IEEE P802.11
Wireless LANs

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| CR for TXS related CIDs |
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Abstract

This submission addressed the following CIDs relative to 11be draft 2.1:

10993 10994 12005 12127 13555 12982 14009 11704 10076 10078 10079 10715 13252 13845 10214 10407 11089 11090 11925 12983 12373 11252 11532 11533 12498 12882 13683 11534 13878 12062 11091 11092 12761 10094 11093 11926 11119 13961 11094 12477 13204 13336 13972 12755 12760 10408 13770 11766 12895 12500 12501 12495 13962 11927 10779 13253 13337 13881 10780 12762 12763 12984 12614 11928 12063 11767 13338 13339 14057 13974 13317 13318 14056 13771 12985 13975 14027 10781 14028 11018 11019 13773 13882 11021 10775 13883 12504 13966 11537 12986 13964 13963 13965 13967 11539 12505 12987 14098 12988 11538 12506 13884 10216 12374 12507 12989 13254 11540 14029 10017 11637 13774 13775

Revisions:

 Rev0: initial version.

 R2: removed the CIDs related to OM Control.

 R3: bug fixes, identified CIDs (highlighted in blue) that were presented and not asked to defer.

 R4: format correction and revise resolution for following CIDs 10078, 10079, 13962 (need more discussion)

