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.

|  |  |  |
| --- | --- | --- |
| 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 | Codebook  Information | 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 = 1  Set to 1 for Nc = 2  Set to 2 for Nc = 3  Set to 3 for Nc = 4  Set to 4 for Nc = 5  Set to 5 for Nc = 6  Set to 6 for Nc = 7  Set 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 = 1  Set to 1 for Nr = 2  Set to 2 for Nr = 3  Set to 3 for Nr = 4  Set to 4 for Nr = 5  Set to 5 for Nr = 6  Set to 6 for Nr = 7  Set 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 GHz  Set to 1 for 4.32 GHz  Set to 2 for 6.48 GHz  Set 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 for  Set to 1 reserved  If 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 provided  Set 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?**