IEEE P802.11
Wireless LANs

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| LB 200 Comment Resolution for CID 1508 |
| Date: 2014-05-01 |
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Abstract

This submission proposes resolutions for comments in clause DUMMY of TGah Draft 1.0 with the following CIDs:

1508

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 TGah Draft. This introduction is not part of the adopted material.

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

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

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1508 | 180.1 | 9.29 | How does Link Adaptation procedure work for 11ah. Also in the S1G Capabilities element it is indicated that anS1G may support both HT and VHT variant which seems excessive. Also is it needed to use control wrapper frames? And do all fields in the HT Control field make sense for S1G? | Add description for Link Adaptation procedure for S1G in a similar way as for VHT clearly describing that when this procedure is enabled, the TX/Rxer use normal control response frames instead of NDP frames (respect NAV/RID settings). | Revised –Agree with commenter. Proposed resolution is inline with proposed changes by the commenter. TGah editor to make the changes shown in 14/0603r0 for CID 1508 |

**Discussion:** *None*

**9.30.3 Link adaptation using the VHT variant HT Control field**

***TGah Editor: Change this subclause as follows:***

The behavior described in this subclause is specific to the VHT variant HT Control field which can be used by VHT STAs and S1G STAs.

For link adaptation procedure between two S1G STAs the same behavior that is described throughout this subclause is valid with the following qualifications:

* “VHT” is replaced by “S1G” when referring to characteristics of an S1G STA or when referring to the contents of an S1G PPDU. More specifically:
	+ “VHT Capabilities Info field in the VHT Capabilities element” is replaced by “S1G Capabilities Info field in the S1G Capabilities element”
	+ “VHT NDP Announcement frame” is replaced by “S1G NDP Announcement frame”
	+ “VHT MU PPDU” is replaced by “S1G MU PPDU”

A STA that supports VHT link adaptation using the VHT variant HT Control field shall set the VHT Link Adaptation Capable subfield in the VHT Capabilities Info field in the VHT Capabilities element to Unsolicited or Both, depending on its specific link adaptation feedback capability. A STA shall not send an MRQ to STAs that have not set VHT Link Adaptation Capable subfield to Both in the VHT Capabilities Info field of the VHT Capabilities element. A STA whose VHT Link Adaptation Capable subfield of the VHT Capabilities Info field of the VHT Capabilities element is either set to Unsolicited or Both may transmit unsolicited MFB in any frame that contains a VHT variant HT Control field.

The MFB requester or MFB responder that is an S1G STA shall set the S1G subfield in the VHT variant HT Control field to 1. Otherwise the value of the S1G field shall be reserved.

An S1G STA shall not transmit a +HTC Control frame to another S1G STA that does not support VHT link adaptation.

An S1G STA that is an MFB requester shall set the TXVECTOR parameter RESPONSE\_INDICATION to NORMAL\_RESPONSE if it intends to elicit link adaptation feedback in the immediate control response frame. Otherwise, it shall not set the TXVECTOR parameter RESPONSE\_INDICATION to Normal Response, unless it is permitted to do so as described in 9.23 (Block acknowledgement (block ack), 9.3.2.9 (Ack procedure), and 9.42 (Target Wake Time).

An S1G STA that is an MFB responder may transmit a +HTC Control frame as an immediate response to an eliciting frame for which the RXVECTOR parameter RESPONSE\_INDICATION is equal to NORMAL\_RESPONSE. The +HTC Control Response frame shall be one of the following:

* +HTC Ack frame if the eliciting frame requires an Ack frame as a response (see 9.3.2.9)
* +HTC BlockAck or +HTC BAT frame if the eliciting frame requires a BlockAck or BAT frame as a response (see 9.23)
* +HTC TACK or +HTC STACK frame if the eliciting frame requires a TACK or STACK frame as a response (see 9.45)

Otherwise, the S1G STA shall not transmit a +HTC Control response frame.

The MFB requester may set the MRQ field to 1 in the VHT variant HT Control field of a frame to request a STA to provide link adaptation feedback. In each request the MFB requester shall set the MSI/STBC field to a value in the ranges 0 to 6, 0 to 2, or 0 to 3, depending on the settings in the Unsolicited MFB and STBC fields (see 8.2.4.6.3 (VHT variant(11ac))). The choice of MSI value is implementation dependent.

