IEEE P802.11  
Wireless LANs

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| Comment resolution for CID 13084 | | | | |
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Abstract

This submission proposes resolution for CID 13084 of TGax Draft 2.3

**Revisions :**

* Rev 0 : Initial version of the document
* Rev 1 : adaptation to draft 2.3

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| **CID** | **Pg, Li** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 13084 | 92,32 | 9.3.1.23 | "The No Further RA RU subfield is set to 1 to indicate that random access RUs are not allocated in subsequent  Trigger frames that are sent before either the end of the current TWT SP or the end of the current  TXOP in the case of no TWT SP."  This information is not sufficient for a non-AP STA to decide going in doze state or not. If a scheduled RU is assigned to a STA after the "No further random RUs" was set to 1, if it is in doze state, it cannot answer to a scheduled RU. Moreover this bit seems to be limited for the TWT usage. But why not extend for others cases ? | Add another bit to drive the status "No further scheduled RU" and remove the words "before either the end of the current TWT SP or the end of the current TXOP in the case of no TWT SP" | Revised  Agree with the comment.  For the power saving of UORA STAs, a new field “No More Scheduled RU” (in addition to No More RA-RU field) shall be added to determine an early TWT SP termination event.  TGax editor makes changes as shown in 11-18/0388r1 that are marked with CID 13084. |

**Discussion:**

Although a trigger frame indicates no available random RUs in subsequent trigger frames by using the “No More RA-RU” subfield, some scheduled RUs can be allocated for a given station by the AP in subsequent trigger frames. Indeed, as soon as the trigger frame is not intended for a given station and contains one or more RA-RUs, the given station can gain access according to 27.5.5 (UL OFDMA-based random access (UORA)).

*[27.7.5 Power save operation during TWT SPs*

*NOTE 2—A Trigger frame, sent by the TWT scheduling AP, is defined as intended for the TWT scheduled STA when the Trigger frame contains the AID of the STA in one of its Per User Info fields (see 27.5.3 (UL MU operation)), and can have in the TA field the MAC address of the AP or the transmitted BSSID under the conditions defined in 27.5.3.2.3 (Allowed settings of the Trigger frame fields and UMRS Control subfield(#14137)). Otherwise, the Trigger frame is not intended for the STA. If the Trigger frame contains one or more RA-RUsfor which the STA can gain access according to 27.5.5 (UL OFDMA-based random access (UORA)) then the STA can follow the rules defined in 27.14.2 (Power save with UORA) to determine an early TWT SP termination event.]*

*[27.5.5.2 UORA procedure*

*For an HE STA that has a pending frame for the AP, upon the reception of a Trigger frame containing at least one eligible RA-RU(#11033), if the OBO counter of an HE STA is not greater than the number of eligible RA-RUs(#11033) in a Trigger frame from that AP, then the HE STA shall decrement its OBO counter to zero. Otherwise, the HE STA decrements its OBO counter by the number of eligible RA-RUs(#11033) in the Trigger frame.]*

Consequently, if the station enters in anticipated manner in doze mode (due to the value of the subfield “No More RA-RU”) and neitheless received a subsequent trigger frame intended for it, the station (in doze mode) is not able to transmit a HE TB PPDU in the scheduled RUs assigned by the AP which is not compliant with the section 27.5.3.3 STA of the IEEE 802.11ax standard.

[*section 27.5.3.3 STA behavior for UL MU operation :*

*A STA shall transmit an HE TB PPDU a SIFS after a received PPDU, if both the following conditions are met:*

*— The received PPDU contains either a Trigger frame (that is not an MU-RTS variant) with a User Info field addressed to the STA, or an MPDU addressed to the STA that contains an UMRS Control field. The User Info field in the Trigger frame is addressed to a STA if one of the following conditions are met:*

*• The AID12 subfield is equal to the 12 LSBs of the AID of the STA and the STA is associated with the AP]*

Consequently, a STA shall take into account both the value of the “No More RA-RU” subfield and the value of a "No More scheduled RU" subfield to determine an early TWT SP termination event.

The Proposed text changes are as follows.

* Basic Trigger variant

The Trigger Dependent Common Info subfield is not present in the Basic Trigger frame. The Trigger Dependent User Info subfield of the Basic Trigger frame is defined in Figure 9-52j (Trigger Dependent User Info subfield for the Basic Trigger variant).

