### IEEE P802.11 Wireless LANs

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| **REVme Miscellaneous CRs** | | | | |
| Date: 2022-06-25 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | San Diego, California |  |  |

Abstract

This document contains proposed resolutions for several REVme comments (5 CIDs):

* 1034, 2202, 1031, 1310, 1199.

Revisions:

* Rev 0: Initial version of the document
* Rev 1: Incorporated changes suggested during the presentation.

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 REVme Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the REVme Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***REVme Editor: Editing instructions preceded by “REVme Editor” are instructions to the REVme editor to modify existing material in the REVme draft. As a result of adopting the changes, the REVme editor will execute the instructions rather than copy them to the REVme Draft.***

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Proposed Resolution** |
| 2202 | Naveen Kakani | 4211.29 | "The TWT scheduling AP shall schedule for transmission of a Trigger frame addressed to one or more TWT scheduled STAs during a trigger-enabled TWT SP except that the Trigger frame may be replaced by a frame carrying a TRS Control subfield provided"  In scenarios where the B-TWT SPs are overlapping, is it still a requirement for the AP to send Trigger frame before the start of an SP (Trigger Enabled TWT SP), even though the SP is overlapping with an SP, for which the STA has responded back ? Allow AP to not send a Trigger frame if all the STAs in the B-TWT SP are members of another B-TWT SP with which there is an overlap. | Allow for AP not to send Trigger frame at the start of all Triggered enabled TWT SPs if the current SP is already part of another TWT SP (and it doesn't correspond to B-TWT Id = 0). | Revised –  TWT scheduled STAs joint a particular TWT SP based on the characteristics of their traffic. Hence the STA expects to be triggered in a specific TWT SP because it expects frames to be exchanged during that TWT SP. Having been triggered by the AP earlier due to an overlapping TWT SP does not guarantee that the STA will not have traffic to be exchanged during the current TWT SP. However, it is true that the AP can cancel transmission of a Trigger frame if none of the TWT scheduled STAs are expected to be in the awake state. Proposed resolution clarifies that this might be the case for b-twts with nonzero memberships.  REVme editor to make the changes shown in 11-22/0936r1 under all headings that include CID 2202. |
| 1034 | Alfred Asterjadhi | 4216.47 | It is not clear when the TWT scheduled STA that is in PS mode can enter the doze state after sending PS-Poll or an APSD trigger frame. For example, if the TWT scheduled STA is a member of an announced TWT SP, the TWT scheduled STA is expected to send PS-Poll to signal its awake state and can go back to doze state after the SP ends without waiting for the whole Beacon interval. Also, in terms of enhancing power-save, a TWT scheduled STA should be awake only during the broadcast TWT SPs for which it is a member rather than being awake for all SPs in the remaining Beacon interval | Please clarify the power save rules for broadcast TWT when a TWT scheduled STA sends a PS-Poll or an APSD Trigger frame | Revised—  Agree in principle. The items are a bit confusing in the sense that it is not specified which are these broadcast TWTs at which the STA is expected to be in the awake state. In order to make it clear the proposed resolution is to identify the specific broadcast TWTs and qualify each of them for each bullet depending on their characteristics, while keeping the language consistent with the rules at the AP side (P4213L1 to 11 of REVme D1.0.  REVme editor to make the changes shown in 11-22/0936r1 under all headings that include CID 1034. |
| 1031 | Alfred Asterjadhi | 214.47 | The definition states that the information carried in these IEs does not change throughout the lifetime of the BSS (at least the MCS set). However this is not the case if you follow the MAC protos. For example please check critical update procedures defined so far. Suggest fixing the inconsistency. In addition i would not call these elements PHY operation elements because several components of them are MAC exclusive (or at least aid MAC). | As in comment. | Revised –  Agree in principle with the comment. A STA that started the BSS may, for example change parameters of e.g., HT operation, VHT operation elements, and advertise that such changes have occurred by following the critical update protocols defined in 11.2.3.15. However, as stated in the definition not all fields are expected to change. Proposed resolution is to append in the notes in 11.2.3.15 that not all fields of certain elements, such as HT Op, VHT Op, HE Op, are expected to change. Regarding the second point, it is indeed correct that these elements are not only PHY related but also carry MAC related functionalities, hence resolution is to simply refer to operation elements.  REVme editor to make the changes shown in 11-22/0936r1 under all headings that include CID 1031. |
| 1310 |  | 225.23 | We now have a specific definition for the term "identifier", and it is (only) used for WUR frames? Surely that is not how to interpret every occurrence of "identifier" in our Standard. | Add an adjective to distinguish this particular usage, perhaps "WUR broadcast identifier"? | Revised –  There seems to have been an error when copying IEEE802.11ba amendment to REVme. The original definition contained “nontransmitter”. Proposed resolution is to add “nontransmitter” aligning with 11ba.  REVme editor to make the changes shown in 11-22/0936r1 under all headings that include CID 1310. |
| 1199 |  | 4220.42 | What is "preserves the PM mode"? Too astractive. It seems like the STA may be in doze state from the indicated time (from xxx to ..). Rewrite or add the details explicitly as comment for clarification. | As per comment | Revised –  Preserves means that the same PM mode is then inherited when the time comes. Proposed resolution adds some more details so that it is clearer.  REVme editor to make the changes shown in 11-22/0936r1 under all headings that include CID 1199. |

