IEEE P802.11  
Wireless LANs

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| Resolution for CIDs related to UORA | | | | |
| Date: May 1, 2019 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Inc. |  |  | appatil@qti.qualcomm.com |
| Alfred Asterjadhi | Qualcomm Inc. |  |  | aasterja@qti.qualcomm.com |
| George Cherian | Qualcomm Inc. |  |  | gcherian@qti.qualcomm.com |

Abstract

This submission proposes resolutions for comments received for TGax LB238 (25):

20054, 21196, 21169, 20542, 21549, 20663, 20055, 21548, 21114, 20192, 21603, 20056, 21130, 21144, 21145, 21197, 21133, 20052, 20065, 20066, 20067, 20068, 20058, 20059, 20578

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: updated based on offline feedback + changes made when the doc was discussed on 5/8/19 (ad-hoc)

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

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

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

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20054 | Abhishek Patil | 343.60 | 26.5.5.2 | Should a STA consider RA-RUs outside its operating BW as eligible? Or a subset of them? | Please clarify | **Revised**  Per clause 26.5.4.2, a non-AP STA is required to consider the conditions described in clause 26.5.2.3 when determining an RA-RU as ‘eligible’. Clause 26.5.2.3.2 requires that a non-AP STA ignore a TF if it doesn’t recognize or is unable to satisfy or support the values in the TF’s Common Info or User Info subfields. Updated the text in 26.5.2.3.2 to suggest that the non-AP STA doesn’t respond to the TF. Further clarified that the User Info field is applicable to RA-RU case.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 20054** |
| 21196 | Pooya Monajemi | 344.14 | 26.5.5.2 | Pending frames is not a sufficiently precise criteria, which should be specific to the Trigger Type. | Update to list the criteria for each of the 3 allowed UORA Trigger Types:  \* Basic Triggers depend on pending frames available;  \* BSRP depends on a change of Queuesize as last reported;  \* BQRP pend on both frames available and presumably a non-zero bitmap; There are other references to pending frames that should also be updated in 26.5.5. | **Revised**  The term ‘pending frame’ is intended to cover the different scenarios mentioned by the commenter. A non-AP STA would not be motivated to perform random access if it doesn’t have any frames to send to the AP, therefore the spec doesn’t need to get into the details for each scenario. In addition, the criteria for eligibility of an RA-RU and whether a STA decides to content for an eligible RU-RU are different. Therefore the sentence cited by the commenter is moved to the subclause on countdown and transmission.  Additional changes were made to the 2nd paragraph (based on discussion on 5/8/19 (ad-hoc)) to indicate that the STA randomly selects an RA-RU for transmission.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 21196** |
| 21169 | Pooya Monajemi | 344.04 | 26.5.5.2 | When there is a low contention level for RA-RUs, mandating the AP to allocate separate RA-RUs for each BSSID is unacceptably inefficient. There needs to be a method to allocate one RU to be available for random access. | Indicate scheme to allow AP to allocate RA-RUs to all BSSIDs. Accordingly, revise pg326 ln25 and pg 332 ln 34. | **Reject**  I assume the commenter is referring to a multiple BSSID scenario. The proposed scheme would add necessary burden to implementation without much gain.   1. A non-AP would need to have two modes of operation – one for the regular UORA operation (as described in the current spec) which is applicable to single BSS case or the case when the STA monitors TF from its associated BSS in the multiple BSSID set and a special mode when the STA needs to monitor TFs from TxBSSID. 2. The scheme would also require defining new signaling mechanism to inform non-AP STAs when they should switch their mode of UORA operation (i.e., at what point should it start monitoring RA-RU from TF sent by TxBSSID)? 3. Further, the scheme would require updating the UORA parameter set values when the UORA operating mode is switched. The updated UORA parameter set would need to account for the increased number of contenders when operating in multi-BSS UORA mode while maintaining fairness to STAs associated with TxBSSID. This would be a difficult balance. 4. In addition, the current spec, allows an APs operating in multiple BSSID set to send a single DL MU PPDU addressed to different BSSIDs in the set carrying TFs with RA-RUs for STAs associated with their respective BSSIDs (please see note on P344L56 of D4.1.   Given these considerations, there is no need to define a new multi-BSS UORA procedure. |