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| **CID** | **Page** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 10993 | 393.43 | 26.2.7 | Subclause 26 is about HE STA that may not understand the MU-RTS TXS Trigger frame frame. Clause 35 looks like a better fit for this rule. Another option is to point out that this rule only applies to EHT STA | As in comment | **Revised.** For TXS since we already have normative text the note is not needed. See P410L54 in 11be draft 2.1:“A non-AP EHT STA that receives a MU-RTS TXS Trigger frame from its associated AP that contains a UserInfo field addressed to the STA shall update its CWmin[AC], CWmax[AC], AIFSN[AC], andMUEDCATimer[AC] state variables to the values contained in the dot11MUEDCATable, for all the ACsfrom which at least one QoS Data frame was transmitted successfully in a non-TB PPDU to the AP withinthe time allocated in the Trigger frame. A QoS Data frame is transmitted successfully by the STA for an ACif it requires immediate acknowledgment and the STA receives an immediate acknowledgment for thatframe, or if the QoS Data frame does not require immediate acknowledgment.”**TGbe editor:** Apply the changes tagged with #10993 in this document  |
| 10994 | 393.50 | 26.2.7 | Subclause 26 is about HE STA that may not understand the MU-RTS TXS Trigger frame frame. Clause 35 looks like a better fit for this rule. Another option is to point out that this rule only applies to EHT STA | As in comment | **Revised.** For TXS since we already have normative text the note is not needed. See P410L54 in 11be draft 2.1:“A non-AP EHT STA that receives a MU-RTS TXS Trigger frame from its associated AP that contains a UserInfo field addressed to the STA shall update its CWmin[AC], CWmax[AC], AIFSN[AC], andMUEDCATimer[AC] state variables to the values contained in the dot11MUEDCATable, for all the ACsfrom which at least one QoS Data frame was transmitted successfully in a non-TB PPDU to the AP withinthe time allocated in the Trigger frame. A QoS Data frame is transmitted successfully by the STA for an ACif it requires immediate acknowledgment and the STA receives an immediate acknowledgment for thatframe, or if the QoS Data frame does not require immediate acknowledgment.”**TGbe editor:** Apply the changes tagged with #10994 in this document  |
| **~~11866~~** | **~~393.50~~** | **~~26.2.7~~** | **~~For the case of MU RTS TXS Trigger frame with mode 2 does the STA update its state variables if it includes QoS Data frames sent to a peer STA? Please clarify if that is the case.~~** | **~~As in comment.~~** |  |
| 12005 | 395.10 | 26.5.1.3a | Change "20MH z" to "20 MHz". | As in comment. | **Accept.** |
| 12127 | 395.10 | 26.5.1.3a | Change from '20MH z' to '20 MHz' | As the comment | **Accept.** |
| 13555 | 395.11 | 26.5.1.3a | One more space between 20 MH and z | As in comment | **Revised.** **Same resolution as CID 12127.**  |
| 12982 | 396.20 | 26.5.2.2.1a | Change "for" to "in" in "an RU for a 40 MHz HE TB PPDU", and similarly in other sentences in this subsection. | As in comment | **Revised.** Made corresponding text changes. **TGbe editor:** Apply the changes tagged with #12982 in this document  |
| 14009 | 396.62 | 26.5.2.3.4 | The subfield name for MCS in the TRS Confol field was modified to "UL MCS" from "UL HE-MCS". Therefore, that subfield name in this subclause should be modified correspondingly. | Change "UL HE-MCS" to "UL MCS". | **Accept.** |
| ~~11704~~ | ~~512.57~~ | ~~35.10~~ | ~~An AP that supports Triggered TXOP sharing should also support disablement requests (UL MU Data disable functionality) from the STA. Specify that OM Control UL MU Data Disable RX Support shall be set to 1 if Triggered TXOP sharing is supported.~~ | ~~As in the comment~~ | **~~Reject.~~** ~~The Triggered TXOP Sharing and soliciting PPDUs using Basic TF are orthogonal features. Hence, no need to make one conditional on the other.~~  |
|  |  |  | **~~The non-AP STA does not respond CTS after receiving MU-RTS TXS if not entire allocated BW is CCA idle. Because there is only 1 STA responding MU-RTS TXS, the spec should allow the non-AP STA responding CTS on primary 20/80/80/160 (except punctured channels) which is a subset of the allocated BW, and use CH\_BANDWIDTH\_IN\_NON\_HT to signal the resulting BW~~****~~For mode 2, this is also useful if peer STA does not support the large BW allocated by AP, and AP can revise allocation duration in future triggered TXOP.~~** |  |  |
| 10076 | 399.58 | 35.2.1.2 | The Triggered TXOP Sharing procedure in D2.0 only supports that STA transmits one or more non-TB PPDUs to AP or peer-STA. It is one-way communication. In order to reduce the communication latency, this procedure shall be improved to support bi-directional communication, for example, AP and peer-STA can also transmit data to the STA. | For TXOP sharing mode 1, AP's behavior needs a little bit modification to support bi-directional data transmission. But for TXOP sharing mode 2, the STA needs to report its peer-STA to AP, and then AP allocates time/resource to this STA and its peer-STA via MU-RTS TXS TF. | **Reject.** There may be other ways to enable this. For mode 1, the AP can transmit any DL MSDU PIFS after the STA has finished UL transmission. For mode 2, the allocated STA may use RDG or other techniques (e.g., using TF within a non-infrastructure network) within allocated time to solicit frames from its peer STAs.  |
| 10078 | 400.60 | 35.2.1.2 | For the TXOP Sharing mode=1, the method of returning TXOP to AP is that, AP could transmit when "the medium is idle at the TxPIFS slot boundary after the end of either the transmission of an immediate response frame sent to that STA or the reception of a frame from that STA that did not require an immediate response". For the TXOP Sharing mode=2, we can restrict the STA from P2P transmission first, and then followed by uplink transmission. In this way, we can use the same rule to return back the remaining TXOP as TXOP Sharing mode=1. The benefit is that a frame with RDG/More PPDU subfield = 0 is avoided. Only a simple rule is needed. In case there is only P2P transmission for a STA when TXOP Sharing mode=2, we can then use the current solution: STA transmits a frame with RDG/More PPDU subfield = 0. | As in comment. | **Reject.** The proposed scheme is not efficient for the case when the P2P frame has lower priority than UL transmissions.  |
| 10079 | 399.57 | 35.2.1.2 | Can Triggered TXOP sharing procedure apply to MLD level/device? If a NSTR non-AP MLD is opearting on link 1 with its peer-non-AP MLD under TXOP Sharing mode(=2), AP STA/MLD or other non-AP STAs/MLDs should not transmit to the NSTR non-AP MLD on other links due to NSTR limit. | As in comment. Please provide rules for NSTR device operates in Triggered TXOP procedure. | **Revised.** We add text under NSTR channel access rules to clarify that a STA that obtained allocation through TXS could also choose not to transmit.  **TGbe editor:** Apply the changes tagged with #10079 in this document  |
| 10715 | 399.57 | 35.2.1.2 | Other than allocating portion of the time within an obtained TXOP to an associated non-AP EHT STA, AP should also indicate the AC limitation for the scheduled non-AP EHT STA to use the allocated time | Same as comment, the MU-RTS TXS trigger frame should carry the AC limitation information. | **Reject.** The TXS procedure does not restrict PPDU transmission to certain ACs similar to how the 11ax Basic TFs don’t restrict the response PPDUs to be sent from a specific AC.  |
| 13252 | 399.57 | 35.2.1.2 | A non-AP EHT STA should be able to exchange both non-TB PPDUs and TB PPDUs with a peer STA on a p2p link during TXOP sharing for Triggered TXOP Sharing Mode 2 e.g. when the STA acts as Mobile AP/Soft AP and sends a trigger to the p2p peer, it can exchange TB PPDUs with peer over the p2p link. Update the text throughout 35.2.1.2 to allow TB PDDU exchange over p2p link for Triggered TXOP Sharing Mode 2. | As in comment | **Revised.**The current rules permit the allocated STA to solicit frames from peer STAs in the most general sense. Revised the text to clarify this.  **TGbe editor:** Apply the changes tagged with #13252 in this document  |
| 13845 | 399.52 | 35.2.1.2 | It is recommended to allow to use protection mechanism(such as RTS/CTS exchange) between the non-AP STA and the peer STA. | As in comment. | **Revised.**Agreed in principle. Revised corresponding text to allow RTS/CTS exchange within allocated time. **TGbe editor:** Apply the changes tagged with #13845 in this document |
| 10214 | 399.62 | 35.2.1.2.1 | The text refers to the two TXOP sharing modes (Triggered TXOP Sharing Mode 1 Support and Triggered TXOP Sharing Mode 2 Support) but does not define or describe them until Sub-clause 35.2.1.2.3. Understanding these modes of operation would be helpful in interpretting AP behavior as well. | Add a note that describes the two modes: "Note: With the TXOP Sharing Mode set to 1, a non-AP STA is only allowed to send frames to its associated AP. With TXOP Sharing Mode set to 2, a non-AP STA is allowed to send frames to its associated AP or any other STA." | **Revised.**Adding a note seems redundant since this is specified elsewhere (see Table 9-53e and Table 9-401j)as well. Rather we add reference to those tables. **TGbe editor:** Apply the changes tagged with #10214 in this document |
