Supporting report to EC for request of conditional approval to initiate sponsor ballot on P802.16Rev2

IEEE 802.16 Presentation Submission Template (Rev. 9)

Document Number:

IEEE 802.16-08/040r1

Date Submitted:

2008-07-18

Source:

Jonathan Labs, Phillip Barber, Scott Probasco, Jose Puthenkulam
Wavesat, Huawei, Nokia, Intel

Voice:
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Venue:

Session #56

Base Contribution:

None

Purpose:

Report to the EC on the status of LB26 in support of request for conditional approval to initiate sponsor ballot on the IEEE P802.16Rev2 draft.

Rules

- Motions requesting conditional approval to forward where the prior ballot has closed shall be accompanied by:
  - Date the ballot closed
  - Vote tally including Approve, Disapprove and Abstain votes
  - Comments that support the remaining disapprove votes and Working Group responses.
  - Schedule for confirmation ballot and resolution meeting.

Date the Ballot Closed
21 June 2008

Stage	Open	Close
Letter Ballot 26	5 Oct 2007	4 Nov 2007
Letter Ballot Recirc 26a	20 Dec 2007	14 Jan 2008
Letter Ballot Recirc 26b	20 Feb 2008	10 Mar 2008
Letter Ballot Recirc 26c	4 Apr 2008	19 Apr 2008
Letter Ballot Recirc 26d	6 June 2008	21 June 2008

Vote tally including Approve, Disapprove and Abstain votes

- Approve: 284
- Disapprove: 1
  - 6 comments, all on MIMO, 4 specifically on cyclic delay diversity (CDD)
- Abstain: 5

- Return ratio: 87.1%
- Approve ratio: 99.6%

Comments that support the remaining disapprove votes and Working Group responses

- LB 26:
  - no outstanding comments
- LB recirc 26a:
  - no outstanding comments
- LB recirc 26b:
  - 3 outstanding comments: 1 rejected, 2 superceded
- LB recirc 26c:
  - 3 outstanding comments: 3 rejected,
- LB recirc 26d:
  - no outstanding comments.

Comment by: Zhou Frank **Membership Status:** Member **Date:** 3/10/2008

Comment # 2166 **Document under Review:** P802.16Rev2/D3 **Ballot ID:** 26b

Comment **Type** Technical **Part of Dis** ☒ **Satisfied** ☐ **Page** ? **Line** **Fig/Table#** 543 **Subclause** 11.4.1

We propose BS to announcement its CDD parameters when using CDD. Please see detail at C80216maint-08/070r1 or its later revision.

Suggested Remedy

Please see detail at C80216maint-08/070r1 or its later revision.

GroupResolution **Decision of Group:** **Superceded**

Reason for Group's Decision/Resolution

by 2147

Group's Notes

Editor's Notes **Editor's Actions** b) none needed

Comment by: Zhou Frank **Membership Status:** Member **Date:** 3/10/2008

Comment # 2237 **Document under Review:** P802.16Rev2/D3 **Ballot ID:** 26b

Comment **Type** Technical **Part of Dis** ☒ **Satisfied** ☐ **Page** ? **Line** **Fig/Table#** **Subclause**

Two conditions need to be satisfied for a mobile to request a transition into band AMC mode (from PUSC mode):

i. The average CINR of the whole bandwidth should be larger than the band AMC entry average CINR for at least band AMC allocation timer frames.

ii. The maximum of the standard deviation of the individual band's CINR measurements should be lower than the band AMC allocation threshold (σMAX) for at least band AMC allocation timer frames.

The method for computing the average CINR as outlined in the IEEE 802.16e-2006, Rev2/D1 is performed by averaging instantaneous ratios of signal power to noise plus interference power, this type of averaging results in a bias and will impact condition (i) above. Further, the method for computing the standard deviation as outlined in IEEE P802.16 (e.g., 802.16e-2006, Rev2/D1) specification is performed using linear values of CINR moments and not decibel values of the CINR moments. This causes a problem when checking for condition (ii) above.

Suggested Remedy

C80216maint-07_067r1 or its later version

GroupResolution **Decision of Group:** **Rejected**

Adopt C802.16maint-08/0159r2

Reason for Group's Decision/Resolution

Concerns about backward compatibility

Group's Notes

Result of vote: 3 in favor, 13 opposed.