The appearance of more than one instance of a VHT variant HT Control field with the MRQ field equal to 1 within a single PPDU shall be interpreted by the receiver as a single request for link adaptation feedback.

An MFB responder that has set the VHT Link Adaptation Capable subfield to Both in the VHT Capabilities Info field of the VHT Capabilities element shall support both of the following:

* Computation and feedback of the MFB estimate on the receipt of an MFB request (MRQ equal to 1 in the VHT variant HT Control field) in a PPDU that is not a VHT NDP Announcement frame
* Computation and feedback of the MFB estimate on the receipt of an MFB request (MRQ equal to 1 in VHT variant HT Control field) in a VHT NDP Announcement frame and the receipt of VHT NDPs (see 9.33 (Null data packet (NDP) sounding)) if this STA set the SU Beamformee Capable subfield of the VHT Capabilities Info field of the VHT Capabilities element to 1

On receipt of a VHT variant HT Control field with the MRQ field equal to 1, an MFB responder computes the VHT-MCS, NUM\_STS, and SNR estimates based on the PPDU carrying the MRQ or, in the case of a VHT NDP Announcement frame carrying the MRQ, based on the subsequent VHT NDP. The MFB responder labels the result of this computation with the MSI value from the VHT variant HT Control field in the received frame carrying the MRQ. The MFB responder may include the received MSI value in the MFSI field of the corresponding response frame. In the case of a delayed response, this allows the MFB requester to associate the MFB with the soliciting MRQ.

An MFB responder that sends a solicited MFB shall set the Unsolicited MFB subfield in VHT variant HT

Control field to 0.

The MFB responder may send a solicited response frame with any of the following combinations of VHT-MCS, NUM\_STS, and MFSI:

* VHT-MCS = 15, NUM\_STS = 7 in the MFB subfield, MFSI = 7 in a VHT PPDU and VHT-MCS = 15, NUM\_STS = 3 and MFSI = 7 in an S1G PPDU: no information is provided for the immediately preceding request or for any other pending request. This combination is used when the responder is required to include a VHT variant HT Control field due to other protocols that use this field (e.g., the Reverse Direction Protocol) and when no MFB is available. It has no effect on the status of any pending MRQ.
* VHT-MCS = 15, NUM\_STS = 7 in the MFB subfield, MFSI in the range 0 to 6 in a VHT PPDU and VHT-MCS = 15, NUM\_STS = 3 and MFSI in the range 0 to 6: the responder is not now providing, and will never provide, feedback for the request that had the MSI value that matches the MFSI value.
* VHT-MCS = valid value, NUM\_STS = valid value in the MFB subfield, MFSI in the range 0 to 6: the responder is providing feedback for the request that had the MSI value that matches the MFSI value.

An MFB responder that discards or abandons the MFB estimates computed in response to an MRQ may indicate that it has done so by setting the VHT-MCS to 15 and NUM\_STS to 7 in the MFB subfield in the next VHT PPDU frame if the frame is carried in a VHT PPDU or by setting the VHT-MCS to 15, NUM\_STS to 3 if the frame is carried in an S1G PPDU addressed to the MFB requester that includes the VHT variant HT Control field. The value of the MFSI is set to the value of the MSI/STBC subfield of the frame that contains an MRQ for which the computation was abandoned, regardless of whether the MSI/STBC subfield contains an MSI or a Compressed MSI and STBC Indication subfields.

The STA receiving MFB may use the received MFB to compute the appropriate VHT-MCS, SNR, and NUM\_STS.

A STA sending unsolicited MFB feedback using the VHT variant HT Control field shall set the Unsolicited MFB subfield to 1.

Unsolicited VHT-MCS, NUM\_STS, BW, and SNR estimates reported in the MFB subfield of a VHT variant HT Control field sent by a STA are computed based on the most recent PPDU received by the STA that matches the description indicated by the GID-L, GID-H, Coding Type, STBC Indication, and FB Tx Type fields in the same VHT variant HT Control field.