* Conditions for not responding with an HE TB PPDU[20054]

***TGax editor, please split the 2nd paragraph and make changes (includes adding a NOTE) as shown below:***

A non-AP STA may choose to not respond to a Trigger frame that contains one or more subfields in the Common Info field or in the User Info field addressed to or selected by the non-AP STA with values that are not recognized, not supported or cannot be satisfied by the non-AP STA.

NOTE – The User Info field in this context corresponds to the one directed to the non-AP STA (i.e., value in the AID12 subfield matches the STA’s AID) or the one allocating an RA-RU (single or within a contiguous set) that is selected by the non-AP STA.

A non-AP STA may choose to not respond to a TRS Control subfield in a frame addressed to the non-AP STA if the TRS Control subfield contains one or more subfields with values that are not recognized, not supported or cannot be satisfied by the non-AP STA. A non-AP STA shall update the intra-BSS NAV (see 26.2.4 (Updating two NAVs)) based on the duration information of the Trigger frame or frame containing TRS Control subfield even if it decides to not respond to the frame.

* Eligible RA-RUs

***TGax Editor: Please move the 4th paragraph from this clause as the 2nd paragraph of 26.5.4.3:***

[21196]

* Transmission procedure for UORA

***TGax Editor: Please move the 4th paragraph from 26.5.4.2 as the 2nd paragraph in this clause and make changes as shown below:***

A non-AP STA(#16592) shall not select an eligible RA-RU or decrement its OBO counter if it does not have pending frames for the AP.[21196]

***TGax Editor: Please make changes to the following paragraph in this subclause as shown below:***

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, if the OBO counter of an HE STA is not greater than the number of eligible RA-RUs in a Trigger frame from that AP, then the HE STA shall set its OBO counter to zero and randomly select one of the eligible RA-RUs to be considered for transmission[21196]. Otherwise, the HE STA decrements its OBO counter by the number of eligible RA-RUs in the Trigger frame.