**Discussion: *None.***

**26.8.3.3 Rules for TWT scheduled STA**

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**REme Editor: *Change the paragraph below of this subclause as follows (#CID 2202):***

The TWT scheduling AP shall schedule for transmission of a Trigger frame addressed to one or more TWT scheduled STAs during a trigger-enabled TWT SP, except that the Trigger frame may be replaced by a frame carrying a TRS Control subfield, provided that the frame is carried in a DL MU PPDU and the AP allocates enough resources in the HE TB PPDU for the STA to at least deliver its BSRs in response to the soliciting DL MU PPDU. A TWT scheduling AP should not include the 12 LSBs of the STA’s AID in a User Info field of a Trigger frame transmitted within a broadcast TWT SP, unless the STA is in the awake state, has established membership in the broadcast TWT with that Broadcast TWT ID, or has indicated to receive the Beacon frame preceding the beacon interval that contains this TWT SP (see 26.8.6 (Negotiation of wake TBTT and wake interval)). A TWT scheduling AP may cancel the transmission of a Trigger frame during a trigger-enabled TWT SP if the AP does not expect any member TWT scheduled STAs to be in the awake state at the time of transmitting the Trigger frame.*(#2202)*

The TWT scheduling AP that schedules for transmission additional Trigger frames during a trigger-enabled TWT SP shall set the More TF subfield in the Common Info field of the Trigger frame to 1 to indicate that it will schedule for transmission another Trigger frame within the same TWT SP. The TWT scheduling AP shall set the More TF subfield to 0 if the Trigger frame is the last scheduled Trigger frame of the TWT SP or if the Trigger frame is scheduled for transmission outside of a trigger-enabled TWT SP. The TWT scheduling AP should poll as many STAs as possible among TWT scheduled STAs that are members of that nonzero Broadcast TWT ID so that the STAs can perform a frame exchange with the TWT scheduling AP during that TWT SP.

NOTE 2—The TWT scheduling AP does not intend to schedule for transmission of a Trigger frame for the TWT scheduled STA when the broadcast TWT is not a trigger-enabled TWT or when the TWT scheduled STA has sent an OM Control subfield that has the UL MU disable bit equal to 1 (see 26.9 (Operating mode indication)).

NOTE 3—The TWT scheduling AP can cancel the transmission of a scheduled Trigger frame if the AP gains access to the wireless medium outside of the TWT SP.

NOTE 4—If the AP replaces the Trigger frame with a frame carrying a TRS Control field, then it is recommended that the AP allocate enough resources in subsequent Trigger frames sent during the TWT SP so that the STA can send as much as possible of the data reported in the BSR.

**REme Editor: *Change the paragraph below of this subclause as follows (#CID 1034):***

A TWT scheduled STA that is in PS mode may enter the doze state after receiving a Beacon frame with a

TWT element indicating the existence of a broadcast TWT and shall be in the awake state at specific broadcast TWT start times for which the STA has indicated it will be awake by any of the following means:

* Establishing a membership for the unannounced broadcast TWT with the applicable broadcast

TWT IDs, in which case the specific broadcast TWTs are the unannounced broadcast TWTs.

* Negotiating a wake TBTT and wake interval between Beacon frames that the STA receives, as

defined in 26.8.6 (Negotiation of wake TBTT and wake interval), in which case the specific broadcast TWTs are those that occur during the beacon interval, and the Beacon frame that is sent at the start of that beacon interval and that had the TIM bit corresponding to that STA equal to 1.

