**IEEE P802.11
Wireless LANs**

|  |
| --- |
| **D5.0 CR for CIDs on R-TWT-Part 1** |
| **Date:** 2024-04-22 |
| **Author(s):** |
| **Name** | **Affiliation** | **Address** | **Phone** | **email** |
| Muhammad Kumail Haider | Meta | 1180 Discovery Wy, Sunnyvale, CA |  | haiderkumail@meta.com |
| Guoqing Li | Meta |  |  |  |
|  |  |  |  |  |

**Abstract**

This submission proposes resolutions for the following CIDs:

22188, 22300, 22298, 22297, 22296, 22154, 22299, 22207, 22208, 22257, 22288, 22384

Revisions:

* Rev 0: Initial version of the document
* Rev 1: Added resolution to related CID 22299, editorial changes to improve resolutions to some 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 D5.1 and P802.11meD5.0***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 22188 | 35.8.1 | 620.63 | The second part of this sentence is not required, and therefore confusing, because the requirement in the prior paragraph says that an EHT STA with dot11RestrictedTWTOptionImplemented equal to true shall set the Restricted TWT Support subfield in the transmitted EHT Capabilities element to 1. | Remove latter part of sentence to produce: "An R-TWT scheduling AP is an EHT AP with dot11RestrictedTWTOptionImplemented equal to true." | **Revised**Agree in principle. **TGbe editor, please make change as shown in 24/0371r1 tagged by #22188** |
| 22300 | 35.8.1 | 623.01 | [Liuming Lu] The description is incomplete. | Suggest to change "An R-TWT scheduled STA is a non-AP EHT STA that sets the Restricted TWT Support subfield in the transmitted EHT Capabilities element to 1..." to "An R-TWT scheduled STA is a non-AP EHT STA with dot11RestrictedTWTOptionImplemented equal to true that sets the Restricted TWT Support subfield in the transmitted EHT Capabilities element to 1..." | **Revised**Agree in principle. **TGbe editor, please make change as shown in 24/0371r1 tagged by #22300** |
| 22298 | 35.8.1 | 623.09 | [Liuming Lu] The description is confusing. | Suggest to change "An R-TWT scheduling AP may announce one or more R-TWT SPs as described in 35.8.3 (R-TWT announcement)." to "An R-TWT scheduling AP may announce one or more R-TWT schedules as described in 35.8.3 (R-TWT announcement)." | **Accepted** |
| 22297 | 35.8.1 | 623.09 | [Liuming Lu] The description is incomplete. | Suggest to change "EHT STAs that support R-TWT operation follow..." to "EHT STAs with dot11RestrictedTWTOptionImplemented equal to true that support R-TWT operation follow...". | **Revised**Agree in principle. **TGbe editor, please make change as shown in 24/0371r1 tagged by #22297** |
| 22296 | 35.8.2 | 623.19 | [Liuming Lu] An unsolicited TWT response can also establish an R-TWT membership. | Suggest to change "...except that the broadcast TWT element(s) carried in the Management frames used to..." to "...except that the broadcast TWT element(s) carried in the Management frame(s) used to...". | **Revised****TGbe editor, please make change as shown in 24/0371r1 tagged by #22296** |
| 22154 | 26.8.3.2 | 0.00 | The following sentence in baseline spec (REVme D4.2 P4073L37) needs to be updated to include Broadcast TWT ID subfield set to 31: "The TWT scheduling AP shall include a unique value in the Broadcast TWT ID subfield for each Broadcast TWT to allow identification of each Broadcast TWT, unless the TWT Setup Command field is Alternate TWT or the Broadcast TWT ID subfield is zero." | Modify the cited sentence as follows: "The TWT scheduling AP shall include a unique value in the Broadcast TWT ID subfield for each Broadcast TWT to allow identification of each Broadcast TWT, unless the TWT Setup Command field is Alternate TWT or the Broadcast TWT ID subfield is zero or 31." Modify NOTE 6 as follows: "NOTE 6—The broadcast TWT element contains two Broadcast TWT Parameter Set fields with the same Broadcast TWT ID subfield value if the TWT Setup Command field indicates Alternate TWT in one of the Broadcast TWT Parameter Set fields. The broadcast TWT element might contain multiple Broadcast TWT Parameter Set fields with the Broadcast TWT ID subfield equal to 0 or 31." | **Revised**Agree in principle. **TGbe editor, please make change as shown in 24/0371r1 tagged by #22154** |