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20542 | Mark RISON | 344.03 | 26.5.5.2 | "the non-AP STA is an associated STA" -- not clear what the STA is associated to | Change "the non-AP STA is an associated STA, the TA field of the Trigger frame is set to the BSSID of the associated BSS" at the referenced location to "the non-AP STA is associated with the BSS whose BSSID is the value in the TA field of the Trigger frame" | **Accept**  **TGax editor, please implement the changes as suggested by the commenter** |
| 20663 | Mark RISON | 344.30 | 26.5.5.2 | "A non-AP HE STA may consider as eligible RA-RUs, a subset of the RA-RUs indicated by the User Info fields in a Trigger frame that carries more than one User Info field allocating RA-RUs. In this case, the num- ber of eligible RA-RUs for that non-AP STA shall be the total number of eligible RA-RUs indicated by the selected subset of User Info fields." is not clear in the case where the subset is the full set (esp. the "in such case", which suggests a subset does not include the full set) | Change the cited text at the referenced location to "A non-AP HE STA may consider as eligible RA-RUs all or a subset of the RA-RUs indicated by the User Info fields in a Trigger frame that carries more than one User Info field allocating RA-RUs. The number of eligible RA-RUs for that non-AP STA shall be the total number of eligible RA-RUs indicated by the selected User Info fields.". Delete the comma in the immediately following NOTE | **Accept**  **TGax editor, please implement the changes as suggested by the commenter** |
| 21549 | Yoshio Urabe | 344.26 | 26.5.5.2 | It is not clear what if the RU indicated in a User Info with AID12=2046 overlaps with one of contiguous set of RA-RUs indicated in another User Info. | Insert the following sentence before the paragraph from P344L26: "A non-AP HE STA shall not consider an RU indicated in a User Info field with the AID12 subfield equal to 2046 as an eligible RA-RU if the RU overlaps with one of a contiguous set of RA-RUs." Replace the paragraph from P344L26 with "A non-AP HE STA shall determine the number of eligible RA-RUs in a contiguous set for the User Info field corresponding to an eligible RA-RU by adding the value carried in the Number Of RA-RU subfields plus one minus the number of unallocated RUs indicated by one or more User Info fields with the AID12 subfield equal to 2046 among the contiguous set of RA-RUs." | **Revised**  An AP is expected to signal more than one contiguous set of RA-RUs such that a unallocated RU doesn’t lie within any set – i.e., more than one User Info field signaling set of RA-RUs such that they don’t overlap with unallocated RU.  A NOTE is added to explicitly clarifying this case. Figure 26-3a also illustrates this case.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 21549** |
| 21548 | Yoshio Urabe | 330.44 | 26.5.3.2.4 | The usage of AID12=2046 is not clear. It may be used to exclude an RU among contiguous RA-RUs indicated by a User Info with AID12=0 or 2045. The usage should be explained because, probably, there is no other meaningful usage. Two separate sets of contiguous RA-RUs can also be indicated by two User Info for each set, but there is a differnce that some non-AP STA may decode only one of them and other set may be disregarded. | Add a note after the sentence of P330L44-54: "Note: A User Info field with the AID12 subfield is 2046 may be used to exclude an RU out of a set of contiguous RA-RUs indicated in another User Info field." | **Reject**  There could be a variety of reasons why an AP may signal an unassigned RU – for example an AP may be experiencing interference on a particular sub-channel and decides not to allocate any RUs on that subchannel. In case where an unallocated RU lies in-between a set of contiguous RA-RUs, an AP must include two User Info fields in the TF to signal the two sets separately and another User Info field to signal the unallocated RU. |
| 20055 | Abhishek Patil | 344.31 | 26.5.5.2 | The choice of considering a sub-set of eligible RA-RU for count-down and selection for transmission should fall under transmission rules. | Move this paragraph and the note to the next clause (26.5.5.3) and clarify that amongst the eligible set, the STA may consider a subset or all of the RUs for countdown and transmission | **Revised**  Resolution to CID 20663 would clarify that the subset can be a full set. The paragraph and note is not moved. Instead, text is updated to clarify that for the STA considers a subset of RA-RUs for countdown and transmission process.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 20055** |
| 21114 | Oghenekome Oteri | 330.49 | 26.5.3.2.4 | Sentence conflicts with example in Figure 26-5 on pg 345 line 9--"If a Trigger frame contains User Info fields with AID12 subfield equal to 0 or greater than 2007, then they shall appear after User Info fields with values of AID12 subfield greater than 0 and less than 2008 (if any present)". Figure 26.5 has AID 0 and 2045 before AID 3 | Resolve conflict. One simple way is to delete this sentence. | **Revised**  Figure 26-5 is for illustration purpose only. The intention is to show how the UORA countdown works. The physical location of a directed RU can occur before or after an RA-RU- i.e., the order in which User Info fields appear in a Trigger frame has no correlation with the RU location that each User Info indicates. Figure 26-3a is added to clarify this point.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 21114** |

* Eligible RA-RUs

***TGax Editor: Please make changes to the 5th paragraph in this subclause as shown below:***

An HE AP may allocate a contiguous set of RUs for random access by setting the Number Of RA-RU subfield in the User Info field of the Trigger frame to a value greater than one. The RA-RU indicated by the RU Allocation subfield in the User Info field shall represent the starting RU of the set. The size of all RA-RUs in the set shall be the same and equal to the size of the RA-RU indicated by the RU Allocation subfield in the User Info field. The remaining subfields of the User Info field apply to each RA-RU in the set. An AP allocating a contiguous set of RA-RUs in a Trigger frame with an UL BW subfield that indicates 80+80 MHz or 160 MHz shall set the Number Of RA-RUs subfield such that all the RA-RUs in the set lie in one 80 MHz frequency segment.

