IEEE P802.11  
Wireless LANs

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| Restricted TWT Spec Text  Resolving TBDs: Part I | | | | |
| Date: 2021-01-01 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Chunyu Hu | Facebook | 1 Hacker Way, Menlo Park, CA 95034 |  | chunyuhu07@gmail.com |
| Muhammad Kumail Haider | Facebook |  |  |  |
| Morteza Mehrnoush | Facebook |  |  |  |
| Payam Torab | Facebook |  |  |  |
| Chitto Ghosh | Facebook |  |  |  |
|  |  |  |  |  |
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# Abstract

This submission proposes the draft text for restricted TWT TBDs in Draft P802.11be\_D0.4.pdf, to be incorporated into the latest 801.11be draft. The proposed changes also resolve CIDs 2920 of DraftP802.11be\_D0.3.pdf.

The resolution for TBDs and CIDs focuses on the restricted TWT setup procedure.

Revisions:

* Rev 0: Initial version of the document

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CID | Clause | Page | Comment | Proposed change | Resolution |
| 2920 | 35.6 | 146.58 | (The part of PDT about quality of service for latency sensitive traffic was approved, and a motion of SP#1 about restricted TWT in 20/1046r11 was passed.) The restricted TWT is based on the broadcast TWT. The clear definition is needed to what kinds of data are transmitted during the restricted SP. In "Broadcast TWT Recommendation" of request type field format in a Broadcast TWT parameter set field, the value from 4 to 7 is reserved. By using one of the reserved values, the traffic can be defined for the restricted SP. | As in comment. | Revised.  Please see discussion section.  This draft text defines rTWT SP as described in subclause 9.4.2.199.  **TGbe editor, please implement changes as shown in latest revision doc 11-21/462 tagged 2920.** |

# Discussion:

1. We compared two options with regards to defining a restricted TWT identifier: a) repurpose the Reserved field located at bit-15 of the Request Type field to be the Restricted TWT subfield. b) use value 4 of of the Broadcast TWT Recommendation field as the restricted TWT identifier. Both can serve the functionality requirement however it’s clearler to differentiate Restricted TWT from Broadcast TWT at a higher level instead of defining one specific value of “Recommendation” field as the identifier. Hence we choose option a to develop this draft text.
2. In the TWT element design for restricted TWT purpose, we consider the current baseline where one Broadcast TWT element can include multiple Broadcast TWT Parameter Set fields and intend to support both cases where the receiver is a legacy HE STA or an EHT STA. The proposed design is intended to allow a Braodcast TWT element to announce both restricted TWT schedules and broadcast TWT schedules.

***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. Please note the baseline is 11be D0.4.***

# 9. Frame formats

### 9.4.2.199 TWT element

TGbe editor: change Figure 9-687b (Broadcast TWT Parameter Set field format) as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | Request Type | Target Wake Time | Nominal Minimum TWT Wake Duration | TWT Wake Interval Mantissa | Broadcast TWT Info | Restricted TWT Traffic Info  (optional) |
| Octets: | 2 | 2 | 1 | 2 | 2 | variable |
| * Broadcast TWT Parameter Set field format | | | | | | |

***TGbe editor: change Figure 9-688a (Request Type field format in a Broadcast TWT Parameter Set field) as follows:***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 B3 | B4 | B5 | B6 | B7 B9 | B10 B14 | B15 |
|  | TWT Request | TWT Setup Command | Trigger | Last Broadcast Parameter Set | Flow Type | Broadcast TWT Recommendation | TWT Wake Interval Exponent | ~~Reserved~~  Restricted TWT |
| Bits: | 1 | 3 | 1 | 1 | 1 | 3 | 5 | 1 |
| * Request Type field format in a Broadcast TWT Parameter Set field (#2920) | | | | | | | | |

***TGbe editor: insert the following paragraph after paragraph XX (When transmitted by a TWT responding STA that is an AP, the TWT Protection subfield …)***

The Restricted TWT subfield in the Request Type field is set to 1 to indicate that the TWT schedule specified by the corresponding Broadcast TWT Parameter Set field is a restricted TWT schedule; and set to 0 otherwise. A Broadcast TWT Parameter Set field that has the Restricted TWT subfield set to 1 is referred to as a Restricted TWT Parameter Set field. (#2920)

A broadcast TWT element that contains only Restricted TWT Parameter Set field(s) is also refered to as a restricted TWT element.

The Broadcast TWT Recommendation field of a Restricted TWT Parameter Set field is reserved and set to value 7.

***TGbe editor: change Figure 9-689a (Broadcast TWT Info subfield format) as follows:***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | ~~B0~~        B2 | B3         B7 | B8                B15 |
|  | Peer-to-Peer | Restricted TWT Traffic Info Present | Reserved | Broadcast TWT ID | Broadcast TWT Persistence |
| Bits: | 1 | 1 | ~~3~~1 | 5 | 8 |
| * Broadcast TWT Info subfield format | | | | | |

***TGbe editor: modify paragraph 2 at Page 191 of P802.11ax D8.0 (Within a TWT element that includes a TWT setup command …) as follows:***

The Peer-to-Peer subfield, when included in a Restricted TWT Parameter Set field transmitted by a restricted TWT scheduling AP, is set to 1 to indicate that the AP allows the restricted TWT scheduled STA to transmit or receive latency sensitive traffic for its peer-to-peer link(s) during the restricted TWT SPs of this schedule; and set to 0 otherwise.

The Peer-to-Peer subfield, when included in a Restricted TWT Parameter Set field transmitted by a restricted TWT scheduled STA, is set to 1 to indicate that the STA intends to transmit or receive latency sensitive traffic over its peer-to-peer link(s) as part of latency sensitive traffic to be delivered in the corresponding restricted TWT SPs; and set to 0 otherwise.

