Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Proposed Responses to Technical Binding Comments from IEEE802.16a Session#18.**
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Re:	Call for Contributions on P802.16a Mergers and Consolidation Document Number: IEEE 802.16a-02/22, April 15, 2002. URL: <http://ieee802.org/16/docs/02/80216-02_22.pdf>
Abstract	To help resolving technical binding comments for IEEE802-SEC sponsor balloting phase.
Purpose	Proposed changes to the P80216a_D3 technical binding comment resolutions.
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Proposed Responses to Technical Binding Comments from IEEE802.16a Session#18

Anader Benyamin-Seeyar, Remi Chayer, Paul Struhsaker, Brian Eidson, Joe Hakim, Arthur Wang, Malik Audeh, Dean Chang, John Langley, Russel McKwon

INTRODUCTION:

The following comments were rejected by the WG at IEEE802.16a Session#18 in St. Louis and it seems the rebuttal given by the WG to the comments did NOT satisfy the comment originators and nor IEEE-SEC members. We have provided the detailed information for the unresolved comments and have also added proposed rebuttal to the commenters as follows:

1- Comment # 34 (by David Trinkwon)

Original comment:

With this proposed amendment, IEEE 802 will offer six (or more) air interfaces for license exempt bands:

a) 802.11 variants
b) 802.16 OFDM PMP 64-FFT
c) 802.16 OFDM PMP 256-FFT
d) 802.16 OFDM PMP 512-FFT
e) 802.16 OFDM Mesh
f) 802.16 OFDMA.

There is no information presented in the Draft Amendment to enable a comparative analysis of these alternatives to enable vendors, service providers or end users to determine suitability / appropriateness for their particular applications (e.g. capacity, coverage, reliability, relative cost).

There is also no requirement / mechanism to define / identify CPE compatibility / interoperability between the alternatives, either on a PMP, Mesh or PMP-Mesh basis. Is this a family of complementary standards or a collection of disparate standards?

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

Rejected due to lack of text proposed for the document.

Rejected due to foreseeable lack of consensus on performance data.

Editor's Action: Defer to next round:

Commenter claimed comment was inappropriate superceded. Deferred to next round.

Comment will be rejected by default unless any discrete text changes are proposed.

Proposed rebuttal:

There are only 3 PHY variants:

> 1) Single Carrier
> 2) OFDM
> 3) OFDMA

Single carrier (SC2) is an extension of the current 802.16 standard with framing features to implement Frequency Domain filtering to handle delay spread in 2 to 11 GHz based on a 256 FFT point transform. The OFDM mode is based on a mandatory 256 Point transform (making a common frame and architecture with single carrier). Finally, OFDMA mode is provided to make use of DVB standard for down stream and the use of FDM multiplex upstream carriers to provide efficient multiple access.

The standard must be applied across a broad range of application including integrated Voice and Data access as well as best efforts data. The multiple PHY layers provide flexibility to meet these service categories.

In addition, the interoperability between the 3 main PHY specifications might be a WiMAX matter.

2- Comment # 35 (by David Trinkwon)

Original comment:

With this proposed amendment, IEEE 802 will offer five (or more) air interfaces for license bands:

a) Single Carrier PMP (10-66GHz)
b) Single Carrier PMP (2-11GHz)
c) OFDM PMP (various FFT sizes)
d) OFDMA (DVB) PMP
e) OFDM (AMB) PMP
f) Potential future Mesh modes.

There is no information presented in the Draft Amendment to enable a comparative analysis of these alternatives to enable vendors, service providers or end users to determine suitability / appropriateness for their particular applications (e.g. capacity, coverage, reliability, relative cost).

There is also no requirement / mechanism to define / identify CPE compatibility / interoperability between the alternatives. Is this a family of complimentary standards or a collection of disparate standards ?

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

Rejected due to lack of text proposed for the document.

Rejected due to foreseeable lack of consensus on performance data.

Editor's Action: Defer to next round:

Commenter claimed comment was inappropriate superceded. Deferred to next round.

Comment will be rejected by default unless any discrete text changes are proposed.

Proposed rebuttal:

All PHY layer specifications have been evaluated against the SUI channel models and they meet the required performance for 802.16a. The choice of PHY layer is more a function of vendor system implementation including analog / RF complexity. There is precedence for multiple Air Interface standards, for example, with 802.11 having 3 PHY specifications of OFDM, Single Carrier Direct Sequence, and Frequency hopping FSK.

