IEEE P802.11
Wireless LANs

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| LB266 CR for CID 12485 |
| Date: 2022-11-02 |
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Abstract

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

• 12485

**Revisions:**

* Rev 0: Initial version of the document.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 12485 | 35.9.5 | 512.50 | r-TWT is designed for supporting latency sensitive traffic. In trigger-enabled r-TWT SP, if the member r-TWT scheduled STA follows the trigger-enabled TWT rule (e.g., the STA should not transmit frames that are not contained within HE TB PPDUs within trigger-enabled TWT SPs), in some cases, the STA may not transmit latency sensitive traffic at the intended time during the SP. For example, when AP cannot transmit a Trigger frame for a while due to non-zero NAV. It results in the delay of the latence sensitive traffic or the latency sensitive traffic may be discarded. While the latence sensitive traffic of the member STA is delayed, other STA (e.g., non-member STA or legacy STA) can transmit a frame (like non-latency sensitive traffic) during the trigger-enabled TWT SP.To minimize the delay of latency sensitive traffic of a member STA during a trigger-enabled r-TWT SP, we need to describe some conditions when the member STA can transmit a frame using DCF or EDCA during the trigger-enabled r-TWT SP. | Describe a condition that a member r-TWT scheduled STA can access the wireless medium using DCF or EDCA during a trigger-enabled r-TWT SP. | Revised Agree in principle with the commenter.During a trigger-enabled R-TWT SP, AP may not transmit a Trigger frame to a scheduled STA during a certain period (e.g., due to long OBSS NAV or OBSS TXs). In this case, the R-TWT scheduled STA may wait to receive the Trigger frame from the AP while the other EHT STAs (e.g., non-R-TWT EHT STA) can transmit a frame using EDCA during the R-TWT SP. In some case, a member R-TWT scheduled STA may transmit using EDCA in a trigger-enabled R-TWT SP by using its own rule according to the baseline spec while another member STA waits for Trigger frame by following the recommendation rule.Unlike normal TWT SP, this will be important issue because the delay of the latency sensitive traffic of the member/scheduled STA can be increased in the R-TWT SP. TGbe editor to make the changes shown in 11-22/2153r0 under all headings that include CID 12485 |

**Discussion:**

In REVme D2.0, the following texts are described for a trigger-enabled TWT SP.

*A TWT scheduled STA should not transmit frames to the TWT scheduling AP outside of broadcast TWT SPs and should not transmit frames that are not contained within HE TB PPDUs to the TWT scheduling AP within trigger-enabled broadcast TWT SPs, except that the STA can transmit frames within negotiated individual TWT SPs as defined in 26.8.2 (Individual TWT agreements).*

*NOTE 1—The TWT scheduled STA decides which frames to transmit within or outside a TWT SP; and while it is recommended that the TWT scheduled STA not transmit using EDCA within or outside TWT SPs, the TWT scheduled STA might still do so. If the STA decides to transmit, then the STA might contend for accessing the medium as defined in 10.23.2 (HCF contention based channel access (EDCA)) and in 26.2.7 (EDCA operation using MU EDCA parameters).*

According to the above baseline text, a TWT scheduled STA may transmit a frame using EDCA within a trigger enabled TWP SP by its own decision, although the specification does not recommend it. If the same rule is adopted to R-TWT, a member R-TWT scheduled STA will also try to transmit using EDCA within a trigger-enabled R-TWT SP according to its own decision. For example, STA1 may try to transmit using EDCA based on not receiving a Trigger frame within T1 (e.g., 50us), STA2 may do so based on not receiving a Trigger frame within T2 (e.g., 100us), while STA3 may choose not to transmit at all using EDCA per the spec recommendation (e.g., STA3 may choose to wait for a Trigger frame, which may be scheduled by the AP for example). In this case, only STA 3 has latency sensitive traffic.

Note that R-TWT is designed for supporting latency sensitive traffic. If the existing rule of basic TWT is applied to R-TWT, R-TWT SPs may become very inefficient and the delay of latency sensitive traffic would increase.

