IEEE P802.11
Wireless LANs

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| D3.0 Comment Resolutions on Hybrid Beamforming Part I |
| Date: 2019-03-19 |
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Introduction

This submission proposes resolutions for the following 6 comments on Hybrid Beamforming: 4062, 4134, 4231, 4315, 4329 and 4344

Revisions:

- Rev 0: Initial version of document.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGay Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGay Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGay Editor: Editing instructions preceded by “TGay Editor” are instructions to the TGay editor to modify existing material in the TGay draft. As a result of adopting the changes, the TGay editor will execute the instructions rather than copy them to the TGay Draft.***

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| **CID** | **Commenter** | **Clause Number(C)** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 4062 | Alecsander Eitan | 9.4.2.269 | 170.01 | Table 28 is actually a reproduction of REVmd D2.1 Table 9-73.It is better to reference the former than duplicate. | Reference and not duplicate. | AcceptAgree with Commenter.TGay editor to make the changes as requested in the comment. |
| 4134 | Assaf Kasher | 10.43.10.2.4.3.1 | 298.29 | "The transmitter (initiator or responder) shall use BRP": what information is used by the STAs to determine whether it is the initiator or the responder who needs to respond? | Use passive form the avoid the issue | RevisedRemoved the disputed text in brackets. Added a note to describe the transmitter.TGay editor to make the changes shown in 11-19/0554r0 under all headings that include CID 4134 |
| 4231 | Kazuyuki Sakoda | 9.4.2.250.2 | 125.19 | There is an Editor Note in subclause 9.4.2.250.2 "there is no normative behavior in sections 10 or 11 associated with the two subfields above." This needs to be fixed before going to the sponsor ballot | Specify the normative behavior associated with these 2 subfields. | Revised The issue raised by the Editor Note was addressed as a part of the Draft 2.0 LB. See resolutions for CID 3054 and CID 3523 in 11-19/0075r1.The Editor Note should be removed.Editor to remove pg 125 line 19. TGay editor to make the changes shown in 11-19/0554r0 under all headings that include CID 4231 |
| 4315 | Oghenekome Oteri | 9.4.2.250.2 | 125.19 | Editor Note: there is no normative behavior in sections 10 or 11 associated with the two subfields above. | Already done: see 11-19/0075r1, CID 3054 and CID 3523. | Revised The issue raised by the Editor Note was addressed as a part of the Draft 2.0 LB. See resolutions for CID 3054 and CID 3523 in 11-19/0075r1.The Editor Note should be removed.Editor to remove pg 125 line 19. TGay editor to make the changes shown in 11-19/0554r0 under all headings that include CID 4315 |
| 4329 | Oghenekome Oteri | 10.40.11.4.2 | 249.35 | add description for HBF protocol in sentence "before initiating MIMO channel access, to" | Update to "before initiating MIMO channel access OR HBF PROTOCOL, to" | RevisedAgree in principle. Modified text of the suggestion.TGay editor to make the changes shown in 11-19/0554r0 under all headings that include CID 4329 |
| 4344 | Oghenekome Oteri | 9.4.2.269 | 165.22 | "When the Grouping 34 subfield within the Digital Fbck Control field is 3, the Digital BF Feedback element includes the Differential 35 Subcarrier Index field marking the number of subcarriers" .. Would be helpful if there were an example or a diagram | show example or diagram | RevisedAgree in principle but the diagram should be located in Chapter 10 which has normative text and not in Chapter 9 that discusses the structure of the element.TGay editor to make the changes shown in 11-19/0554r0 under all headings that include CID 4344 |

*Changes to D3.0*

***TGay Editor: Please make the following change from Pg 169 line 3 (#4062)***

In Table ~~28~~ Table 9-73 (Order of angles in the Compressed Beamforming Feedback Matrix subfield when used in a non-S1G band), *Nc* is the number of columns in a compressed beamforming feedback matrix determined by the Nc Index subfield within the Digital Fbck Control field, and *Nr* is the number of rows in a compressed beamforming feedback matrix determined by the Nr Index subfield within the Digital Fbck Control field.

***TGay Editor: Please make the following change from Pg 298 line 29 (#4134)***

The transmitter ~~(initiator or responder)~~ shall use BRP sounding immediately after the hybrid beamforming protocol announcement or when the DMG antenna configuration or the digital beamforming feedback may need to be modified. The transmitter ~~(initiator or responder)~~ may use BRP or digital baseband beam tracking when DMG antenna configuration and the digital beamforming feedback are unchanged.

NOTE - The transmitter described above is the STA that sends the TRN fields and may be the initiator or the responder

***TGay Editor: Please make the following change from Pg 125 line 19 (#4231, #4315)***

***~~Editor Note: there is no normative behavior in sections 10 or 11 associated with the two subfields above.~~***

***TGay Editor: Please make the following change from Pg 249 line 34 (#4329)***

If the Grant Required field within a responder’s EDMG Capabilities element is 1, the initiator shall transmit a Grant frame with a control trailer in a CBAP to this responder before initiating MIMO channel access or the hybrid beamforming protocol, to indicate the intent to transmit a MIMO PPDU to the responder or announce the start of the hybrid beamforming protocol respectively. Otherwise if the Grant Required field within a responder’s EDMG Capabilities is 0, the initiator may optionally transmit a Grant frame to the responder.

***TGay Editor: Please make the following change from Pg 301 line 11 (#4344)***

**10.43.10.2.4.4.1 General**

The feedback phase is used by the hybrid beamforming protocol to feed back the hybrid beamforming information to the transmitter for use in a subsequent hybrid beamforming transmission.

The feedback is carried in the MIMO BF Feedback frame and its contents are as follows:

* For the EDMG SC mode, when the BRP frame used during the sounding phase has the DBF FBCK REQ field equal to 1 within the DMG Refinement element, the MIMO BF Feedback frame contains the Digital BF Feedback element carrying the digital beamforming matrix information. When DBF FBCK REQ field equal to 0, the MIMO BF Feedback frame contains the Channel Measurement 18 Feedback element and the EDMG Channel Measurement Feedback element.
* For the EDMG OFDM mode, the MIMO BF Feedback frame contains the Digital BF Feedback element carrying the digital beamforming matrix information.

The feedback may be based on fixed grouping of the subcarriers with Ng = 2, 4 or 8 or the feedback may be based on dynamic grouping of the subcarriers in which the distance between the subcarriers may vary based on the characteristics of the channel fed back. These are illustrated in Figure xxx .



**Figure xxx – EDMG OFDM Mode Dynamic Feedback**

The capabilities governing the subcarrier grouping of an EDMG STA whose feedback is in the EDMG OFDM mode are contained in the Largest Ng Supported field and the Dynamic Grouping Supported field in the Beamforming Capability subelement of a STA’s EDMG Capabilities element.

An EDMG STA shall not transmit digital BF feedback with a subcarrier grouping value larger than that in the Largest Ng Supported field indicated by the STA receiving the feedback. An EDMG STA shall not transmit digital BF feedback using dynamic grouping if the STA receiving the feedback indicates that it does not support dynamic grouping.

**REFERENCES**

1. IEEE P802.11ayTM/D3.0

**Straw Poll**

Do you agree to accept comment resolutions for CIDs: 4062, 4134, 4231, 4315, 4329 and 4344 as proposed in 11-19/0554r0?