IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolution for LB266 CIDs related to 9.4.2.316 QoS Characteristics element Part 2 (p2p related issues) | | | | |
| Date: September, 2022 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Duncan Ho | Qualcomm Inc. | 5665 Morehouse Dr. San Diego CA 92121 USA | +1 (858) 845-3214 | dho@qti.qualcomm.com |
| Alfred Asterjadhi |  |  |  |
| Abdel Karim Ajami |  |  |  |
| Abhishek Patil |  |  |  |
| George Cherian |  |  |  |
| Gaurang Naik |  |  |  |
| Yanjun Sun |  |  |  |

Abstract

This submission proposes a resolution for the following 10CIDs for TGbe (LB266).

10703, 13245, 13109, 13246, 10673, 12832, 13220, 13487, 13489, 12973

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

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

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Page.Line** | **Comment** | **Proposed Change** | **Resolution** |
| 10703 | Liangxiao Xin | 254.15 | No peak data rate is defined in the element. The mean data rate, the peak data rate, and the burst size are the parameters of the token bucket model, which provides standard terminology for describing the behavior of a traffic source. | Please add the definition of peak data rate and add the peak data rate field in the element | **Revised**  Agreed in principle and resolved the same as CID 13245.  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 13245** |
| 13245 | Binita Gupta | 254.15 | The definition of the Burst Size field uses peak data rate, however the peak data rate parameter is not defined. The Burst Size can be defined as the maximum burst arriving at the MAC SAP within the Delay Bound time duration. | Modify Burst Size duration to use Delay Bound instead of peak data rate. Also indicate that the Delay Bound field is present and nonzero if the Burst Size field is present. | **Revised**  Agreed in principle and added text to reflect the same.  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 13245** |
| 13109 | Chittabrata Ghosh | 254.28 | Need to clarify what is the expectation for the MSDU Delivery ratio, when the Delay Bound parameter is not specified. | As in comment | **Revised**  Agreed. Same resolution as CID 13246.  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 13246** |
| 13246 | Binita Gupta | 254.28 | Need to clarify what is the expectation for the MSDU Delivery ratio, when the Delay Bound parameter is not specified. | As in comment | **Revised**  Agreed in principle and added text to reflect the same: “The 4 MSBs of the MSDU Delivery Ratio subfield are reserved. If the delay bound is not specified, then the 4 LSBs of the MSDU Delivery Ratio subfield are reserved”  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 13246** |
| 10673 | Duncan Ho | 251.40 | Bandwidth info is missing in the QoS characteristics element and various editorials | Adopt the changes in 11-22-0200-04-00be-cc36-cr-for-qos-characteristics-element | **Revised**  Added a list of (LinkID, Medium Time, Bandwidth) tuple to the QoS characteristics element.  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 10673** |
| 12832 | Laurent Cariou | 254.64 | For the case when Medium Time field is used in an SCS Request frame signaling requirements for P2P traffic, its not clear what is the BW assumed for direct link. Without this information the AP that receives this frame may not be able to properly allocate resources for the P2P traffic. | Clarify the connection between the Medium Time field when used to signal P2P/ Direct Link traffic requirements and the BW used for the corresponding P2P link. | **Revised**  Agreed and same resolution as CID 10673.  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 10673** |
| 13220 | Evgeny Khorov | 66.54 | The amount of needed channel time depends on the allocated band, which is not considered in the element | Add requested channel bandwidth (as the STA may need a narrow band for transmssion) | **Revised**  Agreed and same resolution as CID 10673.  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 10673** |
| 13487 | Liwen Chu | 253.05 | The P2P traffic can be transmitted in more than one link. | update the text per the comment | **Revised**  There are two cases:  **Case 1:** e.g., if there are 2 links, the non-AP MLD can use one link to connect to a STA and the other link to connect to another STA. Each link will then require a separate SCS flow and QoS characteristics element (i.e., in this case, there are two SCS flows and two QoS char elements total)  **Case 2:** if there are 2 links, the non-AP MLD can use both links to communicate with another non-AP MLD. In this case one SCS flow + one QoS char element is used. However, this case is NOT supported yet in the current version of the 11be spec.  To support case 2 above, please see the changes in resolution of CID 10673 (basically add the ability for the non-AP MLD to indicate its p2p request (medium time, Bandwidth) per link for multiple p2p links while restricting it to be one link only in the current version of the 11be spec.    **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 10673** |
| 13489 | Liwen Chu | 254.63 | The miedium time should be related to one to multiple links where P2P traffic can happen. | update the text per the comment | **Revised**  Agreed and same resolution as CID 10673.  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 10673** |
| 12973 | Chunyu Hu | 254.22 | "may be discarded" is subject to AP for the DL traffic. It would be useful to add a bit for the requesting STA to instruct AP to discard if the service time for the MSDU reaches the lifetime. When this field is 0, then keep the "may" behavior. | See comment. | **Revised**  Added clarification to explain if the packet has exceeded its MSDU Lifetime, the packet will not be useful even if transmitted so the transmitter may consider discard such packet before it is transmitter over-the-air.  **TGbe editor, please make changes as shown in 11-22/1457r1 tagged 12973** |