For efficient management of R-TWT SPs, AP can inform a member R-TWT scheduled STA of a timer value (e.g., Trigger enabled R-TWT Timer) at the end of which the member R-TWT scheduled STA can start to transmit using EDCA during an R-TWT SP. AP will try to transmit at least one Trigger frame before the timer expires. If a member R-TWT scheduled STA does not receive any Trigger frame from the AP before the timer expires, the member R-TWT scheduled STA will start to transmit using EDCA.

**Proposed texts:**

***TGbe editor: Change Figure 9-1002ae (EHT MAC Capabilities Information field format) as follows: (#12485):***

B0 B1 B2 B3 B4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EPCS Priority Access Support(#13482) | EHT OM Control Support | Triggered TXOP Sharing Mode 1 Support | Triggered TXOP Sharing Mode 2 Support | Restricted TWT Support |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Bits: | 1 |  | 1 |  | 1 | 1 | 1 |
|  | B5 | B6 |  | B7 | B8 | B9 | B10 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SCS Traffic Description Support | Maximum MPDU Length | MaximumA-MPDU Length Exponent Extension | EHT TRS Support | TXOP Return Support In TXOP Sharing Mode 2 |

Bits: 1 2 1 1 1

B11 B12 B13 B14 B15

Bits: 1 2 1 1

**Figure 9-1002ae—EHT MAC Capabilities Information field format**

***TGbe editor: Change Table 9-401j —Subfields of the EHT MAC Capabilities Information field (continued) as follows: (#12485):***

**Table 9-401j—Subfields of the EHT MAC Capabilities Information field *(continued)***

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Two BQRs Sup- port(#13536) | For an AP, indicates support for receiving a frame with two BQR Con- trol subfields.For a non-AP STA, indicates support for generating a frame with two BQR Control subfields. | For an EHT AP:If the +HTC-HE Support subfield is 1:Set to 1 to indicate that the AP is capable of receiving a frame with two BQR Con- trol subfields.Set to 0 otherwise.Reserved if the +HTC-HE Support sub- field is 0.For an non-AP EHT STA:If the +HTC-HE Support subfield is 1:Set to 1 to indicate that the non-AP EHT STA is capable of transmitting a frame with two BQR Control subfields.Set to 0 otherwise.Reserved if the +HTC-HE Support subfield is 0. |
| EHT Link Adaptation Support(#10116) | Indicates support for link adaptation using the ELA Control subfield. | If the +HTC-HE Support subfield in HE MAC Capabilities Information field in HE Capabili- ties element is equal to 1:Set to 0 (No feedback) if the STA does not provide EHT MFB.Set to 2 (Unsolicited) if the STA can receive and provide only unsolicited EHT MFB.Set to 3 (Solicited and unsolicited) if the STA is capable of receiving and providing EHT MFB in response to EHT MRQ and if the STA can receive and provide unsolic- ited EHT MFB.The value 1 is reserved.EHT MFB and EHT MRQ are MFB and MRQ using ELA Control subfield, respectively.Reserved if the +HTC-HE Support subfield in HE MAC Capabilities Information field in HE Capabilities element is 0. |
| Trigger-enabled R-TWT EDCA Control Support (#12485) | Indicates support for the Trigger-enabled R-TWT EDCA Control operation | For an EHT AP:Set to 1 to indicate that the AP is capable of transmitting to a member R-TWT scheduled STA a TWT Setup frame including a Trigger-enabled R-TWT EDCA Timer field. When the timer expires, the member R-TWT scheduled STA is able to start to transmit a frame using EDCA in a trigger-enabled R-TWT SP. Set to 0 otherwise.For a non-AP EHT STA:Set to 1 to indicate that the STA is capable of transmitting a frame using EDCA in a trigger-enabled R-TWT SP after a Trigger-enabled R-TWT EDCA Timer received from its associated R-TWT scheduling AP expires. Set to 0 otherwise. |

***TGbe editor: Insert the following paragraph at the end of subclause 35.8.1 (General) in the latest version of TGbe Draft: (#12485):***

(#12485)An EHT AP with dot11TERestrictedTWTEDCAControlOptionImplemented equal to true shall set the Trigger-enabled R-TWT EDCA Control Support subfield in its transmitted EHT Capabilities element to 1; otherwise, the EHT AP shall set the Trigger-enabled R-TWT EDCA Control Support subfield in its transmitted EHT Capabilities element to 0.

