IEEE P802.11  
Wireless LANs

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| MRQ in NDPA | | | | |
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| Author(s): | | | | |
| Name | Affiliation | Address | Phone | Email |
| Simone Merlin | Qualcomm Inc | 5775 Morehouse Dr  San Diego, CA 92109 | 8588451243 | smerlin@gmail.com |
| Menzo Wentink | Qualcomm Inc | Straatweg 66-S, 3621 BR Breukelen,  The Netherlands |  | mwentink@qualcomm.com |
| Allert van Zelst | Qualcomm | Straatweg 66-S, 3621 BR Breukelen, The Netherlands | +31 346 259663 | allert@qualcomm.com |

Abstract

This document provides resolution for the comments listed below

Comments are from: 11-11-0276-00-00ac-tgac-d0-1-comments.xls

Comments refer to: Draft P802.11ac\_D0.1.pdf

Editing instructions refer to: Draft P802.11ac\_D0.4.pdf

**Comments**

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| 1072 | 9.18.3 | 56 | 28 | TR | MFB is not done in case there is mixture of SU-BF feedback and MU-BF feedback. This unnecessarily creates artificial restriction where if the AP wants MFB as well as CB feedback then it must only assign SU-BF feedback in the NDPA. Remove such restriction. | change to make STA feedback MFB only if SU-BF feedback if configured for that particular STA if MRQ is enabled in NDPA. For STAs configured with MU-BF feedback should disregard the MRQ when MRQ is enabled in NDPA. Suggested text : "The MFB responder shall include the corresponding MFB feedback in the VHT Compressed Beamforming frame that is the response of the same NDP-A and NDP sequence, if the MFB requester sends MRQ in an VHT NDP announcement frame where the Feedback Type subfield in the STA Info field for the MFB spresonder is set to 1 (meaning requesting SU-BF Feedbacks).  The MFB responder shall indicate MFB=127 in the VHT Compressed Beamforming frame that that is the response of the same NDP-A and NDP sequence, if the MFB requester sends MRQ in an VHT NDP announcement frame where the Feedback Type subfield in the STA Info field for the MFB spresonder is set to 0 (meaning requesting MU-BF Feedbacks)." | Daewon. [Ed: removed from 11/304r1] | MU |

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| 1464 | 9.18.3 | 56 | 28 | TR | restriction to only feedback MFB in case there is only SU-BF feedback is not needed. The MFB now as it stand does not support mixture of MU-BF and SU-BF. | change the section to allow support of mixture of MU-BF and SU-BF. | Daewon. [Ed: removed from 11/304r1] | MU  Agree in principle |

**Proposed resolution**

Agree in principle. See discussion.

**Discussion**

1. Text proposed in DCN 304r1 and included in D0.4 defines the MFB value when present in a Beamforming feedback of type SU.

*If the MFB is in the same PPDU as a VHT Compressed Beamforming frame where the Feedback Type subfield*

*in the VHT MIMO Control field(Ed) is set to 0 (meaning SU-BF feedback), the MFB responder shall*

*estimate the recommended MFB under the assumption that the MFB requester will use the steering matrices*

*contained therein.*

Text is silent about the value of the MFB in case MFB is present in a Beamforming feedback of type MU (or whether that is allowed)

1. Text proposed in DCN 304r0 defines that MFB shall be present in a Compressed beamforming frame that is a response to an NDPA carrying a (single) STA Info field and requesting for SU type of feedback

*If the MFB requester sends MRQ in an NDPA frame where the Feedback Type subfield in the STA Info field*

*is set to 1 (meaning requesting SU-BF Feedback), then the MFB responder shall include the corresponding*

*MFB (#1069)in the VHT Compressed Beamforming frame that is the response to the same NDPA and NDP*

*sequence.*

Text is silent about the meaning of MRQ in a broadcast NDPA and what the responder should do.

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| **NDPA** | **Feedback type** | **Response in VHT-CB** |
| Single STA Info field + MRQ | SU type | **Mandatory SU-BF MFB** |
| Single STA Info field + MRQ | MU type | **Undefined (1)** |
| Multiple STA Info field | Any of SU/MU | **Undefined (2)** |

**Proposal for 1): send SU MFB also in MU case**

* *If the MFB is sent in the same PPDU as a VHT Compressed Beamforming frame, the MFB responder shall estimate the recommended MFB under the assumption that the MFB initiator will use the steering matrices contained therein for performing a SU beamformed transmission*

Clearly, the correct MU MFB cannot be estimated from the sounding procedure, but

any information on the status of the link is useful for MU rate prediction

* + An MFB computed assuming SU BF can be leveraged to improve the MCS selection for the MU-MIMO case

**Moreover, MU feedback can be used for SU beamforming**

* + MFB assuming SU BF is correct for this case

**Advantages**

* + No difference between SU and MU
  + MU feedback can be used for SU BF as well
  + Allows for improved rate adaptation for MU
  + No benefits in disallowing this mode

**Proposal for 2):**

**Allow MRQ in an NDPA with multiple STA Info fields**

* + As long as all the STAs listed in the NDPA support the reception of MRQ

**MRQ in this case solicits MFB from all the STAs listed in the NDPA**

* + STAs shall reply with MFB in the VHT compressed beamforming report frame (as in current specs for the SU case)

*In case of an NDPA frame with multiple STA Info fields and carrying a VHT format of HT Control field with MRQ set to 1, the MRQ is intended to solicit an MFB response from all the STAs listed in the AID field of the STA Info fields;*

*an NDPA frame with multiple STA Info fields shall not carry a VHT format of HT Control field with MRQ set to 1, unless all the STAs listed in the AID field of the STA Info fields have advertized support for the solicited link adaptation.*

**Advantages:**

* + Allows link adaptation when an NDPA with multiple STAs is used
  + As pointed out by the comment, if this mode is not allowed, beamformer has to decide between using multi-STA NDPA or requesting link adaptation (the two operation cannot be done at the same time)
    - used for both SU and MU type of feedback

**Editing instructions**

***Modify the following sentence in section 9.18.3 (Link adaptation using the VHT Format of HT Control field) at P76L55***

*If the MFB is in the same PPDU as a VHT Compressed Beamforming frame, the MFB responder shall*

*estimate the recommended MFB under the assumption that the MFB requester will use the steering matrices*

*contained therein for performing a SU beamformed transmission.*

***Modify the sentence in section 9.18.3 (Link adaptation using the VHT Format of HT Control field)at P77L1***

If the MFB requester sends MRQ in an NDPA frame, then the MFB responder shall include the corresponding

MFB (#1069)in the VHT Compressed Beamforming frame that is the response to the same NDPA and NDP

sequence.

***Add the following paragraph in section 9.18.3 (Link adaptation using the VHT Format of HT Control field ) at P77L6***

In case of an NDPA frame with multiple STA Info fields and carrying a VHT format of HT Control field with MRQ set to 1, the MRQ is intended to solicit an MFB response from all the STAs listed in the AID field of the STA Info fields;

***Add the following paragraph at the end of section 8.3.1.11 NDPA frame format***

An NDPA frame with more than one STA Info fields shall not carry a HT Control field, unless all the STAs listed in the AID field of the STA Info fields have set +HTC-VHT Capable to 1 in VHT capabilities Info field or set +HTC-HT Support to 1 in HT Extended Capabilities field;

***Add the following sentence in 9.30.5 VHT sounding protocol P79L39***

A bemaformer that sets the Feedback Type subfield of a STA Info field to 1 shall set the Nc subfield of the same STA Info field to a value equal or less than the maximum number of supported spatial streams according to the Rx MCS map inVHT Supported MCS set field.