Editor's Notes **Editor's Actions** b) none needed

Comment by: Zhou Frank **Membership Status:** Member **Date:** 3/10/2008

Comment # 2238 **Document under Review:** P802.16Rev2/D3 **Ballot ID:** 26b

Comment **Type** Technical **Part of Dis** ☒ **Satisfied** ☐ **Page** ? **Line** **Fig/Table#** **Subclause** 8.4.8.7, 11.4.1

Currently CDD (cyclic delay diversity) is not defined in the 802.16 standard (OFDMA PHY) however widely used in practice in WiMAX system. This contribution attempts to bridge this gap by formally defining transparent CDD and supplying necessary restrictions. Although there is an effort to make these definitions in RPD in WiMAX forum we believe the correct place for them is the 802.16 standard since:

1. These definitions are necessary for the interoperability of devices, not only in the scope of WiMAX.
2. In order to refrain from contradictions between WiMAX and 802.16

CDD affects symbol timing estimation. The signal transmitted from the antenna with delay D has the same symbol timing as the normal signal, but in frequency domain processing (channel estimation, correlation, etc) it would appear to have a delay of D. In order to correctly set the symbol timing without causing ISI and artificial phase roll, the SS needs to know the value of D.

Without the CDD announcement and since CDD is optional at BS, 1% CDD delay could result in about 1 us timing error which will cause 1% ISI and limit the SNR at max 20 dB. This will cause problem for 64 QAM.

Suggested Remedy

C80216maint-08_006r5 or its later version

GroupResolution **Decision of Group:** **Superceded**

Reason for Group's Decision/Resolution

by 2147

Group's Notes

Editor's Notes **Editor's Actions** b) none needed

Comment by: Frank Zhou **Membership Status:** Member **Date:** 4/19/2008

Comment # 3215 **Document under Review:** P802.16Rev2/D4 **Ballot ID:** 26c

Comment **Type** Technical **Part of Dis** ☒ **Satisfied** ☐ **Page** 841 **Line** 19 **Fig/Table#** **Subclause** 8.4.5.4.10.15

The 3-Bit 2-Tx codebook in 16e was designed 3-4 years ago without the power balance across antennas in mind. Similar mis-haps at that time were Antenna Selection and Antenna Grouping in 16e. Typical contemporary BS implementation involves one constant PA per antenna. In order to maximize the usage of PA power, the codeword should have constant modulus over its elements. The property of constant modulus with quaternary alphabet can also enable faster search and potentially eliminate SVD operations in MS implementations. Competing standard has codebooks designed with the above considerations in mind. Here we propose a new 3-Bit 2-Tx codebook that further improves the counterpart in competing standard. It has been shown that performance of the 3-Bit 2-Tx codebook in the competing standard is similar compared with the 16e 3-Bit 2-Tx codebook; therefore the 3-Bit 2-Tx codebook we propose outperforms the 16e 3-Bit 2-Tx codebook.

Suggested Remedy

Please see C80216maint-07_218 or its later version.

GroupResolution **Decision of Group:** **Rejected**

adopt c801.16maint-08/218

Reason for Group's Decision/Resolution

adequate performance from existing solution; lack of harmonization.

Group's Notes

deferred until MIMO
vote: 5 approve, 10 opposed, 0 abstain

Editor's Notes **Editor's Actions** b) none needed

Comment by: Frank Zhou **Membership Status:** Member **Date:** 4/19/2008

Comment # 3232 **Document under Review:** P802.16Rev2/D4 **Ballot ID:** 26c

Comment **Type** Technical **Part of Dis** ☒ **Satisfied** ☐ **Page** ? **Line** 45 **Fig/Table#** **Subclause** 8.4.8.7, 11.4.1

I am unsatisfied with the resolution of my comment 2238 in LB26b. It was superceded without my permission.

Per comment 2238 in LB26b:

Currently CDD (cyclic delay diversity) is not defined in the 802.16 standard (OFDMA PHY) however widely used in practice in WiMAX system. This contribution attempts to bridge this gap by formally defining transparent CDD and supplying necessary restrictions. Although there is an effort to make these definitions in RPD in WiMAX forum we believe the correct place for them is the 802.16 standard since:

1. These definitions are necessary for the interoperability of devices, not only in the scope of WiMAX.
2. In order to refrain from contradictions between WiMAX and 802.16

CDD affects symbol timing estimation. The signal transmitted from the antenna with delay D has the same symbol timing as the normal signal, but in frequency domain processing (channel estimation, correlation, etc) it would appear to have a delay of D. In order to correctly set the symbol timing without causing ISI and artificial phase roll, the SS needs to know the value of D.

Without the CDD announcement and since CDD is optional at BS, 1% CDD delay could result in about 1 us timing error which will cause 1% ISI and limit the SNR at max 20 dB. This will cause problem for 64 QAM.