| 22299 | 35.8.1 | 623.02 | [Liuming Lu] The description is incomplete: "with which the STA is associated" is missing. | Suggest to change "...and sends to or receives from an R-TWT scheduling AP a broadcast TWT element carrying one or more Restricted TWT Parameter Set field(s)." to "...and sends to or receives from an R-TWT scheduling AP with which the STA is associated a broadcast TWT element carrying one or more Restricted TWT Parameter Set field(s)." | **Rejected**The definition of R-TWT scheduled STA follows baseline definition of TWT scheduled STA for broadcast TWT. No further changes are needed.  |
| 22207 | 4.5.6.3 | 69.63 | "Latency sensitive traffic requires packets to be delivered with predictable latency in terms of both its average and the worst case values over the wireless link." What does predictable delay mean? How the delay can be predicted? Is it just a guess? Or there is a more scientific way to predict the dleay given the random nature of the traffic sysem. If predictable, then why not determisinistic? In fact packets belonging to real-time applications needs to be delivered within certain delay limit, i.e. Total\_Delaay <= Delay\_Limit (bounded delay). | Replace the word "predictable" by the word "bounded" on line 63 and L3P70. | **Rejected**The comment fails to identify a technical issue. The sentence states subset of requirements for latency sensitive traffic for average and worst-case latency values. Actual requirements may differ depending on traffic type. |
| 22208 | 4.5.6.3 | 69.61 | "Traffic originating from many real time applications has stringent requirements in terms of latency and its jitter along with certain reliability constraints.". It is not clear what is meant by "reliability constraints". It would be more informative if those contrainta are explicitly mentioned. In its current form the sentence is vague and doesn't stste anything useful | Explicitly state those reliability constraints and define what does "reliability" mean. | **Rejected**The comment fails to identify a technical issue. Reliability constraints may vary from application to application and may encompass different aspects like delay bound, packet delivery ratio and data rate. The sentence is intended to be general to cover multitude of scenarios. |
| 22257 | 35.8.4.1 | 623.60 | When responding to EMLSR/EMLMR control frame in an R-TWT SP, it is more advantageous and efficient that the STA remains ready to operate till the end of R-TWT SP (and not TXOP). | add a corresponding rule: non-AP STA that is affiliated with a non-AP MLD and operates on one link of an one of the EMLSR or EMLMR links is a member of an R-TWT SP , shall be switched back to the listening operation on the EMLSR links after the EMLSR transition delay time indicated by the non-AP MLD after the end of the R-TWT SP. | **Rejected**The comment fails to identify a technical issue with the current spec. The channel access rules for EMLSR/EMLMR links in this subclause apply to ending the TXOP at R-TWT SP start boundary, and not operation within SP. |
| 22288 | 35.8.4.2 | 626.44 | Current requrements for overlapping quiet intervals are weak and undermines the feature. | Option A:(Preferred) Improve the spec: "A non-AP STA that is a member of an R-TWT SP may behave as if the overlapping quiet interval of the R-TWT SP, if present, does not exist." Option B: Given the weakness of the requirements on overlapping quiet intervals, leave quiet intervals intact by deleting section 35.8.4.2. | **Rejected**The group has reached consensus in previous rounds, after detailed discussions, that “Non-AP EHT STAs may ignore overlapping quiet intervals.”; and not just member R-TWT STAs. There is also consensus to keep overlapping quiet interval rules defined in 35.8.4.2 after multiple rounds of discussion. Please see CIDs and relevant discussion in 11-23/0847r3 |
| 22384 | 9.4.2.198 | 238.27 | P2P TID bitmap specification is missing in current Restricted TWT Traffic Info field. This may cause a fairness issue based on a scenario when a trigger enabled TXOP sharing with Triggered TXOP Sharing Mode subfield value equal to 2 happens inside an R-TWT SP, AP as the TXOP holder has the low latency traffic TID(s) specified for UL and DL only, it's not reasonable for AP to share this TXOP to P2P without any TID limitation. | The commenter will provide a resolution on it. | **Rejected**An explicit indication for P2P traffic in R-TWT SPs has been discussed in multiple previous rounds but failed to reach consensus (please refer to relevant CIDs and discussions in 22/1463r3, 23/1545r0).  |

