IEEE P802.11
Wireless LANs

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| Comment resolutions for remaining CIDs in BSR Control |
| Date: 2017-05-01 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs (9 CIDs):

* 8426, 8427, 4735, 5000, 7132, 7304, 9358, 3105, 4735

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** | **Commenter** | **P.L** | **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 –The BSR Control field is an alternative way of delivering buffer status information to the AP, which in contrast to the delivery in the QoS Control field has a more flexible BSR range, thanks to the scaling factor, can deliver BSR for one AC and for all ACs in the same field, and the number of TIDs for which there is buffered traffic. All of this without the need of additional access to the medium or multi-TID aggregation. It is up to the STA to determine which method to use to deliver BSR. If the AP does not support multi-TID A-MPDU then it makes sense for the STA to use QoS Control BSR delivery (mandatory mode), if the AP supports multi-TID A-MPDU then it makes sense that the STA uses BSR Control, or QoS Control, or both to deliver BSR. From the AP’s perspective, the resource allocation is going to be determined independently on which method the STA uses to deliver BSR, as long as the AP supports the BSR delivery method (referring to the BSR Control which is optional in RX). Please refer to <https://mentor.ieee.org/802.11/dcn/16/11-16-0628-01-00ax-buffer-status-report-in-he-control-field.pptx> for more information on this functionality.However, based on further comparison of the two BSR methods, it was identified that having only one value of the SF for the QoS Contorl field is limited for certain traffic types (SF is 256 octets when compared to the BSR Control field (which contains a Scaling Factor with 4 values). See <https://mentor.ieee.org/802.11/dcn/17/11-17-0477-00-00ax-buffer-status-report.pptx>To address this issue the proposed resolution is to enable the QoS Control field signaling to use a scaling factor (along the lines of the BSR Control field) that is backwards compatible and negotiable between the STA and the AP.TGax editor to make the changes shown in 11-17/0607r0 under all headings that include CID 8426. |
| 8427 | Robert Stacey | 25.34 | The BSR is poorly designed. Its only purpose is to report queue state for traffic not in the current aggregate (since queue size in QoS Control can do it for traffic in the aggregate). Even so, it is not strictly necessary since that status could be collected through multi-TID aggregation or through a separate access. It is not compatible with queue size reported in QoS Control since it reports per AC and has a queue size range that different from queue size in QoS Control. | Redesign BSR so that it reports queue size in a manner compatible with queue size in QoS Control. Say 3 fields of 8-bits representing the queue sizes of TIDs in each of the ACs not represeted by the TID of the QoS Data frame carrying the BSR. Queue size reported in a manner compatible with queue size in QoS Control (units of 256 octets). The TIDs reported in sets: say {1, 0, 4, 6} and {2, 3, 5, 7}, so that if the QoS Data frame is for a TID in set 1 the queue size for other TIDs are in set 1. | Revised –Similar considerations as for comment to 8426.The BSR Control field is an alternative way of delivering buffer status information to the AP, which in contrast to the delivery in the QoS Control field has a more flexible BSR range, thanks to the scaling factor, can deliver BSR for one AC and for all ACs in the same field, and the number of TIDs for which there is buffered traffic. All of this without the need of additional access to the medium or multi-TID aggregation.  Please refer to <https://mentor.ieee.org/802.11/dcn/16/11-16-0628-01-00ax-buffer-status-report-in-he-control-field.pptx> for more information on this functionality.However, based on further comparison of the two BSR methods, it was identified that having only one value of the SF for the QoS Contorl field is limited for certain traffic types (SF is 256 octets when compared to the BSR Control field (which contains a Scaling Factor with 4 values). See <https://mentor.ieee.org/802.11/dcn/17/11-17-0477-00-00ax-buffer-status-report.pptx>To address this ssue the proposed resolution is to enable the QoS Control field signaling to use a scaling factor (along the lines of the BSR Control field) that is backwards compatible and negotiable between the STA and the AP.TGax editor to make the changes shown in 11-17/0607r0 under all headings that include CID 8427. |
| 5000 | Carol Ansley | 26.00 | sentence is confusing - "...indicate that the buffer status of the AC, which ACI is identified by the location of the bit in the ACI Bitmapsubfield, is reported and set to 0 otherwise.' | Reword to clarify meaning. Suggested wording: "... indicate that the buffer status of the corresponding AC is reported and set to 0 otherwise." | Revised –Agree in principle. Proposed resolution accounts for the suggested changes. TGax editor to make the changes shown in 11-17/607r0 under all headings that include CID 5000. |
| 7132 | kaiying Lv | 26.47 | The reference of the ACI mapping between ACI and AC is missing. | Please change the text to "The ACI High subfield indicates the ACI of the AC for which the BSR is indicated in the Queue Size High subfield. The reference of the ACI mapping between ACI and AC is defined in Table 9-136 (ACI-to-AC coding)." | Revised—Agree in principle. Proposed resolution accounts for the suggested change. And also fixed a minor typo in the ACI to AC mapping to make the values inline with baseline encoding.TGax editor to make the changes shown in 11-17/607r0 under all headings that include CID 7132. |
| 7304 | Kwok Shum Au | 27.02 | SF is a variable. | Italicize SF. | Accepted |
| 9358 | Weimin Xing | 26.51 | The discription of Queue Size subfields is not accurate. Change "Queue Size subfields" to "Queue Size High subfield and Queue Size All subfield" | As in comment | Rejected –This paragraph is providing a definition of the scaling factor and its encoding. The precise definition, and interpretation, for each Queue Size High and Queue Size All, is provided in the subsequent paragraphs, as such the description does not leave space to ambiguity. Quoting from D1.2:“The Queue Size High subfield indicates the amount of buffered traffic, in units of SF octets, for the AC identified by the ACI High subfield.The Queue Size All subfield indicates the amount of buffered traffic, in units of SF octets, for all the ACs identified by the ACI Bitmap subfield.” |
| 3105 | Adrian Stephens | 26.52 | Scaling factor subfield definition is inherently tabular. | Turn value definitions into a table and reference from here. | Revised – Agree with comment. Proposed resolution incorporates the suggested change. TGax editor to make the changes shown in 11-17/607r0 under all headings that include CID 3105. |
| 4735 | Alfred Asterjadhi | 27.12 | Wrong reference. Replace "10.9 (HT operation)" with "10.13.1 (A-MPDU contents)" | As in comment. | Accepted |

