

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Comments to D2 Draft Standard IEEE 802.16 – Part 4: Protocol Implementation Conformance Statement (PICS) Proforma for Frequencies below 11 GHz	
Date Submitted	2005-7-08	
Source(s)	SHLOMO OVADIA HASSAN YAGHOOBI	Voice: 408-765-1844, mailto:shlomo.ovadia@intel.com 408-765-1906, mailto:hassan.yaghoobi@intel.com
	Intel Corporation SC12-512 2200 College Mission Blvd. Santa Clara, CA 95054	
Re:	Supporting document for call for contribution for IEEE 802.16C	
Abstract	Comments on the structure, organization, and technical content of IEEE P802.16/Conformance04/D2, June 2005 draft standard for conformance to IEEE Standard 802.16 – Part 4: Protocol Implementation Conformance Statement (PICS) Proforma for Frequencies below 11 GHz.	
Purpose	Adoption of P802.16/Conformance04/D1	
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.	
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.	
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures < http://ieee802.org/16/ipr/patents/policy.html >, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair < mailto:chair@wirelessman.org > as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site < http://ieee802.org/16/ipr/patents/notices >.	

1 **Comments to D2 Draft Standard IEEE 802.16 - Part 4:**
 2 **Protocol Implementation Conformance Statement**
 3 **(PICS) Proforma for Frequencies below 11 GHz**
 4 **(DRAFT)**

5
6
7

8	1	Overview.....	2
9	2	Comments.....	2
10	2.1	High-level partition	2
11	2.2	Partition based on Functions	2
12	2.3	PHY Layer Partitioning	2
13	2.4	MAC/PHY Layer Partitioning	3
14	2.5	MAC Layer Partitioning	4
15		MAC Layer Architecture	4
16		MAC Convergence Sublayer	4
17		MAC Channel Acquisition.....	4
18		MAC Headers and Payload	4
19		MAC Message Structure	4
20		Connection Establishment and Service Flows	4
21		Support of H-ARQ	4
22		Security	4
23	3	References.....	4

24

1 **1 Overview**

2
3 The purpose of this contribution is to provide comments on the structure, organization, and technical content of
4 draft standard for conformance to IEEE Standard 802.16 — Part 4: Protocol Implementation Conformance
5 Statement (PICS) Proforma for Frequencies below 11 GHz [1].

6 **2 Comments**

7 **2.1 High-level partition**

8 High level partitioning of IEEE PICS according to PHY, MAC/PHY, and MAC layer, which is appropriate for
9 RCT and TSS/TP development (based on discussion with test equipment vendor).

10
11
12 Rationale: Using this method of partitioning, the document will be user friendly, in a sense that TSS/TP and RCT
13 development tasks can utilize the relevant sections (MAC and MAC/PHY for TSS/TP and PHY for RCT) more
14 effectively and conveniently.

15 **2.2 Partition based on Functions**

16 Partition of the various test cases such that the specific PICS correlated by function and not by specific sections is
17 desired. See sections 2.3, 2.4, and 2.5.

18
19 Rationale: The main reason for this recommendation is to make the document more friendly to the end user tasks,
20 i.e. TSS/TP and RCT developments. As an example, this eliminates any potential redundancy in the PICS document.
21 This creates additional burden to all users of the PICS. The proposal for structuring the document based on
22 functionality greatly helps with this regards.

23 **2.3 PHY Layer Partitioning**

24 *[Note: Are categorized this way because they are good candidates for PHY driven, RCT type testing using specially*
25 *designed PHY testing setups]*

- 26
- 27 ■ Profile list
- 28 ■ Network Topology
- 29 ■ Power Classes
- 30 ■ Duplexing Mode
- 31 ■ Frequency Band
- 32 ■ Channel Bandwidth
- 33 ■ Sampling Factor
- 34 ■ Cyclic Prefix
- 35 ■ Frame Length
- 36 ■ Rx-Tx Gaps
 - 37 ○ TTG/RTG
 - 38 ○ SSTTG/SSRTG
- 39 ■ Subcarrier Allocation
 - 40 ○ DL Subcarrier Allocation
 - 41 ○ UL Subcarrier Allocation
- 42 ■ UL Feedback
 - 43 ○ Fast-Feedback
 - 44 ○ CQICH
 - 45 ○ ACK Channel
- 46 ■ Channel Coding
 - 47 Randomization
- 48 ■ Control Mechanism
 - 49 ○ Synchronization
 - 50 ○ Ranging

