
IEEE P802.11
Wireless LANs

**Proposed resolution for comments related to
Various CIDs in 27.5.2**

Date: 2025-06-30

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 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.

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 either UL OFDMA, UL MU-MIMO, or both, 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))." to "Non-AP STAs shall transmit their response frames using HE trigger-based PPDU format, in either UL OFDMA, UL MU-MIMO, or both, except when the Trigger frame is of type MU-RTS, in which case the response (CTS) shall be sent in a non-HT PPDU format (see 10.3.2.8a (MU-RTS/CTS procedure))."	Revised Revised 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	Revised Agree with the comment Updated 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 either UL OFDMA, UL MU-MIMO, or both," is redundant since the trigger-based PPDU already defines the allowed modes	remove "in either UL OFDMA, UL MU-MIMO, or both,"	Accept Agree with the comment. Deleted the reference to UL OFDMA and UL MU-MIMO TGax 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	Revised The 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	Reject The 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	Revised Updated the sentence to clarify that this is a Trigger-based PPDU that is using UL MU-MIMO TGax 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.	Revised Updated the sentence to clarify that this is a Trigger-based PPDU that is using UL MU-MIMO TGax 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.	Revised Agree 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 applied 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 ...".	Revised Agree 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 trigger-based PPDU with no more than one SS per user?	Define UL OFDMA PPDU or contextually add more details to define the intended type of PPDU	Revised Agree 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	Revised Agree 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 defined terminology	Revised Agree 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	Revised

						Agree 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	Reject The sentence is <u>not</u> 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.	Accept Agree 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.	Accept Agree with the comment Deleted '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	Reject The 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	Reject The 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..."	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).
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.	Clarify the language on situations in which trigger frames may be	Reject As described in the spec, all the Trigger

				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.	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.	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-control shall follow same rule.	As in comment.	Revised Agree 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 10.9 TGax 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	Reject The 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"	Accept Made 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 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." 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	Revised The 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 redundant. The previous one is sufficient	Remove this para	Accept Agree 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	Revised Agree 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.	Revised Agree with the comment Revised 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 <i>MinTrigProcTime</i> 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 <i>MinTrigProcTime</i> 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.	Revised Agree with the comment See 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.	Reject From 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"	Reject From 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 0xFFFF in 9.3.1.23.	Change "a value of the AID equal to 2047" to "a value of the AID12 subfield equal to 0xFFFF".	Reject From 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 PPDU 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	Revised Agree with the comment Moved 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'.	Revised Agree with the comment Updated 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"	Reject A 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.	Reject Both 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,".	Reject As 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"	Revised Agree 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	Revised Agree 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.	Accept Corrected 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	Accept Agree 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 specific than "STA behavior"	Revised Changed 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	Accept Fixed 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 "soliciting Trigger frame", sometimes "eliciting Trigger frame" or just "Trigger frame".	Use consistent wording	Revised Changed 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_BANDWIDTH	remove the final W	Accept Deleted 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.	Revised Agree with the comment. Fixed the parameter name to NUM_HE_LTF TGax 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	Accept Deleted repeating text TGax 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")	Accept Deleted 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	Accept Deleted repeating text TGax 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 parameters that go into the trigger-based PPDU	Accept Removed the two parameters are pointed in the comment TGax 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 parameter. LDPC_EXTRA is actually LTPC_EXTRA_SYMBOL; CODING_TYPE is not defined; SS_ALLOCATION is not defined	Refer to the correct parameters or remove them.	Revised Renamed incorrect field reference Removed fields that are not present in the TX/RXVECTOR TGax editor please make the changes as shown in 11-17/0250r2
4825	Alfred Asterjadhi	27.5.2.3	169.26	CP_LTF_TYPE parameter does not exist	Refer to the correct parameter	Revised Fixed incorrect reference. Change CP_LTF_TYPE to HE_LTF_TYPE

						TGax 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".	Accept Text changed as suggested by the commenter TGax 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.	Revised Fixed incorrect reference. Added correct reference pointing to section 27.10.3 TGax 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.	Accept Added 'and' as suggested by the commenter TGax 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."	Revised Agree 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.	Revised Agree with the comment Changed 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 Knecht	27.5.2.3	169.61	QoS Data or QoS Null frame may be used as a response to BSRP and BQR. Currently only QoS Null is listed.	Add QoS Data as one response frame.	Reject Only 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	As per comment.	Revised Agree with the comment. Updated text to fix the frame name to Beamforming and CQI frame. Included the case of BQRP variant of TF. TGax editor please make the changes as shown in 11-17/0250r2

				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))...."		
4828	Alfred Asterjadhi	27.5.2.3	170.15	double period		Accept Deleted extra period TGax 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.	Accept Deleted CID reference TGax 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	Accept Deleted CID reference TGax 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.	Accept Fixed the Table number reference TGax 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	Accept Fixed the Table number reference TGax 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".	Accept Text changed as suggested by the commenter TGax 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 recipient's AID" at P181L44.	Revised Updated 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".	Accept Text changed as suggested by the commenter TGax 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.	Reject A 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 Knecht	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..."	Reject A 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 Knecht	27.5.2.5	172.20	Unclear statements that may be interpreted differently resulting to interoperability problems.	Please clarify what is meant with "asks for acknowledgement" and "has high priority to be transmitted".	Revised Agree 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).	Revised Agree 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

27.5.2 UL MU operation

27.5.2.1 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 an 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.

27.5.2.2 Rules for soliciting UL MU frames

27.5.2.2.1 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 B_{SYM} 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
- B_{SYM} 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]

27.5.2.2.2 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 ~~32~~ if the carrying PPDU TXVECTOR parameter [HECP_LTF_TYPE](#) is 4x LTF + 3.2 μ s CP or 2x LTF + 1.6 μ s CP; otherwise is set to ~~21~~ [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 an [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 PPDU.

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.

27.5.2.2.3 AP access procedures for UL MU operation

TX 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]

27.5.2.3 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_BANDWIDTHW [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_SYM ~~BOL~~ ~~[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:

- N_{SYM} shall be set to the $F_{VAL} + 1$, where F_{VAL} 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 μ s CP if the RXVECTOR parameter [4825]HE CP LTF_TYPE is 4x LTF + 3.2 μ s CP or 2x LTF + 1.6 μ s CP ; otherwise shall be set to indicate 2x LTF + 1.6 μ 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~~ one 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]

27.5.2.5 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] Trigger-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 \(A-MPDU contents in the data enabled immediate response context\)](#)^[5998, 6701] acknowledgement has high priority to be transmitted.

27.7 TWT operation

27.7.2 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

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).

27.7.3.2 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.