Proposed Text Change

***TGbe editor: modify subclause 9.4.2.316 as follows:***

9.4.2.316 QoS Characteristics element

The QoS Characteristics element contains a set of parameters that define the characteristics and QoS expectations of a traffic flow, in the context of a particular non-AP EHT STA, for use by the EHT AP and the non-AP EHT STA in support of QoS traffic transfer using the procedures defined in 11.25.2 (SCS procedures) and 35.9 (Restricted TWT (r-TWT)).

The element information format comprises the items as defined in this subclause, and the structure is defined in Figure 9-1002as (QoS Characteristics element format).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID extension | Control Info | Minimum Service Interval | Maximum Service Interval | Minimum Data Rate | Delay Bound |
| Octets: | 1 | 1 | 1 | 4 | 4 | 4 | 3 | 3 |
|  | Maximum MSDU Size | Service Start Time | Mean Data Rate | Burst Size | MSDU Lifetime | MSDU Delivery Info | | Direct link Info |
| Octets: | 0 or 2 | 0 or 4 | 0 or 3 | 0 or 4 | 0 or 2 | 0 or 1 | | 0 or 3 x (Number of  Direct links)(#10673) |
| Figure 9-1002as – QoS Characteristics element format | | | | | | | | |

The structure of the Control Info field is defined in Figure 9-1002at (Control Info field format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B1 | B2 B5 | B6 B8 | B9 B24 | B25 B28 | B29 B31 |
|  | Direction | TID | User-Priority | Presence Bitmap of Additional Parameters | Number of Direct links(#10673) | Reserved |
| Bits: | 2 | 4 | 3 | 16 | 4 | 3 |
|  | Figure 9-1002at – Control Info field format | | | | | |

The Element ID, Length, and Extended Element ID fields are defined in 9.4.2.1 (General).

The subfields of the Control Info field are defined as follows:

* The Direction subfield specifies the direction of data described by this element as defined in Table 9-401p (Direction subfield encoding).

|  |  |  |
| --- | --- | --- |
| Table 9-401p - Direction subfield encoding | | |
| Bit 5 | Bit 6 | Usage |
| 0 | 0 | Uplink, defined as follows:   * MSDUs or A‑MSDUs are sent from the non-AP STA to the AP. |
| 1 | 0 | Downlink, defined as follows:   * MSDUs or A‑MSDUs are sent from the AP to the non-AP STA. |
| 0 | 1 | Direct link (MSDUs or A‑MSDUs are sent from the non-AP STA to another non-AP STA). |
| 1 | 1 | Reserved. |

* The TID subfield contains the TID value of the data frames that are described by this element. The TID subfield is set to the same value as the User Priority field. The values 8~15 are reserved.
* The User Priority subfield contains the user priority value (0~7) of the data frames that are described by this element. When the TCLAS element is present in the SCS Request frame containing this element, the User Priority subfield is set to the User Priority value specified in the TCLAS element.
* The Presence Bitmap of Additional Parameters subfield contains a bitmap where the ith entry of the bitmap is set to 1 if the ith field starting from the Maximum MSDU Size field is present in this element. For each field starting from the Maximum MSDU Size field, the value 0 is reserved unless otherwise stated(#10673).
* (#10673)
* The Number of Direct Links subfield contains the number of Direct Link Info fields contained in this element and this field is reserved if the Direction subfield is set to any value other than 2 (Direct link). The values 0, 2 to 15 are reserved (#10673).

