IEEE P802.11
Wireless LANs

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| Proposed resolution for comments related to Various CIDs in 27.5.2 |
| Date: 2017-03-09 |
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Abstract

This submission proposes resolutions for multiple comments received for TGax LB225 (75 CIDs):

7968, 8271, 4809, 4810, 4811, 5702, 5183, 5184, 9451, 5185, 5703, 7574, 9894, 4812, 5186, 5704, 9452, 8272, 9707, 5706, 5187, 6168, 5983, 8273, 8338, 9588, 6166, 10167, 4815, 4816, 7644, 7812, 9896, 6065, 7175, 9759, 9456, 9589, 7176, 10260, 9898, 8552, 3228, 9710, 4818, 8151, 8701, 8702, 4821, 9529, 4820, 8703, 4822, 4823, 4824, 4825, 6685, 7649, 5717, 3232, 7816, 5988, 9713, 4828, 6196, 3325\*, 6695, 8705, 6696, 7817, 6697, 9917, 5997, 5998, 6701

\* CID 3325 has several duplicates which are not listed or counted here. Instead, the duplicate CIDs are being tracked in document 11-17/0010 which is maintained by the TGax Editor.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1:
	+ Included resolution to CID 7041
	+ Edits to the text on padding duration based offline feedback
	+ Removed Note 2 for padding – revised text on padding covers the case
	+ Minor editorial changes
* Rev 2:
	+ Removed resolutions 7041, 7141, 9897 (as suggested by the group during ad-hoc session on 3/9/17)

