IEEE P802.11
Wireless LANs

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| Final D1.0 Comment Resolutions on Hybrid Beamforming  |
| Date: 2018-07-05 |
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Introduction

This submission proposes resolutions for the following 5 comments on Hybrid 1353, 1887, 1911, 1927, and 1994

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.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 1353 | 10.36.11.4.3 | 140.14 | "An EDMG STA shall transmit a Grant frame with a control trailer to a peer EDMG STA to indicate the intent to transmit a MIMO PPDU to the peer STA or announce the start of the hybrid beamforming protocol if the Grant Required field within the peer STA's EDMG Capabilities element is one. " - it is not clear whether the "Grant Required" field applies to the SU-MIMO BF or not. | Separate the soup from the flies. In 10.38.9.2.4.3.1, define what fields need to be set to start the anouncement phase, rather than only point to 10.36.11.4.3 | RejectedSU-MIMO channel access section has been completely re-written as 10.37.11.4 (MIMO Channel Access). See [11/18-0723r4](https://mentor.ieee.org/802.11/dcn/18/11-18-0723-04-00ay-resolution-to-cids-related-to-mimo-channel-access.docx)  |
| 1887 | 10.38.9.2.4.1 | 176.01 | No spec for CSI matrices | The text referes to NON\_COMPRESSED\_SV or CSI\_MATRICES but there is no specification for them. 802.11-2016 has some spec in section 19.3.12.3.2, but it is for HT PHY and not optimized for EDMG.Will provide a detailed submission about the solution. | RevisedSpec for CSI matrices addressed in 11/18-0441r2 We create entries in TXVECTOR table to define the COMPRESSED\_SV, NON\_COMPRESSED\_SV and CSI-MATRICES TXVECTORs for EDMGTGay editor to make the changes shown in 11-18/1182r0 under all headings that include CID 1887 |
| 1911 | 10.38.7 | 160.07 | Harmonize terminology "Digital beamforming, baseband beamforming and hybrid beamforming": multiple cases. | Make digital beamforming. Ensure HBF is analog and digital beamforming | RevisedHybrid beamforming definition resolved in CID 1491 (11/18-0715r1). Two terminologies used in specification that refer to the exact same thing i.e. “Digital beamforming” and “Digital Baseband Beamforming”.“Digital” and “baseband” are redundant as all digital is done in the baseband. Also the term “Digital baseband” is relatively long.Just use terminology “Digital beamforming”TGay editor to make the changes shown in 11-18/1182r0 under all headings that include CID 1911 |
| 1927 |  |  | All "baseband beamforming" or "baseband beamformer" should be changed to "digital baseband beamforming" or "digital baseband beamformer". | Change all "baseband beamforming" and "baseband beamformer" to "digital baseband beamforming" and "digital baseband beamformer", respectively. | Revised.Modified to term “digital beamformer” as discussed in CID 1927.TGay editor to make the changes shown in 11-18/1182r0 under all headings that include CID 1927 |
| 1994 | 10.38.9.2.4.1 | 176.01 | No spec for CSI matrices | The text referes to NON\_COMPRESSED\_SV or CSI\_MATRICES but there is no specification for them. 802.11-2016 has some spec in section 19.3.12.3.2, but it is for HT PHY and not optimized for EDMG.Will provide a detailed submission about the solution. | RevisedIdentical problem and solution to CID 1887. Spec for CSI matrices addressed in 11/18-0441r2 We create entries in TXVECTOR table to define the COMPRESSED\_SV, NON\_COMPRESSED\_SV and CSI-MATRICES TXVECTORs for EDMGTGay editor to make the changes shown in 11-18/1182r0 under all headings that include CID 1994 |

*Changes to D1.3*

***TGay Editor: Please make the following change from Pg 326 line 1 (#1991, #1927)***

Editor to change all references to “Digital baseband beamforming” in D1.3 to “Digital beamforming”

**Pg 236 line 11**

NOTE—If the EDMG\_BEAM\_TRACKING\_TYPE parameter in the RXVECTOR is Baseband Beam Tracking, the digital (#1911, #1927) ~~baseband~~ beamformers at the initiator can be set to a predetermined orthogonal matrix (e.g., the identity matrix) during the transmission of the appended TRN-R subfields only and the measurement at the initiator is based on the appended TRN-R packets**.**

**Pg 236 line 26**

The digital (#1911, #1927) ~~baseband~~ beamformer for the responder can be set to a predetermined orthogonal matrix (e.g., the identity matrix) during the transmission of the appended TRN-T subfields only and the measurement is based on the appended TRN-T subfields.

***TGay Editor: Please make the following change from Pg 326 line 1 (#1887, #1994).***

***Table 40- TXVECTOR and RXVECTOR parameters***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| *EXPANSION\_MAT* | *FORMAT is EDMG. EXPANSION\_MAT**\_TYPE is**COMPRESSED\_SV* | *Contains a set of compressed digital beamforming feedback matrices as defined in 9.4.2.270. The number of elements depends on the number of subcarriers, the number of spatial streams and the number of transmit chains.* | *Y* | *N* |
|  | *FORMAT is EDMG. EXPANSION\_MAT**\_TYPE is**NON\_COMPRESSED\_SV* | *Contains a set of noncompressed beamforming feedback matrices as defined in 9.4.2.270. The number of complex elements depends on the number of feedback taps per element of the SC feedback matrix, the number of columns, and the number of rows in each matrix.* | *Y* | *N* |
|  | *EXPANSION**\_MAT\_TYPE is**CSI\_MATRICES* | *Contains a set of CSI matrices as defined in 9.4.2.253. The number of complex elements depends on the number of feedback taps per element of the SC feedback matrix, the number of columns, and the number of rows in**each matrix.* | *Y* | *N* |
|  | *Otherwise* | *Not present* | *N* | *N* |
| *EXPANSION\_MAT\_TYPE* | *EXPANSION\_MAT**is present* | *Enumerated type:**COMPRESSED\_SV indicates that EXPANSION\_MAT is a set of compressed beamforming feedback matrices.**NON\_COMPRESSED\_SV indicates that EXPANSION\_MAT is a set of noncompressed beamforming feedback matrices.**CSI\_MATRICES indicates that EXPANSION\_MAT is a set of channel state matrices.* | *Y* | *N* |

**References:**

1. **IEEE P802.11ayTM/D1.0**
2. **IEEE P802.11ayTM/D1.3**

**Straw Poll**

Do you agree to accept comment resolutions for CIDs 1353, 1887, 1911, 1927, and 1994 as proposed in 11-18/1182r0?