IEEE P802.11
Wireless LANs

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| Proposed changes for MU type sounding feedback |
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Abstract

This submission proposes text changes of TGbe Draft 1.0

Revisions:

* Rev 0: Initial version of the 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 TGbe Draft 0.3. This introduction is not part of the adopted material.

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

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

**Disussions:**

1. **Main change of this document:** In the current 11be draft, it’s **optional** to support **Partial BW DL MUMIMO,** however the support of **Partial BW MU\_Type feedback,** which is used to support Partial BW DL MUMIMO, is **mandatory**. This document proposes to change the mandatory support of Partial BW MU\_Type feedback from mandatory to conditional mandatory. Namely, **if a non-AP STA supports the reception of Partial BW DL MUMIMO, the STA shall support transmit Partial BW MU Type feedback, otherwise it’s optional**.
2. **Clarifications:** currently the full BW with puncturing is categorized as partial BW feedback. The partial BW feedback was mainly for the case that RU/MRU requested in NDPA is smaller than the entire non-puctured portion of the PPDU. E.g. 160MHz with 40MHz punctured. If NDPA indicate 996+484 feedback, it should be full BW feedback; if NDPA indicate 996 feedback, it should be for partial BW. So propose the following definitions of full/partial bandwidth beamforming feedback:
	1. Full BW SU, MU or CQI feedback refers to the feedback mode where the RU/MRU indicated in the Partial BW Info subfield of the EHT NDP Announcement frame spans **all** the available PPDU BW, where the available PPDU BW is the entire PPDU BW if puncture is not applied and is the entire non-punctured PPDU BW if puncture is applied.
	2. Partial BW SU, MU or CQI feedback refers to the feedback mode where the RU/MRU indicated in the Partial BW Info subfield of the EHT NDP Announcement frame spans **part** of the available PPDU BW, where the available PPDU BW is the entire PPDU BW if puncture is not applied and is the entire non-punctured PPDU BW if puncture is applied.

**Proposed text changes:**

**In the section of “9.4.2.295c.3 EHT PHY Capabilities Information field” change the two capability fiels below**

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| Triggered MU Beamforming Partial BWFeedback | For an AP, indicates support for the reception of partial bandwidth MU feedback in an EHT TB sounding sequence. For a non-AP STA, indicates support for the transmission of partial bandwidth MU feedback in an EHT TB sounding sequence. | Set to 0 if not supported.Set to 1 if supported. For a non-AP STA, this field is set to 1 if the Partial Bandwidth DL MU-MIMO subfield is set to 1. |

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| Partial BandwidthDL MU-MIMO | For a non-AP STA, indicates support for thereception of a DL MU-MIMO transmission onan RU/MRU in an EHT MU PPDU where theRU/MRU does not span the entire nonpunctured portion of the PPDUbandwidth (DL MU-MIMO within OFDMA) | For a non-AP STA:Set to 0 if not supported.Set to 1 if supported.NOTE—A non-AP STAthat sets this field to 0 supports receiving a partialbandwidth RU/MRU allocated to a single user within an EHT MU PPDU where some other RU/MRU are employing DLMU-MIMO. |

**In P.L. 289.27 make the following changes.**

The bandwidth (partial or full) of the feedback solicited by an EHT beamformer from an EHT beamformee
depends on the Partial BW Info subfield in the STA Info field identifying the EHT beamformee in the EHT
NDP Announcement frame and the bandwidth of the EHT NDP Announcement frame. The bandwidth of
the EHT NDP Announcement frame and the EHT NDP frame shall be same.

Full bandwidth SU, MU or CQI feedback refers to the feedback mode where the Feedback RU/MRU size indicated in the Partial BW Info subfield of the EHT NDP Announcement frame spans all the available PPDU BW, where the available PPDU BW is the entire PPDU BW if puncture is not applied and is the entire non-punctured PPDU BW if puncture is applied.

* Note that for a beamformee with operating BW smaller than the BW of NDP Announcement frame, a full bandwidth feedback also refers to the feedback mode where the Feedback RU/MRU size indicated in the Partial BW Info subfield of the EHT NDP Announcement frame spans all the beamformee’s available operating BW, where the available operating BW is the beamformee’s entire operating BW if puncture is not applied and is the beamformee’s entire non-punctured operating BW if puncture is applied.

Partial bandwidth SU, MU or CQI feedback refers to the feedback mode where the Feedback RU/MRU size indicated in the Partial BW Info subfield of the EHT NDP Announcement frame spans part of the available PPDU BW, where the available PPDU BW is the entire PPDU BW if puncture is not applied and is the entire non-punctured PPDU BW if puncture is applied.

An EHT NDP Announcement frame shall only request partial BW feedback on a large RU or MRU that is defined for each signal bandwidth in 36.3.2 (Subcarrier and resource allocation).

An EHT NDP Announcement frame shall not request feedback on a 242-tone RU that is signaled as punctured in the U-SIG of the NDP that follows the EHT NDP Announcement frame.

An EHT NDP Announcement frame shall not request partial BW feedback on a 242-tone RU outside of the beamformee’s operating channel width.

An SU beamformer shall only solicite full bandwidth SU feedback from an SU beamformee in an EHT non-TB sounding sequence.

An SU beamformer may solicit partial bandwidth or full bandwidth SU feedback from an SU beamformee in an EHT TB sounding sequence if the SU beamformee indicates support by setting the Triggered SU Beamforming Feedback subfield in the EHT PHY Capabilities Information field in the EHT Capabilities element it transmits to 1.