[21549]NOTE – An AP can transmit a Trigger frame carrying more than one User Info field, each allocating a single or a contiguous set of RA-RUs, to ensure that an RA-RU set does not overlap with other RUs allocated by the frame.

***TGax Editor: Please make changes to the 7th paragraph in this subclause as shown below:***

A non-AP HE STA may consider as eligible RA-RUs, a subset of the RA-RUs indicated by the User Info fields in a Trigger frame that carries more than one User Info field allocating RA-RUs. In this case, the number of eligible RA-RUs that the non-AP STA [20055]considers for OBO countdown and transmission (see 26.5.4.3) shall be the total number of eligible RA-RUs indicated by the selected subset of User Info fields.

* **Allowed settings of the Trigger frame fields and TRS Control subfield**

***TGax Editor: Please make changes to the 12th paragraph in this subclause as shown below:***

An AP may indicate an unassigned RU in a Trigger frame by including a User Info field with AID12 subfield equal to 2046. If an AP transmits a Trigger frame that contains one or more a User Info field with AID12 subfield equal to 2046, it shall place the User Info field(s) with AID12 subfield equal to 2046 after User Info field(s) with an AID12 subfield less than 2046. An AP shall not transmit a Trigger frame that contains more than one User Info field with the same value in the AID12 subfield unless the value of the AID12 subfield is 0 or greater than 2007. If an AP transmits a Trigger frame that contains User Info fields with the same value in the AID12 subfield, then the AP shall place these User Info fields as a contiguous block within the Trigger frame. If an AP transmits a Trigger frame that contains User Info fields with AID12 subfield equal to 0 or greater than 2007, then the AP shall include these User Info fields after User Info fields with values of AID12 subfield greater than 0 and less than 2008 (if any present). If an AP transmits a Trigger frame that is individually addressed, then it shall include only one User Info field in the Trigger frame with the value of the AID12 subfield set to the 12 LSBs of the AID of the non-AP STA addressed by the RA field. See Figure 26-3a for an example of how User Info fields are ordered in a Trigger frame.[21114]

[21114, 21549]

***TGax Editor: Please add the following figure after the 12th paragraph in this subclause as shown below:***

***Visio file: 11-19/0751***



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| **Figure 26-3a – Illustration of order User Info fields versus their mapping to RU locations** |