| 10407 | 400.11 | 35.2.1.2.1 | subclause 26.2.5 only covers the HE scenario,so subclause 10.23.2.10 (Truncation of TXOP ) covering the general scenario should be added | unless the STA receives a CF-End frame that satisfies the conditions in 10.23.2.10 (Truncation of TXOP ) and 26.2.5(Truncation of TXOP). | **Revised.** Added the second reference.**TGbe editor:** Apply the changes tagged with #10407 in this document |
| 11089 | 399.57 | 35.2.1.2.1 | "an obtained TXOP" -- obtained by whom? "portion of time withing" -- a TXOP is an amount of time so this is equivalent to the simple "part of the TXOP". "to only an associated non-AP STA" -- what does only add here? "to ... for ..." can be simplified. | Change "a portion of the time within an obtained TXOP to only an associated non-AP EHT STA for transmitting one or more non-TB PPDUs" to "a part of its TXOP for the transmission of one or more non-TB PPDUs by an associated non-AP EHT STA" | **Revised.** Agree in principle. Revised the text along the suggested lines.**TGbe editor:** Apply the changes tagged with #11089 in this document |
| 11090 | 399.61 | 35.2.1.2.1 | They are not "bits", they are subfields. "shall set either" is anmbiguous as to whether both can be set. | Change "shall set one of the following subfields to 1" OR "shall set one or both of the folllowing subfields to 1" | **Revised.** Clarified the text with the second option. **TGbe editor:** Apply the changes tagged with #11090 in this document |
| 11925 | 399.62 | 35.2.1.2.1 | Is this an exclusive either or? Please clarify | As in comment. | **Revised.**Clarified that it means just “either or”. **TGbe editor:** Apply the changes tagged with #11925 in this document |
| 12983 | 399.58 | 35.2.1.2.1 | Not sure what "only" is intending to limit. The "associated" already qualifies the STA. | Remove "only" in only an associated non-AP EHT STA". | **Revised.**Deleted “only”. **TGbe editor:** Apply the changes tagged with #12983 in this document |
| 12373 | 399.58 | 35.2.1.2.1 | It is not clear what the word "only" is emphasizing here: only one associated non-AP STA (i.e., not more than one)? or only associated STAs (i.e. not to non-associated STAs)? | Rephrase to better convey the intention: e.g. " a single ...", else delete "only" | **Revised.**Deleted “only”. **TGbe editor:** Apply the changes tagged with #12373 in this document |
| 11252 | 399.58 | 35.2.1.2.1 | "allows an AP to allocate a portion of the time within an obtained TXOP to only an associated non-AP EHT STA". If the intention is that this mechanism can only be used by associated STAs, it would be clearer to add that as a separate sentence, rather than in passing ("to only an associated STA") | change "to only an associated" to "a". Add sentence at end of paragraph "The Triggered TXOP sharing procedure can only be used with associated STAs" | **Revised.** Revised the text to clarify that the MU-RTS TXS frame can be sent to associated STAs and only one at a time.  **TGbe editor:** Apply the changes tagged with #11252 in this document |
| 11532 | 399.58 | 35.2.1.2.1 | "only an associated" should be "one"; it is more clear | as in comment | **Revised.** Revised the text to clarify that the MU-RTS TXS frame can be sent to associated STAs and only one at a time.  **TGbe editor:** Apply the changes tagged with #11532 in this document |
| 11533 | 399.61 | 35.2.1.2.1 | "that is" is unnecessary | delete the phrase | **Accept.**  |
| 12498 | 399.61 | 35.2.1.2.1 | Change "An EHT STA with dot11EHTTXOPSharingTFOptionImplemented that is equal to true shall set either of the" to "An EHT STA with dot11EHTTXOPSharingTFOptionImplemented equal to true shall set either of the" for aligning with the next sentence. | As in comment | **Revised.**Clarified that it means just “either or”. **TGbe editor:** Apply the changes tagged with #12498 in this document |
| 12882 | 400.01 | 35.2.1.2.1 | Throughout the draft text, all flags "dot11..." are "equal to true/false" | Change "An EHT STA with dot11EHTTXOPSharingTFOptionImplemented equal to 1" to "An EHT STA with dot11EHTTXOPSharingTFOptionImplemented equal to true" | **Accept.**  |
| 13683 | 400.01 | 35.2.1.2.1 | changes "dot11EHTTXOPSharingTFOptionImplemented equal to 1" to "dot11EHTTXOPSharingTFOptionImplemented equal to true" | as in comment. | **Accept.**  |
| 11534 | 400.08 | 35.2.1.2.1 | "should" should be a "shall" unless there are clearly defined conditions that a reset should happen. | as in comment | **Reject.** During r1 discussions the group considered this possibility. However, there were implementation concerns which is why the “should” was adopted instead.  |
| 13878 | 400.08 | 35.2.1.2.1 | Why should the STA not reset its NAV after the NAVTimeout has expired? If the NAV is not reset, what is NAV after the NAVTimeout has expired | clarify it and update the text | **Reject.** Different from regular MU-RTS/CTS, in TXS, the AP does not send any DL PPDU after receiving CTS response to the MU-RTS TXS frame. Hence, a STA may start transmitting its frames after NAVtimeout (~2\*SIFS+CTS txtime) which is undesirable. The goal of the current text is to minimize the chances of this happening. An EHT STA that follows this rule would wait for NAV set by the Duration field in the MU-RTS TXS frame to expire before resuming regular backoff.  |
| 12062 | 400.13 | 35.2.1.2.2 | It would be worth to recall that when an AP decides to transmit during the Triggered TXOP sharing procedure (using PIFS), any PPDU that is sent should always be within the TXOP gained (or refer to the adequat subclause .. Just as a friendly remainder) | As in comment | **Reject.** The current text seems to already do that by providing a reference.  |
| 11091 | 400.19 | 35.2.1.2.2 | Since there is only a single item in the list it is not a list and does not need to be bulleted | The bulleted item can follow the colon. Better yet, since the bulleted item contains multiple statements, make each statement a bulleted item (i.e., turn it into a list) | **Revised.**Converted each statement to own bullet. **TGbe editor:** Apply the changes tagged with #11091 in this document |
| 11092 | 400.22 | 35.2.1.2.2 | The bracketed (i.e....) is not equivalent to "shall be addressed to". A number between 1 and 2006 does not necessarily represent an associated STA. Also, if it did represent an associated then it would have to be between 1 and 2006. | Removed the bracketed statement. | **Accept.**  |
| 12761 | 35.2.1.2.2 | 400.23 | Why the MU RTS TXS may contain a special User info field ? The Special User info field is defined for TB PPDU and the the TXOP sharing procedure sollicits only non-TB PPDU. | Remove this sentence | **Reject.** The Special User Info is also used by MU-RTS frames to signal 320 MHz. See P171 in draft 2.1.1:“The UL BW subfield in the Common Info field along with the UL BW Extension subfield in the SpecialUser Info field (if present) indicates the bandwidth of the PPDU carrying the MU-RTS Trigger frame and isdefined in Table 9-29d (UL BW subfield encoding) and Table 9-53c (UL Bandwidth Extension subfieldencoding).” |
| 10094 | 400.23 | 35.2.1.2.2 | The reference could be more specific. | Suggest to add a more referred subclause such as "The MU-RTS TXS Trigger frame may contain a Special User Info field as defined in9.3.1.22.9 (MU-RTS Trigger frame format(#8067)) and 9.3.1.22.5 (Special User Info field)." | **Revised.** Agree in principle. Made corresponding changes. **TGbe editor:** Apply the changes tagged with #10094 in this document |
| 11093 | 400.27 | 35.2.1.2.2 | "The allocation time" is cumbersome | Change to "The time allocated" | **Accept.**  |
| 11926 | 400.27 | 35.2.1.2.2 | Replace "allocation time" with "time allocated" | As in comment. | **Accept.** |
| 11119 | 400.28 | 35.2.1.2.2 | "MU RTS TXS Trigger" is used at P400L28 and P50945 but apparently never defined anywhere | Change to "MU-RTS TXS Trigger" x2 | **Revised.** Made corresponding changes.**TGbe editor:** Apply the changes tagged with #11119 in this document |
| 13961 | 400.28 | 35.2.1.2.2 | Missing hyphen between "MU" and "RTS" | Add hyphen | **Revised.** Made corresponding changes.**TGbe editor:** Apply the changes tagged with #13961 in this document |
| 11094 | 400.30 | 35.2.1.2.2 | Case irregularity | Change the sentence so that it references the actual field that is set to 1. | **Revised.****“**number of User Info fields” is not a field itself. However, since this text is redundant, we delete this sentence altogether.**TGbe editor:** Apply the changes tagged with #11094 in this document |
| 12477 | 400.30 | 35.2.1.2.2 | L30-L31 can be deleted since L21-L22 covers this aspect | Delete 30-31 | **Revised.**We delete this sentence.**TGbe editor:** Apply the changes tagged with #12477 in this document |
| 13204 | 400.30 | 35.2.1.2.2 | L30-L31 and L21-L22 seems to be redundant | remove L30-L31 | **Revised.**We delete this sentence.**TGbe editor:** Apply the changes tagged with #13204 in this document |
| 13336 | 400.30 | 35.2.1.2.2 | L30-L31 isnot needed since L21-L22 already cocer it. | Remove L30-L31 | **Revised.**We delete this sentence.**TGbe editor:** Apply the changes tagged with #13336 in this document |
| 13972 | 400.30 | 35.2.1.2.2 | It is a duplicate of a bullet in line 19. | Remove the duplicate. | **Revised.**We delete this sentence.**TGbe editor:** Apply the changes tagged with #13972 in this document |