An MU beamformer may solicit full bandwidth MU feedback from an MU beamformee in an EHT TB sounding sequence. An MU beamformer may solicit partial bandwidth MU feedback from an MU beamformee in an EHT TB sounding sequence if the MU beamformee indicates support by setting the Triggered MU Beamforming Feedback subfield in the EHT PHY Capabilities Information field in the EHT Capabilities element it transmits to 1. An MU beamformer shall not solicit MU feedback in an EHT non-TB sounding sequence.

An MU beamformer may solicit partial bandwidth or full bandwidth CQI feedback from an MU beamformee in an EHT TB sounding sequence if the MU beamformee indicates support by setting the Triggered CQI Beamforming Feedback subfield to 1.

An MU beamformer may solicit partial bandwidth or full bandwidth CQI feedback from an MU beamformee in an EHT non-TB sounding sequence if the MU beamformee indicates support by setting the Non-Triggered CQI Beamforming Feedback subfield to 1.

**Replace P.L. 291.44 to P.L.292.2 with the text below.**

**For a MU Beamformee the supported feedback RU/MRU sizes for MU feedback are listed in table 35-a1 (The supported feedback RU/MRU size for MU feedback)**

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| Table 35-a1 The supported feedback RU/MRU size for MU feedback |
| **Operating channel width of the EHT beamformee (MHz)** |  | **Bandwidth of EHT NDP Announcement frame (MHz)** |
| 20 | 40 | 80 | 160 | 320 |
| 20  | Mandatory supported RU/MRU  | 242 | N/A |
| Optional supported RU/MRU | N/A | 242 | 242 | 242 | N/A |
| 40 | Mandatory supported RU/MRU | 242 | 484 | N/A |
| Optional supported RU/MRU | N/A | 242 | N/A |
| 80 | Mandatory supported RU/MRU | 242 | 484 | 484+242, 996 | 484+242, 996 | 996 |
| Optional supported RU/MRU | N/A | 242 | 242, 484 | 242, 484 | 484 |
| 160 | Mandatory supported RU/MRU | 242 | 484 | 484+242, 996 | 996+484, 996+484+242, 2x996 | 996+484, 2x996 |
| Optional supported RU/MRU | N/A | 242 | 242, 484 | 242, 484, 996, 484+242 | 484, 996 |
| 320 | Mandatory supported RU/MRU | 242 | 484 | 484+242, 996 | 996+484, 996+484+242, 2x996 | 2x996+484, 3x996, 3x996+484, 4x996 |
| Optional supported RU/MRU | N/A | 242 | 242, 484 | 242, 484, 996, 484+242 | 484, 996, 996+484, 2x996 |

A 20 MHz operating EHT beamformee shall support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 20MHz.

A 20 MHz operating EHT beamformee may support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz, 80MHz, 160MHz.

A 40 MHz operating EHT beamformee shall support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 20MHz;
* 484 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz.

A 40 MHz operating EHT beamformee may support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz.

An 80 MHz operating EHT beamformee shall support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 20MHz;
* 484 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz;
* 484+242 tone MRU and 996 tone RU feedback if the bandwidth of NDP announcement frame is 80MHz or 160MHz;
* 996 tone RU feedback if the bandwidth of NDP announcement frame is 320MHz.

An 80 MHz operating EHT beamformee may support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz;
* 242 tone and 484 tone RU feedback if the bandwidth of NDP announcement frame is 80MHz or 160MHz;
* 484 tone RU feedback if the bandwidth of NDP announcement frame is 320MHz.

An 160 MHz operating EHT beamformee shall support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 20MHz;
* 484 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz;
* 484+242 tone MRU and 996 tone RU feedback if the bandwidth of NDP announcement frame is 80MHz;
* 996+484 tone MRU, 996+484+242 tone MRU and 2x996 tone RU feedback if the bandwidth of NDP announcement frame is 160MHz;
* 996+484 tone MRU and 2x996 tone RU feedback if the bandwidth of NDP announcement frame is 320MHz .

An 160 MHz operating EHT beamformee may support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz;
* 242 tone and 484 tone RU feedback if the bandwidth of NDP announcement frame is 80MHz;
* 242 tone, 484 tone, 996 tone RU and 484+242 tone MRU feedback if the bandwidth of NDP announcement frame is 160MHz;
* 484 tone and 996 tone RU feedback if the bandwidth of NDP announcement frame is 320MHz.

A 320 MHz operating EHT beamformee shall support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 20MHz;
* 484 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz;
* 484+242 tone MRU and 996 tone RU feedback if the bandwidth of NDP announcement frame is 80MHz;
* 996+484 tone MRU, 996+484+242 tone MRU and 2x996 tone RU feedback if the bandwidth of NDP announcement frame is 160MHz;
* 2x996+484 tone MRU, 3x996 tone RU, 3x996+484 tone MRUand 4x996 tone RU feedback if the bandwidth of NDP announcement frame is 320MHz.

A 320 MHz operating EHT beamformee may support MU feedback for

* 242 tone RU feedback if the bandwidth of NDP announcement frame is 40MHz;
* 242 tone and 484 tone RU feedback if the bandwidth of NDP announcement frame is 80MHz;
* 242 tone, 484 tone, 996 tone RU and 484+242 tone MRU feedback if the bandwidth of NDP announcement frame is 160MHz;
* 484 tone RU, 996 tone RU,996+484 tone MRUand 2x996 tone RU feedback if the bandwidth of NDP announcement frame is 320MHz.