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20192 | Chunyu Hu | 347.03 | 26.5.5.5 | "An AP transmitting a Trigger frame that allocates one or more RA-RUs for unassociated STAs shall transmit the Trigger frame in an HE PPDU so that an unassociated non-AP STA can determine the AP's BSS color." imposes the trigger frame to be tx'd in HE PPDU un-necessarily. The non-AP STA can determine the BSS color from the AP's beacons. | Remove this paragraph. | **Reject**  An unassociated STA may not have any information on the AP’s BSS configuration (e.g., BSS Color etc) when it receives a Trigger frame with RA-RUs for unassociated STAs. In such cases, the STA won’t be able to construct a TB PPDU with the correct color information. TGax had discussed this topic at great length – there were two options on the table – #1, a TF carrying RA-RUs for unassociated STAs should carry enough information (e.g., overload the Trigger Dependent User Info field to carry primary channel information) or #2, have the STA wait until it receives a Beacon frame from this AP. Both options had their pros and cons. Specifically with #2, a STA would have lost an opportunity to send a mgmt. frame to the AP. TGax members debated the topic over a couple of IEEE meetings and as a compromise, decided to add a requirement that a TF carrying RA-RU for unassociated STA should be transmitted in HE PPDU so that the STAs can determine the BSS color of the AP. |
| 21603 | Zhou Lan | 347.03 | 26.5.5.5 | "An AP transmitting a Trigger frame that allocates one or more RA-RUs for unassociated STAs shall transmit the Trigger frame in an HE PPDU so that an unassociated non-AP STA can determine the AP's BSS color." imposes the trigger frame to be tx'd in HE PPDU un-necessarily. The non-AP STA can determine the BSS color from the AP's beacons. | Remove this paragraph. | **Reject**  An unassociated STA may not have any information on the AP’s BSS configuration (e.g., BSS Color etc) when it receives a Trigger frame with RA-RUs for unassociated STAs. In such cases, the STA won’t be able to construct a TB PPDU with the correct color information. TGax had discussed this topic at great length – there were two options on the table – #1, a TF carrying RA-RUs for unassociated STAs should carry enough information (e.g., overload the Trigger Dependent User Info field to carry primary channel information) or #2, have the STA wait until it receives a Beacon frame from this AP. Both options had their pros and cons. Specifically with #2, a STA would have lost an opportunity to send a mgmt. frame to the AP. TGax members debated the topic over a couple of IEEE meetings and as a compromise, decided to add a requirement that a TF carrying RA-RU for unassociated STA should be transmitted in HE PPDU so that the STAs can determine the BSS color of the AP. |
| 20056 | Abhishek Patil | 347.09 | 26.5.5.5 | An AP transmits a trigger frame. Same comment applies to P425L36. There may be other such instances throughtout the spec. | Replace all such 'STA' instances with 'AP' or 'AP STA' | **Accept**  **TGax editor, please implement the changes as suggested by the commenter** |
| 21130 | Pascal VIGER | 347.09 | 26.5.5.5 | Sentence of first paragraph begins with "An AP transmitting a Trigger frame" whereas second paragraph begins with "An HE STA with dot11OFDMARandomAccessOptionImplemented equal to true that intends to transmit Trigger frames". Please align the wording. | Keep AP wording to avoid confusion. | **Accept**  **TGax editor, please implement the changes as suggested by the commenter** |
| 21144 | Patrice Nezou | 412.45 | 26.5.5.5 | All recommandations listed from line 45 to 50 are only related to TWT usage. Please specify that the HE STA must set dot11TWTOptionImplemented to 1 to support these recommandations. | Replace "An HE STA with dot11OFDMARandomAccessOptionImplemented equal to true" by "An HE STA with dot11OFDMARandomAccessOptionImplemented equal to true and with dot11TWTOptionImplemented equal to true" | **Revised**  The text in the cited paragraph is updated to say that the rules apply to an AP that supports both UORA and TWT operation.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 21144** |
| 21145 | Patrice Nezou | 412.57 | 26.5.5.5 | All recommandations listed from line 57 to 61 are only related to TWT usage. Please specify that the AP must set dot11TWTOptionImplemented to 1 to support these recommandations. | Replace "An AP operating a BSS ..." by "An AP with dot11TWTOptionImplemented equal to true operating a BSS ..." | **Revised**  The text in the cited paragraph is updated to say that the rules apply to an AP that supports both UORA and TWT operation.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 21145** |
| 21197 | Pooya Monajemi | 347.30 | 26.5.5.5 | Are we now asserting that all AP must support FILS discovery? Was this statement intended to apply to all AP or HE AP or HE AP that support FILS discovery, or HE that supports both FILS discovery and UORA for unassociated STA? The latter appears to be the context of this section. | Properly clarify which case we intended, and consider if this should state they send the FILS Discovery frame, or that the support FILS Discovery as described in 11.47.2.1 | **Revised**  An unassociated STA may not have any information on the AP’s BSS configuration (e.g., operating BW, location or primary channel etc) when it receives a Trigger frame with RA-RUs for unassociated STAs. In such cases, the STA may not be able to accurately map the RU allocation or construct the TB PPDU. TGax had discussed this at great length – there were two options on the table – #1, a TF carrying RA-RUs for unassociated STAs should carry enough information (e.g., overload the Trigger Dependent User Info field to carry primary channel information) or #2, have the STA wait until it receives a Beacon frame from this AP. Both options had their pros and cons. TGax members debated the topic over a couple of IEEE meetings and as a compromise, decided to recommend that an AP transmit FILS Discovery frames at frequent intervals to help unassociated STAs gather the necessary information about the AP.  Updated the sentences to indicates that the recommendation applies to an AP that intends to allocate RA-RUs for unassociated STAs.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 21197** |
| 21133 | Pascal VIGER | 347.30 | 26.5.5.5 | Scheduling transmission of FILS Discovery frames are nothing to do with RA procedure. Either remove the text, or move it to a note in appropriated section for FILS Discovery procedure. | as per comment | **Revised**  Updated the sentences to indicates that the recommendation applies to an AP that intends to allocate RA-RUs for unassociated STAs. Also, please see resolution to CID 21197  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 21197** |
| 20052 | Abhishek Patil | 336.06 | 26.5.3.4 | The case of unassociated STA sending TB PPDU to the AP is covered in 26.5.5.5. Move the rules for unassociated STA TB PPDU to this clause so that they are all in one place. | At the beginning of this sub-clause add a sentence which says that rules for generating a  TB PPDU by an unassociated non-AP STA are described in 26.5.5.5. Consolidate and move the content on P336L6 and P337L20 to 26.5.5.5. | **Revised**  The two paragraphs in 26.5.2.4 cited by the comment are deleted and corresponding paragraph in 26.5.4.5 is updated to capture the content from the deleted paragraphs.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 20052** |