| 12755 | 400.33 | 35.2.1.2.2 | An EHT AP shall not send an MU-RTS TXS Trigger frame with TXOP Sharing Mode subfield equal to 1 and with the User Info field that is addressed to an associated non-AP STA from which it has not received an EHT Capabilities element with the Triggered TXOP Sharing Mode 1 Support subfield equal to 1.Comment: When the non-AP STA with an EHT Capapbilities with a Triggered TXOP Sharing Mode 2 Support subfield equal to 1, it is also able to manage UL transmission. The TXOP Sharing mode 1 is included in the TXOP Sharing mode 2. | Modify the paragraph such as:An EHT AP shall not send an MU-RTS TXS Trigger frame with TXOP Sharing Mode subfield equal to 1 and with the User Info field that is addressed to an associated non-AP STA from which it has not received an EHT Capabilities element with the Triggered TXOP Sharing Mode 1 Support subfield equal to 1 or with the Triggered TXOP Sharing Mode 2 Support subfield equal to 1 . | **Reject.** The channel access rules in both modes are little bit different. As such the group decided in the past to have separate signaling for each mode.  |
| 12760 | 400.33 | 35.2.1.2.2 | An EHT AP shall not send an MU-RTS TXS Trigger frame with TXOP Sharing Mode subfield equal to 1 and with the User Info field that is addressed to an associatednon-AP STA from which it has not received an EHT Capabilities element with the Triggered TXOP Sharing Mode 1 Support subfield equal to 1.Comment: There is an inconsistency because the mode 2 also allows UL transmissions. | Remove this paragraph because, when a non-AP STA sets its EHT Capabilities element with the Triggered TXOP Sharing Mode 2 Support subfield to 1, the UL transmissions is also enabled. | **Reject.** The channel access rules in both modes are little bit different. As such the group decided in the past to have separate signaling for each mode.  |
| 10408 | 400.34 | 35.2.1.2.2 | the paragraph and the following one are redundant and should be merged | as the comment | **Reject.**The two sentences are for different modes.  |
| 13770 | 400.34 | 35.2.1.2.2 | what if the non-AP EHT sets the Triggered TXOP Sharing Mode 1 Support subfield to 0, but sets the Triggered TXOP Sharing Mode 2 Support subfield to 1? | Please clarify | **Reject.**Clearly, in this case the AP will send it TXS frames with Mode 2 and the STA will follow associated behaviors for that mode as specified in this section.  |
| 11766 | 400.36 | 35.2.1.2.2 | The term "Triggered TXOP" doesn't seem to be defined. | Define the term "Triggered TXOP" | **Revised.** Agreed, there is a typo. However, this seems to have been mostly fixed in draft 2.1.1 except for the figures. **TGbe editor:** Apply the changes tagged with #11766 in this document  |
| 12895 | 400.41 | 35.2.1.2.2 | It is possible that the AP transmits an MU RTS TXS frame with Triggered TXOP sharing mode 2 and shares its TXOP with a STA when its peer STA is in the doze state. A mechanism is required to ensure that the AP shares the TXOP with a STA in Mode 2 only when the STA and its peer are in active state. | As in comment. A proposal will be prepared. | **Reject.**The commenter failed to identify a specific issue with the channel access scheme.   |
| 12500 | 400.47 | 35.2.1.2.2 | The following two subbullets are and condition or or condition?For clarification, change "unless:" to "unless one of the following conditions is met:" | change "unless:" to "unless one of the following conditions is met:" | **Revised.** Made changes along the lines of the suggestion. **TGbe editor:** Apply the changes tagged with #12500 in this document |
| 12501 | 400.57 | 35.2.1.2.2 | The following two subbullets are and condition or or condition?For clarification, change "unless:" to "unless one of the following conditions is met:" | change "unless:" to "unless one of the following conditions is met:" | **Revised.** Made changes along the lines of the suggestion. **TGbe editor:** Apply the changes tagged with #12501 in this document |
| 12495 | 400.60 | 35.2.1.2.2 | Change "TXOP Sharing Mode 2" to "Triggered TXOP Sharing Mode 2" in indicated sentence | As in comment | **Reject.** The field name is used in several places consistently throughout the spec without introducing any ambiguity.  |
| 13962 | 400.61 | 35.2.1.2.2 | The AP would set its NAV, if it receives a P2P frame sent during the allocated time. Thus, when the AP receives the TXOP return signaling, the AP is difficult to use the remaining TXOP. | The AP should ignore its NAV that was set based on the P2P frame. | **Reject.** The group could not find a general solution without introducing significant complexity that would satisfy the commenter |
| 11927 | 400.62 | 35.2.1.2.2 |  This sentence is very confusing. Please rephrase it to make it clearer. In particulr the if condition is very difficult to decode. | As in comment. | **Revised.**Agree with the commenter. Revised the text to clarify. **TGbe editor:** Apply the changes tagged with #11927 in this document |
| 10779 | 401.06 | 35.2.1.2.2 | A PIFS is not something that is transmitted. | Replace "...it may transmit a PIFS after the end..." with "...it may transmit PIFS after the end..." | **Revised.** Removed the “a”. **TGbe editor:** Apply the changes tagged with #10779 in this document |
| 13253 | 401.06 | 35.2.1.2.2 | It does not make sense to say "transmit a PIFS" or "transmit a SIFS" mean, since PIFS and SIFS refer to Interframe space. Update to indicate 'may transmit after a PIFS' and 'may transmit after a SIFS' | As in comment | **Revised.** Removed the “a”. **TGbe editor:** Apply the changes tagged with #13253 in this document |
| 13337 | 401.08 | 35.2.1.2.2 | the last PPDU could be from the STA where the PPDU carries the frames that don't solicit immediate response | Add the case mentioned | **Revised.**Added the corresponding case. **TGbe editor:** Apply the changes tagged with #13337 in this document |
| 13881 | 401.08 | 35.2.1.2.2 | change "transmission" to "transmitted" | change "transmission" to "transmitted" | **Revised.** Made corresponding change.**TGbe editor:** Apply the changes tagged with #13881 in this document |
| 10780 | 401.09 | 35.2.1.2.2 | A SIFS is not something that is transmitted. | Replace "...it may transmit a SIFS after the end..." with "...it may transmit SIFS after the end..." | **Revised.** Removed the “a”. **TGbe editor:** Apply the changes tagged with #10780 in this document |
| 12762 | 401.24 | 35.2.1.2.2 | Figure 35-1 is incomplete. Please specify the timing between frames. | As in comment | **Reject.**The figures give an example of the frame exchange sequence and need not be complete. The timing between frames is not present in baseline Mu-RTS/CTS figures either (see Figure 26-1 and 26-2 in REVme draft 1.2) |
| 12763 | 401.27 | 35.2.1.2.2 | Figure 35-2 is incomplete. Please specify the timing between frames. | As in comment | **Reject.**The figures give an example of the frame exchange sequence and need not be complete. The timing between frames is not present in baseline Mu-RTS/CTS figures either (see Figure 26-1 and 26-2 in REVme draft 1.2) |
| 12984 | 401.27 | 35.2.1.2.2 | The CTS-to-self frame in Fig 35-1 is optional and non-essential to the frame sequence. | Remove the "CTS-to-self" or use dotted-line and add text to explain it's optional. | **Revised.** Use dotted text to outline the CTS-to-self. **TGbe editor:** Apply the changes tagged with #12984 in this document  |
| 12614 | 401.18 | 35.2.12.2 | Need to emphasize the following distinction between figure 35-1 and figure 35-2:Figure 35-1 shows the case where the AP transmits to another non-AP STA within TxPIFS boundary within the allocated time in MU-RTS Trigger frame, since the CS mechanism indicates that the medium is idle after the transmission of the immediate response of BACK to STA1.Figure 35-2 shows the case where the AP transmits to another non-AP STA after a PIFS following the allocated time in MU-RTS Trigger frame for STA 1. | 1. Please add the following text in the subclause preceding Figure 35-1:"Additionaly, Figure 35-1 shows the case where the AP transmits to another non-AP STA within TxPIFS boundary within the allocated time in MU-RTS Trigger frame, since the CS mechanism indicates that the medium is idle after the transmission of the immediate response of BACK to STA1."2. Please add the following text in the subclause preceding Figure 35-2:"Additionaly, Figure 35-2 shows the case where the AP transmits to another non-AP STA after a PIFS following the allocated time in MU-RTS Trigger frame for STA 1. " | **Revised.** Made corresponding changes per suggestion.  **TGbe editor:** Apply the changes tagged with #12614 in this document |
| 11928 | 401.41 | 35.2.1.2.3 | Several suggestions: to an associated AP that supports its reception (one that has the CAS control Support and RDG bit support to 1). And the CAS control field mentioned here is the one contained in the MPDU. | As in comment. | **Revised.** Revised the text according to the suggestion.**TGbe editor:** Apply the changes tagged with #11928 in this document |
| 12063 | 401.48 | 35.2.1.2.3 | The "and" could be removed in "the non-AP EHT STA may transmit non-TB PPDUs and only to its associated AP" | As in comment | **Reject.** The current text prevents the case when STA may transmit frames to some other STA that’s not its associated AP.  |
| 11767 | 402.31 | 35.2.1.2.3 | The sentence; "After a non-AP EHT STA receives an MU-RTS TXS Trigger frame its associated AP" | The sentence; "After a non-AP EHT STA receives an MU-RTS TXS Trigger frame its associated AP" | **Reject.**It seems that “its associated AP” is used in several places in both REVme and 11be draft 2.1 outside this section.  |