Suggested Remedy

Please see C80216maint-08_006r8 or its later version.

GroupResolution **Decision of Group:** **Rejected**

Adopt contribution C80216maint-08_006r9

Reason for Group's Decision/Resolution

maximum cdd delay to restrictive

Group's Notes

deferred until MIMO
vote: 16 approved, 20 opposed, 0 abstain

Editor's Notes **Editor's Actions** b) none needed

Comment by: Frank Zhou **Membership Status:** Member **Date:** 4/19/2008

Comment # 3245 **Document under Review:** P802.16Rev2/D4 **Ballot ID:** 26c

Comment **Type** Technical **Part of Dis** ☒ **Satisfied** ☐ **Page** ? **Line** 15 **Fig/Table#** 563 **Subclause** 11.4.1

I am unsatisfied with the resolution of my comment 2166 in LB26b. It was superceded without my permission.

Per comment 2166:

We propose BS to announcement its CDD parameters when using CDD. Please see detail at C80216maint-08/070r4 or its later revision.

Suggested Remedy

Please see detail at C80216maint-08/070r4 or its later revision.

GroupResolution **Decision of Group:** **Rejected**

adopt C80216maint-08/070r4

Reason for Group's Decision/Resolution

do not see benefit to broadcast the number or value of CDD

Group's Notes

deferred until MIMO
vote: 23 approve, 10 opposed, 0 abstain

Editor's Notes **Editor's Actions** b) none needed

Comment by: Yuval Lomnitz **Membership Status:** **Date:** 3/10/2008

Comment # 2147 **Document under Review:** P802.16REV2/D3 **Ballot ID:** 26b

Comment **Type** Technical **Part of Dis** ☐ **Satisfied** ☐ **Page** 953 **Line** 45 **Fig/Table#** **Subclause** 8.4.8

Definitions for transparent transmit diversity and beamforming

Currently CDD (cyclic delay diversity) is not defined in the 802.16 standard (OFDMA PHY) and is even contradictory to the standard, however widely used in practice in WiMAX system. It is necessary to define transparent CDD and supply necessary restrictions. Beamforming is also included in this scope since it requires similar definitions for interoperability which are missing in the standard today.

Suggested Remedy

Adopt contribution IEEE C802.16maint-08/006r4 or latest revision

GroupResolution **Decision of Group:** **Rejected**

Adopt C802.16maint-08/006r6

Reason for Group's Decision/Resolution

The requirement #5 in the contribution (maximum delay) is too restrictive.

Group's Notes

Result of vote to adopt C802.16maint-08/006r6: 23 in favor, 8 against
Result of revote to adopt C802.16maint-08/006r6: 31 in favor, 16 against

Editor's Notes **Editor's Actions** b) none needed

Comment by: Louay Jalloul **Membership Status:** member **Date:** 6/20/2008

Comment # 4184 **Document under Review:** P802.16REV2/D5 **Ballot ID:** 26d

Comment **Type** Technical **Part of Dis** ☐ **Satisfied** ☐ **Page** ? **Line** **Fig/Table#** **Subclause**

Cyclic delay diversity (CDD) is not defined in the 802.16 standard (OFDMA PHY). However, CDD is widely used in WiMAX systems. This formally defines transparent CDD and supplying necessary restrictions for it to work.

Suggested Remedy

Adopt C802.16maint-08/006r9.

GroupResolution **Decision of Group:** **Accepted-Modified**

Adopt C802.16maint-08/006r11

Reason for Group's Decision/Resolution

Group's Notes

Editor's Notes **Editor's Actions**

Schedule for confirmation ballot and resolution meeting

- July 25: Release Rev2/D6
- July 25: Open WG confirmation ballot
- August 9: Close WG confirmation ballot
- August 11: Submit the draft to IEEE for SB
- August 18: open sponsor ballot

Appendix: 802.16 WG Motions

1. **To accept draft P802.16Rev2/D5 as modified by the comment resolutions (80216-08/032r2) and to open a Working Group Confirmation Letter Ballot on that Draft (P802.16Rev2/D6), and to request conditional approval to the 802 EC to forward the draft to Sponsor Ballot.**
   - **Moved: Jonathan Labs, Seconded: Lei Wang**
   - **Passed: 72/0/0**
2. **To authorize the WG Chair and TG Chair to resolve any comments that may be submitted in Letter Ballot Recirc #26e.**
   - **Moved: Jonathan Labs, Seconded: John Humbert**
   - **Passed: 68/0/0**

Appendix: List of Disapprove Voters

- Frank Zhou