**IEEE P802.11
Wireless LANs**

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| **LB 275 CR for R-TWT-Part 2** |
| **Date:** 2023-11-13 |
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**Abstract**

This submission proposes resolutions for the following CIDs (12) for TGbe LB275:

Group 1 (Misc. CIDs): 19400, 19824, 20105, 19818, 20116, 20082, 19987, 19569

Group 1 (P2P Support): 19822, 19823, 19967, 19975, 20116

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 P802.11be D4.1 and P802.11meD4.0***

**Group 1: Misc. CIDs**

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| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 19400 | 35.8.1 | 611.55 | In the current spec, the TWT Information frame can only represent broadcast/individual TWT schedules. The restricted TWT schedules also need to be included in an existing frame, or a new designed frame. | As in the comment | **Rejected**The proposal to extend TWT Information frame to add R-TWT schedule identifier was discussed in 11-22/1545r5 and an SP was run, with results 26Y/29N/25A. There is no consensus in 802.11be on this topic. |
| 19824 | 35.8 | 0.00 | TWT Information frame does not have a bTWT ID field and cannot specify a specific bTWT schedule that the suspension/resumption applies to. In case there are multiple bTWT and R-TWT schedules setup, an ID is needed to manage specific schedules. Further, there should be method to distinguish between All R-TWT and non R-TWT bTWT schedules; All TWT field is not enough. | Amend the TWT Information frame to specify which bTWT/R-TWT schedule the frame applies to by adding the Broadcast TWT ID field. Also create a further classification/grouping beyong just the All TWT field. Address any further gaps for usage of TWT Information frame for R-TWT schedules | **Rejected**The proposal to extend TWT Information frame to add R-TWT schedule identifier was discussed in 11-22/1545r5 and an SP was run, with results 26Y/29N/25A. There is no consensus in 802.11be on this topic. |
| 20105 | 35.8.1 | 611.35 | The usage of the TWT Information frame needs to be extended for better adaptation to R-TWT and MLD needs. | as in comment. | **Rejected**The proposal to extend TWT Information frame to add R-TWT schedule identifier was discussed in 11-22/1545r5 and an SP was run, with results 26Y/29N/25A. There is no consensus in 802.11be on this topic. |
| 19818 | 35.8.1 | 611.55 | EHT TWT and Broadcast TWT subclauses should also be mentioned here as R-TWT scheduled STA is also a TWT scheduled STA | Add reference to 35.3.24 and any other subclauses | **Revised**Agree in principle. Suggested changes are incorporated**TGbe editor, please make change as shown in 23/1545r0 tagged by #19818** |
| 20082 | 35.8.5 | 616.08 | R-TWT is designed for supporting latency sensitive traffic. According to current draft, in a trigger-enabled R-TWT SP, a non-member R-TWT scheduled STA (e.g., legacy STA or other EHT STA) may transmit a frame using EDCA while a member STA does not transmit a frame using EDCA if the member STA follows the existing recommendation rule for the existing Trigger-enabled TWT. This will decrease the peformance of the member STA or the entire R-TWT SP. Furthermore, as described in 22/2153, if the member STA does not follow the existing recommendation rule for Trigger-enabled TWT, each member STA might transmit a frame using EDCA based on its implemenation rule while the other member STA does not transmit a frame using EDCA by following the existing recommendation rule. It may result in the fairness issue or lower performance of R-TWT SP. Need to define a mechanism to manage the allocated R-TWT SP efficiently from the freely medium access. And need to manage the channel access of member STAs with well-defined rule. | Define a method for controling a transmisison using EDCA in a trigger-enabled R-TWT | **Rejected**During a Trigger enabled TWT SP, member STAs are recommended not to do EDCA as per TWT baseline spec, and in case of R-TWT, the AP prioritizes member STA’s R-TWT TID traffic. Member STAs doing EDCA in this case may have the disadvantage of increased contention and reduced efficiency.The method proposed in 11-22/2153r0 was discussed in the group and it failed to reach consensus. The group’s consensus is to use baseline bTWT EDCA rules for R-TWT as well. |
| 19987 | 35.8.1 | 611.35 | An R-TWT scheduled STA, which may or may not be affiliated with an MLD, should be able request for TXOP to the AP MLD for its latency sensitive traffic. A mechanism to seek or request TXOP for an R-TWT scheduled STA would be crucial and needs to included in the spec. | as in comment. | **Rejected**The scenario raised in the comment is already supported in the spec. For example, if an R-TWT scheduling AP and an associated R-TWT scheduled STA both support TXOP sharing procedure (please refer to 35.2.1.2 Triggered TXOP sharing procedure), the STA can request a TXOP from the AP. No further changes are needed. |
| 19569 | 35.8.5 | 616.26 | It needs to clarify "the AP should follow the rules specified in 35.17 (EHT SCS procedure) for scheduling of downlink QoS Data frames or enabling the transmission of uplink QoS Data frames for that R-TWT TID in corresponding R-TWT SPs": In 35.17, P649L41, NOTE1 indicates "receiving EHT AP to facilitate the creation of a schedule for contention based channel access (EDCA) or MU operation. How the AP uses the information provided by the non-AP STA QoS Characteristics element that do not have corresponding normative requirements is beyond the scope of the standard". If R-TWT allows UL transmission from the member STAs using EDCA in R-TWT SP, the R-TWT AP should indicate that the R-TWT SP is for the member STAs to transmit SCS stream via EDCA. | Suggest to change text, like "enabling the transmission of uplink QoS Data frames using EDCA for that R-TWT TID in corresponding non-trigger based R-TWT SPs, | **Rejected**Rules for an AP with which a STA has established SCS procedure are comprehensively covered in 35.17 and are not unique to R-TWT operation. Further, “enabling” the transmission of uplink frames is the correct usage as the AP cannot perform EDCA on the STA’s behalf and may facilitate by soliciting frames e.g., via Trigger frames. |