* Having sent a PS-Poll or U-APSD trigger frame during the beacon interval, in which case the specific broadcast TWT is the first broadcast TWT that occurs during that beacon interval and either during or after sending that frame.
* Having sent another indication that it is in the awake state during that beacon interval, in which case the specific broadcast TWT is the first broadcast TWT that occurs during that beacon interval and either during or after sending that indication.*(#1034)*

NOTE 2—Other indications that the STA is in the awake state are the transmission of an HE TB feedback NDP in response to an NFRP Trigger frame (see 26.5.7 (NDP feedback report procedure)) or the transmission of a frame that indicates that the STA is in active mode (see 11.2.3.2 (Non-AP STA power management modes)).

NOTE 3—The STA might indicate that it will not be awake at certain broadcast TWT start times by sending a TWT Information frame. The AP might indicate to a STA that it need not be awake at certain broadcast TWT start times by sending a TWT information frame (see 26.8.4 (Use of TWT Information frames)).

**3.1 Definitions**

**REme Editor: *Change the paragraph below of this subclause as follows (#CID 1310):***

**nontransmitter identifier (ID)***(#1310)*: An identifier used by a wake-up radio (WUR) access point (AP) to identify broadcast WUR frames that are addressed to all WUR non-AP stations (STAs) associated with an AP corresponding to a nontransmitted basic service set identifier (BSSID) from the multiple BSSID set when multiple BSSID operation is supported.

**26.8.4.4 TWT Information frame exchange for flexible wake time**

…

**REme Editor: *Change the paragraph below of this subclause as follows (#CID 1199):***

A non-AP HE STA that receives an acknowledgment for a TWT Information frame with flexible TWT that contains a TWT Flow Identifier that does not identify any existing individual TWT agreement will use the same PM mode that the STA has at time *t1*, which is the time the TWT Information frame was sent, at time *t2*, which is the time indicated in the Next TWT subfield of the TWT Information frame as described below in this subclause.*(#1199)*

…

**3.2 Definitions specific to IEEE Std 802.11**

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**REme Editor: *Change the paragraph below of this subclause as follows (#CID 1031):***

basic modulation and coding scheme (MCS) set: A set of MCSs designated by the station (STA) that started the basic service set (BSS) and fixed for the lifetime of the BSS. The basic MCS set is typically advertised in the element(s) that contain the physical layer (PHY) operation parameters (among others)*(#1031)*, e.g., high throughput (HT) and very high throughput (VHT) Operation elements. All STAs in a BSS are capable of, or have signed that they are capable of, receiving and transmitting at all MCSs in the basic MCS set.

…

**11.2.3.15 TIM Broadcast**

**REme Editor: *Change the paragraphs below of this subclause as follows (#CID 1031):***

The AP shall increase the value (modulo 256) of the Check Beacon field in the next transmitted TIM frame(s)

when a critical update occurs to any of the elements inside the Beacon frame. The following events shall

classify as a critical update:

* Inclusion of a Channel Switch Announcement element
* Inclusion of an Extended Channel Switch Announcement element
* Modification of the EDCA parameters element
* Inclusion of a Quiet element
* Modification of the DSSS Parameter Set
* Modification of the HT Operation element
* Inclusion of a Wide Bandwidth Channel Switch element
* Inclusion of a Channel Switch Wrapper element
* Inclusion of an Operating Mode Notification element
* Inclusion of a Quiet Channel element
* Modification of the VHT Operation element
* Modification of the HE Operation element
* Insertion of a Broadcast TWT element
* Inclusion of the BSS Color Change Announcement element
* Modification of the MU EDCA Parameter Set element
* Modification of the Spatial Reuse Parameter Set element
* Modification of the UORA Parameter Set element

NOTE 4—Modification of an element means that at least one field in the element is changed, although not all fields in an element can be changed (e.g., the fields that advertise the basic MCS sets in HT Operation, VHT Operation and HE Operation elements do not change)*(#1031)*. Inclusion of an element means that the element is included in a Beacon frame. The insertion of an element means that the element was not present in the previous Beacon frame, is present in the current Beacon frame, and will be carried in the next Beacon frame.

An AP may classify other changes in the Beacon frame as critical updates.