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** | **Section** | **Pg / Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 7968 | Mark RISON | 27.5.2.1 | 163.19 | This is normative, not just informative | Change "Non-AP STAs transmit their response frames using HE trigger-based PPDU format, in eitherUL OFDMA, UL MU-MIMO, or both, except when the Trigger frame is of type MU-RTS, in which case theresponse (CTS) is sent in a non-HT PPDU format (see 10.3.2.8a (MU-RTS/CTS procedure))." to "Non-AP STAs shall transmit their response frames using HE trigger-based PPDU format, in eitherUL OFDMA, UL MU-MIMO, or both, except when the Trigger frame is of type MU-RTS, in which case theresponse (CTS) shall be sent in a non-HT PPDU format (see 10.3.2.8a (MU-RTS/CTS procedure))." | RevisedRevised text to make the sentence normative as suggested by the commenter.TGax editor please make the changes as shown in 11-17/0250r2 |
| 8271 | Pascal VIGER | 27.5.2.1 | 163.58 | There is a mix of STA, HE STA, non-AP STA terms used in this section in a confusing manner. As example, page 164 line 14, "A STA shall not transmit a Trigger frame..." whereas only a AP HE STA is able to do this. | as per comment | RevisedAgree with the commentUpdated text to make reference to a non-AP HE STA or an HE AP.TGax editor please make the changes as shown in 11-17/0250r2 |
| 4809 | Alfred Asterjadhi | 27.5.2.1 | 163.60 | "in eitherUL OFDMA, UL MU-MIMO, or both," is redundant since the trigger-based PPDU already defines the allowed modes | remove "in eitherUL OFDMA, UL MU-MIMO, or both," | AcceptAgree with the comment.Deleted the reference to UL OFDMA and UL MU-MIMOTGax editor please make the changes as shown in 11-17/0250r2 |
| 4810 | Alfred Asterjadhi | 27.5.2.1 | 164.03 | use field name instad of bit number. Same in other lines | as in comment | RevisedThe issue pointed out by the commenter doesn’t exist in D1.1. The paragraphs were updated in D1.1 as a resolution to CID 5142. The revised text refers to field names instead of bits. |
| 4811 | Alfred Asterjadhi | 27.5.2.1 | 164.14 | This para is reduntant with the next one | Remove this para and keep the next one starting at line19 | RejectThe two paragraphs refer to separate capabilities and neither should be deleted |
| 5702 | Guoqing Li | 27.5.2.1 | 164.14 | There is no terminology called MU-MIMO RU and UL OFDMA PPDU. I think what this sentence means is "An AP shall not ....assigning spatial streams to more than one STA in an RU in the response trigger-based PPDU when the RU does not span..." | Clarify as suggested | Revised Agree with the comment. Update the text in this paragraph to clarify that the solicited TB PPDU uses MU-MIMO, the solicited STA has indicated support for partial BW and the RU assigned to the STA spans partial BW.TGax editor please make the changes as shown in 11-17/0250r2 |
| 5183 | Dorothy Stanley | 27.5.2.1 | 164.14 | Define "MU-MIMO RU" | as in comment | Revised Agree with the comment. The sentence was update as a resolution to CID 5702. The term MU-MIMO RU is no longer present without affecting the intention of the sentence.TGax editor please make the changes as shown in 11-17/0250r2 |
| 5184 | Dorothy Stanley | 27.5.2.1 | 164.14 | Define "UL OFDMA PPDU" | as in comment | Revised Agree with the comment. The sentence was update as a resolution to CID 5702. The term OFDMA PPDU is no longer present.TGax editor please make the changes as shown in 11-17/0250r2 |
| 9451 | Xiaofei Wang | 27.5.2.1 | 164.14 | there is no definition of 'UL OFDMA PPDU' | Define UL OFDMA PPDU or use other defined terminology. | Revised Agree with the comment. The sentence was update as a resolution to CID 5702. The term OFDMA PPDU is no longer present.TGax editor please make the changes as shown in 11-17/0250r2 |
| 5185 | Dorothy Stanley | 27.5.2.1 | 164.19 | Define "UL MU-MIMO HE trigger-based PPDU" | as in comment | RevisedUpdated the sentence to clarify that this is a Trigger-based PPDU that is using UL MU-MIMOTGax editor please make the changes as shown in 11-17/0250r2 |
| 5703 | Guoqing Li | 27.5.2.1 | 164.19 | There is no terminology called "UL MU-MIMO HE trigger-based PPDU" | Delete "UL MU-MIMO" from the sentence. | RevisedUpdated the sentence to clarify that this is a Trigger-based PPDU that is using UL MU-MIMOTGax editor please make the changes as shown in 11-17/0250r2 |
| 7574 | Liwen Chu | 27.5.2.1 | 164.24 | Class A and B should also apply to UL MU also. | Change the text per the comment. | RevisedAgree with the comment. Deleted text that indicated only UL OFDMA case.TGax editor please make the changes as shown in 11-17/0250r2 |
| 9894 | Young Hoon Kwon | 27.5.2.1 | 164.24 | Class A/B is not limited to an UL OFDMA PPDU. It can be applided HE trigger-based PPDU including not only OFDMA but also MU-MIMO cases. | Modify the last paragraph of 27.5.2.1 to " A STA transmitting an UL trigger-based PPDU shall operate as either ...". | RevisedAgree with the comment. Text is updated to indicate HE trigger based PPDU. Deleted text indicating only UL OFDMA case. Also see resolution to CID 7574. |
| 4812 | Alfred Asterjadhi | 27.5.2.1 | 164.24 | UL OFDMA PPDU is not defined. Is it meant to be triger-based PPDU with no more than one SS per user? | Define UL OFDMA PPDU or contextualy add more details to define the intended type of PPDU | RevisedAgree with the comment. However, the term UL OFDMA was deleted as a resolution to CID 7574. |
| 5186 | Dorothy Stanley | 27.5.2.1 | 164.24 | Define "UL OFDMA PPDU" | as in comment | RevisedAgree with the comment. However, the term UL OFDMA was deleted as a resolution to CID 7574. |
| 5704 | Guoqing Li | 27.5.2.1 | 164.24 | There is no terminology called "UL OFDMA PPDU" | Use a difined terminology | RevisedAgree with the comment. However, the term UL OFDMA was deleted as a resolution to CID 7574. |
| 9452 | Xiaofei Wang | 27.5.2.1 | 164.24 | there is no definition of 'UL OFDMA PPDU' | Define UL OFDMA PPDU or use other defined terminology | RevisedAgree with the comment. However, the term UL OFDMA was deleted as a resolution to CID 7574. |
| 8272 | Pascal VIGER | 27.5.2.1 | 164.24 | class A or class B devices are said to be defined in 28.3.14 (Transmit requirements for an HE trigger-based PPDU), whereas this seems not the case. | as per comment | RejectThe sentence is not implying that the definition of class A or class B devices is in 28.3.14 but instead it is point to how a STA sending a trigger response will operate while in class A or class B. The section reference (28.3.14) is correct. |
| 9707 | Yongho Seok | 27.5.2.1 | 164.25 | "A STA that is a class A device shall set the Class A subfield in HE Capabilities elements that it transmits to 1. A STA that is a class B device shall set the Class A subfield in HE Capabilities elements that it transmits to 0."There is no Class A subfield in HE Capabilities element.Change it as the following:"A STA that is a class A device shall set the Device Class subfield in HE Capabilities elements that it transmits to 1. A STA that is a class B device shall set the Device Class subfield in HE Capabilities elements that it transmits to 0." | As per comment. | AcceptAgree with the comment.Fixed text as suggested by the commenter.TGax editor please make the changes as shown in 11-17/0250r2 |
| 5706 | Guoqing Li | 27.5.2.1 | 164.50 | Comparing to the first bullitin which has "one or more trigger frames", the second bullitin here says "an UL MU Response scheduling", it reads like only one MPDU in the PPDU can include an UL MU response scheduling subfield. However, I don't think that's the intention of this bullitin. Multiple MPDUs can carry the UL MU response scheduling A-Control field each addressed to differnet STAs. This needs to be clarified. | Clarify, remove "An" from beginning of the sentence. | AcceptAgree with the commentDeleted ‘An’ from the beginning of the sentence. Also see resolution to CID 9588.TGax editor please make the changes as shown in 11-17/0250r2 |
| 5187 | Dorothy Stanley | 27.5.2.2.1 | 164.52 | Define "S-MPDU" | as in comment | RejectThe term S-MPDU is defined in 802.11ah spec (please see 802.11ah D10.0 page 3 line 9) |
| 6168 | Jinjing Jiang | 27.5.2.2.1 | 164.53 | What is S-MPDU? VHT single MPDU? It is not formally defined in the draft or 802.11-16; please quote the correct 10.13.8 section title; and if carried in VHT single MPDU, should "Are"-->"Is" | Define the term before use it | RejectThe term S-MPDU is defined in 802.11ah spec (please see 802.11ah D10.0 page 3 line 9). Also, the ‘Are’ refers to the MPDUs (plural). |
| 5983 | Jarkko Kneckt | 27.5.2.2.1 | 164.63 | The standard should not encourage to put more than one Trigger frame to the A-MPDU, because multiple Trigger generate overhead and the Trigger frames will be located right after each other. | Change may to should not. Change the text to read:" More than one Trigger frame should not be aggregated..." | RejectAn AP may aggregate multiple Trigger frames in an A-MPDU for the purpose of robustness and/or to replace junk with useful information (i.e., instead of adding padding to the A-MPDU, the AP can fill the frame with Trigger frames carrying the same content). |
| 8273 | Pascal VIGER | 27.5.2.2.1 | 164.63 | The purpose of following sentence is unclear: "More than one Trigger frame may be aggregated in an A-MPDU. If more than one Trigger frame is aggregated in an A-MPDU, all of them shall have the same content." What is the aim of such duplication, to replace padding ? | as per comment | Reject An AP may aggregate multiple Trigger frames in an A-MPDU for the purpose of robustness and/or to replace junk with useful information (i.e., instead of adding padding to the A-MPDU, the AP can fill the frame with Trigger frames carrying the same content). |
| 8338 | Peter Khoury | 27.5.2.2.1 | 164.63 | The sentence "More than one Trigger frame may be aggregated in an A-MPDU. If more than one Trigger frame is aggregated in an A-MPDU, all of them shall have the same content." Is the situation in which more than one trigger frame is aggregated is a DL MU PPDU with multiple Trigger Frames transmitted to different users in different RUs? If this is the case then this sentence is overly restrictive as information about other users is being unicasted to a single user. | Clarify the language on situations in which trigger frames may be aggregated. If the situation described in the comment is valid allow trigger frames to different users in an A-MPDU to differ from each other. | RejectAs described in the spec, all the Trigger frames in an A-MPDU shall carry the same content. An AP may aggregate multiple trigger frames for the purpose of robustness and/or to replace junk with useful data. |
| 9588 | Yongho Kim | 27.5.2.2.1 | 164.64 | Not only Trigger frame, but also Trigger A-contol shall follow same rule. | As in comment. | RevisedAgree with the comment. The rules for HT Control field in an A-MPDU are described in section 10.9 (see pg 1364 of 802.11-2016): “If the HT Control field is present in an MPDU aggregated in an A-MPDU, then all MPDUs of the same frame type (i.e., having the same value for the Type subfield of the Frame Control field) aggregated in the same A-MPDU shall contain an HT Control field. The HT Control field of all MPDUs containing the HT Control field aggregated in the same A-MPDU shall be set to the same value.”Added an explanatory note with reference to section 10.9TGax editor please make the changes as shown in 11-17/0250r2 |