* Additional considerations for unassociated STAs

***TGax Editor: Please make changes to the 2nd paragraph in this subclause as shown below:***

An HE AP, that supports UORA and broadcast TWT operation, [21144]that intends to transmit Trigger frames that allocate one or more RA-RUs for unassociated STAs shall schedule the transmission of at least one such Trigger frame within each TWT SP corresponding to a Broadcast TWT Parameter Set field in a TWT element with a Broadcast TWT ID subfield equal to 0, Flow Type subfield equal to 0, Trigger subfield equal to 1 and Broadcast TWT Recommendation subfield equal to 2.

***TGax Editor: Please make changes to the 4th paragraph in this subclause as shown below:***

An AP, that supports UORA and broadcast TWT operation,[21145] operating a BSS with a width of 80 MHz or greater and transmitting a Trigger frame that allocates one or more RA-RUs for unassociated STAs shall include at least 2 RA-RUs for unassociated STAs for at least one transmission of such a Trigger frame within a Broadcast TWT SP that meets the conditions described above.

***TGax Editor: Please make changes to the 6th paragraph in this subclause as shown below:***

An AP [21197, 21133]that intends to transmit Trigger frames that allocate one or more RA-RUs for unassociated STAs should transmit FILS Discovery frames as described in 11.46.2.1 (FILS Discovery frame transmission) at regular intervals within a beacon period to assist unassociated STA discover the BSS and its operating parameters.

***TGax Editor: Please make changes to the 8th paragraph in this subclause as shown below:***

***[There are no comments associated with the changes below. The 1st sentence is a repetition from 26.5.4.1 and hence deleted. The changes to the 2nd sentence are editorial]***

A non-AP STA that intends to transmit its first HE TB PPDU, to an AP with which it is not associated, in response to a Trigger frame from that AP carrying RA-RU for unassociated STAs, shall initialize its OCW using the default values or the values provided in the UORA Parameter Set element received from that AP and shall initialize its OBO counter as defined in 26.5.4.3 (Transmission procedure for UORA).

***TGax Editor: Please make changes to the 10th paragraph in this subclause as shown below:***

[20052]A non-AP STA shall include at most one Management frame, belonging to either Class 1 or Class 2, carried in an S-MPDU when it transmits an HE TB PPDU, in response to a Trigger frame sent by an AP to which the non-AP STA is not associated.

* A-MPDU contents in an HE TB PPDU[20052]

***TGax Editor: Please make the following changes to the 2nd paragraph in this subclause as shown below:***

A non-AP STA shall follow the rules described in 26.5.4.5 to construct an S-MPDU when it transmits an HE TB PPDU in response to a Trigger frame, from an AP with which it is not associated with, that allocates RA-RUs for unassociated.