3- Comment # 49 (by Tom Kolze)

Original comment:

This MAC departs greatly from DOCSIS 1.1 MAC, although our working group has heard from some license holders that consider it highly desirable to be aligned with DOCSIS MAC. The changes to DOCSIS 1.1 MAC necessary for adaptation to wireless is very minimal, as discussed and presented in numerous presentations to the working group. Even given the above two facts, the working group DID vote to eliminate from consideration all but a small set of documents for forming the basis of its common MAC, and specifically voted DOWN the motion for INCLUDING DOCSIS 1.1 MAC in the set of documents which could be drawn upon. It is not surprising that the 802.16 MAC is a vast departure from the DOCSIS MAC, given this set of votes. The only surprise is that the group voted in this pattern in the face of license holders expressed wishes otherwise. It is my position that the 802.16 standard needs to align its MAC to the DOCSIS world.

This change in course for 802.16 will require some extensive rewrite of the section 6, but, given the maturity and successful deployment of the DOCSIS MAC, will lead to SPEEDIER execution of the 802.16 standard.

Suggested remedy by original commenter:

Adopt and build upon the recommendations and proposals from the individuals within 802.16 supporting the DOCSIS MAC.

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

The title of the project PAR ("Medium Access Control Modifications and Additional Physical Layer Specifications for 2-11 GHz") makes it quite clear that the intent of the project is to develop modifications to the MAC described in IEEE Standard 802.16. The Working Group has consciously made the decision, again and again, that the 802.16 MAC is best suited for wireless metropolitan area networks.

[Reason developed by Roger Marks and entered 4 April 2002]

Group's Action Items:

Retrieve rejection text from TG1 database.

Proposed rebuttal:

This comment is well responded.

We would also add that DOCSIS has an extreme flaw by not having ARQ integrated at the MAC layer. Given the RF channel dynamics. ARQ is required to ensure the delivery of required data throughput.

4- Comment # 221 (by Heinz Lycklama)

Original comment:

The standard needs to support both TDD and FDD for both licensed and licensed-exempt bands. This makes it easier to use the same chipsets for various licensed and licensed-exempt bands. For example, some equipment suppliers for the UNII band wish to use both the 5.25 GHz and the 5.725 GHz bands. The most efficient way to use this spectrum is to use FDD.

Suggested remedy by original commenter:

Delete the sentence starting at line 53 in Section 6.2.7.7.2.1 "Systems in the licensed-exempt bands shall use TDD only."

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

This necessitates addressing TDD/FDD co-existence problems in the license-exempt bands. From a chip perspective, it makes no difference. It would also lead to more interoperability issues. Further, with FDD in license-exempt bands, periodic DFS presents the challenge of switching frequencies on the Rx chain to check the Tx channel, during which the Tx chain must cease.

Editor's Note: none needed.

Proposed rebuttal:

In general we agree that the standard should support both TDD and FDD for both license and license-exempt bands for the same reason given by Heinz. But, there is an issue that the WG disagree with the comment where the FDD will not properly operate with DFS and the interference avoidance in unlicensed channels that 802.11 members of the SEC had an issue can be an added problem.

5- Comment # 270 (by Tom Kolze)

Original comment:

The compliance with 802.16 allows for (at least) two separate systems, which do not interoperate. There are multiple PHYs, but a BS does not have to support both, or even a subset of both, and the SS does not have to support both, either. These are effectively two different standards, which means the group did not do its work. In some other standardization activities, wireless and otherwise, a related family of modulation formats was selected for the standard: one example is a standard using single carrier, with various, well-thought-out modulation constellations of varying bits per symbol, and FEC from a family with great commonality, such as Reed-Solomon with common field; another example is multi-tone (OFDM) with family of constellations and FEC family from a convolutional code with various puncturing. There is even an example now with two different U/S modulation types, but with the "SS-like" units supporting BOTH, so that the benefits of standardization are provided for the industry and the consumer. In short, there is a reason why IEEE says "one problem, one solution," and while families of techniques comprising toolboxes have proven great for standards now for years, i.e., "flexible PHY," disparate approaches, with no "inclusion strategy" at the SS and/or the BS that benefits the industry and/or consumers, is definitely not in the IEEE spirit.

Suggested remedy by original commenter:

Pick a standard, or develop an inclusion strategy that makes sense and shows the benefit to the industry of standardizing in common equipment multiple disparate solutions. DO NOT just have separate standards for separate systems, which is AT ODDS with IEEE policy for its standards.

Decision of Group:

Superceded.

Reason for Group's decision/resolution:

The standard has been reduced to define four major PHY configurations and a common MAC. Splitting the embodiments into separate documents is not permitted under the PAR. Furthermore, the 802.11 example is a bad one, since the various documents are logically a single document (and will eventually be united into a single physical document). A better solution is to name the embodiments. A good example is 10Base T and 100BaseT, both defined in IEEE standard 802.3.

Editor's Note: none needed.

Proposed rebuttal:

The WG group response is good enough. There is nothing wrong of having three applicable PHY specifications for wide range of frequency bands and wide range of applications.

See also response to comments #1 and #2.

6- Comment # 476 (by Tom Kolze)

Original comment:

Dozens of TBDs, question marks (?), and blank entries over three pages.