| 13338 | 402.31 | 35.2.1.2.3 | clarify that the "a non-AP EHT STA" supports triggered TXOP sharing mode 1/2 | As in comment | **Reject.** Based on the text in previous section this scenario is not possible:“An EHT AP shall not send an MU-RTS TXS Trigger frame with (#12943)Triggered TXOP Sharing Modesubfield equal to 1 and with the User Info field that is addressed to an associated non-AP STA from which ithas not received an EHT Capabilities element with the Triggered TXOP Sharing Mode 1 Support subfieldequal to 1.An EHT AP shall not send an MU-RTS TXS Trigger frame with (#12943)Triggered TXOP Sharing Modesubfield equal to 2 and with the User Info field that is addressed to an associated non-AP STA from which ithas not received an EHT Capabilities element with the Triggered TXOP Sharing Mode 2 Support subfieldequal to 1.” |
| 13339 | 402.31 | 35.2.1.2.3 | clarify whether the QoS Data/Null frame can have No Ack policy. Clarify whether Management frame is allowed. | As in comment | **Reject.** Since there is no explicit restriction on PPDUs by the TXS procedure itself, its not necessary to list all possible frames.  |
| 14057 | 402.31 | 35.2.1.2.3 | The subclause needs language clarifying when and what types of frames non-AP STA 2 is allowed to transmit during a TXOP allocated for non-AP STA 1 and after non-AP STA 1 transmits PPDUs to non-AP STA 2 | Add language describing transmission and channel access rules for non-AP STAs that are addressed by another non-AP STA that is granted the TXOP | **Reject.** Since there is no explicit restriction on PPDUs by the TXS procedure itself, its not necessary to list all possible frames. |
| 13974 | 402.34 | 35.2.1.2.3 | It is suggested changing "shall be" to "shall include" to match between PPDU and frame. | As in comment | **Revised.** Clarified that the PPDU contains a CTS frame. **TGbe editor:** Apply the changes tagged with #13974 in this document |
| 13317 | 402.40 | 35.2.1.2.3 | The first sentence of third paragraph is ambiguous about what relates to mode 1 vs mode 2. | Propose to replace as "ï»¿During the time allocated by an associated AP, the non-AP EHT STA may transmit non-TB PPDUs to theAP. It may also transmit non-TB PPDUs to another STA if the TXOP Sharing Mode subfield value is 2 | **Revised.** Reworded the text to clarify that the intention is for Mode 2 to apply for both AP and another STA. **TGbe editor:** Apply the changes tagged with #13317 in this document |
| 13318 | 402.40 | 35.2.1.2.3 | Please clarify whether in TXOP Sharing Mode 2, only non-TB PPDUs may be exchanged between non-AP STAs? It is implied by the sentence and the motivation of this restriction is not clear, if so. | Please clarify | **Reject.**Transmission of HE/EHT TB PPDUs require the recipient of the TB PPDU to control the Tx parameters (MCS, RU etc.) as well as strong time synchronization which is only possible when the TB PPDU is sent as immediate response to some TF that is not MU-RTS sent by the AP. Moreover, non-AP STAs cant decode TB PPDUs. Hence, its not feasible for the allocated STA to send any TB PPDU to anyone during TXS.  |
| 14056 | 402.41 | 35.2.1.2.3 | From sentence structure it is not clear whether the subfield value of 2 condition applies only to another STA or also to the AP, while the intention is to apply only to another STA. | Split the sentence to make it clear | **Revised.** Reworded the text to clarify that the intention is to apply for both AP and another STA. **TGbe editor:** Apply the changes tagged with #14056 in this document |
| 13771 | 402.42 | 35.2.1.2.3 | add "in the received MU-RTS TXS Trigger frame" after "the TXOP Sharing Mode subfield value". Same for Line 49. | At 402.42 and 402.49, add "in the received MU-RTS TXS Trigger frame" after "the TXOP Sharing Mode subfield value". | **Revised.**Reworded the text along the lines suggested by the commenter. **TGbe editor:** Apply the changes tagged with #13771 in this document |
| 12985 | 402.43 | 35.2.1.2.3 | Not clear what "if the RDG/More PPDU ..." is a condition or is the action to terminate the allocated time. Nees to better explain the intended mechanism to terminate the allocated time. | One way to fix it, if this is intended, is to change this sentence to be: The non-AP EHT STA may transmit a QoS Data or QoS Null frame to an associated AP to terminate the allocated time, with the frame carrying a RDG/More PPDU subfield in a CAS Control subfield of the HE variant HT Control field and having that subfield set to 0." | **Revised.**Reworded the text along the lines suggested by the commenter. **TGbe editor:** Apply the changes tagged with #12985 in this document |
| 13975 | 402.43 | 35.2.1.2.3 | The relationship between the if condition and the behavior is unclear. | The non-AP EHT STA may transmit a QoS Data or QoS Null frame with the RDG/More PPDU subfield set to 0 in CAS Control subfield of the HE variant HT Control field to an associated AP to terminate the allocated time. | **Revised.**Reworded the text along the lines suggested by the commenter. **TGbe editor:** Apply the changes tagged with #13975 in this document |
| 14027 | 402.43 | 35.2.1.2.3 | Change "an associated AP" to "the associated AP" | As in comment. | **Revised.**Made changes per suggested by commenter in multiple places. **TGbe editor:** Apply the changes tagged with #14027 in this document |
| 10781 | 402.48 | 35.2.1.2.3 | Sentence is wrong, suspecting a word too much. | Remove the word "and", more precisely: Replace "...may transmit non-TB PPDUs and only..." with "...may transmit non-TB PPDUs only..." | **Revised.** Re-worded the text to better clarify. **TGbe editor:** Apply the changes tagged with #10781 in this document |
| 14028 | 402.48 | 35.2.1.2.3 | Delete "and" | As in comment. | **Revised.**Re-worded the text to better clarify. **TGbe editor:** Apply the changes tagged with #14028 in this document |
| 11018 | 402.48 | 35.2.1.3 | This sentence should be moved to the beginning of the paragraph start in line 40? | See comment | **Reject.** The two paragraphs are describing behavior associated with different TXOP Shatring Modes.  |
| 11019 | 402.52 | 35.2.1.3 | Should be "non-AP EHT STA" instead of "non-AP STA"? | See comment | **Revised.** Strictly speaking it does not seem necessary to mention its “EHT” everywhere since the normative text in previous sub-section does not allow AP to send MU-RTS TXS frames to non-EHT non-AP STAs. However, clarified it in this sentence to avoid confustion. **TGbe editor:** Apply the changes tagged with #11019 in this document  |
| 13773 | 402.59 | 35.2.1.2.3 | The MU EDCA is only used after UL transmission? what about P2P transmission? | Please clarify, or add corresponding rules for P2P transmission | **Reject.** During 11be r1 the group discussed whether to add MU EDCA rules for P2P and did not approve it.  |
| 13882 | 403.01 | 35.2.1.2.3 | regarding "a non-TB PPDU" after "the end of theimmediateresponse if", is this the first one or the last one? | clarify it and update the text | **Revised.**Clarified that it is the last PPDU.**TGbe editor:** Apply the changes tagged with #13882 in this document |
| 11021 | 403.01 | 35.2.1.3 | It is not clear when the non-AP STA should start EDCA backoff with the updated parameters. As shown in Figure 35-1 and 35-2, multiple data transmissions from the non-AP STA (non-AP STA1 in the figures) are possible within the allocated time. Does the non-AP STA need to start EDCA backoff after the first non-TB data transmission but before the second non-TB data transmission within the allocated time? If so, a third STA may easily grab the channel and start its TXOP. | Please clarify | **Revised.**Clarified that it is the last PPDU.**TGbe editor:** Apply the changes tagged with #11021 in this document |
| 10775 | 403.03 | 35.2.1.2.3 | The two conditions to apply updated MUEDCATimer are mutually exclusive. | change "and shall start" to "or shall start" or divide the sentence into two sentences. | **Revised.**Divided the sentence into two and re-worded for clarity. **TGbe editor:** Apply the changes tagged with #10775 in this document |
| 13883 | 403.03 | 35.2.1.2.3 | regarding "the non-TB PPDU" after "at the end of", is this the first one or the last one? | clarify it and update the text | **Revised.**Clarified that it is the last PPDU.**TGbe editor:** Apply the changes tagged with #11021 in this document |
| 12504 | 403.08 | 35.2.1.2.3 | Change "After sending the CTS solicited by MU-RTS TXS from the associated AP" to "After sending the CTS solicited by MU-RTS TXS Trigger frame from the associated AP". | As in comment | **Revised.** Made corresponding change along with re-wording the sentence. **TGbe editor:** Apply the changes tagged with #12504 in this document |
| 13966 | 403.08 | 35.2.1.2.3 | Change "MU-RTS TXS" to "the MU-RTS TXS Trigger frame". | As in comment | **Revised.** Made corresponding change along with re-wording the sentence. **TGbe editor:** Apply the changes tagged with #13966 in this document |
| 11537 | 403.09 | 35.2.1.2.3 | NAV does not necessarily associate with a particular STA or AP, does this paragraph mean NAV set by the MU-RTS frame? Otherwise, the NAV needs to specified to from a particular STA | as in comment | **Revised.** Clarified that the sentence applies NAV set by any frame before and including the MU-RTS TXS frame that was transmitted by the AP. **TGbe editor:** Apply the changes tagged with #11537 in this document |
| 12986 | 403.09 | 35.2.1.2.3 | The description "shall ignore the NAV that is set by the AP" isn't quite accurate or not clear: accordingly to the current rule in 10.3.2.4, a STA won't set its NAV upon receiving the MU-RTS frame from AP addressed to itself. In this case, what NAV to ignore (since none is set)? | See comment. | **Revised.** Clarified that the sentence applies NAV set by any frame before and including the MU-RTS TXS frame that was transmitted by the AP. **TGbe editor:** Apply the changes tagged with #12986 in this document |