(#12485)An EHT STA with dot11TERestrictedTWTEDCAControlOptionImplemented equal to true shall set the Trigger-enabled R-TWT EDCA Control Support subfield in its transmitted EHT Capabilities element to 1; otherwise, the EHT STA shall set the Trigger-enabled R-TWT EDCA Control Support subfield in its transmitted EHT Capabilities element to 0.

***TGbe editor: Change Figure 9-770a (Restricted TWT Traffic Info field format) as follows: (#12485):***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  | Traffic Info Control | Restricted TWT DL TID Bitmap | Restricted TWT UL TID Bitmap | Trigger-enabled R-TWT EDCA Timer (#12485) |
| Octets: | 1 | 1 | 1 | 0 or 2 |

**Figure 9-770a-Restricted TWT Traffic Info field format**

***TGbe editor: Change Figure 9-770b (Traffic Info Control subfield format) as follows: (#12485):***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 B7 |
|  | DL TID Bitmap Valid | DL TID Bitmap Valid | Trigger-enabled R-TWT EDCA Timer Present(#12485) | Reserved |
| Bits: | 1 | 1 | 1 | 5 |

**Figure 9-770b- Traffic Info Control field format**

***TGbe editor: Insert the following paragraphs at the end of the subclause 9.4.2.199 (TWT element) in the latest version of TGbe Draft: (#12485):***

(#12485)The Trigger-enabled R-TWT EDCA Timer Present subfield of the Traffic Info Control field is set to 1 if the Trigger-enabled R-TWT EDCA Timer field is present in a Restricted TWT Traffic Info field; and set to 0 otherwise. It is reserved for non-EHT STAs.

(#12485) The Trigger-enabled R-TWT EDCA Timer subfield indicates the duration of time, in units of 8us, after which a member R-TWT scheduled STA that sets the Trigger-enabled R-TWT EDCA Control Support subfield in its transmitted EHT Capabilities element to 1 may be able to transmit a frame using EDCA in a trigger-enabled R-TWT SP as defined in 35.8.4.1(TXOP and backoff procedures rules for R-TWT SPs).

***TGbe editor: Insert the following paragraph at the end of subclause 35.8.2.2 (The setup procedure) in the latest version of TGbe Draft: (#12485):***

(#12485)When included in an individually addressed TWT Setup frame transmitted by an R-TWT scheduling AP that sets the Trigger-enabled R-TWT EDCA Control Support subfield in its transmitted EHT Capabilities element to 1, the Trigger-enabled R-TWT EDCA Timer Present subfield of the Broadcast TWT Info field included in a Restricted TWT Parameter Set field shall be set to 1,

***TGbe editor: Insert the following paragraph at the end of the subclause 35.8.4.1*** (***TXOP and backoff procedures rules for R-TWT SPs) in the latest version of TGbe Draft: (#12485):***

(#12485)In a trigger-enabled R-TWT SP, an R-TWT scheduling AP that sets the Trigger-enabled R-TWT EDCA Control Support subfield in its transmitted EHT Capabilities element to 1 should transmit at least one Trigger frame before the Trigger-enabled R-TWT EDCA Timer expires if the medium indicates idle.

(#12485)In a trigger-enabled R-TWT SP, if a member R-TWT scheduled STA that sets the Trigger-enabled R-TWT EDCA Control Support subfield in its transmitted EHT Capabilities element to 1 does not receive any Trigger frame from its associated R-TWT scheduling AP before the Trigger-enabled R-TWT EDCA Timer expires, the member R-TWT scheduled STA may transmit a frame using EDCA in the trigger-enabled R-TWT SP. Otherwise, the member R-TWT scheduled STA should not transmit a frame using EDCA in the trigger-enabled R-TWT SP.

***TGbe editor: Insert the following text after “***dot11RestrictedTWTOptionImplemented***” of Annex C in the latest version of TGbe Draft: (#12485):***

(#12485)dot11TERestrictedTWTEDCAControlOptionImplemented OBJECT-TYPE SYNTAX TruthValue

MAX-ACCESS read-only STATUS current DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates the ability of the EHT STA to support the trigger-enabled R-TWT EDCA Control operation. If the attribute is false, the EHT STA does not support the trigger-enabled R-TWT EDCA Control operation."

::= { StationConfigEntry <Last assigned + 1> }