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Technical Specification

Broadband Radio Access Networks (BRAN);
HiperMAN;
Conformance Testing for WiMAX/HiperMAN 1.3.1;
Part 1: Protocol Implementation Conformance Statement (PICS) proforma

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Foreword

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

The present document specifies the Protocol Implementation Conformance Statement (PICS) for High PERformance Radio Metropolitan Area Network (HiperMAN) and WiMAX, which operates on frequencies between 2 GHz and 11 GHz.

The present document has been developed on the basis of preceding versions of HiperMAN and WiMAX PICS and makes the previous versions obsolete.

The present document is part 1 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)".

1 Scope

The present document specifies the Protocol Implementation Conformance Statement (PICS) for HiperMAN/WiMAX per ISO/IEC 9646-7 [10], ITU-T Recommendation X.296 [11] and EG 201 058 [12] for conformance of HiperMAN1.3.1/WiMAX compliant systems.

2 References

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.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

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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 102 177: "Broadband Radio Access Networks (BRAN); HiperMAN; Physical (PHY) layer".

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

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

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

[5] IEEE 802.16e-2005 and IEEE 802.16-2004/Cor 1-2005: "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 Corrigendum1".

[6] IEEE 802.16-Rev2/D7 (October 2008): "Standard for Local and metropolitan area networks - Part 16: Air Interface for Broadband Wireless Access Systems.

[7] WiMAX ForumTM Mobile System Profile v16.1: "WiMAX ForumTM, Technical Working Group, April 2008".

[8] WiMAX ForumTM Mobile Radio Specifications v0.1.0: "WiMAX ForumTM, Technical Working Group, April 2008".

[9] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

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

[11] ITU-T Recommendation X.296: "OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications - Implementation conformance statements".

[12] ETSI EG 201 058: "Methods for Testing and Specification (MTS); Implementation Conformance Statement (ICS) proforma style guide".

[13] 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".

[14] IEEE 802.1Q: "IEEE Standards for Local and metropolitan area networks - Virtual Bridged Local Area Networks".

[15] ITU-T Recommendation X.690: "Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)".

[16] IETF RFC 2131: "Dynamic Host Configuration Protocol".

[17] IETF RFC 868: "Time Protocol".

[18] IEEE 802.2 (ISO/IEC 8802-2:1998): "IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific Requirements - Part 2: Logical Link Control".

[19] IEEE 802.1D: "IEEE standard for local and metropolitan area networks--Media access control (MAC) Bridges (Incorporates IEEE 802.1t-2001 and IEEE 802.1w)".

[20] IETF RFC 3344: "IP Mobility Support for IPv4 ".

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, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ISO/IEC 9646-1 [9], TS 102 177 [1], TS 102 178 [2], ISO/IEC 9646-7 [10] and IEEE 802.16-2004 [4] with Corrigendum and Amendment as provided by IEEE 802.16e-2005 [5] apply.

3.2 Symbols

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

BW	Nominal channel bandwidth (MHz)
m	CID range divider
$P_{TX,max}$	Maximum mean transmit power at the antenna port (dBm)
T_b	Useful OFDM symbol time (s)
T_F	Frame duration (ms)
T_g	OFDM symbol guard time or CP time (s)
T_s	OFDM symbol time (s)

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TS 102 177 [1], TS 102 178 [2], ISO/IEC 9646-1 [9] and the following apply:

BS	Base Station
IUT	Implementation Under Test
MS	Mobile Station
PICS	Protocol Implementation Conformance Statement
SUT	System Under Test

4 Conformance to this PICS Proforma Specification

If it claims to conform to the present document, the actual PICS proforma to be filled in by a supplier shall be technically equivalent to the text of the PICS proforma given in annex A, and shall preserve the numbering, naming, and ordering of the proforma items.

A PICS which conforms to the present document shall be a conforming PICS proforma completed in accordance with the guidance for completion given in clause A.1.

Annex A (normative): Protocol ICS (PICS) for HiperMAN/WiMAX- TWG profile

A.1 Guidance for completing PICS Proforma

A.1.1 Purposes and Structure

The purpose of this PICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in defined in references [1], [2](which mandates requirements defined in [4] and [5]) may provide information about the implementation in a standardized manner. The PICS proforma does not cover every possible compliant WiMAX implementation, but only those implementations that are compliant with the system profiles as defined in [7] and [8].

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

- guidance for completing the PICS proforma;
- identification and implementation;
- identification of the standard;
- global statement of conformance;
- roles;
- Mobile Station (MS);
- Base Station (BS);
- List of MAC PDUs;
- PDU Fields.

A.1.2 Abbreviations and Conventions

Item column

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

Capability column

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

Reference column

- The reference column indicates the clause of [1], [2], [4], [5] and [7] from which the requirement for the capability is derived.
- By convention, indicating a clause of [5] may also refer implicitly to [1], [2], [4], and [7] as applicable.