| 6166 | Jinjing Jiang | 27.5.2.2.1 | 165.01 | line 1-6 is a duplicate of line 18-19 | As in the comments | RejectThe lines are not duplicates. Lines 1-6 explain that an A-MPDU cannot carry a trigger frame and a MPDU containing UL MU Response Scheduling A-Control addressed to the same STA. While lines 18-19 imply that only an HE AP can send an MPDU that carries a Trigger frame or a UL MU Response Scheduling A-Control subfield. |
| 10167 | Yunbo Li | 27.5.2.2.1 | 165.26 | In sentence,"The AP shall apply the Trigger Frame MAC Padding field with duration corresponding to the longest value among all STAs that have requested extra MinTrigProcTime through Trigger Frame MAC Padding Duration capability", only need to consider all triggered STAs. | change "among all STAs" to "among all triggered STAs" | AcceptMade the change as suggested by the comment. This clarifies that only the triggered STAs are considered.TGax editor please make the changes as shown in 11-17/0250r2 |
| 4815 | Alfred Asterjadhi | 27.5.2.2.1 | 165.27 | "The AP shall apply the Trigger Frame MACPadding field with duration corresponding to the longest value among all STAs that have requested extraMinTrigProcTime through Trigger Frame MAC Padding Duration capability." Which are "all the STAs"? even STAs that are not allocated by this trigger frame? | Clarify that the statement refers to only the STAs are allocated by this trigger frame | RevisedThe paragraph on trigger frame padding has been updated and includes clarification that only the triggered STAs are considered when padding length is computed.TGax editor please make the changes as shown in 11-17/0250r2 |
| 4816 | Alfred Asterjadhi | 27.5.2.2.1 | 165.31 | This para is reduntant. The previous one is sufficient | Remove this para | AcceptAgree with the comment. The redundant paragraph has been deleted.TGax editor please make the changes as shown in 11-17/0250r2 |
| 7644 | Liwen Chu | 27.5.2.2.1 | 165.21 | This requirement must be true to the last Trigger frame in A-MPDU. Change the text accordingly. | As in comment | RevisedAgree with the comment. The paragraph has been updated and includes clarification that the padding requirement applies to the last or the only trigger frame carried in the PPDU.TGax editor please make the changes as shown in 11-17/0250r2 |
| 7812 | Mark Hamilton | 27.5.2.2.1 | 165.26 | This sentence is inconsistent with the next paragraph, and the previous sentence. The only rule we need, is for the AP to protect each non-AP STA's requested time. No need for a maximumizing function. | Delete this sentence. | RevisedAgree with the commentRevised the paragraph on trigger frame padding to cover the case of LDPC and BCC coding and to clarify that the padding length (in time) is computed with respect to *MinTrigProcTime* specified by each triggered STA and not the longest of all the triggered STAs. Also deleted the formula in 9.3.1.23 (Trigger frame format) since it is not used for computing the size of the padding field.TGax editor please make the changes as shown in 11-17/0250r2 |
| 9896 | Young Hoon Kwon | 27.5.2.2.1 | 165.27 | This sentence is somewhat misleading. An AP shall ensure that the duration from the end of the User Info field to the end of the PPDU shall be longer than the maximum MinTrigProcTime value. However, how to achieve this is an AP's implementation issue, such as using EOF padding, Trigger frame padding, or both, etc. Therefore, it is not appropriate to mention that the AP shall apply the Trigger Frame MAC Padding field with duration corresponding to the longest value among all STAs... Further clarification is needed. | As in the comment. | RevisedAgree with the commentSee resolution for CID 7812. Also added a note to mention that AP can use any type of padding to ensure the required amount of ‘padding’ time has passed.TGax editor please make the changes as shown in 11-17/0250r2 |
| 6065 | Jeongki Kim | 27.5.2.2.1 | 165.35 | Because the size of AID in User Info field is 12 bits, change the value of AID for padding from the 2047 to 4095. | Change the related text as follows:NOTE 1--The start of the Padding subfield is identified by a User Info field that has a value of the AID equal to 2047 4095, and the remaining subfields of the Padding field are set to 1. | RejectFrom section 9.4.1.8 (AID field), "A non-DMG STA assigns the value of the AID in the range 1–2007; the 5 MSBs of the AID field are reserved." – i.e., bit 12 is reserved. Therefore, leaving the current text unchanged. |
| 7175 | kaiying Lv | 27.5.2.2.1 | 165.35 | The start of the Padding subfield is identified by a User Info field that has a value of the AID equal to 0XFFF,not 2047 | Change "2047" to "0XFFF" | RejectFrom section 9.4.1.8 (AID field), "A non-DMG STA assigns the value of the AID in the range 1–2007; the 5 MSBs of the AID field are reserved." – i.e., bit 12 is reserved. Therefore, leaving the current text unchanged. |
| 9759 | Yoshio Urabe | 27.5.2.2.1 | 165.35 | The value of AID12 subfield for MAC padding of a Trigger frame is not clear.The special AID value is 2047 (i.e. 0x7FF) in 27.5.2.2.1 while the special value of STAID[11:0] is 0xFFF in 9.3.1.23. | Change "a value of the AID equal to 2047" to "a value of the AID12 subfield equal to 0xFFF". | RejectFrom section 9.4.1.8 (AID field), "A non-DMG STA assigns the value of the AID in the range 1–2007; the 5 MSBs of the AID field are reserved." – i.e., bit 12 is reserved. Therefore, leaving the current text unchanged. |
| 9456 | Xiaofei Wang | 27.5.2.2.2 | 165.56 | The Note is about how to set RA address in Trigger based PPDUs and it seems to be unrelated to the text above, which is on the setting of the trigger frame. It should be removed or moved to the related sections. | Remove the Note | RevisedAgree with the commentMoved the note to section 27.5.2.3 which describes behavior on the responding STA. Also moved text related to RA behavior in following paragraph to 27.5.2.3.TGax editor please make the changes as shown in 11-17/0250r2 |
| 9589 | Yongho Kim | 27.5.2.2.2 | 165.64 | GCR-MU-BAR also need to be included. | Instead of using 'MU-BAR', use '(GCR)MU-BAR)'. | RevisedAgree with the commentUpdated text to fix missing references to GCR MU-BAR at the location pointed out by the comment and at other locations in this section.TGax editor please make the changes as shown in 11-17/0250r2 |
| 7176 | kaiying Lv | 27.5.2.2.2 | 166.05 | "destination AP" is confusing. Need to be clarified. | Change "destination AP" to "associated AP" | RejectA trigger frame may assign RA RUs for unassociated STAs. Therefore, ‘destination AP’ is the correct term. |
| 10260 | Yusuke Tanaka | 27.5.2.2.2 | 166.10 | This rule conflict with the rule described in P164L63. Here it says "An AP shall set all the subfields, except the Trigger Type subfield, of the Common Info field of a Trigger frame to the same value (omitted) carried in the same PPDU" but P164L63 says "If more than one Trigger frame is aggregated in an A-MPDU, all of them shall have the same content." | Resolve the conflict. | RejectBoth sentences are correct. One of them is referring to Trigger frames in an A-MPDU while the other is referring to Trigger frames in a PPDU. A PPDU can carry multiple A-MPDUs. Within an A-MPDU, if there are more than one trigger frame, they shall all have the same content. Each A-MPDU (within a PPDU) could carry different types of trigger frames. |
| 9898 | Young Hoon Kwon | 27.5.2.2.2 | 166.10 | How about Trigger Dependent Common Info subfield? For example, if an AP sends GCR MU-BAR Trigger frame and MU-BAR Trigger frame together, it is not sure how to set the Trigger Dependent Common Info subfield of MU-BAR frame. | Change the txt "except the Trigger Type subfield," to "except the Trigger Type subfield and Trigger Dependent Common Info subfield,". | RejectAs seen from table 9-425, an A-MPDU can aggregate one or more trigger frames where the trigger type is not GCR (which is the only type that can have a Trigger Dependent Common Info field). |
| 8552 | Rojan Chitrakar | 27.5.2.2.2 | 166.38 | "User Info field" should be "A-control subfield"? | Replace "User Info field" with "A-control subfield" | RevisedAgree with the comment. Changed text to indicate STAs that receive the UL MU Response Scheduling A-Control subfield.TGax editor please make the changes as shown in 11-17/0250r2 |
| 3228 | Ahmadreza Hedayat | 27.5.2.2.2 | 166.49 | Better to refer to "... HE variant HT Control fields with an UL MU Response Scheduling A-Control subfield" as "UL MU Response Scheduling A-Control field" as in the rest of 27.5. | As in the comment | RevisedAgree with the comment. Fixed such reference at another location in this section.TGax editor please make the changes as shown in 11-17/0250r2 |
| 9710 | Yongho Seok | 27.5.2.2.2 | 166.62 | The Multi-TID Support field is not defined in the HE MAC Capabilities Information field of the HE Capabilities element.Replace "Multi-TID Support" with "Multi-TID Aggregation Support". Also replace the same on Page 167 Line 7. | As per comment. | AcceptCorrected the field name referenced in the sentences.TGax editor please make the changes as shown in 11-17/0250r2 |
| 4818 | Alfred Asterjadhi | 27.5.2.2.3 | 167.38 | this para is redundant. Concepts are better explained at the previous para | Remove this paragraph | AcceptAgree with the comment. The previous paragraph contains more detailed and covers the items in this one. Deleted the redundant paragraph.TGax editor please make the changes as shown in 11-17/0250r2 |
| 8151 | Michael Montemurro | 27.5.2.3 | 167.42 | "STA behavior" doesn't provide much context for this subclause. Is it really TX rules? | Update the title of the clause to be something more specicic than "STA behavior" | RevisedChanged the title of the clause to “STA behavior for UL MU Operation”TGax editor please update the section title as suggested in 11-17/0250r2. Also please update other sections in the draft to show the updated title when they make reference to 27.5.2.3.  |
| 8701 | Sigurd Schelstraete | 27.5.2.3 | 168.05 | In the bullet list on page 168, sometimes we explicitly refer to the "Common field of the Trigger frame" sometimes just "The trigger Frame" | Include "Common field" in all cases | AcceptFixed reference as suggested by the comment.TGax editor please make the changes as shown in 11-17/0250r2 |
| 8702 | Sigurd Schelstraete | 27.5.2.3 | 168.06 | In the bullet list on page 168, sometimes we use "solicting Trigger frame", sometimes "eliciting Trigger frame" or just "Trigger frame". | Use consistent wording | RevisedChanged the two instances of ‘soliciting’ to ‘eliciting’ as ‘eliciting Trigger frame’ was used at all other instances in this particular clause (27.5.2.3).TGax editor please make the changes as shown in 11-17/0250r2 |
