**IEEE P802.11  
Wireless LANs**

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| **CC 36 CR for Restricted TWT P2P Support** | | | | |
| **Date:** 2022-01-26 | | | | |
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**Abstract**

This submission proposes resolutions for the following CIDs (4) for TGbe CC36:

4778, 6408, 6409, 6423

Revisions:

* Rev 0: Initial version of the document
* Rev 1: Added resolution to similar CID #6409, some other changes based on offline comments

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 D1.4 and P802.11meD1.0.***

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| **CID** | **Commenter** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 4778 | Chunyu Hu | 298.23 | 35.6.2 | rTWT can build in support for a peer-to-peer link so the latency sensitive traffic over the peer-to-peer link can also enjoy any applicable benefit of rTWT (e.g. channel access, txop sharing), regardless how the peer-to-peer link sets up some service periods for latency sensitive traffic (softAP/STA, TDLS or other p2p protocol out of 802.11 scope). The current rTWT is lack of such support. | Please add support of rTWT for p2p. For example, dcn 11-21/462r5 defines the <peer-to-peer> field in Fig. 9-689a for the peer-to-peer latency sensitive traffic tx/rx SP to be aware at AP. (The authors removed this field as there wasn't enough time to discuss.)  There might be some details or other aspects (in addition to the setup procedure) to make the rTWT support of P2P to work. Please add. | **Revised**  Agreed with the commenter on support for p2p. Added Broadcast TWT Recommendation value 5 to indicate p2p, and other relevant spec changes are made.  **TGbe editor, please make change as shown in this doc 11-22/0213 tagged by 4778.** |
| 6408 | Muhammad Kumail Haider | 126.18 | 9.4.2.199 | A PDT and motion(#2920) was passed to make changes to TWT element to accommodate restricted TWT schedule announcements and negotiations. However, the passed version of PDT and motion does not address how the TWT element can be used to signal r-TWT usage for peer-to-peer links of a STA. STAs should be able to use r-TWT operation to provide protection for latency sensitive traffic on their p2p links as well, as it aligns with 802.11be direction to expand support for low-latency traffic and p2p links. | Broadcast TWT parameter set field should have a field/subfield to indicate if the r-TWT schedule is also used by peer-to-peer traffic. | **Revised**  Agreed with the commenter on support for p2p. Added Broadcast TWT Recommendation value 5 to indicate p2p, and other relevant spec changes are made.  **TGbe editor, please make change as shown in this doc 11-22/0213 tagged by 6408.** |
| 6409 | Muhammad Kumail Haider | 126.18 | 9.4.2.199 | A PDT and motion(#2920) was passed to make changes to TWT element to accommodate restricted TWT schedule announcements and negotiations. According to this PDT, Broadcast TWT Recommendation value of 4 was defined to indicate restricted TWT parameter set. However, from 11axD8.0 9.4.2.199 pg 189, "The Broadcast TWT Recommendation is reserved if transmitted by a TWT scheduled STA." Modify text to accommodate when bTWT recommendation=4 is transmitted by r-TWT scheduled STAs | as in comment | **Revised**  Agree in principle. Add text about Broadcast TWT Recommendation value 4  **TGbe editor, please make change as shown in this doc 11-22/0213 tagged by 6409.** |
| 6423 | Muhammad Kumail Haider | 241.01 | 26.8.3 | 802.11ax text specifies rules for TWT scheduling APs and scheduled STAs. Text should be revised to accommodate rules that apply to r-TWT operation and clarify any exceptions. One such modification is adding behavior for Broadcast TWT Recommendation value 4, which was specified in motion#2920 to indicate restricted TWT parameter set | as in comment | **Revised**  Baseline text is modified to add text about Broadcast TWT Recommendation value 4  **TGbe editor, please make change as shown in this doc 11-22/0213 tagged by 6423.** |

**Discussion:**

Multiple motions passed in 802.11be reflect group’s support to facilitate a STA’s peer-to-peer traffic in 802.11be:

* The 802.11be amendment shall define mechanism(s) for an AP to assist a STA that communicates with another STA (Motion 22, 19/1755r2)
* 802.11be supports defining a procedure for an AP to share time resource obtained in a TXOP for peer-to-peer (STA-TO-STA) frame exchanges
  + Whether it is in R1 or R2 is TBD (Motion 111, #SP0611-24)

Several scenarios like mobile gaming and AR/VR encompass a topology where latency sensitive traffic goes from a mobile device to the AP via a peer STA. In such cases, it is critical to support the STA’s p2p traffic as well to ensure better end-to-end latency performance and user-experience. Therefore, in alignment with the direction agreed by the group in above motions, and comments #4778 and #6408, we propose to add explicit indication for a STA’s p2p traffic in rTWT operation by defining a new Broadcast TWT Recommendation value 5.

