IEEE P802.11
Wireless LANs

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| LB 266 CR for Latency Report Elemet |
| Date: 2022-07-18 |
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Abstract

This submission proposes resolutions for following 1 CID received for TGbe LB266

: 10776

Revision History:

* Rev 0: Initial version of the document
* Rev 1: Add MSDU drop ratio and editorial change

***TGbe editor: The baseline for this document is 11be D2.0***

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).***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 10776 | Chien-Fang Hsu | 9.4.2 | 193.01 | There is an R2 SFD motion (Motion 119, #SP110) to include Link latency measurement and report in MLO. It is time to add a such report to the draft. | Add an element to report latency measurement and statistics of each link in MLO. | **Revised**Agree with the commenter. Add an element to report ML DL latency measurement results of each link. **TGbe editor, please apply the changes tagged as 10776 in this document.** |

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGbe 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.***

**Discussion:**

The motion 119 #110 is

Do you support to define a mechanism so that an EHT AP MLD can provide information about traffic conditions of each link (e.g., DL transmit Delay, BSS load)?

* Signaling details is TBD

This document addresses the DL transmit delay statistics report of MLO in a new element.

TGbe editor: ***Insert the following new subclause at the end of subclause 9.4.2*** (#10776)***:***

**9.4.2.xxx ML Latency Report element (#10776)**

The ML Latency Report element contains DL latency information of APs affiliated with an AP MLD. The element is transmitted by an AP affiliated with an AP MLD in Beacon and Probe Response frames. The format of this element is shown in Figure 9-xxx (ML Latency Report element format).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension | MLD Latency Report | MSDU Drop Ratio Report | Link ID Bitmap  | Link 0 Latency Report | … | Link N Latency Report |
| Octets: | 1 | 1 | 1 | 4 | 1 | 2 | 4 |  | 4 |

**Figure 9-xxx — ML Latency Report element format**

The Element ID, Length, and Element ID Extension fields are defined in [9.4.2.1 (General)](file:///C%3A%5CUsers%5Cpmonajem%5CDocuments%5CDocs%5CIEEE%20802.11%5C11be%5CSource%5CTGbe_Cl_09.doc#bookmark85).

The Link ID Bitmap field indicates the links for which a Link Latency Report field is present. In bit position *n* of the Link ID Bitmap field, a value of 1 indicates that the Link Latency Report field is present for the link associated with the link ID *n*. Otherwise, the Link Latecny Report field for the link associated with link ID *n* is not present.

MLD Latency Report and Link *n* Latency Report fields are shown in Figure 9-xxx (Latency Report field format).

MSDU transmit delay is measured from the time the MSDU is passed to the MAC through the MAC SAP until the point at which the entire MSDU has been successfully transmitted, including receipt of the final Ack frame from the peer STA if the QoS Ack service class is being used. MSDU Transmit delay is expressed in units of milliseconds.

The MLD Latency Report field reports the transmit delay statistics of transmitted AC\_VO and AC\_VI MSDUs.

The Link *n* Latency Report field reports the transmit delay statistics of transmitted AC\_VO and AC\_VI MSDUs on link *n* and the receipt of the final Ack is on the same link. If an MSDU is retransmitted on another link, the transmit delay of the MSDU is excluded from the transmit delay statistics in the Link Latency *n* Report.

The value of the Average Transmit Delay field is a scalar indication of average MSDU transmit delay of the indicated access category. If the report is not available, the value of the Average MSDU Transmit Delay field is set to 0. The values between 1 and 254 are a scaled representation of the average transmit delay of transmitted MSDUs using the indicated AC rounded up to the next integer. The value 255 indicates the average transmit delay is equal to or larger than 255 milliseconds.

The value of the 95th Pecentile Transmit Delay field is a scalar indication of 95th percentile of MSDU transmit delay of the indicated access category. If the report is not available, the value of the 95th Pecentile Transmit Delay field is set to 0. The values between 1 and 254 are a scaled representation of the 95th percentile of MSDU transmit delay of transmitted MSDUs using the indicated AC rounded up to the next integer. The value 255 indicates the 95th Pecentile of MSDU transmit delay is equal to or larger than 255 milliseconds.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Average Transmit Delay of AC\_VO | 95th Pecentile of Transmit Delay of AC\_VO | Average Transmit Delay of AC\_VI | 95th Pecentile of Transmit Delay of AC\_VI |
| Octets: | 1 | 1 | 1 | 1 |

**Figure 9-xxx—Latency Report field format**

MSDU Drop Ratio Report field is shown on Figure 9-xxx (MSDU Drop Ratio Report field format).