| 4821 | Alfred Asterjadhi | 27.5.2.3 | 168.27 | typo on CH\_BANDWITHW | remove the final W | AcceptDeleted typo (extra ‘W’ from the word)TGax editor please make the changes as shown in 11-17/0250r2 |
| 9529 | Yasuhiko Inoue | 27.5.2.3 | 168.32 | "The NUMBER\_HE\_LTF\_SYM parameter shall be set to the value ..."There is no such a parameter in TXVECTOR nor RXVECTOR. | Clarify which parameter is referred to. | RevisedAgree with the comment.Fixed the parameter name to NUM\_HE\_LTFTGax editor please make the changes as shown in 11-17/0250r2 |
| 4820 | Alfred Asterjadhi | 27.5.2.3 | 168.46 | repeated "shall be set" | remove | AcceptDeleted repeating textTGax editor please make the changes as shown in 11-17/0250r2 |
| 8703 | Sigurd Schelstraete | 27.5.2.3 | 168.46 | "The MCS parameter shall be set to shall be set to the value of the MCS field in the Common Info field of the eliciting Trigger frame". The MCS is not in the Common field, but the User Info field. | Correct. Also correct typo (repetition of "shall be set to") | AcceptDeleted repeating text and fixed incorrect reference (Common Info field => User Info field)TGax editor please make the changes as shown in 11-17/0250r2 |
| 4822 | Alfred Asterjadhi | 27.5.2.3 | 168.52 | repeated "shall be set" | remove duplication | AcceptDeleted repeating textTGax editor please make the changes as shown in 11-17/0250r2 |
| 4823 | Alfred Asterjadhi | 27.5.2.3 | 169.07 | UL\_TARGET\_RSSI, DL\_TX\_POWER are not defined vectors | Remove. These are not paramters that go into the trigger-based PPDU | AcceptRemoved the two parameters are pointed in the commentTGax editor please make the changes as shown in 11-17/0250r2 |
| 4824 | Alfred Asterjadhi | 27.5.2.3 | 169.15 | MU\_MIMO\_LTF\_MODE is not a tx/rx vector paramter. LDPC\_EXTRA is actually LTPC\_EXTRA\_SYMBOL; CODING\_TYPE is not defined; SS\_ALOCATION is not defined | Refer to the correct paramters or remove them. | RevisedRenamed incorrect field referenceRemoved fields that are not present in the TX/RXVECTORTGax editor please make the changes as shown in 11-17/0250r2 |
| 4825 | Alfred Asterjadhi | 27.5.2.3 | 169.26 | CP\_LTF\_TYPE paramter does not exist | Refer to the correct paramter | RevisedFixed incorrect reference. Change CP\_LTF\_TYPE to HE\_LTF\_TYPETGax editor please make the changes as shown in 11-17/0250r2 |
| 6685 | John Coffey | 27.5.2.3 | 169.41 | Inconsistent terminology: here we have "the trigger-based PPDU", whereas almost everywhere else in the draft we have "the HE trigger-based PPDU". If the same thing is intended, the same term should be used. | Change to "the HE trigger-based PPDU". | AcceptText changed as suggested by the commenterTGax editor please make the changes as shown in 11-17/0250r2 |
| 7649 | Liwen Chu | 27.5.2.3 | 169.50 | MAC padding of A-MPDU in HE TRIG PPDU should be in subcaluse 27 | Change the padding subclause. | RevisedFixed incorrect reference. Added correct reference pointing to section 27.10.3TGax editor please make the changes as shown in 11-17/0250r2 |
| 5717 | Guoqing Li | 27.5.2.3 | 169.52 | missing "and" between the reference of 9.7.3 and 27.10.3 | add "and" between the two reference sections. | AcceptAdded ‘and’ as suggested by the commenterTGax editor please make the changes as shown in 11-17/0250r2 |
| 3232 | Ahmadreza Hedayat | 27.5.2.3 | 169.56 | Add the BQRP and GCR MU-BAR: "If the Trigger Type field of a Trigger frame is not Basic Trigger, then the STA shall include in the response A-MPDU at least one MPDU of the required type. A Beamforming Report Poll Trigger frame solicits HE Compressed Beamforming Feedback frames (see 27.6 (HE sounding protocol), an MU BAR Trigger frame solicits BlockAck frames (see 27.4 (Block acknowledgement)), and a BSRP Trigger frame solicits QoS Null frames (see 27.5.2.5 (HE buffer status feedback operation for UL MU). The MPDUs included in the response shall not solicit a response." | "If the Trigger Type field of a Trigger frame is not Basic Trigger, then the STA shall include in the response A-MPDU at least one MPDU of the required type. A Beamforming Report Poll Trigger frame solicits HE Compressed Beamforming Feedback frames (see 27.6 (HE sounding protocol), an MU BAR Trigger frame or a GCR MU-BAR frame solicits BlockAck frames (see 27.4 (Block acknowledgement)), a BSRP Trigger frame solicits QoS Null frames (see 27.5.2.5 (HE buffer status feedback operation for UL MU), and a BQRP Trigger frame solicits QoS Null frames. The MPDUs included in the response shall not solicit a response." | RevisedAgree with the comment.Updated text to include GCR case and BQRP variant of TF.TGax editor please make the changes as shown in 11-17/0250r2 |
| 7816 | Mark Hamilton | 27.5.2.3 | 169.57 | Clarify 'required'. | Change "required type" to "type requested by the Trigger frame". Same thing at P170L2. | RevisedAgree with the commentChanged text to say requested type for the case when trigger frame type is not basic trigger. Revised the text for basic trigger case to indicate empty buffer case.TGax editor please make the changes as shown in 11-17/0250r2 |
| 5988 | Jarkko Kneckt | 27.5.2.3 | 169.61 | QoS Data or QoS Null frame may be used as a response to BSRP and BQR. Currenly only QoS Null is listed. | Add QoS Data as one response frame. | RejectOnly Basic Trigger specifies the minimum spacing field (i.e., the MPDU MU spacing field) and other fields like TID Aggregation Limit necessary for a data frame. Therefore TB PPDU for BSRP and BQR cannot be a QoS Data frame. |
| 9713 | Yongho Seok | 27.5.2.3 | 169.61 | "If the Trigger Type field of a Trigger frame is not Basic Trigger, then the STA shall include in the response A-MPDU at least one MPDU of the required type. A Beamforming Report Poll Trigger frame solicits HE Compressed Beamforming Feedback frames (see 27.6 (HE sounding protocol), an MU BAR Trigger frame solicits BlockAck frames (see 27.4 (Block acknowledgement)), and a BSRP Trigger frame solicits QoS Null frames (see 27.5.2.5 (HE buffer status feedback operation for UL MU). The MPDUs included in the response shall not solicit a response."The HE Compressed Beamforming Feedback frame is a wrong frame name.And, the above paragraph is missing the Bandwidth Query Report Poll variant Trigger frame.Change it as the following:"...A Beamforming Report Poll Trigger frame solicits HE Compressed Beamforming And CQI frames (see 27.6 (HE sounding protocol)... a BSRP Trigger frame and a BQRP Trigger frame solicit QoS Null frames (see 27.5.2.5 (HE buffer status feedback operation for UL MU and 27.5.1.3 (HE bandwidth query report operation for DL MU))...." | As per comment. | RevisedAgree with the comment.Updated text to fix the frame name to Beacomforming and CQI frame. Included the case of BQRP variant of TF.TGax editor please make the changes as shown in 11-17/0250r2 |
| 4828 | Alfred Asterjadhi | 27.5.2.3 | 170.15 | double period |  | AcceptDeleted extra periodTGax editor please make the changes as shown in 11-17/0250r2 |
| 6196 | John Buffington | 27.5.2.5 | 171.39 | Unknown reference in description of "(#2190, 2191)". | Please clarify reference or remove it if it's a mistake. | AcceptDeleted CID referenceTGax editor please make the changes as shown in 11-17/0250r2 |
| 3325 | Albert Petrick | 27.5.2.5 | 171.40 | "ACs (#2190, 2191)" are remaining CID placeholders and not part of draft .11ax D1.0 | Remove references to CIDs #2190, and 2191 | AcceptDeleted CID referenceTGax editor please make the changes as shown in 11-17/0250r2 |
| 6695 | John Coffey | 27.5.2.5 | 171.41 | Incomplete cross-reference: "Table 9-XX". | Add full table number. | AcceptFixed the Table number referenceTGax editor please make the changes as shown in 11-17/0250r2 |
| 8705 | Sigurd Schelstraete | 27.5.2.5 | 171.41 | Wrong reference: Table 9-XX | Correct reference | AcceptFixed the Table number referenceTGax editor please make the changes as shown in 11-17/0250r2 |
| 6696 | John Coffey | 27.5.2.5 | 171.56 | Inconsistent terminology: here we have "the trigger-based PPDU", whereas almost everywhere else in the draft we have "the HE trigger-based PPDU". If the same thing is intended, the same term should be used. | Change to "the HE trigger-based PPDU". | AcceptText changed as suggested by the commenterTGax editor please make the changes as shown in 11-17/0250r2 |
| 7817 | Mark Hamilton | 27.5.2.5 | 171.56 | AID12 is equal to the least significant 12 bits of the AID | Change "the STA's AID" to "the 12 least significant bits of the STA's AID". Same thing at P181L43, P184L1. Similarly "recipient's AID" to "12 least significant bits of the reipcient's AID" at P181L44. | RevisedUpdated text to indicate 12 LSBs of the STA’s AID.TGax editor please make the changes as shown in 11-17/0250r2 |
| 6697 | John Coffey | 27.5.2.5 | 171.59 | Inconsistent terminology: here we have "the Trigger-based PPDU", whereas almost everywhere else in the draft we have "the HE trigger-based PPDU". If the same thing is intended, the same term should be used. | Change to "the HE trigger-based PPDU". | AcceptText changed as suggested by the commenterTGax editor please make the changes as shown in 11-17/0250r2 |
| 9917 | Young Hoon Kwon | 27.5.2.5 | 172.06 | If the AP does not support the A-BSR Support subfield, it shall not send BSRP variant Trigger frame. Therefore, "when the AP indicated its support..." is meaningless. | Delete "when the AP has indicated its support in the A-BSR Support subfield of its HE Capabilities element" in the second sub-bullet. | RejectA non-AP STA shall not send an A-BSR in response to a trigger frame of type BSRP if the AP has not indicated support for receiving A-BSR via the A-BSR Supported field in HE Capabilities element. In such case, QoS Control field is the only option available to the STA. |
| 5997 | Jarkko Kneckt | 27.5.2.5 | 172.19 | Aggregating the BSR control frame with data, control and management frame is unlikely. It is more likely that BSR control frame is aggregated with control, data OR management frame. | Change to:" aggregated with control, data or management frames..." | RejectA Multi-TID A-MPDU can carry management frame (TID value 15), therefore, a Trigger frame of type BSRP could be aggregated with Data, Control and Management frame. |
| 5998 | Jarkko Kneckt | 27.5.2.5 | 172.20 | Unclear statements that may be interpretted differently resulting to interoperability problems. | Please clarify what is meant with "asks for acknowledgement" and "has high priority to be transmitted". | RevisedAgree with the comment.The sentence is revised to clarify that the solicited A-MPDU shall carry MPDU(s) in the order specified in Table 9-425.TGax editor please make the changes as shown in 11-17/0250r2 |
| 6701 | John Coffey | 27.5.2.5 | 172.20 | The statement that the acknowledgment has "high priority" doesn't seem to mean much. High compared with what? It may be that "highest" is meant, but if so, it's essential to say so, because that's not what the text says now. | Change "high" to "highest" (if this is what is intended). | RevisedAgree with the comment.The sentence is revised to clarify that the solicited A-MPDU shall carry MPDU(s) in the order specified in Table 9-425.TGax editor please make the changes as shown in 11-17/0250r2 |