***TGax Editor: Please delete the 6th paragraph in this subclause as shown below:***

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20065 | Abhishek Patil | 415.28 | 26.14.2 | Simplify the sentence and update it to reflect the actions of a single non-AP STA. The reference to 26.5.5.3 can be deleted as the rest of the subclause provides detailed references. | Replace the paragraph as: "This subclause illustrates the power save mechanisms for a non-AP HE STA that is operating in PS mode and is UORA and TWT capable." | **Accept**  **TGax editor, please implement the changes as suggested by the commenter** |
| 20066 | Abhishek Patil | 415.32 | 26.14.2 | TWT IE is not carried in all mgmt frames. Further, PS rules are not applicable to unassociated STAs. Therefore, TWT IE carried in Beacon and (Re-)Association frames are of interest in this context. | Replace Management frame in this section with Beacon and (Re-)Association Response frames. | **Accept**  **TGax editor, please implement the changes as suggested by the commenter** |
| 20067 | Abhishek Patil | 416.10 | 26.14.2 | The last paragraph in this sub-clause provides PS rules based on the value of More RA-RU bit. The rules for setting the value of this field should be covered in another clause. | Move this paragraph to 26.5.5.1. | **Revised**  The (5th) paragraph describing the rules for setting the More RA-RU subfield is moved to 26.5.4.1  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 20067** |
| 20068 | Abhishek Patil | 416.25 | 26.14.2 | Avoid reference to magic numbers (2045). TGax has discussed this topic before and had decided to replace all references to AID12=0 or AID12=2045 with RA-RU for associated or unassociated STA. | Replace reference to AID12=0 (2045) with RA-RU for associated (unassociated) STA | **Revised**  The text in the last paragraph of 26.14.2 is update to remove any reference to AID12=0 or 2045.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 20068** |

* **Power save with UORA and TWT**

***TGax Editor: Please make changes to the 3rd paragraph in this subclause as shown below***

A TWT-SP with RA-RU is a TWT SP corresponding to a Broadcast TWT Parameter Set field in a TWT element having Broadcast TWT ID subfield[#Ed] equal to 0, Flow Type [#Ed]subfield equal to 0(#15114, #15812), Trigger subfield equal to 1, and a Broadcast TWT Recommendation subfield equal to 2. An associated HE STA that supports TWT and UORA procedure when operating in PS mode, upon receiving a Management frame from its associated AP carrying TWT element indicating a schedule for TWT-SP(s) with RA-RU, may enter doze state if no other condition requires it to be awake. The STA may transition to awake state at the start of a TWT SP with RA-RU and follow the procedure in 26.5.5 (UL OFDMA-based random access (UORA))) to send an HE TB PPDU to its associated AP.(#15111)(18/1812r2)

***TGax Editor: Please move the 5th paragraph in this subclause to clause 26.5.4.1***

[20067]***TGax Editor: Please make changes to the 6th paragraph in this subclause as shown below***

An HE [#Ed]non-AP STA shall decrement its OBO counter by following the procedure in 26.5.4.3 (Transmission procedure for UORA). If the OBO counter decrements to a nonzero value, then the STA may enter the doze state until the end of the current TWT SP if the STA has not declared to the AP that it is in awake state (as described in 26.8.3.3 (Rules for TWT scheduled STA)) and no other condition requires it to remain awake and one of the following conditions is met:

* The More TF subfield in the Common Info field of the Trigger frame is equal to 0.
* [20068]The More TF subfield in the Common Info field of the Trigger frame is equal to 1 and the More RA-RU subfield in User Info field is equal to 0 indicating that subsequent Trigger frames, within the the current broadcast TWT SP, will not include RA-RUs matching the value in AID12 subfield.(#15114, #15812, #16468)
* General[20067]