| 13964 | 403.09 | 35.2.1.2.3 | The description is not clear. "the NAV" here is the STA's NAV that is set based on a PPDU sent by the AP. | Change "the NAV that is set by the AP" to "the NAV that was set based on a PPDU sent from the AP". | **Revised.**  Re-worded the sentence along that line. **TGbe editor:** Apply the changes tagged with #13964 in this document |
| 13963 | 403.10 | 35.2.1.2.3 | "within the time allocation" is to indicate the period that the NAV is ignored, but the sentence has ambiguity to be interpreted as the period that the NAV is set. | Change the sentence to remove ambiguity.e.g. "the STA that sends the responding CTS shall ignore the NAV within the time allocation signaled in the MU-RTS TXS Trigger frame, if the NAV is set by the AP." | **Revised.**  Re-worded the sentence along that line. **TGbe editor:** Apply the changes tagged with #13963 in this document |
| 13965 | 403.10 | 35.2.1.2.3 | Change "the NAV that is set by the AP" to "the NAV that was set by the AP". | As in comment | **Revised.** Changed “is” to “was” in that sentence.**TGbe editor:** Apply the changes tagged with #13965 in this document |
| 13967 | 403.10 | 35.2.1.2.3 | The STA should not ignore the NAV after the STA sent the TXOP return signaling. | The STA can ignore the NAV until the STA transmits the TXOP return signaling. | **Revised.** Modified the sentence to clarify that the STA only ignores NAV set before start of the allocation.**TGbe editor:** Apply the changes tagged with #13967 in this document |
| 11539 | 403.13 | 35.2.1.2.3 | This sentence is unclear and has technical inaccuracies and should be rewritte | as in comment | **Revised.** Modified the text to clarify the Duration/ID field setting rules. **TGbe editor:** Apply the changes tagged with #11539 in this document |
| 12505 | 403.13 | 35.2.1.2.3 | The indicated text is for TXS mode 2.Change "After sending the CTS solicited by MU-RTS TXS, the STA shall set the Duration field of its frame to peer-to-peer (P2P) peer STA with" to "After sending the CTS solicited by MU-RTS TXS Trigger frame with TXOP Sharing Mode subfield equal to 2, the STA shall set the Duration field of its frame to transmit to peer-to-peer (P2P) peer STA with". | As in comment | **Revised.** Modified the text to clarify the Duration/ID field setting rules. **TGbe editor:** Apply the changes tagged with #12505 in this document |
| 12987 | 403.13 | 35.2.1.2.3 | What is a "peer-to-peer (P2P) peer STA"? Simple stating "to its peer STA" would be sufficient and avoid any confusion. | As in comment | **Revised.** The reference to “peer STA” is removed after modifying the sentence per resolution of CID 12505. **TGbe editor:** Apply the changes tagged with #12987 in this document |
| 14098 | 403.13 | 35.2.1.2.3 | "After sending the CTS solicited by MU-RTS TXS, the STA shall set the Duration field of its frame to peer-to-peer (P2P) peer STA with the value that indicates the time no later than the ending time of the PPDU carrying MU-RTS TXS plus the Allocation Duration field in soliciting MU-RTS TXS".This rule should also be applicable to the Ack frame sent by the AP to prevent other STAs sets basic NAV beyond the allocation duration | Add similar Duration setting for Ack frame sent by AP. | **Revised.** The restriction to “peer STA” is removed after modifying the sentence per resolution of CID 12505. As such the new sentence resolves the issue raised by commenter since Duration of the BA sent by AP will be derived from the Duration/ID field of the PPDU sent by STA to AP. **TGbe editor:** Apply the changes tagged with #14098 in this document |
| 12988 | 403.14 | 35.2.1.2.3 | Improve wording of "with the value that indicates the time no later than". Change to, e.g. "with a value indicating an ending time no later than". | As in comment | **Revised.**The word “no later than” is removed after modifying the text per resolution of CID 12505.**TGbe editor:** Apply the changes tagged with #12988 in this document |
| 11538 | 403.15 | 35.2.1.2.3 | Duration field indicates a duration, not a time. | as in comment | **Revised.**The sentence is re-worded so that the sentence no longer says the “shall set the Duration field… with the value that indicates the time…”**TGbe editor:** Apply the changes tagged with #11538 in this document |
| 12506 | 403.15 | 35.2.1.2.3 | The indicated text is for TXS mode 2. In the indicated text, STA transmits those frames to P2P STA. Describe the target STA in the text.Change it to "Within the allocated time by an MU-RTS TXS Trigger frame with TXOP Sharing Mode subfield equal to 2, the addressed STA by the MU-RTS TXS Trigger frame may transmit to a P2P peer STA QoS Data frames, Management frames and the frames that assists the transmission of QoS Data frames and Management frames, e.g., RTS frame, the frames for sounding". | As in comment | **Reject.**Mode 2 applies to both frames sent to AP as well as peer STA. |
| 13884 | 403.15 | 35.2.1.2.3 | "plus the Allocation Duration field" should be "plus the value of the Allocation Duration field" | change "plus the Allocation Duration field" to "plus the value of the Allocation Duration field" | **Revised.** Changed the sentence to clarify that we indeed are referring to Allocation Duration field value. **TGbe editor:** Apply the changes tagged with #13884 in this document |
| 10216 | 403.22 | 35.2.1.2.3 | It is not at all clear what Note 2 is trying to say. It makes reference to the basic NAV becoming 0 but then talks about what happens because of the nonzero basic NAV. | Rephrase as to clarify. | **Revised.** Rephrased the sentence to clarify that the last “nozero” term in the sentence should be “zero”.**TGbe editor:** Apply the changes tagged with #10216 in this document   |
| 12374 | 403.22 | 35.2.1.2.3 | It is not clear what the NOTE-2 is trying to say. | Rephrase the note to clarify the intension of the NOTE. | **Revised.** Rephrased the sentence so it clarifies how a STA in the same BSS as the AP can respond to TFs or RTS from the AP at the end of the allocation in the same TXOP. **TGbe editor:** Apply the changes tagged with #12374 in this document |
| 12507 | 403.22 | 35.2.1.2.3 | In NOTE2, is a STA a scheduled STA or other STA? Clarify it in the NOTE2. | As in comment | **Revised.** Rephrased so as to clarify the sentence applies to any STA in the same BSS as the AP. **TGbe editor:** Apply the changes tagged with #12507 in this document |
| 12989 | 403.22 | 35.2.1.2.3 | "will become 0" at what time? It's not clear to me and needs add necessary text. | See comment. | **Revised.** Clarified that it happens at the end of the allocated time period.**TGbe editor:** Apply the changes tagged with #12989 in this document |
| 13254 | 403.22 | 35.2.1.2.3 | The NOTE 2 text is not clear about how the basic NAV of the STA will become zero allowing STA to transmit. Clarify the note text and indicate 'STA' reference is for which STA (p2p peer STA?) in the note. | As in comment | **Revised.** Clarified that (a) it happens at the end of the allocated time period and (b) the sentence is referring to any STA in the same BSS as the AP; not just the STA that was addressed in the MU-RTS TXS frame or any peer STA of the allocated STA.**TGbe editor:** Apply the changes tagged with #13254 in this document |
| 11540 | 403.22 | 35.2.1.2.4 | The note is very confusing and needs to be rewritten | as in comment | **Revised.** Rephrased the sentence to clarify that (a) it is referring to what happens at the end of the allocated time period and (b) it is referring to any STA in the same BSS as the AP; not just the STA that was addressed in the MU-RTS TXS frame or any peer STA of the allocated STA. **TGbe editor:** Apply the changes tagged with #11540 in this document |
| 14029 | 403.23 | 35.2.1.2.4 | Change "due to a nonzero basic NAV value" to "due to a zero basic NAV value" | As in comment. | **Revised.** Re-worded the sentence so that the last “nonzero basic NAV” is changed to “zero basic NAV”.**TGbe editor:** Apply the changes tagged with #14029 in this document  |
| 10017 | 403.24 | 35.2.1.2.3 | grammer error: change "in the remain TXOP that after ..." to "in the remaining TXOP after ..." | as in comment | **Revised.** Re-worded the sentence along the lines suggested by the commenter.**TGbe editor:** Apply the changes tagged with #10017 in this document |
| 11637 | 403.24 | 35.2.1.2.3 | grammar error: change "in the remain TXOP that after ..." to "in the remaining TXOP after ..." | as in comment | **Revised.** Re-worded the sentence along the lines suggested by the commenter.**TGbe editor:** Apply the changes tagged with #11637 in this document |
| 13774 | 403.24 | 35.2.1.2.3 | "Remain" or "Remaining"? | as in comment | **Revised.** Changed it to “remaining”.**TGbe editor:** Apply the changes tagged with #13774 in this document |
| 13775 | 403.24 | 35.2.1.2.3 | "nonzero" should be "zero" | Replace "nonzero" with "zero". | **Revised.** Re-worded the sentence so that the last “nonzero basic NAV” is changed to “zero basic NAV”.**TGbe editor:** Apply the changes tagged with #13775 in this document |
| ~~11702~~ | ~~399.56~~ | ~~35.2.1.2.1~~ | ~~The reference to OM control disablement is missing~~ | ~~Add a reference to OM control~~ | **~~Revised.~~**~~Added text to OM control disablement for TXS procedure.~~ **~~TGbe editor:~~** ~~Apply the changes tagged with #11702 in this document~~ |