**35.8 Restricted TWT (R-TWT)**

**35.8.1 General**

***TGbe editor: Please modify the last paragraph of 35.8.1 as follows:***

An R-TWT scheduled STA establishes membership for one or more R-TWT schedules with its associated EHT AP by following the rules defined in 26.8.3 (Broadcast TWT operation) with the additional rules defined in 35.8.2 (R-TWT membership setup). An R-TWT scheduling AP may announce one or more R-TWT SPs as described in 35.8.3 (R-TWT announcement). EHT STAs that support R-TWT operation follow the rules defined in 26.8.3 (Broadcast TWT operation), (#19818) 35.3.24 (TWT operation), and the additional rules and restrictions that are defined in the subclauses below.

**Group 2: P2P Support**

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| **CID** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 19822 | 35.8 | 0.00 | It is possible for an R-TWT scheduled STA to use an R-TWT SP for its p2p traffic, but in current R-TWT schedule setup signaling, there is no method to indicate a STA's request to use an SP for its p2p traffic. Similarly AP cannot designate certain SPs as "allowing" or accommodating p2p traffic | An explicit indication should be added to R-TWT signaling (setup and announcement) for use for p2p traffic. This helps with resource management and better coordination and scheduling of p2p traffic instead of STA contending within the SPs for its p2p traffic and potentially increasing contention and efficiency | **Revised**Agree in principle. Signaling mechanism to indicate usage of an R-TWT SP for p2p traffic is defined.**TGbe editor, please make change as shown in 23/1545r0 tagged by #19822** |
| 19823 | 35.8 | 0.00 | Additional signaling and rules should be defined to facilitate p2p traffic support in R-TWT SPs by using Triggered TXOP sharing mode 2 | As in comment | **Revised**Agree in principle. Signaling mechanism to indicate usage of an R-TWT SP for p2p traffic is defined.**TGbe editor, please make change as shown in 23/1545r0 tagged by #19822** |
| 19967 | 35.8.1 | 611.37 | P2P STAs should be able to use a r-TWT schedule to communicate over the P2P link. However, the AP-side and STA-side procedures to enable the use of r-TWT for P2P communication is currently missing in the 11be spec. | Please add text in the spec related to procedures to enable r-TWT operation for P2P communications. | **Revised**Agree in principle. Signaling mechanism to indicate usage of an R-TWT SP for p2p traffic is defined.**TGbe editor, please make change as shown in 23/1545r0 tagged by #19822** |
| 19975 | 35.8.1 | 611.37 | Currently there is no guidance in the spec on how to enable Triggered TXOP sharing for P2P communication during a restricted TWT SP of an r-TWT scheduled STA. Such procedure would be essential so that the STA can utilize the TXOP during the r-TWT SP to coordinate with its peer STA for P2P communication. | Please provide mechanisms and frameworks for enabling Trigger TXOP Sharing for P2P communication during r-TWT operation. | **Revised**Agree in principle. Signaling mechanism to indicate usage of an R-TWT SP for p2p traffic is defined.**TGbe editor, please make change as shown in 23/1545r0 tagged by #19822** |