## Discussion: *None.*

**9.2.4.5.6 Queue Size subfield**

**TGax Editor: *Change the paragraphs below as follows (CID 8426, 8427):***

The Queue Size subfield is an 8-bit field that indicates the amount of buffered traffic for a given TC or TS at the non-HE STA(#7710) sending this frame. A non-AP HE STA uses the Queue Size subfield to indicate the amount of buffered traffic intended for the STA identified by the receive address of the frame containing the QoS Control field. The Queue Size subfield is present in QoS Data and QoS Null frames sent by non-AP STAs with bit 4 of the QoS Control field equal to 1. The AP might(#7711) use information contained in the Queue Size subfield to determine the TXOP duration assigned to the STA or to determine the UL resources assigned to the HE STA (see 27.5.2 (UL MU operation)).

**Option 1:**

When transmitted by an HE non-AP STA to its associated HE AP the Queue Size subfield contains a Scaling Factor subfield in its 2 LSBs (B8 and B9) and an unscaled value, *UV*, in its 6 MSBs (B10 to B15). The Scaling Factor subfield provides the scaling factor, *SF*, with an encoding that is shown in Figure 9-18d (Scaling Factor subfield encoding). The queue size value, *QS*, for an HE non-AP STA is calculated as follows:

* *QS* = 16\**UV* when the Scaling Factor subfield is 0
* *QS* = (1024 + 256 \* *UV)* when the Scaling Factor subfield is 1
* *QS* = (17 408+ 2 048 \* *UV)* when the Scaling Factor subfield is 2
* *QS* = (148 480 + *32 768* \* *UV)* when the Scaling Factor subfield is 3*(#8426, 8427)*

**For information purposes only (option 1):**

|  |  |
| --- | --- |
| **Scaling Factor subfield value** | **Scaling factor, *SF* [in octets]** |
| 0 | 16 |
| 1 | 256 |
| 2 | 2 048 |
| 3 | 32 768 |

**For information purposes only (option 1):**

|  |  |
| --- | --- |
| **Scaling Factor subfield value** | **Scaling factor, *SF* [in octets]** |
| 0 | 16 |
| 1 | 256 |
| 2 | 4 092 |
| 3 | 65 536 |