***TGbe editor: revise the following paragraph in P469L31 of 11be draft 2.1 as***

**35.3.16.4 Nonsimultaneous transmit and receive (NSTR) operation**

A non-AP STA )affiliated with an MLD that has gained the right to initiate transmission of a frame of an AC
on a link through the rules for EDCA backoff in 10.23.2.4 (Obtaining an EDCA TXOP) or the rules for Triggered TXOP sharing in 35.2.1.2 (Triggered TXOP sharing procedure) (#10079) may choose to not transmit any frame corresponding to that AC due to expected NSTR based interference at another STA within the MLD and lack of availability of an alternative frame in the queue that would not introduce the opportunity for such interference.

***TGbe editor: revise the following paragraph in P397L40 of 11be draft 2.1 as (#10993, 10994):***

NOTE 3—A non-AP STA does not update its state variables to the values contained in the MU EDCA Parameter Set
element if any of the following applies:
a) The Trigger frame addressed to the STA is not a Basic Trigger frame
b) The STA does not include QoS Data frames in the HE TB PPDU response sent in response to the Basic Trigger
frame.
c) The STA transmits the HE TB PPDU in response to a Basic Trigger frame following the rules defined in 26.5.4
(UL OFDMA-based random access (UORA)).

***TGbe editor: revise the following paragraph in P402L18 of 11be draft 2.1 as***

**26.5.2.2.1a Additional rules for soliciting UL MU frames**

An HE AP shall not allocate an RU in (#12982) a 40 MHz HE TB PPDU to a 20 MHz operating non-AP HE STA in
the 2.4 GHz band, unless the AP has received from the 20 MHz operating non-AP HE STA an HE Capabilities element with the 20 MHz In 40 MHz HE PPDU In 2.4 GHz Band subfield in the HE PHY Capabilities
Information field in its HE Capabilities element to 1.

An HE AP shall not allocate an RU in (#12982) an 160 MHz or 80+80 MHz HE TB PPDU to a 20 MHz operating non-AP HE STA, unless the AP has received from the 20 MHz operating non-AP HE STA an HE Capabilities element with the 20 MHz In 160/80+80 MHz HE PPDU in the HE PHY Capabilities Information field
equal to 1.

An AP shall not allocate to a 20 MHz operating non-AP HE STA a 242-tone RU in (#12982) a 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz HE TB PPDU transmission.

***TGbe editor: revise the following text in P955L37 of REVme draft 1.3 as***

**9.2.5.2 Setting for single and multiple protection under enhanced distributed channel
access (EDCA)**

b) Multiple protection settings. The Duration/ID field is set to a value D as follows:

1) If *TTXOP* = 0 and *TEND-NAV* = 0 and the frame is not an MU-RTS TXS frame with the Triggered TXOP Sharing Mode subfield equal to 2(#13845), then *D = TSINGLE-MSDU – T*PPDU
2) Else if *TTXOP* = 0 and *TEND-NAV* = 0 and the frame is an MU-RTS TXS frame with the Triggered TXOP Sharing Mode subfield equal to 2, then *TPENDING* £ *D ≤ TSINGLE-MSDU – T*PPDU (#13845)

3) Else if *TTXOP =* 0 and *TEND-NAV* > 0, then *D =* max(0, *TEND-NAV – T*PPDU)
4) Else if *TEND-NAV =* 0, then min (*TPENDING*, *TTXOP* – *TPPDU*) £ *D ≤ TTXOP* – *T*PPDU
 5) Else *TEND*-*NAV* – *TPPDU* £ *D* £ *TTXOP*-*REMAINING* – *TPPDU*
where

 *TSINGLE-MSDU* is the estimated time required for the transmission of the allowed frame
 exchange sequence defined in 10.23.2.9 (TXOP limits) (for a TXOP limit
 of 0), including applicable IFSs

 *TPENDING* is the estimated time required for the transmission of

* Pending MPDUs(11ax)
* Any associated immediate response frames
* Any HT NDP, VHT NDP,(11ax) HE sounding NDP, or
Beamforming Report Poll frame transmissions and explicit feedback
response frames
* Applicable IFSs
* Any RDG
* Any BDT
* Any pending QoS Null frame (#109)exchange sequences by paged
STAs
* Any pending PS-Poll or NDP PS-Poll frame exchanges by paged
STAs