The Peer-to-Peer subfield, when included in a non-Restricted TWT Parameter Set field, is reserved.

The Restricted TWT Traffic Info Present subfield, when included in a Restricted TWT Parameter Set field, is set to 1 to indicate that the Restricted TWT Traffic Info field is present; and set to 0 otherwise. When included in a non-Restricted TWT Parameter Set field, the Restricted TWT Traffic Info Present subfield is reserved.

Within a TWT element that includes a TWT setup command value of Request TWT, Suggest TWT or Demand TWT, the Broadcast TWT ID, if present, indicates a specific Broadcast TWT in which the transmitting STA is requesting to participate. Within a TWT element that includes a TWT setup command value of Accept TWT, Alternate TWT, Dictate TWT or Reject TWT, the Broadcast TWT ID, if present, indicates a specific Broadcast TWT for which the transmitting STA is providing TWT parameters. Within a TWT element that includes a TWT setup command value of TWT Grouping, the Broadcast subfield is 0 and the Broadcast TWT ID, is not present. The value 0 in the Broadcast TWT ID subfield indicates the broadcast TWT whose membership corresponds to all STAs that are members of the BSS corresponding to the BSSID of the Management frame carrying the TWT element and that is permitted to contain Trigger frames with RA-RUs for unassociated STAs. The Broadcast TWT ID subfield in a Restricted TWT Parameter Set field shall be set to a non-zero value.

***TGbe editor: insert the following paragraphs and Figures after paragraph (The Broadcast TWT Persistence subfield indicates …):***

The Restricted TWT Traffic Info field is present in a Restricted TWT Parameter Set field when the Restricted TWT Traffic Info Present subfield of the Request Type field is set to 1. Its format is defined in Figure 9-689b (Restricted TWT Traffic Info field format).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Traffic Info Control | | Restricted TWT DL TID Bitmap | Restricted TWT UL TID Bitmap |
| Octets: | 2 | 2 | | 2 |
| Figure 9-689b Restricted TWT Traffic Info field format | | | | |

The Traffic Info Control field is defined in Figure 9-689c (Traffic Info Control field format).

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 | B1 | B2        B15 |
|  | DL TID Bitmap Valid | UL TID Bitmap Valid | Reserved |
| Bits: | 1 | 1 | 14 |
| Figure 9-689c Traffic Info Control field format | | | |

The DL TID Bitmap Valid subfield indicates if the Restricted TWT DL TID Bitmap field has valid information. When the value is set to 0, the Restricted TWT DL TID Bitmap field is reserved.

The UL TID Bitmap Valid subfield indicates if the Restricted TWT UL TID Bitmap field has valid information. When the value is set to 0, the Restricted TWT UL TID Bitmap field is reserved.

The Restricted TWT DL/UL TID Bitmap subfields specify which TID(s) are identified by the TWT scheduling AP or the TWT scheduled STA as latency sensitive traffic streams in the downlink and uplink direction, respectively. A value of 1 (0) at bit position *k* in the bitmap indicates that TID *k* is classified as latency sensitive traffic stream, and MSDUs of TID *k* are (are not) allowed to be transmitted in the restricted TWT SP(s) specified by the TWT element.

# 35.7 Restricted TWT

## 35.7.2 Restricted TWT agreement setup

### 35.7.2.1 General

***TGbe editor: replace TBD with the following paragraphs:***

A restricted TWT agreement is established using the same procedure used to set up a broadcast TWT agreement as described in 26.8.3 (Broadcast TWT operation) except that the TWT setup frames contain a broadcast TWT element that includes a Restricted TWT Parameter Set field as described in 9.4.2.199 (TWT element).

A restricted TWT scheduling AP is an EHT AP with dot11RestrictedTWTOptionImplemented equal to true that sets the Restricted TWT Support subfield in the EHT Capabilities element it transmitted to 1 and supports the restricted TWT operation. It may set the Broadcast TWT Support field in the HE Capabilities element it transmits to 0 or 1. If the restricted TWT scheduling AP sets the Broadcast TWT Support field in the HE Capabilities element it transmits to 0, then the broadcast TWT element(s) it includes in any applicable management frames have to be restricted TWT element(s) as described in 9.4.2.199 (TWT element); otherwise, the restricted TWT scheduling AP is also a TWT scheduling AP, and there is no such restriction on the type of broadcast TWT elements it may include.

A restricted TWT scheduled STA is a non-AP EHT STA with dot11RestrictedTWTOptionImplemented equal to true that sets the Restricted TWT Support subfield in the EHT Capabilities element it transmitted to 1 and supports the restricted TWT operation. It may set the Broadcast TWT Support field in the HE Capabilities element it transmits to 0 or 1. If the restricted TWT scheduled STA sets the Broadcast TWT Support field in the HE Capabilities element it transmits to 0, then it only supports a broadcast TWT setup procedure during which any TWT element it transmits is also a restricted TWT element; otherwise, the restricted TWT scheduled STA is also a TWT scheduled STA, and does not have the aforementioned restriction.

A restricted TWT scheduling AP or restricted TWT scheduled STA which transmits a restricted TWT element with Negotiation Type subfield set to 3 shall set the Restircted TWT Traffic Info Present subfield of the Broadcast TWT Info field to 1, and include Restricted TWT Traffic Info field in the Restricted TWT Parameter set field. If the Negotiation Type subfield of a broadcast TWT element is set to 2, the Restricted TWT Parameter Set field, if included, shall set the Restricted TWT Traffic Info Present subfield to 0, and shall not include the Restricted TWT Traffic Info field accordingly.

**Straw Poll: Do you support to incorporate the proposed draft text in this document 11-21/462r0, to the latest TGbe Draft?**

**Result: Yes/No/Abstain**