The structure of the Direct Link Info field is defined in Figure 9-1002au (Direct Link Info field format). This field is present only if the Number of Direct Links subfield is greater than zero. (#10673)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 B3 | B4 B15 | B16 B19 | B20 B23 |
|  | LinkID | Medium Time | Bandwidth | Reserved |
| Bits: | 4 | 12 | 4 | 4 |
| Figure 9-1002au – Direct Link Info field format | | | | |

The subfields of the Direct Link Info field are defined as follows: (#10673)

* The LinkID subfield specifies the link identifier of the link between the non-AP MLD and the AP MLD that corresponds to the direct link for which the medium time and bandwidth are requested.
* The Medium Time field contains an unsigned integer that specifies the medium time, in units of 256 microseconds, requested by the STA for direct link transmissions on the link corresponding to LinkID as the average medium time needed in each second, based on the bandwidth indicated in the Bandwidth field for direct link transmissions and based on the assumption that all the direct link transmissions associated with this traffic flow were to take place only on the link corresponding to the LinkID. The values from 3,906 to 4,095 are reserved.
* The Bandwidth field specifies the maximum bandwidth the STA can operate for direct link transmissions on the link specified in the LinkID field. This field is used to compute the medium time requested in the Medium Time field and this field is encoded as shown in Table 9-401q. The total resource requested is the product of the medium time and bandwidth.

NOTE 1 — If the actual bandwidth scheduled is narrower than the value specified in the Bandwidth field, the scheduled medium time needs to be increased to maintain the same medium time bandwidth product. Further, the Medium Time field value needs to be scaled corresponding to the selected service interval for the Direct Link transmission to determine the scheduled medium time.

|  |  |
| --- | --- |
| Table 9-401q Bandwidth values | |
| Value | Bandwidth |
| 0 | 20MHz |
| 1 | 40MHz |
| 2 | 80MHz |
| 3 | 160MHz |
| 4 | 320MHz |
| 5 - 15 | Reserved |

[…]

The Delay Bound field contains an unsigned integer that specifies the maximum amount of time, in microseconds, allowed to transport an MSDU or A-MSDU belonging to the traffic flow described by this element, measured between the time marking the arrival of the MSDU, or the first MSDU of the MSDUs constituting an A-MSDU, at the local MAC sublayer from the local MAC SAP and the time of completion of the successful transmission or retransmission of the MSDU or A-MSDU to the destination. The completion time of the MSDU or A-MSDU transmission includes the relevant corresponding(#12971) acknowledgment frame transmission time, if present.

- If the Direction subfield is set to 0 (Uplink) or 2 (Direct link), the value 0 indicates that this parameter is unspecified.

- If the Direction subfield is set to 1 (Downlink), the value 0 is reserved.

- This field is nonzero if the Burst Size field is present(#13245).

[…]

The Burst Size field is 4 octets long and contains an unsigned integer that specifies the maximum burst, in octets, of the MSDUs or A-MSDUs belonging to the traffic flow that arrive at the MAC SAP within a time duration specified in the Delay Bound field(#13245).

[…]

(#12973)The MSDU Lifetime field contains an unsigned integer that specifies the maximum amount of time, in units of milliseconds, since the arrival of the MSDU at the MAC data service interface beyond which the MSDU is not useful even if received by the receiver. Therefore, the MSDU transmitter may consider discarding such MSDU at the transmitter before it is transmitted over-the-air. The amount of time specified in this field is larger than or equal to the amount of time specified in the Delay Bound field, if present.

(#13246)The MSDU Delivery Info field contains the MSDU delivery information. The MSDU Delivery Info field contains the MSDU Delivery Ratio subfield and the MSDU Count Exponent subfield that are defined as in Figure 9-1002at (MSDU Delivery Info field format):

|  |  |  |
| --- | --- | --- |
|  | B0 B3 | B4 B7 |
|  | MSDU Delivery Ratio | MSDU Count Exponent |
| Bits: | 4 | 4 |
| Figure 9-1002at – MSDU Delivery Info field format | | |

The MSDU Delivery Ratio subfield specifies the MSDU loss requirement and is encoded as defined in Table 9-401q (MSDU Delivery Ratio subfield values).

|  |  |
| --- | --- |
| Table 9-401q MSDU Delivery Ratio subfield values | |
| Value | MSDU delivery ratio |
| 0 | Reserved(#13219) |
| 1 | 95% |
| 2 | 96% |
| 3 | 97% |
| 4 | 98% |
| 5 | 99% |
| 6 | 99.9% |
| 7 | 99.99% |
| 8 | 99.999% |
| 9 | 99.9999% |
| 10 – 15 | Reserved |

[…]

The MSDU Count Exponent subfield contains an unsigned integer that specifies the exponent from which the number of incoming MSDUs used for computing the MSDU delivery ratio is obtained. The number of incoming MSDUs is equal to 10MSDU Count Exponent.

If the delay bound is not specified, then the MSDU Delivery Info subfield is not present (#13246).

Do you agree to the resolution provided in doc 11-22/1457r1 for the following CIDs?

10703, 13245, 13109, 13246, ~~10673, 12832, 13220, 13487, 13489,~~ 12973