TGax Editor, please note, all references in this document to UL MU Response Scheduling A-Control are replaced with UMRS Control to be consistent with doc 11-17-238

* UL MU operation
* **General**

TGax Editor: Please make changes to this section (D1.1 pg 168, ln 4) as shown below:

The UL MU operation allows an HE[8271] AP to solicit simultaneous immediate response frames from one or more non-AP HE[8271] STAs. Non-AP HE[8271] STAs [7968]shall attempt to transmit their response frames using HE trigger-based PPDU format, ~~in either UL OFDMA, UL MU-MIMO, or both,~~[4809] except when the Trigger frame is of type MU-RTS, in which case the response (CTS) is sent in a non-HT PPDU format (see 10.3.2.8a (MU-RTS/CTS procedure)).

~~An~~ A non-AP[8271] HE STA with dot11ULMUMIMOOptionImplemented true shall set the Full Bandwidth UL MU-MIMO subfield of the HE PHY Capabilities Information field of the HE Capabilities element it transmits to 1, if it supports receiving a Trigger frame soliciting a HE trigger-based PPDU that uses UL MU-MIMO within an RU that spans the entire PPDU bandwidth. Otherwise, the HE STA shall set the Full Bandwidth UL MU-MIMO subfield to 0.

A non-AP HE STA with dot11ULMUMIMOOptionImplemented true shall set the Partial Bandwidth UL MU-MIMO subfield of the HE PHY Capabilities Information field of the HE Capabilities element it transmits to 1, if it supports receiving a Trigger frame soliciting a HE trigger-based PPDU that uses UL MU-MIMO within an RU that does not span the entire PPDU bandwidth. Otherwise, the HE STA shall set the Partial Bandwidth UL MU-MIMO subfield to 0.

A non-AP HE[8271] STA with dot11ULMUMIMOOptionImplemented equal to true is referred to as an UL MU capable STA.

~~An~~ A non-AP[8271] HE STA shall set the UL MU Response Scheduling Support subfield of the HE Capabilities element it transmits to 1 if its dot11HEULMUResponseSchedulingOptionImplemented is true; otherwise the STA shall set it to 0.

An HE AP ~~STA~~[8271] shall not transmit a Trigger frame soliciting a HE trigger-based PPDU that uses UL MU-MIMO within an RU that does not span the entire PPDU bandwidth ~~assigning an MU-MIMO RU in an UL OFDMA PPDU when the RU does not span that entire PPDU bandwidth~~ to a STA from which it has not received an HE Capabilities element with the Partial Bandwidth UL MU-MIMO subfield of the HE PHY Capabilities Information field equal to 1[5183, 5184, 5702, 9451].

An HE AP ~~STA~~[8271] shall not transmit a Trigger frame soliciting a HE trigger-based PPDU that uses UL MU-MIMO[5185, 5703] within an RU that spans the full bandwidth ~~UL MU-MIMO HE trigger-based PPDU from~~ to a non-AP HE[8271] STA from which it has not received an HE Capabilities element with the Full Bandwidth UL MU-MIMO subfield of the HE PHY Capabilities Information field equal to 1.

A non-AP HE[8271] STA transmitting a~~n~~ HE trigger-based ~~UL OFDMA~~ PPDU[7574, 9894, 4812, 5186, 5704, 9452] shall operate as either a class A or class B device as defined in 28.3.14 (Transmit requirements for an HE trigger-based PPDU). An HE[8271] STA that is a class A device shall set the [9707]Device Class ~~A~~ subfield in HE Capabilities elements that it transmits to 1. An HE[8271] STA that is a class B device shall set the [9707]Device Class ~~A~~ subfield in HE Capabilities elements that it transmits to 0.

* **Rules for soliciting UL MU frames**
* **General**

TGax Editor: Please make changes to this section (D1.1 pg 168, ln 44) as shown below:

An AP shall not send to a STA an MPDU that contains an ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield, unless the STA has set the UL MU Response Scheduling Support subfield to 1 in the HE Capabilities element it transmits.

An AP may transmit a PPDU that elicits an HE trigger-based PPDU from one or more STAs by including in the PPDU:

* One or more Trigger frames that includes one or more User Info fields addressed to one or more of the recipient STAs. For recipient STAs that are associated with the AP, the User Info field is addressed to a recipient STA if the value of the AID12 subfield of the User Info field is equal to the AID of the STA or to 0 (indicating a random access allocation).. A value of 0 also indicates that non-associated STAs can transmit on the allocated resource using the random access procedure as described in 27.5.2.6 (UL OFDMA-based random access).
* [5706]~~An UL MU Response Scheduling A-Control~~ UMRS Control subfield of individually addressed MPDUs contained in the HE MU PPDU that:
* Are carried in a S-MPDU format that solicits an immediate Ack frame (see 10.13.8 (Transport of S-MPDUs))
* Are carried in an A-MPDU format that solicits an immediate BlockAck frame (see 10.24.7.7 (Originator's behavior))
* Are carried in a multi-TID A-MPDU format that solicits an immediate Multi-STA BA frame (see 27.10.4 (A-MPDU with multiple TIDs))

NOTE—The AP additionally follows the rules defined in 27.3.3 (Procedure at the originator) when fragments are present in the generated MPDU(s).

More than one Trigger frame may be aggregated in an A-MPDU. If more than one Trigger frame is aggregated in an A-MPDU, all of them shall have the same content.

[9588]Note – The UMRS Control subfield within MPDUs carried in an A-MPDU have the same value (see 10.9 (HT Control field operation)).

The following two frames shall not be present in the same A-MPDU:

* A Trigger frame with a User Info field addressed to a STA
* An MPDU that contains an ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield and that is addressed to the same STA

When one or more Trigger Frames are aggregated with other frames in an A-MPDU, the following ordering rules apply:

* When an Ack, BlockAck or Multi-STA BlockAck frame is not present in the A-MPDU, a Trigger frame shall be the first MPDU in the A-MPDU
* When an Ack, BlockAck or Multi-STA BlockAck frame is present in the A-MPDU, the Ack, BlockAck or Multi-STA BlockAck frame shall be the first MPDU in the A-MPDU and a Trigger frame shall follow the Ack, BlockAck or Multi-STA BlockAck frame

A non-AP STA shall not send a Trigger frame or an MPDU carrying an ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield.

[7812, 9896]An AP transmitting a PPDU that contains a Trigger frame or contains an UMRS Control subfield shall ensure that the remaining time duration of the PPDU that follows *BSYM* is larger than or equal to the *MinTrigProcTime* value specified by the non-AP STA[10167, 4815] where:

* *MinTrigProcTime* is equal to the value, in microseconds, specified by the non-AP STA in the Trigger Frame MAC Padding Duration subfield of the HE Capabilities element that it transmits
* *BSYM­* is the symbol of the PPDU that contains either the last bit of the *SCH* field when BCC is used to encode the PSDU or the last coded bit of the LDPC codeword that encodes the last bit of the *SCH* field when LDPC is used to encode the PSDU, where *SCH* is either:
	+ The User Info field with the AID12 subfield corresponding to the 12 LSBs of the non-AP STA’s AID of the [7644]last (or only) Trigger frame soliciting the HE trigger-based PPDU or
	+ The UMRS Control subfield of the last (or only) frame soliciting the HE trigger-based PPDU.