Suggested remedy by original commenter:

These must be eliminated.

Decision of Group:

Accepted-Modified.

Resolution of Group:

Delete section 8.3.5.2.7.5.

Reason for Group's decision/resolution:

no specific changes suggested.

TBDs left after ballot 4a resolution, are in Table 204 and Table 205 (D2).

Editor's Note: none needed.

Proposed rebuttal:

Action: The working group has to eliminate all TBDs and Blank entries.

7- Comment # 491 (by Tom Kolze)

Original comment:

(if possible) for SS and BS that justifies for the industry and the consumer the multiplicity of standards here, rather than simply giving the appearance that 802.16 could not adhere to the IEEE "one problem, one solution" mandate.

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

4a: The standard has been reduced to define four major PHY configurations and a common MAC.

Editor's Note: none needed.

Proposed rebuttal:

IEEE "one problem, one solution" mandate is not that easy issue. As a WG after evaluations we have adopted three workable PHYs for a large frequency range, coverage, and wide range of applications sought by FRD. In addition, the standard must address a wide number of topologies and environments and unlike CABLE/DOCSIS standard, one size solution cannot fit all.

See also comments #1 and #2.

8- Comment # 535 (by Lars Lindh)

Original comment:

The intention of using a DL Frame prefix is not declared in the text and is not evident by itself. One purpose could be to get some information for the next burst a little earlier. Even this is questionable because almost the same kind of operations must be performed. The following kind of execution times for the different decoding phases can be foreseen:

FFT   256*8 cc   FFT-256 case

CC innercode   192*4 cc   192 symbols processed 4 times because of back-tracking and tail-biting

RS outercode   3*t + K cc   dependent on t=4 plus a constant usually a relative small number

de-interleaving   192 cc

To be able to get some intelligent value out of the DL Frame prefix we must at least do the FFT, CC inner decoding and de-interleaving. It is not much faster than if we do the whole stuff (FFT, CC innercode, RS, de-interleaving and digging in the map). Please note that the information element for the first burst comes in the first FEC codeword.

Suggested remedy by original commenter:

Delete the DL Frame Prefix from the FCH burst as it does not much speed up the process of knowing the modulation/coding and length of the next burst.

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

Rate_ID is an essential parameter for decoding the DL-MAP, if the Rate_ID is not fixed (see D2, page 155, line 63).

Editor's Note: none needed.

Proposed rebuttal:

The WG has already given a good response.

9- Comment # 638 (by Tom Kolze)

Original comment:

TBDs in this section must be eliminated.

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

4a: TBDs are not yet resolved.

Editor's Note: none needed.

Proposed rebuttal:

Action: The working group has to eliminate all TBDs and Blank entries.

10- Comment # 928 (by Panyuh Joo)

Original comment:

Quasi-random Ranging Code Selection is necessary for OFDMA PHY. Quasi-random Ranging Code Selection has better benefit than Random selection for avoiding of collision in Bandwidth Request Ranging.

Suggested remedy by original commenter:

Refer to coming contribution.

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

Current solution was deemed adequate in view of no simulation or other documentation on the superiority of the method suggested in the comment. Such documentation is invited

Group's Action Items:

Need rebuttal.

Editor's Note: none needed.

Proposed rebuttal:

Need strong convincing proof by Panyu why WG should change the Ranging Code of OFDMA at this time.

11- Comment # 1069 (by Lars Lindh)

Original comment:

In WG letter ballot I submitted a technically binding comment 535 regarding the DL Frame Prefix. The comment was rejected by the group but did not contain any justification for the rejection. As I consider that the comment was not solved in satisfactory way I still have to disapprove of the DL Frame Prefix.

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

See Comment 0535.

Editor's Note: none needed.

Proposed rebuttal:

The WG has already given a good response.

12- Comment # 1108 (by Panyuh Joo)

Original comment:

Add subsection 8.3.5.6.3.2.1 assignment of pilots.

The Nused used carriers in the UL are portioned into constant-location pilots, variable location pilots, and data subchannels like those in the DL, However, because a subchannel in the UL has the number of pilots which is much smaller than those in the DL, they are not enough to do factions of pilots such as phase estimation and frequency offset estimation.

Decision of Group:

Rejected.

Reason for Group's decision/resolution:

The entire structure of the design would need to be redone to accommodate this request.

The pilots for each uplink user are used to estimate the channel parameters for that user alone. Note also that there is an uplink preamble (not like in the downlink).

Editor's Note: none needed.

Proposed rebuttal:

The WG has already given a good response.

Finally, we have to come up with a resolution for the IEEE802.11 and IEEE802.16a coexistence issue. Possibly the interested IEEE802.16a member's participation at the newly formed WG "IEEE802.18" will be the way to resolve the issue.