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

**35.8.1 General**

***TGbe editor: Please modify subclause 35.8.1 as follows:***

R-TWT operation described in this subclause enables the STAs in a BSS to use enhanced medium access protection and resource reservation mechanisms for delivery of latency sensitive traffic.

An EHT STA with dot11RestrictedTWTOptionImplemented equal to true shall set the Restricted TWT Support subfield in its transmitted EHT Capabilities element to 1 and shall set the Broadcast TWT Support subfield in its transmitted HE Capabilities element to 1; otherwise, the EHT STA shall set the Restricted TWT Support subfield in its transmitted EHT Capabilities element to 0.

An R-TWT scheduling AP is an EHT AP with dot11RestrictedTWTOptionImplemented equal to true(#22188) ~~that sets the Restricted TWT Support subfield in the transmitted EHT Capabilities element to 1~~.

An R-TWT scheduled STA is a non-AP EHT STA (#22300)with dot11RestrictedTWTOptionImplemented equal to true ~~that sets the Restricted TWT Support subfield in the transmitted EHT Capabilities element to 1~~ and sends to or receives from an R-TWT scheduling AP a broadcast TWT element carrying one or more Restricted TWT Parameter Set field(s).

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~~(#22297)with dot11RestrictedTWTOptionImplemented equal to true follow the rules defined in 26.8.3 (Broadcast TWT operation), 35.3.24 (MLD TWT operation), and the additional rules and restrictions that are defined in the subclauses below.

**35.8.3 R-TWT announcement**

**35.8.3.1 Rules for R-TWT scheduling AP**

***TGbe editor: Please modify the first paragraph in 35.8.3.1 as follows:***

When there is any R-TWT membership set up with an R-TWT scheduling AP, the R-TWT schedule information shall be announced by including Restricted TWT Parameter Set field(s) in the broadcast TWT element as specified in 9.4.2.198 (TWT element) contained in transmitted Management (#22296)frame(s) as specified in 26.8.3 (Broadcast TWT operation):

**26.8.3.2 Rules for TWT scheduling AP**

***TGbe editor: Please modify the paragraph as follows in 26.8.3.2 (first paragraph on page 4136 of P802.11REVmeD5.1 :***

The TWT scheduling AP shall include a unique value in the Broadcast TWT ID subfield for each Broadcast TWT to allow identification of each Broadcast TWT, unless the TWT Setup Command field is Alternate TWT or the Broadcast TWT ID subfield is zero(#22154), or the Broadcast TWT ID subfield is 31 in a Restricted TWT Parameter Set field.

NOTE 6—The broadcast TWT element contains two Broadcast TWT Parameter Set fields with the same Broadcast TWT ID subfield value if the TWT Setup Command field indicates Alternate TWT in one of the Broadcast TWT Parameter Set fields. The broadcast TWT element might contain multiple Broadcast TWT Parameter Set fields with the Broadcast TWT ID subfield equal to 0. (#22154)The broadcast TWT element might contain multiple Restricted TWT Parameter Set fields with the Broadcast TWT ID subfield equal to 31.