IEEE P802.11  
Wireless LANs

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| **CIDs for: Section 27.5.3.6**  **HE buffer status feedback operation for UL MU** |
| **Date:** 2018-01-10 |

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Abstract

This submission proposes resolutions for multiple comments related to TGax D2.0 with the following CIDs (11 **CIDs**):

* Provided the resolutions for CID 11323, 11324, 11325, 11499, 12145, 12314, 13920, 13921, 14265, 14324

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

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

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

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| **CID** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** | **Comment Group** |
| 11323 | 255.44 | The statement is confusing. Is it either, or both? Does it apply to all values? And should it be a note? | As in comment. | Revised.  Agree in principal.  TGax editor to make change in 11-18/0108r0 under 11323. | MU operation |
| 11324 | 255.44 | What does the STA that sets the UL MU Disable bit to 1? Does it still send BSRs? | As in comment. | Revised.  An AP should not send a BSRP Trigger frame containing a STAID whose sets the UL MU Disable bit to 1.  Unsolicited BSR is not disallowed to the STA that sets the UL MU Disable bit to 1.  TGax editor to make change in 11-18/0108r0 under 11324. | MU operation |
| 11325 | 255.58 | Same observation. The statement is confusing. Is it either, or both? Does it apply to all values?. | As in comment. | Revised.  Both can be applied, and the value other than 255 can be set.  TGax editor to make change in 11-18/0108r0 under 11325. | MU operation |
| 11499 | 254.49 | The Queue size High and Queue Size All in the BSR Control is poorly designed. It doesn't provide sufficient information of UL OFDMA/MIMO scheduling. Need a better design. | as in the comment | Rejected.  The Queue Size High value is useful for an AP to set the value of the Preferred AC subfield in a Trigger frame, and the Queue Size All value is useful for an AP to determine the RU size and HE TB PPDU length. They provide sufficient information for UL MU scheduling. | MU operation |
| 12145 | 255.61 | Change "the BSRP A-MPDU Aggregation field" to "BSRP BQRP A-MPDU Aggregation field" | as comment | Revised.  Agree in principal.  TGax editor to make change in 11-18/0108r0 under 12145. | Editorials |
| 12314 | 254.48 | The section on buffer status feedback operation for UL MU should describe the possibility to use NDP feedback report procedure to make a resource request | Add the option of NDP feedback report with resource request type as an additional complementary solution for buffer status report. | Revised.  Agree in principal.  TGax editor to make change in 11-18/0108r0 under 12314. | MU operation |
| 13920 | 255.61 | "An AP may include a BSRP Trigger frame together with other Control, Data and Management frames in one A-MPDU to a STA if the HE Capabilities element received from the STA has the BSRP A-MPDU Aggregation field equal to 1." Change "BSRP A-MPDU Aggregation field equal to 1" to "BSRP BQRP A-MPDU Aggregation field equal to 1". | Change "BSRP A-MPDU Aggregation field equal to 1" to "BSRP BQRP A-MPDU Aggregation field equal to 1". | Revised.  Same as CID#12145.  TGax editor to make change in 11-18/0108r0 under 12145. | Editorials |
| 13921 | 255.63 | "If a STA receives a BSRP Trigger frame aggregated with Control, Data and Management frames that solicits an acknowledgement, the response A-MPDU shall contain MPDUs in the order described in Table 9-425 (A-MPDU contents in the data enabled immediate response context)." It is conflicted with the following sentence. "The HE STA shall not solicit an immediate response for the frames carried in the HE TB PPDU (e.g., by setting the Ack Policy subfield of the frame to Normal Ack or Implicit Block Ack Request)." The response A-MPDU shall not be based on Table 9-425 (A-MPDU contents in the data enabled immediate response context). | Change "Table 9-425 (A-MPDU contents in the data enabled immediate response context)" to "Table 9-428--A-MPDU contents MPDUs in the control response context". | Accepted. | MU operation |
| 14265 | 255.13 | No period in L13 and L17. | As commented. | Revised.  Add periods in L13 and L17.  TGax editor to make change in 11-18/0108r0 under 14265. | Editorials |
| 14324 | 254.49 | The Queue size High and Queue Size All in the BSR Control is poorly designed. It doesn't provide sufficient information of UL OFDMA/MIMO scheduling. Need a better design. | as in the comment | Rejected.  The Queue Size High value is useful for an AP to set the value of the Preferred AC subfield in a Trigger frame, and the Queue Size All value is useful for an AP to determine the RU size and HE TB PPDU length. They provide sufficient information for UL MU scheduling. | MU operation |

**Discussion:** *None.*

**Propose:**

Revised for CID 11323, 11324, 11325, 11499, 12145, 12314, 13920, 13921, 14265, 14324 per discussion and editing instructions in 11-18/0xxxr0.

***TGax editor: Modify the sentence on page 254 line 49 as the following:***

**27.5.3.6 HE buffer status feedback operation for UL MU**

A non-AP STA delivers buffer status reports (BSRs) to assist its AP in allocating UL MU resources. The non-AP STA can either implicitly deliver BSRs in the QoS Control field or BSR Control field of any frame transmitted to the AP (unsolicited BSR) or explicitly deliver BSRs in any frame sent to the AP in response to a BSRP Trigger frame (solicited BSR).

