IEEE P802.11
Wireless LANs

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| LB266 CR for 35.9.2.1 Latency sensitive traffic differentiation |
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Abstract

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

14072

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 D2.0.***

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| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 14072 | 35.9.2.1 Latency sensitive traffic differentiation | 511.12 | According to current specification it is difficult to differentiate the latency sensitive traffic especilly for the traffic identified with QoS Characteristics element. Because the latency Sensitive Traffic can be transferred during Restricted TWT periods for strict protection, some traffic with less-stringent requirements in terms of latency is treated as latency-sensitive traffic in advance and occupies the R-TWT periods, which is unfair for other EHT STAs which need to deliver the latency sensitive traffic latter. | The Latency Sensitive Traffic Criterion or differentiation is suggested to be specified. | RevisedAgreed it is necessary to specify how to differentiate the latency sensitive traffic.**Instruction to the editor**, ***please insert the paragraphs in 35.9.2.1 Latency sensitive traffic differentiation, and insert the new subclause at the end of subclause 9.4.2 Elements, as shown in this document (doc.: IEEE 802.11-22/1036r0).*** |
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**Discussion:**

This document proposes a mechanism for differentiating latency sensitive traffic with the thresholds of an advertised Latency Sensitive Traffic Criterion including the threshold for Delay Bound and threshold for MSDU Delivery Ratio.

The reasons for specifying the mechanism is described as follows:

1. 11be has currently specified latency sensitive traffic which has stringent requirements in terms of latency and its jitter along with certain reliability constraints, and latency bound and the reliability as the key KPIs of latency sensitive traffic. And the QoS Characteristics element includes a set of parameters to define the characteristics and QoS expectations of a traffic, among of which latency bound and MSDU Delivery Ratio correspond to the two key KPIs respectively.
2. The key intention of the thresholds is not to differentiate the specific applications for the definition of latency sensitive traffic. Its key intention is to manage and control the usage of r-TWT SPs to avoid the abuse of r-TWT.
3. Although r-TWT provide enhanced medium access protection and resource reservation for LL traffic, it would affect the channel access of the r-TWT unscheduled STAs and legacy STAs. Hence the fairness of channel access for r-TWT unscheduled STAs and legacy STAs should be considered. The usage of the thresholds provides a criterion for STAs to follow when using r-TWT. For example, if no thresholds are applied, when AP firstly receives a SCS request from STA1 with delay bound equal to 200ms, AP accepts the SCS request if the current resource is available. But when AP secondly receives a SCS request from STA2 with delay bound equal to 50ms, AP would reject the SCS request if the current resource is unavailable as the resource has been occupied by STA1. This result is not the intention of r-TWT because the traffic with delay bound equal to 50ms requires r-TWT in greater need.
4. The duration of r-TWT SPs and the occurrence frequency of r-TWT SPs should be controlled for the efficiency of the transmission of both LL traffic and non-LL traffic. The usage of the thresholds provides a tool for AP to plan the usage of r-TWT SPs and balance the protected delivery of LL traffic in r-TWT SPs and the unprotected transmission of other traffic outside of r-TWT SPs.
5. If the QoS parameter thresholds are advertised, the STA doesn’t need to send SCS request which doesn’t satisfy the criterion of LL traffic for setup of r-TWT, which would reduce the unnecessary signaling.

**Proposed Text Change:**

**1. Proposed Text Change for “35.9.2.1 Latency sensitive traffic differentiation”**

**TGbe editor**: ***at P511 of IEEE P802.11be™/D2.0,*** ***please*** insert the following ***pa***ragra***phs in 35.9.2.1 Latency sensitive traffic differentiation*** (CID 14072)

An EHT AP that has dot11RestrictedTWTOptionImplemented equal to true may announce a criterion for differentiating the latency sensitive traffic by containing a Latency Sensitive Traffic Criterion element in transmitted Beacon frames, Probe Response frames, and (Re)Association Response frames, and other management frames. A non-AP EHT STA identifies latency sensitive traffic according to the criterion indicated in the most recently received Latency Sensitive Traffic Criterion element. A traffic stream is identified as latency sensitive traffic if the following conditions are met:

* The direction for the traffic stream is the same as the direction indicated in the Direction subfield of the Latency Sensitive Traffic Criterion Control field of Latency Sensitive Traffic Criterion element.
* The delay bound for the traffic stream is less than or equal to the threshold for delay bound indicated in the Threshold for Delay Bound field of Latency Sensitive Traffic Criterion element.
* The MSDU delivery ratio for the traffic stream is larger than or equal to the threshold for MSDU delivery ratio indicated in the Threshold for MSDU Delivery Ratio field of Latency Sensitive Traffic Criterion element if present.

Otherwise it is not identified as latency sensitive traffic.

**2. Proposed Text Change for “9.4.2 Elements”**

**TGbe editor**: ***at P193 of IEEE P802.11be™/D2.0, please insert the following new subclause at the end of subclause 9.4.2 Elements*** (CID 14072)***:***

The format of the Latency Sensitive Traffic Criterion element is defined in [Figure 9-xxx (Latency Sensitive Traffic Criterion element format)](#bookmark93). The frames carrying this element and usage of this element are described in 35.9.2.1 Latency sensitive traffic differentiation.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Element ID | Length | Element ID Extension | Latency Sensitive Traffic Criterion Control | Threshold for Delay Bound | Threshold for MSDU Delivery Ratio |

Octets: 1 1 1 1 4 0 or 1

**Figure 9-xxx—Latency Sensitive Traffic Criterion element format**

The Element ID, Length, and Element ID Extension fields are defined in [9.4.2.1 (General)](#bookmark71).

The format of the Latency Sensitive Traffic Criterion Control field is defined in [Figure 9-xxx (Latency Sensitive Traffic Criterion Control field format )](#bookmark131).

B0 B1 B2 B3 B7

|  |  |  |
| --- | --- | --- |
| Direction | Threshold for MSDU Delivery Ratio Presence Indicator | Reserved |

Bits: 2 1 5

**Figure 9-xxx—Latency Sensitive Traffic Criterion Control field format**

The Direction subfield is defined in 9.4.2.316 (QoS Characteristics element).

The Threshold for MSDU Delivery Ratio Presence Indicator subfield indicates whether the Threshold for MSDU Delivery Ratio field is present in the Latency Sensitive Traffic Criterion element. A value of 1 in the Threshold for MSDU Delivery Ratio Presence Indicator subfield indicates that the Threshold for MSDU Delivery Ratio field is present in the Latency Sensitive Traffic Criterion element. Otherwise, the Threshold for MSDU Delivery Ratio field is not present in the Latency Sensitive Traffic Criterion element.

The Threshold for Delay Bound field is 3 octets long and contains an unsigned integer that specifies the threshold for delay bound. The meaning of delay bound is the same as the definition of the Delay Bound field specified in the QoS Characteristics element.

The Threshold for MSDU Delivery Ratio field indicates the threshold for the percentage of MSDUs that are expected to be delivered within the threshold for delay bound specified in the Threshold for Delay Bound field and its encoding is defined in Table 9-xxx. The Threshold for MSDU Delivery Ratio field is optional.

Table 9-xxx: Threshold for MSDU Delivery Ratio field values

|  |  |
| --- | --- |
| **Value** | **MSDU delivery ratio** |
| 0 | Not specified |
| 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 |