~~A transmitted Trigger frame that contains a User Info field with the AID of a non-AP STA may contain a Padding field, whose length shall ensure that at least~~ *~~MinTrigProcTime~~*~~, in microseconds, passes from the end of the User Info field that contains that AID and the end of the PPDU that contains the Trigger frame, where the~~ *~~MinTrigProcTime~~* ~~is equal to the value specified by the non-AP STA in the Trigger Frame MAC Padding subfield of the HE Capabilities element it transmits. The AP shall apply the Trigger Frame MAC Padding field with duration corresponding to the longest value among all STAs that have requested extra~~ *~~MinTrigProcTime~~* ~~through Trigger Frame MAC Padding Duration capability.~~

[4816]~~The AP shall ensure that the duration of the symbols that follow the symbol in the Trigger Frame that contains the last bit of the STA’s User Info field is larger than or equal to the~~ *~~MinTrigProcTime~~* ~~value specified by the STA.~~

NOTE 1—The start of the Padding subfield is identified by a User Info field that has a value ~~of~~ in the AID12 subfield equal to 2047, and the remaining subfields of the Padding field are set to 1.

~~NOTE 2—This rule applies to all variants of the Trigger frame (Basic, MU-BAR, MU-RTS, etc).~~

NOTE 2 —The AP can use any type of padding to ensure that the duration of time passes, such as using the Padding subfield in a Trigger frame, post-EOF padding in an A-MPDU, aggregating other MPDUs in the A-MPDU etc.[9896]

* **Allowed settings of the Trigger frame fields and ~~UL MU Response Scheduling A-Control~~ UMRS Control subfields**

TGax Editor: Please make changes to this section (D1.1 pg 169, ln 55) as shown below:

An AP that transmits a Trigger frame shall set the TA field of the frame to one of the following:

* The MAC address of the AP transmitting the frame when dot11MultiBSSIDActivated is false or when dot11MultiBSSIDActivated is true and the Trigger frame is directed to STAs that intend to communicate with the AP
* The MAC address of the transmitted BSSID when dot11MultiBSSIDActivated is true and the Trigger frame is directed to STAs that intend to communicate with at least two different BSSs of the multiple BSSID set and that have indicated reception support for this Trigger frame in the Multiple BSSID Control Support field of the HE Capabilities element it transmits (see 11.1.3.8 (Multiple BSSID procedure)).

~~NOTE—All MPDUs within an A-MPDU carried in an HE trigger-based PPDU have the same RA (see 9.7.3 (A-MPDU contents). The settings of the address fields of MPDUs within the A-MPDU depend on the type and subtype of the MPDU as defined in 9.3 (Format of individual frame types).~~[9456, text moved to 27.5.2.3]

If an HE AP does not receive an HE Capabilities element with the Rx Control Frame To MultiBSS field equal to 1 from a STA, the HE AP shall not send a Trigger frame whose destination STAs associate with more than one APs to the STA. ~~The RA field of the frames sent in response to a MU-RTS frame is set as defined in 9.3.1.3 (CTS frame format). The RA field of the MPDUs sent in response of a MU-BAR is set as defined in 9.3.1.9 (BlockAck frame format). BlockAck frame and Data frames whose RAs are different shall not be aggregated in one A-MPDU in responding to an MU-BAR frame. The RA field of the Data frames and Management frames sent in response to a Trigger frame shall be set to the MAC address of the destination AP.~~[9456, text moved to 27.5.2.3]

An AP shall not set any subfields of the Common Info field of a Trigger frame to a value that is not supported by all the recipient STAs of the Trigger frame.

An AP shall set all the subfields, except the Trigger Type subfield, of the Common Info field of a Trigger frame to the same value of the corresponding subfield of the Common Info field of any other Trigger frame that is carried in the same PPDU. An AP shall set the UL PPDU Length and DL Tx Power subfields of an ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield to the same value of the corresponding subfield of any ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield that is carried in the same PPDU. An AP shall set the following subfields of the Common Info field of a Trigger frame accordingly if an ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield is carried in an MPDU within the same PPDU:

* MU-MIMO LTF Mode and STBC are set to 0
* Number of HE-LTF Symbols is set to 1
* Spatial Reuse is set to SR\_Disallowed
* GI and LTF Type is set to ~~3~~2 if the carrying PPDU TXVECTOR parameter HE~~CP~~\_LTF\_TYPE is 4x LTF + 3.2 µs CP or 2x LTF + 1.6 µs CP; otherwise is set to ~~2~~1[4825, also see Table 9-25c in D1.1 (pg 44, ln 34)]
* CS Required subfield is set to 0

NOTE—STAs obtain the common information either explicitly, or implicitly or both. Explicit information is obtained in the Common Info field of a Trigger frame, or in the UL PPDU Length and DL TX Power subfields of the ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield contained in the soliciting PPDU. Implicit information is obtained in previously exchanged frames with the AP, e.g., in the BSS Color and the Default PE Duration subfields of the HE Operation element, or from default values specified in 27.5.2.3 (STA behavior for UL MU Operation).

An AP shall not set any subfields of the User Info field of a Trigger frame to a value that is not supported by the recipient STAs of the User Info field. An AP shall not set any subfields of an ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield in an HE variant HT Control field to a value that is not supported by the recipient STAs of the [8552]~~User Info~~ UMRS Control subfield.

If a Trigger frame is transmitted in an RU of an HE MU PPDU and the RU is addressed to multiple STAs, then the Trigger frame shall not include any User Info fields addressed to a STA that is identified as recipient of another RU or spatial stream of the same HE MU PPDU.

[3228]~~An HE variant HT Control field with an UL MU Response Scheduling A-Control~~ UMRS Control subfield shall not be included in a~~n~~ group addressed MPDU ~~that is group addressed~~.

If an AP includes one or more Trigger Frames or [3228]~~HE variant HT Control fields with an~~ ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield, then they shall collectively elicit HE trigger-based PPDU responses such that at least one RU is allocated for each 20 MHz channel occupied by the eliciting PPDU. An AP shall not allocate UL subchannel in any 20 MHz channel that is not occupied by the immediately preceding DL PPDU.

The responding STA shall not aggregate QoS Data frames in the multi-TID A-MPDU with a number of TIDs that exceeds the value indicated by the TID Aggregation Limit subfield in the Trigger Dependent User Info field of a Basic Trigger frame (see 9.3.1.23.1 (Basic Trigger variant)) intended to it.

The AP shall set the value in the TID Aggregation Limit subfield in the Type Dependent User Info field to 0 or 1 for an HE STA that has 0 in the Multi-TID Aggregation[9710] Support field of the HE MAC Capabilities Information field of the HE Capabilities element it transmits and is identified by the AID12 subfield of the User Info field of a Basic Trigger frame (see 9.3.1.23 (Trigger frame format)).A value 0 indicates to the STA that it shall not solicit any immediate response for the MPDUs that the STA aggregates in the HE trigger-based PPDU.A value greater than 0 indicates the number of TIDs that the STA can aggregate in the A-MPDU carried in the HE trigger-based PPDU (see 27.10.4 (A-MPDU with multiple TIDs)).

The AP may assign any value between 0 and 7 in the TID Aggregation Limit subfield in the Trigger Dependent User Info field for an HE STA that has a nonzero value in the Multi-TID Aggregation[9710] Support subfield of the HE MAC Capabilities Information field of the HE Capabilities element it transmits and is identified by the AID12 subfield of the User Info field of a Basic Trigger frame.

The AP may assign any value in the AC Preference Level subfield in the Trigger Dependent User Info field for an HE STA identified by the AID12 subfield of the User Info field of a Basic Trigger frame.

The AP may assign any value defined in Table 9-25i (Preferred AC subfield encoding) in the AC Preference Level subfield in the Trigger Dependent User Info field to 1 for an HE STA and identified by the AID12 subfield of the User Info field of a Basic Trigger frame.

NOTE—A STA follows the rules in 27.10.4 (A-MPDU with multiple TIDs) for aggregating the QoS Data frames with multiple TIDs in HE trigger-based PPDUs.

Short guard interval shall not be used for a Trigger frame transmission if the Trigger frame is transmitted using HT or VHT PPDU format. DSSS or HR/DSSS PPDU format shall not be used for Trigger frame transmission.

* **AP access procedures for UL MU operation**

TGax Editor: Please make changes to this section (D1.1 pg 171, ln 44) as shown below:

When an AP receives an immediate response with at least one MPDU from at least one STA solicited by a Trigger frame, the procedures described in 9.22.2.7 (Multiple frame transmission in an EDCA TXOP) apply.

When an AP does not receive an immediate response with at least one MPDU from at least one STA solicited by a Trigger frame, i.e., transmission failure, the backoff procedure described in 9.22.2.2 (EDCA backoff procedure) applies.