* With this new value, a STA can explicitly indicate to the AP that it has p2p traffic as well, and request resources during the r-TWT setup. Further, in announcements, AP can also specifically advertise schedule(s) during which it is willing to support p2p traffic.
* With this new value, the traffic prioritization rules defined in 21/1802 for UL/DL remain intact. In addition, the AP allocates resources for a STA’s p2p traffic as well.
* In particular, we propose that in a trigger-enabled r-TWT SP with Broadcast TWT Recommendation value 5, the AP schedules at least one MU RTS TXS Trigger frame with Sharing Mode 2 (if both AP and STA support this procedure), such that it allocates some time (at AP’s discretion) for STA’s p2p traffic as well.

**9. Frame formats**

**9.4.2.199. TWT element**

***TGbe editor: modify last paragraph on Page 1607 of REVmeD1.0 (﻿The TWT Flow Identifier…) as follows:***

﻿The TWT Flow Identifier subfield contains a 3-bit value that identifies the specific information for this TWT request uniquely from other requests made between the same TWT requesting STA and TWT responding STA pair. The Broadcast TWT Recommendation subfield contains a value that indicates recommendations on the types of frames that are transmitted by TWT scheduled STAs and scheduling AP during the broadcast TWT SP, encoded according to the Broadcast TWT Recommendation field for a broadcast TWT element as ﻿defined in Table 9-332 (Broadcast TWT Recommendation field for a broadcast TWT element(11ax)). (#6409, #6423)The Broadcast TWT Recommendation is set to 0, 4 or 5 if transmitted by a restricted TWT scheduled STA, and otherwise is reserved if transmitted by a TWT scheduled STA.(11ax)

***TGbe editor: change Table 9-339 (not all rows shown) and the paragraph below it of P802.11be D1.4 as follows:***

**Table 9-339—Broadcast TWT Recommendation field for a broadcast TWT element**

|  |  |
| --- | --- |
| **Broadcast TWT Recommendation field value** | **Description when transmitted in a broadcast TWT element** |
| … | … |
| (#2920)4 | The corresponding broadcast TWT SP is referred to as an r-TWT SP.  (#4775) During an r-TWT SP, the AP and member r-TWT scheduled STAs prioritize their transmission of QoS Data frames that are latency sensitive traffic (see 35.8 (Restricted TWT (r-TWT))).  ﻿ |
| 5 | (#4778, #6408) The corresponding broadcast TWT SP is referred to as an r-TWT SP.  During an r-TWT SP, the AP and member r-TWT scheduled STAs prioritize their transmission of QoS Data frames that are latency sensitive traffic between them, as well as those between a member r-TWT scheduled STA and its peer STA(s), as described in 35.8 (Restricted TWT (r-TWT)). |
| (#2920) ~~5~~ 6–7 | Reserved |

A broadcast TWT parameter set that has the Broadcast TWT Recommendation field value equal to 4 or 5 (#4778, #6408) is referred to as a restricted TWT parameter set.

***TGbe editor: insert the following new paragraph after the paragraph (The Restricted TWT DL TID Bitmap and Restricted TWT UL TID Bitmap subfields) in P802.11be D1.4, as follows:***

In a restricted TWT parameter set included in a TWT element in a TWT setup frame, if the Broadcast TWT Recommendation field is set to 5 and all bits in the Restricted TWT DL TID Bitmap and Restricted TWT UL TID Bitmap subfields are set to 0, the corresponding r-TWT schedule is intended to prioritize the transmission of QoS Data frames that are latency sensitive traffic between the member r-TWT scheduled STA and its peer STA(s), as described in 35.8 (Restricted TWT (r-TWT)).

**35.8. Restricted TWT (r-TWT)**

**35.8.4 Channel access rules for r-TWT service periods**

**35.8.4.1 TXOP rules for r-TWT SPs**

***TGbe editor: insert the following new paragraph at the end of 35.8.4.1 of P802.11be D1.4, as follows:***

(#4778)During a trigger-enabled r-TWT SP for which the r-TWT scheduled STA sets up its membership with the Broadcast TWT Recommendation field equal to 5, if both the r-TWT scheduling AP and the r-TWT scheduled STA have the Triggered TXOP Sharing Mode 2 Support subfield in EHT Capabilities element set to 1, the r-TWT scheduling AP shall 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 equal to 2 (see 35.2.1.3 Triggered TXOP sharing procedure).