The MSDU Drop Ratio Report field reports the MSDU drop ratios of AC\_VO and AC\_VI.

|  |  |  |
| --- | --- | --- |
|  | AC\_VO MSDU Drop Ratio | AC\_VI MSDU Drop Ratio |
| Bits: | 4 | 4 |

**Figure 9-xxx—MSDU Drop Ratio Report field format**

MSDU Drop Ratio field indicates the percentage of MSDUs that are dropped, and the encoding is defined in Table 9-xxx.

**Table 9-xxx—MSDU Drop Ratio field values**

|  |  |
| --- | --- |
| **Value** | **MSDU drop ratio** |
| 0 | 0% |
| 1 | 0% < ratio ≤ 0.0001% |
| 2 | 0.0001% < ratio ≤ 0.001% |
| 3 | 0.001% < ratio ≤ 0.01% |
| 4 | 0.01% < ratio ≤ 0.1% |
| 5 | 0.1% < ratio ≤ 1% |
| 6 | 1% < ratio ≤ 5% |
| 7 | 5% < ratio  |
| 8–14 | Reserved |
| 15 | Not available |

### 9.3.3.2 Beacon frame format

TGbe editor: Add a row to table 9-60 as follows

**Table 9-60—Beacon frame body*(continued)***

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| 12 | Quiet | The Quiet element is optionally present if dot11SpectrumManage- mentRequired is true or dot11RadioMeasurementActivated is true or dot11RestrictedTWTOptionImplemented is true. |
| <Last assigned + 1> | Multi-Link | The Basic Multi-Link element is present if dot11MultiLinkActi- vated is true; otherwise it is not present. |
| <Last assigned + 2> | EHT Capabilities | The EHT Capabilities element is present if dot11EHTOptionIm- plemented is true; otherwise it is not present. |
| <Last assigned + 3> | EHT Operation | The EHT Operation element is present if dot11EHTOptionImple- mented is true; otherwise it is not present. |
| <Last assigned + 4> | Multi-Link Traffic Indication | The Multi-Link Traffic Indication element is present if dot11MultiLinkTIMActivated is true; otherwise it is not present. |
| <Last assigned + 5>(#10776) | ML Latency Report element | The ML Latency Report element is optionally present if dot11MultiLinkActivated is true; otherwise it is not present.  |

**9.3.3.10 Probe Response frame format**

TGbe editor: Add a row to table 9-67 as follows

**Table 9-67—Probe Response frame body**

|  |  |  |
| --- | --- | --- |
| **Order** | **Information** | **Notes** |
| 11 | Quiet | The Quiet element is optionally present if dot11SpectrumManage- mentRequired is true or if dot11RadioMeasurementActivated is true or dot11RestrictedTWTOptionImplemented is true. |
| 96 | TWT | The TWT element is optionally present within broadcast Probe Response frames if dot11TWTOptionActivated, dot11HEOption- Implemented and dot11FILSOmitReplicateProbeResponses are true; otherwise, it is not present.The TWT element is present if the dot11RestrictedTWTOption- Implemented is true and the AP has at least one r-TWT schedule as described in 35.9.3 (r-TWT service periods announcement). Otherwise, the TWT element is not present.If the TWT element is present, then the Negotiation Type subfield of the TWT element is 2. |
| <Last assigned + 1> | Multi-Link | The Basic Multi-Link element is present if dot11MultiLinkActi- vated is true. Otherwise it is not present. |
| <Last assigned + 2> | EHT Capabilities | The EHT Capabilities element is present if dot11EHTOptionIm- plemented is true; otherwise it is not present. |
| <Last assigned + 3> | EHT Operation | The EHT Operation element is present if dot11EHTOptionImple- mented is true; otherwise it is not present. |
| <Last assigned + 4>(#10776) | ML Latency Report element | The ML Latency Report element is optionally present if dot11MultiLinkActivated is true; otherwise it is not present.  |