IEEE P802.11
Wireless LANs

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| Draft text for Hybrid MU MIMO Beamforming Baseband Feedback |
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Abstract

The document provides proposed text change to IEEE802.11ay draft 1.2.

It is to enable efficient MIMO CSI feedback by adding a Tx Antenna Mask subfield to Digital Fbck Control Field in MIMO Feedback Control element, according to the proposal in [1].

***TGay Editor: Please make the following change:***

9.4.2.261.MIMO Feedback Control element

The MIMO Feedback Control element, as shown in Table 9-xxx (MIMO Feedback Control element format), is used to carry configuration information for accompanying Channel Measurement Feedback element, EDMG Channel Measurement Feedback element, and/or Digital BF Feedback element.

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| --- |
| Table 9-xxx MIMO Feedback Control element format   |
| Field | Size | Meaning |
| Element ID | 8 bits |  |
| Length | 8 bits |  |
| Element ID Extension | 8 bits |  |
| SU/MU | 1 bit | Sets to 1 to indicate SU-MIMO beamforming and sets to 0 to indicate MU-MIMO beamforming. |
| Link Type | 1 bit | Sets to 1 to indicate initiator link and sets to 0 otherwise. This field shall be set to 1 when the SU/MU field is set to 0. |
| MIMO FBCK-TYPE | 12bits |  |
| Digital Feedback Control Field | 30bits | Defines the requirements for the digital feedback type. |

The Element ID, Length and Element ID Extension fields are defined in 9.4.2.1 (General).

The MIMO FBCK-TYPE field is defined in Figure 61.

 The Digital Feedback Control field is defined in Figure 9-x and is described in Figure 9-xxxx.

**Figure 9-x- Digital Feedback Control Field**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Index | *Nr* Index | Tx Antenna Mask |  | Grouping | CodebookInformation | Feedback Type | Number of Feedback Matrices or Feedback Taps  |
| Bits: | 3 | 3 | 8 | 2 | 2 | 1 | 1 | 10 |

The subfields of the Digital Feedback Control field are defined in Table 9-xx (Subfield of Digital Feedback Control field)

Table 9-xxxx-Subfields of Digital Feedback Control field

|  |  |
| --- | --- |
| ***Subfield*** | ***Meaning*** |
| Nc Index | Indicates the number of columns, Nc, in the beamforming feedback matrix minus one :Set to 0 for Nc = 1Set to 1 for Nc = 2Set to 2 for Nc = 3Set to 3 for Nc = 4Set to 4 for Nc = 5Set to 5 for Nc = 6Set to 6 for Nc = 7Set to 7 for Nc = 8 |
| Nr Index  | Indicates the number of rows, Nr, in a beamforming feedback matrix minus one:Set to 0 for Nr = 1Set to 1 for Nr = 2Set to 2 for Nr = 3Set to 3 for Nr = 4Set to 4 for Nr = 5Set to 5 for Nr = 6Set to 6 for Nr = 7Set to 7 for Nr = 8 |
| Tx Antenna Mask | Indicates the Tx Antennas reported in the accompanying Digital BF Feedback element. If the CSI for *i*th Tx Antenna is included in the accompanying Digital BF feedback element, the *i*th bit in Tx Antenna Mask is set to 1. Otherwise, the *i*th bit in Tx Antenna Mask is set to 0. |
|  | Indicates the number of contiguous 2.16 GHz channels, the measurement was made for minus one:Set to 0 for 2.16 GHzSet to 1 for 4.32 GHzSet to 2 for 6.48 GHzSet to 3 for 8.64 GHz |
| Grouping | Indicates the subcarrier grouping, Ng, used for beamforming feedback matrix Set to 0 for Set to 1 for Set to 2 for Set to 3 for dynamic grouping; Reserved if dynamic grouping is not supported |
| Codebook Information | Indicates the size of codebook entries:If the SU/MU field in the MIMO Feedback Control element is 1:Set to 0 for 6 bits for , 4 bits forSet to 1 reservedIf the SU/MU field in the MIMO Feedback Control element is 0:Set to 0 for 9 bits for , 7 bits for Set to 1 reserved |
| Feedback Type | Indicates which type of feedback is providedSet to 0 for uncompressed beamforming feedback in time domain (SC)Set to 1 for compressed using Givens-Rotation in frequency domain (OFDM) |
| Number of Feedback Matrices or Feedback Taps  | If the Feedback Type subfield is set to 0, is equal to the number of feedback taps per element of the SC feedback matrix.If the Feedback Type subfield is set to 1 and the Grouping subfield is set to less than 3, is determined by Table 9-xx (Subcarriers for which a Compressed Beamforming Feedback Matrix subfield is sent back)If the Feedback Type subfield is set to 1 and the Grouping subfield is set to 3, specifies the number of subcarriers present in the Digital Beamforming Feedback Information minus one.  |

**Reference**

[1] https://mentor.ieee.org/802.11/dcn/18/11-18-0992-02-00ay-baseband-feedback-for-hybrid-mu-mimo-beamforming.pptx

[2] https://mentor.ieee.org/802.11/dcn/18/11-18-0441-02-00ay-cr-on-hybrid-beamforming-feedback.docx

**Straw Poll:**

* **Do you agree to accept the text modifications proposed in 11-18/1035r1 into the next version of 11ay draft standard?**