IEEE P802.11
Wireless LANs

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| LB266 CR for CID 14071 |
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Abstract

This submission proposes resolutions for the following CIDs for TGbe LB266:

14071

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 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.***

***TGbe editor: The baseline for this document is 11be D2.3.***

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| **CID** | **Commenter** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 14071 | Liuming Lu | 9.4.2.316 QoS Characteristics element | 251. 41 | Currently 802.11be has not defined enough parameters of QoS Characteristics element for the latency sensitive traffic. And the potential support for the future TSN applications needs to be considered for the specification of the extended parameters of QoS Characteristics element. | Suggest to specify the extended parameters of QoS Characteristics element for the latency sensitive traffic. TSN paramerters can be used as a reference to specify the extended parameters of QoS Characteristics element. | RevisedAgree to add the Number of Redundant Links field and the Latest Transmit Offset field in the QoS Characteristics element.**Instruction to the editor**, ***please update the text in the subclause 9.4.2.316 QoS Characteristics element, as shown in this document (doc.: IEEE 802.11-22/1786 r0).*** |

**Discussion:**

This document proposes to add the Number of Redundant Links field and the Latest Transmit Offset field in the QoS Characteristics element.

**1) The reason for adding the Number of Redundant Links field**

Delay bound and MSDU Delivery Ratio are the two KPIs for the delivery of latency sensitive traffic. And the redundant transmissions over multiple links can improve the latency with higer reliability. For the traffic which has stringent requirements for low latency with high reliability in some senarios, such as poor communication quality or high BSS load among links, the redundant transmissions across links provides a mechanism to improve the performance.

And the 802.11be report on EHT functionalities in support of TSN [1] has the text mentioned as follows:

Multi-link capabilities can enable 802.1CB frame replication and elimination over 802.11. Multiple links within a MLD can be used to implement redundancy with a single 802.11 network interface. The MLD can enable the frame duplication and elimination required by 802.1CB through multiple affiliated STAs within the MLD.

The Number of Redundant Links field specifies the number of redundant links to deliver seamless redundancy for the traffic flow.

**2) The reason for adding the** **Latest Transmit Offset field**

It is hard to precisely evaluate the time point of the Service Start Time, but to estimate a range for the Service Start Time is relatively easy. And the current specification of the Service Start Time field doesn't mention the latest time for traffic arrival. And the latest time of traffic arrival is more important for AP to schedule the uplink transmission based on the latest time of traffic arrival indicated by STAs to avoid no buffer data to be triggered.

The Latest Transmit Offset field specifies the latest offset time within the Service Interval, at which the MSDU transmitter is capable of starting transmit of the MSDUs or A-MSDUs belonging to the traffic flow described by this element.

**Proposed Text Change:**

**TGbe editor**: ***please update the text in the subclause 9.4.2.316 QoS Characteristics element, as shown in the following (14071)***

**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 35.8 (Restricted TWT (R-TWT)(#11109)).

The element information format comprises the items as defined in this subclause, and the structure is defined in [Figure 9-1002ar (QoS Characteristics element format)](#bookmark214).

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| --- | --- | --- | --- | --- | --- | --- |
| Element ID | Length | Element IDExtension | Control Info | Minimum Service Interval | Maximum Service Interval | Minimum Data Rate |

Octets: 1 1 1 4 4 4 3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Delay Bound | Maximum MSDUSize | Service Start Time | Latest Transmit Offset | Service Start Time LinkID | Number of Redundant Links | Mean Data Rate |

Octets: 3 0 or 2 0 or 4 0 or 1 0 or 1 0 or 1 0 or 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Burst Size | MSDULifetime | MSDUDelivery Ratio | MSDUCount Exponent | Medium Time |

Octets: 0 or 4 0 or 2 0 or 1 0 or 1 0 or 2

**Figure 9-1002ar—QoS Characteristics element format**

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The Service Start Time field contains an unsigned integer that specifies (#13488)the anticipated time, in microseconds, when the traffic starts for the associated TID. The Service Start Time indicates to the AP the time when the STA expects to exchange frames corresponding to the TID specified in this element. The field represents the four lower order octets of the TSF timer (#13488)associated to the link specified in the LinkID field at the start of the anticipated SP.

The Latest Transmit Offset field specifies the latest offset time within the Service Interval, at which the MSDU transmitter is capable of starting transmit of the MSDUs or A-MSDUs belonging to the traffic flow described by this element, to the anticipated time indicated by the Service Start Time field. The Latest Transmit Offset field indicates to the AP the latest transmit offset time to the Service Start Time when the STA expects to exchange frames corresponding to the TID specified in this element. The Latest Transmit Offset field is specified as an integer number of microseconds.

The four LSBs of the Service Start Time LinkID field indicates the link identifier that corresponds to the link for which the TSF timer is used to indicate the Service Start Time. The four MSBs are reserved. This field is present only if the Service Start Time field is present.

The Number of Redundant Links field specifies the number of redundant links to deliver seamless redundancy for the traffic flow. The value zero is interpreted as no redundant links, i.e., no seamless redundancy for the traffic flow is delivered.

**References:**

[1] 11-22/1792r1, 802.11be report on EHT functionalities in support of TSN:

<https://mentor.ieee.org/802.11/dcn/22/11-22-1792-01-00be-802-11be-report-on-eht-functionalities-in-support-of-tsn.docx>