- 1 ▪ Initial Ranging
- 2 ▪ Periodic Ranging
- 3 ▪ BW Request
- 4 ○ Closed-loop Power Control
- 5 ▪ Channel Measurement
- 6 ○ CINR Measurement
- 7 ○ RSSI Measurement
- 8 ▪ Modulation
- 9 ○ PRBS (Covering sequence)
- 10 ○ Pilot Modulation
- 11 ○ Preamble Modulation
- 12 ○ Ranging Modulation
- 13 ▪ AAS
- 14 ○ AAS Zone Support
- 15 ○ Supported Subcarrier Allocation Modes (UL/DL)
- 16 ○ AAS Preamble (UL/DL)
- 17 ○ Diversity MAP Scan
- 18 ○ AAS-FBCK-REQ/RSP support
- 19 ▪ STC/MIMO
- 20 ○ Supported Subcarrier Allocation Modes (UL/DL)
- 21 ○ MIMO Feedback
- 22 ○ MIMO Midamble
- 23 ▪ Performance/Fidelity Requirements
- 24 ○ Transmit Requirements: Power (dynamic ranges, accuracies, etc.)
- 25 ○ Transmit Requirements: Signal Spectrum (Spectral flatness, per subcarrier, etc.)
- 26 ○ Transmit relative constellation error
- 27 ○ Frequency and Time Synchronization Requirements
- 28 ○ Receiver Requirements: Power (input levels etc.)
- 29 ○ Receiver Requirements: SNR, Sensitivity
- 30 ○ Receiver Requirements: Adjacent, Alternate Channels
- 34

35 **2.4 MAC/PHY Layer Partitioning**

36 *[Note: Are categorized this way because they are good candidates for MAC driven, automated testing similar to*
 37 *protocol related PICS]*

- 38
- 39 ▪ Channel Coding
- 40 ○ Repetition
- 41 ○ Convolutional Code
- 42 ○ Convolutional Turbo Code
- 43 ○ BTC
- 44 ○ LDPC
- 45 ○ H-ARQ
- 46 ▪ Chase Combining
- 47 ▪ Incremental Redundancy
- 48 ▪ Modulation (Various IUCs)
- 49 ○ Downlink
- 50 ○ Uplink
- 51 ▪ MAP Support in PHY
- 52 ○ Normal MAP
- 53 ○ Compressed MAP
- 54 ○ Sub-DL-UL MAP
- 55 ○ H-ARQ MAP Message
- 56 ▪ PHY Support for various IEs
- 57

1 2.5 MAC Layer Partitioning

2 MAC Layer Architecture

3 This section will include specification of overall system functionality such as point-to-multipoint, mesh as well as high level system performance enhancements such as AAS and MIMO that have an effect on MAC functionality. For system enhancement techniques a separate section will be included to address specific details. MAC functionality related to zone switching is proposed addressed here. Operation in TDD and FDD mode are at a high level specified here. As well as other system functions such as the secondary management channel.

8 MAC Convergence Sublayer

9 This section will include the specific functionalities related to the convergence sublayer including parameters related to various encapsulation methods, header suppression and classification functionality.

11 MAC Channel Acquisition

12 The functions covered in this section will carefully follow the MAC functionalities involved in synchronizing the MAC to the base station DL and UL parameters. This will include initial ranging, reception of the DL and UL MAPs as well as the DCD and UCD messages. The section will specify all functions required to be supported to begin service flow establishment and data transmission in both the UL and DL.

16 MAC Headers and Payload

17 {The standards includes many options and functions to included various headers that pertain to both the structure of the data streams as well as headers that contain control information relevant to the operation of the overall system. As the negotiation capabilities in the standard lack some specificity in which complimentary control methods is being used, it is important to clearly define a function subset so that interoperability across manufacturers to many base stations in assured}

22 MAC Message Structure

23 It is proposed that due to the variety of messages and their structures – including the optional TLVs – that a section be devoted to specify the parameters included in selected MAC messages. It is not intended that every message structure be exhaustively specified, but that a basic message format for the basic system cases be included to give some direction to implementations for testing purposes. This section address DL and UL sub-channelization via MAP message formats.

28 Connection Establishment and Service Flows

29 This section should concern itself with the functionality required to establish and maintain a connection. Best effort and UGS connections are proposed as two basic connections to address. This section should included detailed parameters related to ARQ. In addition, this section should specify functionality for UL grant and request scheduling and polling functions. In support of QoS the grant mechanisms should included parameters that specify functions related to latency and system delay.

34 Support of H-ARQ

35 TBD

36 Security

37 TBD

38 3 References

39
40 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 nonspecific reference, the latest version applies.

44
45 [1] IEEE Standard 802.16-2004: “Local and Metropolitan Area Networks – Part 16: Air Interface for Fixed

1 Broadband Wireless Access Systems.”
2