IEEE P802.11
Wireless LANs

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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.4 with the following CIDs:

* 8426

Revisions:

* Rev 0: Initial version.
* Rev 1: Port to D1.4.

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** | **Commenter** | **clause** | **Comment** | **Proposed Change** | **Resolution** |
| 8426 | Robert Stacey | 25.34 | The two methods for reporting queue size (Queue Size field in QoS Data and BSR A-Control) are not compatible with each other. The Queue Size in QoS Data is reported per TID while Queue Size in BSR A-Control is reported per AC. An AP collecting Queue Size per TID would not know how to partition the BSR information (since it is the sum of the queue size for two TIDs). An AP that collects queue size per AC may make inaccurate allocations to STAs that do not support multi-TID aggregation or if the AP itself cannot receive multi-TID A-MPDUs. | Change the BSR so that it either reports queue size per TID or simplify it so that it just indicates which Acs have traffic. | Revised –Aggree in principle. Refer to IEEE 802.11-17/1132r0 for discussionsTGax editor to make the changes shown in 11-17/1131r0  |

## Discussion:

Refer to the discussion in doc IEEE 802.11-17/1132r0. This contribution provides spec text replacing the per AC based queue size report with per TID based queue size report.

9.2.4.6.4.5 Buffer status report (BSR) Control

**TGax Editor: *replace the exiting text and tables in section of 9.2.4.6.4.5 with the text and tables as follows:***

The Control Information subfield, when the Control ID subfield is 3, contains buffer status information used for UL MU operation (see 27.5.2.5 (HE buffer status feedback operation for UL MU)). The format of the subfield is shown in Figure 9-15f (Control Information subfield format when Control ID subfield is 3).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B3 | B4 B17 | B18 B19 | B20 B24 |  B25 |
|  | TID | Queue size |  Scaling factor | UL power headroom | Maximum transmit power flag |
| Bits: | 4 | 14 | 4 | 5 | 1 |

**Figure 9-15f—Control Information subfield format when Control ID subfield is 3**

The TID subfield indicates the TID for which the following Queue Size of the TID subfield is present.

The Queue Size subfield indicates the amount of buffered traffic in units of SF octets of the TID identified by the TID subfield that is intended for the STA identified by the receive address of the frame containing the BSR Control field.

The Scaling Factor subfield indicates the unit SF, in octets, of the Queue Size subfields. SF is equal to:

16 if the Scaling Factor subfield is 0

256 if the Scaling Factor subfield is 1

2 048 if the Scaling Factor subfield is 2

32768 if the Scaling Factor subfield is 3

The queue size values in the Queue Size subfields are the total sizes, rounded up to the nearest multiple of SF octets, of all MSDUs and A-MSDUs buffered at the STA. A queue size value of 254 is used for all sizes greater than 254 *SF* octets. A queue size value of 255 is used to indicate an unspecified or unknown size. If an MSDU or A-MSDU is fragmented and is not carried in an A-MPDU, the queue size value might remain constant in all fragments even if the amount of queued traffic changes as successive fragments are transmitted. If an MSDU or A-MSDU is fragmented and is carried in an A-MPDU, the queue size values are set according to the rules in 10.9 (HT operation).

The UL Power Headroom subfield indicates the available power headroom in units of dB, for the current MCS as defined in section 9.2.4.6.4.6.

Ther Maximum Transmit Power Flag subfield indicates the that maxmimum transmit power of the current MCS is reached by the STA as defined in section 9.2.4.6.4.6.

27.5.2.5 HE buffer status feedback operation for UL MU

**TGax Editor: *modify section 27.5.2.5 as follows:***

A non-AP STA delivers buffer status reports (BSRs) to assist its AP in allocating UL MU resources(#8218). The non-AP STA can either implicitly deliver BSRs in the QoS Control field or BSR Control field(#4727) 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(#8485) (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(#4727) 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 report the buffer status for a given TID in the Queue Size subfield of the BSR Control field 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 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 (A-MPDU with multiple TIDs) for aggregating QoS Data frames with multiple TIDs. The HE STA does not follow the rules defined in 27.10.4 (A-MPDU with multiple TIDs) for QoS Null frames whose Ack Policy subfield is No Ack.
* ~~The HE STA may report the buffer status in the BSR Control field(#4727) of frames it transmits if the AP has indicated its support in the BSR Support subfield(#4727) of its HE Capabilities element; otherwise the STA shall not report the buffer status in the BSR Control field(#4727).~~
	+ ~~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(#4727); except that the STA may set the Queue Size High subfield to 255 to indicate an unknown/unspecified BSR for that AC~~
	+ ~~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(#4727); except that the STA may set the Queue Size All subfield to 255 to indicate an unknown/unspecified BSR for those ACs~~
	+ ~~The HE STA shall set the Delta TID subfield according to Table 9-18c(#6695, #8705), and the Scaling Factor subfield as defined in 9.2.4.6.4.5 (Buffer status report (BSR) Control(#4727)).~~

NOTE 1—The STA can send an unsolicited BSR in response to any variant of the Trigger frame except MU-RTS and BSRP(#5996) (with or without random access RUs(17/646r4), as defined in 27.5.2.3 (STA behavior for UL MU operation(# 8151)) and in 27.5.4 (UL OFDMA-based 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(#4727) 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.(#7974)

An AP can also solicit one or more associated(#8427) non-AP STAs for their BSR(s) by sending a BSRP Trigger frame(#8485) (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(#Ed) shall follow the rules defined in 27.5.2.3 (STA behavior for UL MU operation(#8151)) to generate the HE TB PPDU(#6696) when the Trigger frame contains the 12 LSBs of the STA's AID(#7817) 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(#5365, #9916) follow the rules defined in 27.5.4 (UL OFDMA-based random access (UORA)) to gain access to a random access RU(17/646r4) and generate the HE TB PPDU(#6697) when the Trigger frame contains one or more random access RUs(17/646r4).
* 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(#4727) with the ~~Queue Size All subfield~~ Queue Size subfieled indicating the queue size for ~~all the ACs~~ the TIDs, 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(#4727) of its HE Capabilities element. ~~The STA shall set Delta TID, SF, ACI High and Queue Size High subfields of the BSR Control field(#4727) as defined in 9.2.4.6.4.5 (BSR Control(#4727)(#3104)).~~
* The HE STA shall not solicit an immediate response for the frames carried in the HE TB PPDU(#6697) (e.g., by setting the Ack Policy subfield of the frame to Normal Ack or Implicit Block Ack Request(#5566)).

NOTE—Similar to unsolicited BSR, the STA can set Queue Sizes in either QoS Control or BSR Control field(#4727) to 255 to indicate unknown/unspecified BSR for a TID~~, AC or all AC~~.

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. 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)(#5998, #6701).