**TGax Editor: *Make the following changes in section 9.3.1.23.1, page 104, D2.3.***

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|  | B0                       B1 | B2                    B4 | B5 | B6               B7 |
|  | MPDU MU Spacing Factor | TID Aggregation Limit | No More Scheduled RU(#13084) (#3018) | Preferred AC |
| Bits: | 2 | 3 | 1 | 2 |
| * Trigger Dependent User Info subfield(#7324) for the Basic Trigger variant | | | | |

The MPDU MU Spacing Factor subfield is used for calculating *MSF*, the value by which the minimum MPDU start spacing is multiplied (see 10.13.3 (Minimum MPDU Sstart Sspacing field rules)). *MSF* is equal to 2MPDU MU Spacing Factor. (#9640)

The TID Aggregation Limit subfield indicates the MPDUs allowed in an A-MPDU carried in the HE TB PPDU and the maximum number of TIDs that can be aggregated by the STA in the A-MPDU and is set as defined in 27.5.3.2.3 (Allowed settings of the Trigger frame fields and UMRS Control field(#14137)).

(#9831)The value in the TID Aggregation Limit subfield in Trigger frame is less than or equal to *MT* + 1, where *MT* is the value indicated in the Multi-TID Aggregation Support subfield subfield(#12379) in the HE MAC Capabilities Information field in the HE Capabilities element transmitted by the AP that is the intended receiver of the User Info field.(#9264, #9832) (#8025)

The No More Scheduled RU subfield is set to 1 to indicate that scheduled RUs are not allocated for the STA for which the User Info field is intended in subsequent Trigger frames that are sent before either the end of the current TWT SP or the end of the current TXOP in the case of no TWT SP (#13084).

The Preferred AC subfield indicates the lowest AC that is recommended for aggregation of MPDUs in the A-MPDU contained in the HE TB PPDU sent as a response to the Trigger frame. The encoding of the Preferred AC subfield as defined in Table 9-136 (ACI-to-AC encoding).(#11917)

**27.7.5 Power save operation during TWT SPs**

**TGax Editor: *Make the following changes in section 27.7.5, page 320 D2.3.***

The classification of a More Data field equal to 0 in an Ack, BlockAck and Multi-STA BlockAck frame as an event that terminates a TWT SP is only possible when both STAs have indicated support of transmitting or receiving the frame with a nonzero More Data subfield, which is indicated in the More Data Ack subfield of the QoS Info field of frames they transmit (see 11.2.2 (Power management in a non-DMG infrastructure network)).

If the Trigger frame intended for a TWT scheduled STA contains a No More Scheduled RU subfield equal to 1 in the Trigger Dependent User Info fields of the User Info fields with AID12 subfield corresponding to the STA, a STA can follow the rules defined in 27.14.2 (Power save with UORA) to determine an early TWT SP termination event.

NOTE 2—A Trigger frame, sent by the TWT scheduling AP, is defined as intended for the TWT scheduled STA when the Trigger frame contains the AID of the STA in one of its Per User Info fields (see 27.5.3 (UL MU operation)), and can have in the TA field the MAC address of the AP or the(#11036, #13794) transmitted BSSID under the conditions defined in 27.5.3.2.3 (Allowed settings of the Trigger frame fields and UMRS Control subfield(#14137)). Otherwise, the Trigger frame is not intended for the STA.

**27.14.2 Power save with UORA**

**TGax Editor: *Make the following changes in section 27.14.2, page 353 D2.3.***

If the No More RA-RU subfield(#12875) is set to 1, an AP shall not allocate the RA-RUs(#11033)(#12050, #12176) in the subsequent Trigger frames until either the end of the current TWT SP or the end of the cur-rent TXOP in case of no TWT SP.

While TWT SP termination event has not occurred, an HE STA may use the value indicated in the More TF subfield in the Common Info field (#11003) in a Trigger frame to determine whether to enter the doze state. An HE STA shall decrement its OBO counter as defined in 27.5.5 (UL OFDMA-based random access (UORA)). If the OBO counter decrements to a nonzero value and the More TF subfield (#11003) is equal to 0, then the STA may enter the doze state if no other condition requires it to remain awake. If the OBO counter decrements to a nonzero value and the More TF subfield(#11003) is equal to 1, then the STA may remain awake unless the STA received in the current TWT SP or the current TXOP both a trigger frame containing a No More RA-RU subfield equal to 1 in User Info fields with AID12 subfield equal to 0 or 2045 and a trigger frame containing a No More Scheduled RU subfield equal to 1 in the Trigger Dependent User Info fields of the User Info fields with AID12 subfield corresponding to the STA (#13084).In which case, the STA may enter the doze state immediately until either the end of the current TWT SP or the end of the current TXOP in case of no TWT SP if no other condition requires the STA to remain awake. If the OBO counter decrements to zero then the STA shall follow the procedure defined in 27.5.5.3 (UORA procedure) to transmit an HE TB PPDU in response to the Trigger frame.