An AP may use any AC for sending a PPDU that contains only Trigger frames. If the PPDU contains frames that are not Trigger frames in addition to a Trigger frame, then the AP shall follow the rules defined in 10.22.2.6 (Sharing an EDCA TXOP).

~~An AP may send the Trigger frame using any access category and follows the rules defined in 10.22.2 (HCF contention based channel access (EDCA)) for obtaining and sharing the TXOP.~~[4818]

* **STA behavior for UL MU Operation**[8151]

TGax Editor: Please make changes to this section (D1.1 pg 172, ln 1) as shown below:

A STA shall not send an HE trigger-based PPDU unless it is explicitly triggered by an AP in one of the operation modes described in this subclause.

The inter-frame space between a PPDU that contains a Trigger frame or contains an ~~UL MU Response Scheduling A-Control~~ UMRS Control field that solicits an immediate response and the HE trigger-based PPDU is SIFS.

A STA shall commence the transmission of an HE trigger-based PPDU at the SIFS time boundary after the end of a received PPDU, when all 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 ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield. The User Info field is addressed to a STA if the AID12 subfield is equal to the AID of the STA and the STA is associated with the AP. If the STA is not associated with the AP, TBD.
* The CS Required subfield in the Trigger frame is 1 and the UL MU CS condition described in 27.5.2.4 (UL MU CS mechanism) indicates the medium is idle, or the CS Required subfield in a Trigger frame is 0.
* Otherwise, a STA shall not send an HE trigger-based PPDU

A non-AP HE STA transmitting an HE trigger-based PPDU in response to a Trigger frame sets the TXVECTOR parameter as follows:

* The FORMAT parameter shall be set to HE\_TRIG
* The PE\_DURATION parameter shall be set according to the value of the Packet Extension field in the ~~soliciting~~ eliciting[8702] Trigger frame
* The TXOP\_DURATION parameter shall be set according the rules defined in 27.2.3 (Updating two NAVs)
* The BSS\_COLOR parameter shall be set as follows:
* If the preceding Trigger frame was received in an HE PPDU, then set to the value of the RXVECTOR parameter BSS\_COLOR of the HE PPDU
* If the Trigger frame was received in a non-HE PPDU, then set to the value of the BSS Color subfield of the most recently received HE Operation element for that BSS
* The L\_LENGTH parameter shall be set to the value indicated by the Length subfield of the [8701]Common Info field of the eliciting Trigger frame
* The GI\_TYPE and HE\_LTF\_TYPE parameters shall be set to the value indicated by the GI and LTF Type subfield of the Common Info field of the eliciting Trigger frame
* The NUM\_STS parameter shall be set to the number of space time streams indicated by the Number Of Spatial Streams subfield of the SS Allocation field of the User Info field and STBC field in the Common Info field of the eliciting[8702] Trigger frame
* The CH\_BANDWIDTH~~W~~[4821] parameter shall be set to the value of the BW field in the Common Info field of the eliciting Trigger frame
* The HE\_LTF\_MODE parameter shall be set to the value indicated by the MU-MIMO LTF Mode subfield of the Common Info field of the eliciting Trigger frame
* The [9529]~~NUMBER\_HE\_LTF\_SYM~~ NUM\_HE\_LTF parameter shall be set to the value indicated by the Number Of HE-LTF Symbols subfield of the Common Info field of the eliciting Trigger frame
* The STBC parameter shall be set to the value indicated by the STBC subfield of the Common Info field of the eliciting Trigger frame
* The LDPC\_EXTRA\_SYMBOL[4824] parameter shall be set to the value indicated by the LDPC Extra Symbol Segment subfield of the Common Info field of the eliciting Trigger frame
* The SPATIAL\_REUSE parameter shall be set to the value of the Spatial Reuse field in the Common Info field of the eliciting Trigger frame
* The HE\_SIGA\_RESERVED parameter shall be set to the value of the HE-SIG-A Reserved field in the Common Info field of the eliciting Trigger frame
* The MCS parameter shall be set to ~~shall be set to~~[4820, 8703] the value of the MCS field in the [8703]~~Common~~ User Info field of the eliciting Trigger frame
* The DCM parameter shall be set to the value indicated by the DCM subfield of the User Info field of the eliciting Trigger frame
* The STARTING\_STS\_NUM parameter shall be set to ~~shall be set to~~[4822] the value of the Starting Spatial Stream subfield of the SS Allocation field in the ~~Common~~ User Info field of the eliciting Trigger frame
* The FEC\_CODING parameter shall be set to the value indicated by the Coding Type subfield of the User Info field of the eliciting Trigger frame
* The RU\_ALLOCATION parameter shall be set to the value indicated by the RU Allocation field of the User Info subfield of the eliciting Trigger frame
* The TXPWR\_LEVEL\_INDEX parameter shall be set to the value based on the Transmit Power Control for HE trigger-based PPDU and based on the value of the AP Tx Power subfield in the Common Info field and the Target RSSI subfield in the User Info field of the eliciting Trigger frame (28.3.14.2 (Power pre-correction)).

A STA transmitting an HE trigger-based PPDU in response to soliciting MPDU(s), containing an ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield, shall set the TXVECTOR parameters as follows:

* *NSYM* shall be set to the *FVAL* + 1, where *FVAL* is the value of the UL PPDU Length subfield of the UL MU Response Scheduling subfield
* ~~UL\_TARGET\_RSSI, DL\_TX\_POWER,~~ [4823]RU\_ALLOCATION, and MCS parameters shall be set to the values of ~~UL Target RSSI, DL TX Power,~~ RU Allocation, and UL MCS subfields of the UL MU Response Scheduling subfield, respectively.
* BW shall be equal to the bandwidth of the soliciting DL MU PPDU
* BSS\_COLOR, and DCM shall be set to the values of the RXVECTOR parameters BSS\_COLOR, and DCM of the soliciting DL MU PPDU, respectively
* [4824]HE~~MU\_MIMO~~\_LTF\_MODE, LDPC\_EXTRA\_SYMBOL, ~~NSTS,~~ STBC~~, CODING TYPE, SS\_ALLOCATION~~ shall all be set to 0
* SPATIAL\_REUSE shall be set to the value indicating SR\_Disallowed
* PE\_DURATION shall be set to the default PE duration value for UL MU response scheduling, which is indicated by the AP in the ~~Default\_PE~~ Default PE Duration subfield of the HE Operation element it transmits, and the pre-FEC padding factor shall be set to 4 (see 28.3.12 (Packet extension))
* TXOP\_DURATION parameter shall be set according the rules defined in 27.2.3 (Updating two NAVs)
* [4825]HE~~CP~~\_LTF\_TYPE parameter shall be set to indicate 4x LTF + 3.2 s CP if the RXVECTOR parameter [4825]HE~~CP~~\_LTF\_TYPE is 4x LTF + 3.2 s CP or 2x LTF + 1.6 s CP ; otherwise shall be set to indicate 2x LTF + 1.6 s CP

NOTE 1—The HE trigger-based PPDU in this case is only sent in UL OFDMA format and CS is not required prior to its transmission (see 27.5.2.4 (UL MU CS mechanism)).

NOTE 2—The use of BCC limits the available RU sizes as defined in 28.3.11.8 (BCC interleavers).

The RA field of the frames sent in response to a MU-RTS frame is set as defined in 9.3.1.3 (CTS frame format). The RA field of the MPDUs sent in response of a [9589]GCR MU-BAR or MU-BAR is set as defined in 9.3.1.9 (BlockAck frame format). BlockAck frame and Data frames whose RAs are different shall not be aggregated in one A-MPDU in responding to an [9589]GCR MU-BAR or MU-BAR frame. The RA field of the Data frames and Management frames sent in response to a Trigger frame shall be set to the MAC address of the destination AP.

NOTE —All MPDUs within an A-MPDU carried in an HE trigger-based PPDU have the same RA (see 9.7.3 (A-MPDU contents). The settings of the address fields of MPDUs within the A-MPDU depend on the type and subtype of the MPDU as defined in 9.3 (Format of individual frame types).[9456, text moved from 27.5.2.2.2]

The STA that responds to a DL MU PPDU containing MPDU(s) addressed to it that include ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield(s) follows the rules defined in 10.3.2.9 (Ack procedure) for generating the Ack frame, the rules defined in 10.24.7.5 (Generation and transmission of BlockAck frames by an HT STA or DMG STA) for generating the BlockAck frame, and the rules defined in 27.4 (Block acknowledgement) for generating the Multi-STA BlockAck frame. The STA shall construct the A-MPDU carried in the HE[6685] trigger-based PPDU as defined in Table 9-428 (A-MPDU contents MPDUs in the control response context) when the A-MPDU containing the ~~UL MU Response Scheduling A-Control~~ UMRS Control subfield solicits an immediate response and as defined in Table 9-426 (A-MPDU contents in the data enabled no immediate response context) when the A-MPDU does not solicit an immediate response.