**TGax Editor: *Change the paragraphs below as follows (CID 8426, 8427):***

The queue size value is the total size, rounded up to the nearest multiple of *SF* octets and expressed in units of *SF* octets, of all MSDUs and A-MSDUs buffered at the STA (excluding the MSDU or A-MSDU of the present QoS Data frame sent by a non-HE STA or a HE STA to a non-HE STA and including the MSDUs or A-MSDUs contained in the (A- )MPDU containing the Queue Size subfield(#7868) sent by an HE STA) in the delivery queue used for MSDUs and A-MSDUs with TID values equal to the value in the TID subfield of this QoS Control field. The SF when the queue size is sent to a non-HE STA is 256 octets, and is 1 octet if sent to an HE STA.

A queue size value of 0 is used solely to indicate the absence of any buffered traffic in the queue used for the specified TID. A queue size value of 254 is used for all sizes greater than 64 768 octets for a non-HE STA or a HE STA to a non-HE STA and 2 245 632 octets for an HE STA.*(#8426, 8427)* A queue size value of 255 is used to indicate an unspecified or unknown size. If an MSDU or A-MSDU(#7866) is fragmented and is not carried in an A-MPDU, then the queue size value can remain constant in all fragments even if the amount of queued traffic changes as successive fragments are transmitted. If an MSDU or A-MSDU(#7866) is fragmented and is carried in an A-MPDU, then the queue size, bits 8-15 of the QoS Control field(#5435), is set as defined in 10.13.1 (A-MPDU contents).(#7869)

**27.5.2.5 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 in an efficient way. 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 variant Trigger frame (solicited BSR).

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 8426, 8427)):***

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

* Buffer status report (BSR) Control(#4727)

**TGax Editor: *Change the table and paragraph below of this subclause as follows (#CID 7132, 5000):***

|  |  |  |  |
| --- | --- | --- | --- |
| B0 | B1 | B2 | B3 |
| AC\_BK | AC\_BE | AC\_VI | AC\_VO |
| * ACI Bitmap subfield encoding*(#7132)*
 |

 Each bit of the ACI Bitmap subfield is set to 1 to indicate that the buffer status of the corresponding AC *(#5000)* and set to 0 otherwise. When the ACI Bitmap subfield is 0 and the Delta TID subfield is 3 it indicates that there is buffered traffic for all 8 TIDs (see Table 9-18c (Delta TID subfield encoding)).(#9806)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 7132):***

The ACI High subfield indicates the ACI of the AC for which the BSR is indicated in the Queue Size High subfield. The ACI to AC mapping is shown in Table 9-18b (ACI Bitmap subfield encoding).*(#7132)*

NOTE—It is up to the non-AP STA that reports the buffer status to determine which queue deserves higher priority with respect to the other queues. The determination might be based on the time the traffic has been outstanding, QoS delay requirements, amount of buffered traffic, etc., and is out of scope for this standard.(#9620, #9621)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 3105, 8426, 8427):***

The Scaling Factor subfield indicates the unit *SF*, in octets, of the Queue Size subfields. The encoding of the Scaling Factor subfield is shown in Figure 9-18d (Scaling Factor subfield encoding).

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| *(#3105, 8426, 8427)*Table 9-18d--Scaling Factor subfield encoding*(#3105, 8426, 8427)* |
| **Scaling Factor subfield value** | **Scaling factor, *SF* [in octets]** |
| 0 | 16 |
| 1 | 256 |
| 2 | 2 048 |
| 3 | 32 768 |

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 7304, 4735):***

The queue size values in the Queue Size High and Queue Size All subfields are the total sizes, rounded up to the nearest multiple of *SF(#7304)* octets, of all MSDUs and A-MSDUs buffered at the STA (including the MSDUs or A-MSDUs contained in the (A-)MPDU containing the BSR(#7867)) in the delivery queues used for MSDUs and A-MSDUs with AC(s) that are specified in the ACI High and ACI Bitmap subfields, respectively. 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(#7866) is fragmented and is not carried in an A-MPDU, the queue size value might(#7719) remain constant in all fragments even if the amount of queued traffic changes as successive fragments are transmitted. If an MSDU or A-MSDU(#7866) is fragmented and is carried in an A-MPDU, the queue size values are set according to the rules in 10.13.1 (A-MPDU contents). *(#4735)*