A non-AP STA reports its buffer status (unsolicited BSR) to the AP to which it is associated using either the QoS Control field or the BSR Control field of frames it transmits as defined below:

— The HE STA shall report the buffer status for a given TID in the Queue Size subfield of the QoS Control field in QoS Data or QoS Null frames it transmits; except that the STA may set the Queue Size subfield to 255 to indicate an unknown/unspecified BSR for that TID.

• The HE STA may aggregate multiple QoS Data frames or QoS Null frames in an A-MPDU to report the buffer status for different TIDs. The HE STA shall follow the A-MPDU aggregation rules defined in 27.10.4 (multi-TID A-MPDU and ack-enabled A-MPDU) for aggregating QoS Data frames with multiple TIDs. The HE STA does not follow the rules defined in 27.10.4 (multi-TID A-MPDU and ack-enabled A-MPDU) for QoS Null frames whose Ack Policy subfield is No Ack.

— The HE STA may report the buffer status in the BSR Control field of frames it transmits if the AP has indicated its support in the BSR Support subfield of its HE Capabilities element; otherwise the STA shall not report the buffer status in the BSR Control field.

• The HE STA shall report the buffer status for its preferred AC, indicated by the ACI High subfield, in the Queue Size High subfield of the BSR Control field; except that the STA may set the Queue Size High subfield to 255 to indicate an unknown/unspecified BSR for that AC.(#14265)

• The HE STA shall report the buffer status for all ACs, indicated by the ACI Bitmap subfield, in the Queue Size All subfield of the BSR Control field; except that the STA may set the Queue Size All subfield to 255 to indicate an unknown/unspecified BSR for those ACs.(#14265)

• The HE STA shall set the Delta TID subfield according to Table 9-18e (Delta TID subfield encoding), and the Scaling Factor subfield as defined in 9.2.4.6.4.5 (BSR Control).

NOTE 1—The STA can send an unsolicited BSR in response certain Trigger frames except MU-RTS and BSRP (with or without random access RUs, as defined in 27.5.3.3 (STA behavior for UL MU operation) and in 27.5.5 (UL OFDMAbased random access (UORA))) or it can send the unsolicited BSR after accessing the WM using EDCA.

NOTE 2—The STA can include both the QoS Control and the BSR Control field in the same frame. In this case it can set the Queue Size subfield of either field to a value of 255 or have both fields carry the same value in the Queue Size subfield.

An AP can also solicit one or more associated non-AP STAs for their BSR(s) by sending a BSRP Trigger frame (see 9.3.1.23 (Trigger frame format)). The non-AP STA responds (solicited BSR) as defined below:

— The STA that receives a BSRP Trigger frame shall follow the rules defined in 27.5.3.3 (STA behav-ior for UL MU operation) to generate the HE TB PPDU when the Trigger frame contains the 12 LSBs of the STA's AID in any of the User Info fields; otherwise if the STA's buffers are not empty and the STA supports the UL OFDMA-based random access procedure, it may follow the rules defined in 27.5.5 (UL OFDMA-based random access (UORA)) to gain access to a random access RU and generate the HE TB PPDU when the Trigger frame contains one or more random access RUs.

— The STA shall include in the HE TB PPDU one or more QoS Null frames containing one or more of the following:

• The QoS Control field(s) with Queue Size subfields for each of the TIDs for which the STA has buffer status to report to the AP.

• The BSR Control field with the Queue Size All subfield indicating the queue size for all the ACs, indicated by the ACI Bitmap subfield, for which the STA has buffer status to report to the AP when the AP has indicated its support in the BSR Support subfield of its HE Capabilities element. The STA shall set Delta TID, SF, ACI High and Queue Size High subfields of the BSR Control field as defined in 9.2.4.6.4.5 (BSR Control).

NOTE — Similar to unsolicited BSR, the STA can include both the QoS Control and the BSR Control field in the same QoS Null frame in response to the BSRP Trigger frame. In this case, it can set the Queue Size subfield of either field to a value of 255 or have both fields carry the same value in the Queue Size subfield.(#11323)

— The HE STA shall not solicit an immediate response for the frames carried in the HE TB PPDU (e.g., by setting the Ack Policy subfield of the frame to Normal Ack or Implicit Block Ack Request).

NOTE—Similar to unsolicited BSR, the STA can set Queue Sizes in either QoS Control or BSR Control field or both(#11325) to 255 to indicate unknown/unspecified BSR or to other value(#11325) for a TID, AC or all AC.

NOTE—An AP should not send a BSRP Trigger frame containing a 12 LSBs of the AID of that the STA sets the UL MU Disable bit to 1. (#11324)

An AP may include a BSRP Trigger frame together with other Control, Data and Management frames in one A-MPDU to a STA if the HE Capabilities element received from the STA has the BSRP BQRP(#12145)(#13920) A-MPDU Aggregation field equal to 1. If a STA receives a BSRP Trigger frame aggregated with Control, Data and Manage-ment frames that solicits an acknowledgement, the response A-MPDU shall contain MPDUs in the order described in Table 9-425 (A-MPDU contents in the data enabled immediate response context).

NDP feedback report procedure described in 27.5.6 can be used for the buffer status feedback operation. After receiving the NDP feedback report from one or more STAs, the AP should send a BSRP Trigger frame to get more precise buffer status information from the STAs.(#12314)