NOTE—The STA additionally follows the rules defined in 27.3.3 (Procedure at the originator) when fragments are present in the soliciting (A-)MPDU(s).

The MAC padding procedure is described in ~~10.42.2.1.2~~ 27.10.3 (A-MPDU padding for an HE trigger-based PPDU)[7649].

The content of each A-MPDU in an HE trigger-based PPDU is defined in 9.7.3 (A-MPDU contents) and[5717] in 27.10.3 (A-MPDU padding for an HE trigger-based PPDU) and subject to the following additional constraints:

* If the Trigger Type field of a Trigger frame is not Basic Trigger, then the STA shall include in the response A-MPDU at least one MPDU of the [7816]~~required~~ requested type. A Beamforming Report Poll Trigger frame solicits HE Compressed Beamforming [9713]~~Feedback~~ and CQI frames (see 27.6 (HE sounding protocol), an MU BAR Trigger frame [3232]or a GCR MU-BAR frame solicits BlockAck frames (see 27.4 (Block acknowledgement)), ~~and~~ a BSRP Trigger frame solicits QoS Null frames (see 27.5.2.5 (HE buffer status feedback operation for UL MU) [3232, 9713]and a BQRP Trigger frame solicits QoS Null frames (see 27.5.1.3 (HE bandwidth query report operation for DL MU). The MPDUs included in the response shall not solicit a response.
* If the Trigger Type field of the soliciting Trigger frame is Basic Trigger and the STA does not have [7816]a frame to transmit, ~~of the required type,~~ the STA shall either not transmit a response or transmit ~~one~~ zero or more QoS Null frames.

A STA that is an intended receiver of a Trigger frame that is not a Basic Trigger frame shall construct the A-MPDU carried in the HE trigger-based PPDU as defined in 9-428 (A-MPDU contents MPDUs in the control response context). A STA that is an intended receiver of a Basic Trigger frame may include MPDUs with any TID in the HE trigger-based PPDU sent in response to a Trigger frame subject the rules of 27.10.4 (A-MPDU with multiple TIDs).

NOTE 1—An AP can include other MPDUs in a soliciting DL MU PPDU that contains Trigger frames as specified in 9.7.3 (A-MPDU contents).

NOTE 2—The frame type of MPDUs may be different across A-MPDUs within a same HE trigger-based PPDU.~~.~~[ 4828]

* **HE buffer status feedback operation for UL MU**

TGax Editor: Please make changes to this section (D1.1 pg 175, ln 30) as shown below:

A non-AP STA delivers buffer status reports (BSRs) to assist its AP in allocating UL MU resources in an efficient way. The non-AP STA can either implicitly deliver BSRs in the QoS Control field or BSR A-Control field of any frame transmitted to the AP (unsolicited BSR) or explicitly deliver BSRs in any frame sent to the AP in response to a BSRP variant Trigger frame (solicited BSR).

A non-AP STA reports its buffer status (unsolicited BSR) to the AP to which it is associated using either the QoS Control field or the BSR A-Control field of frames it transmits as defined below:

* The HE STA shall report the buffer status for a given TID in the Queue Size subfield of the QoS Control field in QoS Data or QoS Null frames it transmits; except that the STA may set the Queue Size subfield to 255 to indicate an unknown/unspecified BSR for that TID.
* The HE STA may aggregate multiple QoS Data frames or QoS Null frames in an A-MPDU to report the buffer status for different TIDs. The HE STA shall follow the A-MPDU aggregation rules defined in 27.10.4 (A-MPDU with multiple TIDs) for aggregating QoS Data frames with multiple TIDs. The HE STA does not follow the rules defined in 27.10.4 (A-MPDU with multiple TIDs) for QoS Null frames whose Ack Policy subfield is No Ack.
* The HE STA may report the buffer status in the BSR A-Control subfield of frames it transmits if the AP has indicated its support in the A-BSR Support subfield of its HE Capabilities element; otherwise the STA shall not report the buffer status in the BSR A-Control subfield.
* The HE STA shall report the buffer status for its preferred AC, indicated by the ACI High subfield, in the Queue Size High subfield of the BSR A-Control field; except that the STA may set the Queue Size High subfield to 255 to indicate an unknown/unspecified BSR for that AC
* The HE STA shall report the buffer status for all ACs, indicated by the ACI Bitmap subfield, in the Queue Size All subfield of the BSR A-Control field; except that the STA may set the Queue Size All subfield to 255 to indicate an unknown/unspecified BSR for those ACs~~(#2190, 2191)~~ [3325, 6196]
* The HE STA shall set the Delta TID subfield according to Table 9-~~XX~~18c[6695, 8705] (Delta TID subfield encoding), and the Scaling Factor subfield as defined in 9.2.4.6.4.5 (Buffer Status Report (BSR)).

NOTE 1—The STA can send an unsolicited BSR in response to Basic variant Trigger frames (with or without random RUs, as defined in 27.5.2.3 (STA behavior for UL MU Operation) and in 27.5.2.6 (UL OFDMA-based random access)) or it can send the unsolicited BSR after accessing the WM using EDCA.

NOTE 2—The STA can include both the QoS Control and the BSR A-Control field in the same frame and it can set the Queue Size subfield of either of them to a value of 255.

An AP can also solicit one or more non-AP STAs for their BSR(s) by sending a BSRP variant Trigger frame (see 9.3.1.23 (Trigger frame format)). The non-AP STA responds (solicited BSR) as defined below:

* The STA that receives a BSRP variant Trigger frame shall follow the rules defined in 27.5.2.3 (STA behavior for UL MU Operation) to generate the HE[6696] trigger-based PPDU when the Trigger frame contains the 12 LSBs of the[7817] STA's AID in any of the Per User Info fields; otherwise the STA shall follow the rules defined in 27.5.2.6 (UL OFDMA-based random access) to gain access to a random RU and generate the HE[6697] t~~T~~rigger-based PPDU when the Trigger frame contains one or more random RU(s).
* The STA shall include in the HE trigger-based PPDU one or more QoS Null frames containing one or more of the following:
* The QoS Control field(s) with Queue Size subfields for each of the TIDs for which the STA has buffer status to report to the AP.
* The BSR A-Control field with the Queue Size All subfield indicating the queue size for all the ACs, indicated by the ACI Bitmap subfield, for which the STA has buffer status to report to the AP when the AP has indicated its support in the A-BSR Support subfield of its HE Capabilities element. The STA shall set Delta TID, SF, ACI High and Queue Size High subfields of the BSR A-Control field as defined in 9.2.4.6.4.5 (Buffer Status Report (BSR))).
* The HE STA shall not solicit an immediate response for the frames carried in the HE[6697] trigger-based PPDU (e.g., by setting the Ack Policy subfield of the frame to Normal Ack or Implicit BAR).

NOTE—Similar to unsolicited BSR, the STA can set Queue Sizes in either QoS Control or BSR A-Control field to 255 to indicate unknown/unspecified BSR for a TID, AC or all AC.

An AP may include a BSRP Trigger frame together with other control, data and management frames in one A-MPDU to a STA if the HE Capabilities element received from the STA has the BSRP A-MPDU Aggregation field equal to 1. If a STA receives a BSRP Trigger frame aggregated with control, data and management frames that ~~asks for~~ solicits an[5998] acknowledgement, the response A-MPDU shall contain MPDUs in the order as described in Table 9-425 (A-MPDU contents in the data enabled immediate response context)~~acknowledgement has high priority to be transmitted~~[5998, 6701].

* TWT operation
* Individual TWT agreements

TGax Editor: Please modify the note on pg 185, line 1 in D1.1 in this section as follows:

NOTE–A Trigger frame is intended for a TWT requesting STA if it is sent by the AP to which the STA is associated and the frame contains the 12 LSBs of the[7817] STA’s AID in any of its Per User Info fields. The Trigger frame can have multiple recipients, each of which is identified by the presence of the [7817]12 LSBs of the recipient STA’s AID in any of its Per User Info fields (see 27.5.2 (UL MU operation)).

* Rules for TWT scheduling STA

TGax Editor: Please modify the 4th paragraph (pg 187, line 5 in D1.1) in this section as follows:

A TWT scheduling STA should not include ~~a~~ the 12 LSBs of the[7817] STA's AID in a User Info field of a Trigger frame transmitted within a broadcast TWT SP unless the STA has established membership in the broadcast TWT.