***TGax Editor: Please move the 5th paragraph from 26.14.2 and split it as the 6th and 7th paragraph in this clause with additional changes as shown below***

in the User Info field 1stransmit additional Trigger frames, within the current broadcast TWT SP, that matching the AID12 subfield value of the User Info field

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20058 | Abhishek Patil | 370.59 | 26.8.3.1 | Avoid reference to magic numbers (2045). TGax has discussed this topic before and had decided to replace all references to AID12=0 or AID12=2045 with RA-RU for associated or unassociated STA. | Replace reference to AID12=2045 with RA-RU for unassociated STA | **Revised**  Agree with the comment. The sentence is updated to say ‘STAs not associated with the AP’. Similar instance in Trigger frame format is updated. 9th paragraph in 26.5.4.5 is updated to clarify the values carried in the Broadcast TWT Parameter set.  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 20058** |
| 20059 | Abhishek Patil | 370.64 | 26.8.3.1 | Since 6GHz AP is permitted to send unsolicated broadcast Probe Response | Add dot11HE6GOptionImplemented set to true criteria to the last sentence. | **Revised**  D4.1 has fixed this by requiring that an AP operating in 6GHz sets dot11FILSOmitReplicateProbeResponses to true (see 26.17.2.1 P434L65 of D4.1). No further changes are needed. |

* Additional considerations for unassociated STAs[20058]

***TGax Editor: Please move the 4th paragraph from 26.8.3.1 as the 7th paragraph in this clause with additional changes as shown below***

A(see 26.8.3.1 (General)), that supports UORA operation, at least one allocating or more RA- for STAs not associated with the AP, the Flow Type subfield set to 0,

***TGax Editor: Please make changes to the 9th paragraph in this subclause as shown below:***

An unassociated non-AP STA that supports the UORA and TWT procedure may begin listening for Trigger frames at the start of a particular broadcast TWT SP after receiving a Beacon frame, a broadcast Probe Response frame or a FILS Discovery frame containing a TWT element with Broadcast TWT Parameter Set field having Broadcast TWT ID subfield equal to 0, Flow Type subfield equal to 0, Trigger subfield equal to 1 and Broadcast TWT Recommendation subfield equal to 2.

* **General**[20058]

***TGax Editor: Please move the following paragraph in this subclause to clause 26.5.5.5***

* **General**[20058]

***TGax Editor: Please make changes as shown below to the following paragraph in this subclause***

The More RA-RU subfield is set to 1 to indicate that RA-RUs of the type indicated by the AID12 subfield in this User Info field are allocated in subsequent Trigger frames that are sent until the end of the TWT SP in which the Trigger frame carrying this field is sent. Otherwise the subfield is set to 0. The subfield is reserved if the More TF field in the Common Info field is set to 0.(#15813, #16544, #16545, #16546)

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| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 20578 | Mark RISON | 333.55 |  | "SS Allocation field" -- what if it's actually an RA-RU Information subfield (AID12 is 0 or 2045)? Ditto at 334.25, | Clarify | **Revised**  Agree with the comment. D4.1 has address this issue as a resolution to CID 20479 (please see 26.5.2.3.3 P336L55 and P337L27 of D4.1). However the bullet on STARTING\_STS\_NUM is indicating an incorrect value. The error is fixed as a resolution to this comment (the value should be 1 instead of 0).  **TGax editor, please implement the changes shown in doc 11-19/508r1 with the tag 20578** |

* TXVECTOR parameters for HE TB PPDU response to Trigger frame

***TGax Editor: Please make changes as shown below to the following bullet in this subclause***

A non-AP STA transmitting an HE TB PPDU in response to a Trigger frame shall set the TXVECTOR parameters as follows:

* The STARTING\_STS\_NUM parameter is set to the value of the Starting Spatial Stream subfield in the SS Allocation field in the User Info field of the Trigger frame. The STARTING\_STS\_NUM parameter is set to 1 if the HE TB PPDU is sent on an RA-RU following the UORA procedure. [20578]