipv4 over Ethernet	
	Ipv6 over Ethernet	
CS options: Classification	Classifier DSx Signalling	
	Ipv4 Classification	
		General Ipv4 classification
		Ipv4 classification with ROHC
		Ipv4 classification with EC RTP
	Ipv6 Classification	
		General Ipv6 classification
		Ipv6 classification with ROHC
		Ipv6 classification with EC RTP
		Ethernet classification
		Pure Ethernet classification
		Ipv4 over Ethernet <Includes ROHC and EC RTP>

Group	Function	Sub-function
		Ipv6 over Ethernet <Includes ROHC and EC RTP>
Payload Header Suppression		
MAC PDU Formats		
	PDU concatenation	
	Fragmentation	
	Packing	
	CRC	
ARQ		
	Receiver operations	
	Transmitter operations	
	Reset	
Radio Link Control (Initial Network Entry and MAC Support of PHY layer)		
	Initial Ranging	
	Periodic Ranging	
	Downlink Burst Profile Management	
		To a Less Robust Profile
		To a More Robust Profile
	Negotiate Basic Capabilities	
	Feedback mechanism	
	MAC support for H-ARQ	
	Support of different MAP IEs	TBD list of functions in terms of DL-MAP IEs and UL-MAP IEs; MAP Relevance
Registration, IP connectivity and TFTP		
	Registration	
	IP Connectivity	
Dynamic Services (Service flow management)		
	Service Addition	
	Service Change	
	Service Deletion	
	QoS Parameter Sets	
Bandwidth Allocation and Polling		
	CDMA Bandwidth Request	
	Request/Grant mechanism	
	Multicast polling	
General Handover functionality		
	Network topology acquisition	
		Network Advertisement
		Scanning
		Association
	HO initiation <operations with Serving BS>	
		Initiated by MS
		Initiated by BS
	Network Re-Entry	
		Acquisition of DL and UL parameters
		HO Ranging
		Capabilities Exchange
		EAP based Authentication/ Authorization
		Registration
	HO optimization	< All options prescribed by the Mobility Profile>
Sleep mode		
	General functions	
	Power saving class type 1	
	Power saving class type 2	< Leave empty >