Status column

- The following notations, defined in [9], are used in the status column:

m	Explicitly shown as mandatory in the standard. It is required to implement.
o	Explicitly mentioned as optional in the standard or is not explicitly mentioned but has capability negotiations. It may or may not be implemented.
oi	Qualified option- for mutually exclusive or selectable options from a set. One or more of the options from the set shall be supported.
IO-NNNN	Inter-operable Options: Item belongs to NNNN group of features for which it is requested to provide testing procedure and distinct labelling of BS equipment. More specifically: ▪ The item is not required to get general "WiMAX certified" label; and ▪ Is required to get distinct "WiMAX certified with NNNN capability" label.

The following Inter-operable Options are defined and used in the present document:

1. IO-MIMO: Group of Inter-operable Option features related to Multiple Input Multiple Output (MIMO) operation.
2. IO-BF: Group of Inter-operable Option features related to Beam Forming (BF) operation.
3. IO-MBS: Group of Inter-operable Option features related to Multicast and Broadcast Services (MBS) operation.
4. IO-ETHx (x = 1, 2, 3): Groups of features on three Inter-operable options related to Ethernet CS IO-ETH1, IO-ETH2 and IO-ETH3.

Support column

- The support column shall be filled in by the supplier of the implementation. The following common notations, defined in [9] are used for the support column.

Y or y	Supported by implementation.
N or n	Not supported by implementation.
N/A, n/a or -	No answer required (allowed only if the status is n/a either directly or after the evaluation of a conditional status).

Values allowed column

- The values allowed column is only used when necessary in a table. It contains the type, the list, the range, or the length of values allowed. The following notations are used.

Range of values: Example:	<min value> to <max value> 5 to 20
List of values: Example 1: Example 2: Example 3:	<value1>, <value2>, to, <valueN> 2, 4, 6, 8, 9 1101b, 1011b, 1111b 0x0A, 0x34, 0x2F
List of named values: Example:	<name1>(<val1>), <name2>(<val2>), to, <nameN>(<valN>) reject(1), accept(2)
Length: Example:	Size (<min size> to <max size>) Size (1 to 8)

Values supported column

- The values supported column is only present when the values allowed column is present. It shall be filled in by the supplier of the implementation. In this column, the value or the ranges of values supported by the implementation shall be indicated.

Reference to items

- For each possible item answer in the support column within the PICS proforma a unique reference exists which may be used, for example, in conditional expressions. It is defined as the table identifier, followed by the "/" character, followed by the item number in the table. If there is more than one support column in a table, the columns are discriminated by letters (a, b, etc.).

Example 1:	Table A.5/4 is the reference to the answer of item 4 in table A.5.
Example 2:	Table A.6/3b is the reference to the second answer (i.e. in the second support column) of item 3 in table A.6.

Prerequisite Line

- A prerequisite line takes the form: Prerequisite: <predicate>.
- A prerequisite line after a clause or table title indicates that the entire clause or the entire table is not required to be completed if the predicate is FALSE.

Support of specific MAC PDUs or fields does not automatically mean support of the corresponding functionality. It means only that BS(MS) is capable of transmitting or receiving/parsing the message of specific format.

A.1.3 Instructions for completing the PICS Proforma

The supplier of the implementation shall complete the PICS proforma in each of the spaces provided. In particular, an explicit answer shall be entered, in the support or values supported column boxes provided, using the notation described in clause A.1.2.

However, tables related to Mobile Station shall only be completed for Mobile Station (MS) implementations, and tables related to Base Station shall only be filled in for Base Station implementations.

If necessary, the supplier may provide additional comments in space at the bottom of the tables or separately.

A.2 Identification of the implementation

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the PICS should be named as the contact person.

A.2.1 Date of statement

Date of statement (MM/DD/YYYY):	

A.2.2 Implementation Under Test (IUT) identification

IUT name:	
IUT version:	

A.2.3 System Under Test (SUT) identification

SUT name:	
Hardware configuration:	
Operating system:	

A.2.4 Product supplier

Name:	
Address:	
Telephone Number:	
Fax Number:	
E-mail address:	
Additional information:	

A.2.5 Client (if different from product supplier)

Name:	
Address:	
Telephone Number:	
Fax Number:	
E-mail address:	
Additional information:	

A.2.6 PICS contact person

(A person to contact if there are any queries concerning the content of the PICS.)

Name:	
Address:	
Telephone Number:	
Fax Number:	
E-mail address:	
Additional information:	

A.3 Identification of the standard

This PICS proforma applies to the ETSI HiperMAN/WiMAX standard consisting of the following normative references:

- HiperMAN/WiMAX Physical Layer: [1] which normatively references [4] and [5];
- HiperMAN/WiMAX Data Logical Control Layer: [2] which normatively references [4] and [5].

A.4 Global statement of conformance

Are all mandatory capabilities implemented? (Yes/No)	

NOTE: Answering "No" to this question indicates non-conformance to the HiperMAN/WiMAX standard. Non-supported mandatory capabilities are to be identified in the PICS, with an explanation of why the implementation is non-conforming, on pages attached to the PICS proforma.