| 20116 | 35.8.1 | 611.35 | For the scenario where a STA has established a restricted TWT schedule with an AP, and the if the STA has established a TDLS direct link or any P2P link with another peer STA, there needs to be harmonization in the R-TWT operation and the P2P/TDLS operation between the TDLS operation between the peers and the R-TWT operation with the AP. | as in comment. | **Revised**Agree in principle. Signaling mechanism to indicate usage of an R-TWT SP for p2p traffic is defined.**TGbe editor, please make change as shown in 23/1545r0 tagged by #19822** |

**9. Frame formats**

**9.4.2.198 TWT element**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Traffic Info Control | Restricted TWT DL TID Bitmap | Restricted TWT UL TID Bitmap |
| Octets:  | 1 | 1 | 1 |

**Figure 9-765a—Restricted TWT Traffic Info field format**

***TGbe editor: Please modify Figure 9-765b in 9.4.2.198 TWT element as follows (#19822):***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | DL TID Bitmap Valid | UL TID Bitmap Valid | Peer-to-Peer | Reserved |
| Bits:  | 1 | 1 | 1 | ~~6~~5 |

**Figure 9-765b—** **Traffic Info Control field format**

***TGbe editor: Please add the following paragraph at the end of 9.4.2.198, after the paragraph “The Restricted TWT DL TID Bitmap…”:***

(#19822)The Peer-to-Peer subfield, when included in a Restricted TWT Parameter Set field, is set to 1 to indicate that the corresponding R-TWT SP is intended to be used for delivery of traffic on the peer-to-peer link(s) during the restricted TWT SPs of this schedule, in addition to delivery of any uplink or downlink frames; and is set to 0 otherwise.

**35.8.2 R-TWT membership setup**

***TGbe editor: Please add the following paragraphs at the end of 35.8.2 (#19822):***

(#19822)An R-TWT scheduled STA may set to 1 the Peer-to-Peer bit in Traffic Info Control field, included in a TWT element in a TWT request to indicate to the R-TWT scheduling AP its intention to use the R-TWT schedule for its peer-to-peer traffic, in addition to any traffic delivery in uplink and/or downlink, as indicated in the Traffic Info Control field.

(#19822)An R-TWT scheduling AP may set to 1 the Peer-to-Peer bit in Traffic Info Control field, included in a TWT element in a TWT response to indicate to the R-TWT scheduled STA its acknowledgment of STA’s intention to use the R-TWT schedule for the STA’s peer-to-peer traffic.

(#19822)If an R-TWT scheduling AP sets the Peer-to-Peer bit in Traffic Info Control field, included in a TWT element in a TWT response which indicates ACCEPT TWT to 1, and if both the R-TWT scheduling AP and the R-TWT scheduled STA have the Triggered TXOP Sharing Mode 2 Support subfield in the EHT Capabilities element set to 1, the R-TWT scheduling AP should schedule for transmission at least one Trigger frame addressed to the R-TWT scheduled STA that is an MU RTS TXS Trigger frame with the TXOP Sharing Mode subfield set to 2 (see 35.2.1.2 Triggered TXOP sharing procedure).