In an unsolicited MFB response the GID-L, GID-H, Coding Type, STBC Indication, FB Tx Type, and BW fields are set according to the RXVECTOR parameters of the received PPDU from which the VHT-MCS, SNR, BW, and NUM\_STS are estimated, as follows:

* If the VHT-MCS, SNR, BW, and NUM\_STS are estimated from a VHT MU PPDU, then the GID-L field is set to the 3 least significant bits and the GID-H field to the 3 most significant bits of the parameter GROUP\_ID.
* If the VHT-MCS, SNR, BW, and NUM\_STS are estimated from an SU PPDU, then the GID-L field and GID-H field are set to all (Ed)1s.
* The Coding Type field is set to 0 if the parameter FEC\_CODING is equal to BCC\_CODING and set to 1 if equal to LDPC\_CODING.
* The STBC Indication field is set to 1 if the parameter STBC is equal to 1 and set to 0 if the STBC parameter is equal to 0.
* The FB TX Type field is set to 1 if the parameter BEAMFORMED is equal to 1 and set to 0 if equal to 0.
* The BW field shall indicate a bandwidth equal to or less than the bandwidth indicated by the parameter CH\_BANDWIDTH.

In an MFB response solicited by an MRQ that was not carried in a VHT NDP Announcement frame, the MFB is computed based on RXVECTOR parameters CH\_BANDWIDTH, GROUP\_ID, NUM\_STS, FEC\_CODING, BEAMFORMED, and STBC of the received PPDU that carried the MRQ and might additionally be based on other factors that are not part of the RXVECTOR. The NUM\_STS subfield of the MFB subfield of VHT variant HT Control field shall be set to an equal or smaller value than the RXVECTOR parameter NUM\_STS of the received PPDU that triggered the MRQ.

If the MFB is in the same MPDU as a VHT Compressed Beamforming frame, the MFB responder shall estimate the recommended MFB under the assumption that the beamformer will use the steering matrices contained therein for performing an SU beamformed transmission. In this case the value of the NUM\_STS field in the MFB subfield of the VHT variant HT Control field shall be the same as the value of the Nc Index field in the VHT MIMO Control field of the VHT Compressed Beamforming frame and, if the MFB is unsolicited, the Coding Type shall be set to BCC and the FB Tx Type shall be set to 0. Additionally, MFB estimate shall be based on the bandwidth indicated by the Channel Width subfield of the VHT MIMO Control field of the VHT Compressed Beamforming frame. In this case the SNR and BW subfields are reserved and set to 0.

If an unsolicited MFB is not in the same MPDU as a VHT Compressed Beamforming frame, the NUM\_STS subfield of the MFB subfield of the VHT variant HT Control field shall be set to an equal or smaller value than the RXVECTOR parameter NUM\_STS of the received PPDU from which the MFB parameters are estimated.

If the MFB requester sends the MRQ in a VHT NDP Announcement frame, then the MFB responder shall include the corresponding MFB in (all of) the VHT Compressed Beamforming frame(s) sent in response to the same VHT NDP Announcement frame and NDP sequence.

If the value of the NUM\_STS subfield of the MFB field (solicited or unsolicited) is a smaller value than the RXVECTOR parameter NUM\_STS of the received PPDU on which the MFB is based, the MFB responder shall estimate the recommended VHT-MCS under the assumption that the MFB requester will transmit the first NSTS space-time streams in the corresponding PPDU carrying MRQ. If the MFB is based on an SU PPDU the first NSTS space-time streams correspond to columns 1, ..., NSTS of the spatial mapping matrix Q. If the MFB is based on a VHT MU PPDU, then for the user u the first NSTS space-time streams correspond to columns Mu+1, ..., Mu+NSTS,u of the spatial mapping matrix Q (Mu is defined in 22.3.10.11.1 (Transmission in VHT format) and in 24.3.9.11.1 (Transmission in S1G format).

A VHT NDP Announcement frame that contains multiple STA Info fields and that contains a VHT format of HT Control field with the MRQ subfield equal to 1 solicits an MFB response from all the STAs listed in the STA Info fields.

When the MFB requester sets the MRQ subfield to 1 and sets the MSI/STBC subfield to a value that matches the MSI/STBC subfield value of a previous request for which the responder has not yet provided feedback, the responder shall discard or abandon the computation for the MRQ that corresponds to the previous use of that MSI/STBC subfield value and start a new computation based on the new request.

A STA may respond immediately to a current request for MFB with a frame containing an MFSI field value and an MFB field value that correspond to a request that precedes the current request.

Bidirectional request/responses are supported. A STA may act as both the MFB requester for one direction of a duplex link and the MFB responder for the other direction and include both an MRQ and an MFB in the same VHT variant HT Control field.