 *TTXOP*  is the duration given by dot11EDCATableTXOPLimit (dot11QAPEDCATableTXOPLimit for the AP) for that AC

 *TTXOP-REMAINING* is *TTXOP* less the time already used within the TXOP

 *TEND-NAV* is the remaining duration of any NAV set by the TXOP holder, or 0 if no NAV has been established

 *TPPDU* is the time required for transmission of the current PPDU

NOTE 2—The rules allowing or disallowing the transmission of MPDUs with different ACs are described in 10.23.2.7 (Sharing an EDCA TXOP), 10.23.2.8 (Multiple frame exchange sequences in an EDCA TXOP(#109)), and 26.6.3 (Multi-TID A-MPDU and ack-enabled single-TID A-MPDU).(11ax)

NOTE 3—The estimated time to transmit an acknowledgment in response to the frames carried in a solicited HE TB
PPDU might be inexact. The TXOP holder might use the maximum time required to transmit the acknowledgment as the estimated time.(11ax)

NOTE 4 – If the Duration field in the solicited MU-RTS TXS frame and frames (if any) transmitted by the AP before MU-RTS TXS frame in the TXOP only protects the the following CTS only, the above rules allow a first STA may transmit RTS to solicit CTS from the P2P peer STA. (#13845).

***TGbe editor: revise the following paragraph in P2211L13 of REVme draft 1.3 as***

**10.23.2.2 EDCA backoff procedure**

The backoff procedure shall be invoked by an EDCAF (11ax)if any of the following events occurs:
a) An MA-UNITDATA.request primitive is received or the transmit queues associated with that AC
have become nonempty due to the conditions in 35.3.16.4 (Nonsimultaneous transmit and receive
(NSTR) operation), either of which ~~that~~ causes an MPDU corresponding to the
EDCAF’s AC to be queued for transmission such that all of the following are true:

1) One of the transmit queues associated with that AC has now become nonempty(#2222)
2) Any other transmit queues associated with that AC are empty
3) The backoff counter has a value of 0 for that AC
4) The medium is busy on the primary channel as indicated by any of the following:

— Physical CS
— Virtual CS
— A nonzero TXNAV timer value
— For a mesh STA that has dot11MCCAActivated true, a nonzero RAV timer value

b) For the EDCAF that is the TXOP holder, the transmission of the final PPDU transmitted by the
TXOP holder during the TXOP has completed, the final PPDU does not solicit an HE TB PPDU, the final PPDU neither contains an MU-RTS TXS frame with the Triggered TXOP Sharing Mode subfield equal to 2 nor is transmitted within a time allocated by the TXOP holder in an MU-RTS TXS frame with the Triggered TXOP Sharing Mode subfield equal to 2(#13845), and the TXNAV timer has expired.(11ax)
c) For the EDCAF that is the TXOP holder, the transmission of an MPDU in the initial PPDU of a
TXOP fails, as defined in this subclause, and the initial PPDU does not solicit an HE TB
PPDU.(11ax)
d) A transmission attempt by the EDCAF collides internally with another EDCAF of an AC that has
higher priority, that is, two or more EDCAFs in the same STA are granted a TXOP at the same time.
e) The transmission of at least one MPDU in the final PPDU transmitted by the TXOP holder during
the TXOP for that AC has completed, the PPDU contains an MPDU that solicits an HE TB PPDU
and the TXNAV timer has expired.(11ax)
f) The transmission of all MPDUs in the initial PPDU of a TXOP fails, as defined in this subclause,
and the PPDU contains an MPDU that solicits an HE TB PPDU.(11ax)
g) If explicitly indicated, such as in 26.17.2.3.3 (Non-AP STA scanning behavior).(11ax)

h) If explicitly indicated as in 35.3.16.4 (Nonsimultaneous transmit and receive (NSTR) operation).

i) For the EDCAF that is the TXOP holder, the transmission of the final PPDU transmitted by the

TXOP holder during the TXOP has completed, the final PPDU either contains an MU-RTS TXS frame with the Triggered TXOP Sharing Mode subfield equal to 2 or is transmitted within a time allocated by the TXOP holder in an MU-RTS TXS frame with the Triggered TXOP Sharing Mode subfield equal to 2 and *TTXOP-REMAINING*as specified in 9.2.5.2 (Setting for single and multiple protection under enhanced distributed channel

access (EDCA)) is zero(#13845).

In addition, the backoff procedure may be invoked by an EDCAF if(#13845):
j) For the EDCAF that is the TXOP holder, the transmission by the TXOP holder of an MPDU in a
non-initial PPDU of a TXOP fails, as defined in this subclause and an MPDU in the non-initial
PPDU does not solicit an HE TB PPDU.(11ax)
k) For the EDCAF that is the TXOP holder, the transmission by the TXOP holder of all MPDUs in a
non-initial PPDU of a TXOP fails, as defined in this subclause, and the PPDU contains an MPDU
that solicits an HE TB PPDU.(11ax)

NOTE 1—If the transmission by the TXOP holder of an MPDU in a non-initial PPDU of a TXOP failed, the STA can
perform either a PIFS recovery, as described in 10.23.2.8 (Multiple frame exchange sequences in an EDCA
TXOP(#109)), perform a backoff as described in item e) above, or wait for the TXNAV timer to expire and invoke the
backoff procedure per item b) above. How it chooses among these options is implementation dependent.

A STA that performs a backoff within its existing TXOP per item j(#13845)) ~~e)~~ above shall not extend the TXNAV timer
value (see 10.23.2.8 (Multiple frame exchange sequences in an EDCA TXOP(#109))).

***TGbe editor: revise the following paragraph in P2223L20 of REVme draft 1.2 as:***

**10.23.2.9 TXOP limits**

A TXOP limit of 0 indicates that the TXOP holder may transmit or cause to be transmitted (as responses) the following within the current TXOP:
a) One of the following at any rate, subject to the rules in 10.6 (Multirate support)

1) One or more SU PPDUs carrying fragments of a single MSDU or MMPDU

2) An SU or MU PPDU, where the PPDU carries a single MSDU, single MMPDU, single AMSDU, or single A- MPDU(#446)
3) An MU PPDU carrying A-MPDUs to different users (a single A-MPDU to each user)(#446)
4) A QoS Null frame or PS-Poll frame that is not an PS-Poll+BDT frame
5) A Basic Trigger frame, BSRP Trigger frame, or BQRP Trigger frame(11ax)
6) An HE TB PPDU carrying A-MPDUs from different users (a single A-MPDU from each
user)(11ax)

7) One or more PPDUs by a STA allocated time by the TXOP holder using an MU-RTS TXS Trigger frame as specified in 35.2.1.2 (Triggered TXOP sharing procedure) (#13845).

***TGbe editor: revise the following paragraph in P407L55 of 11be draft 2.1.1 as:***

**35.2.1.2 Triggered TXOP sharing procedure**

**35.2.1.2.1 General**

The Triggered TXOP sharing procedure allows an AP to allocate a part of its TXOP for transmitting one or more non-TB PPDUs to one (#11252, 11089, 11532, 12373, 12983) associated non-AP EHT STA (#11089).

An EHT STA with dot11EHTTXOPSharingTFOptionImplemented equal to true shall set one or both(#11090, 11925, 12498) of the
following subfields (#11090) in the EHT Capabilities element to 1: the Triggered TXOP Sharing Mode 1 Support subfield or the Triggered TXOP Sharing Mode 2 Support subfield (see Table 9-401k—Subfields of the EHT MAC Capabilities Information field) (#10214).

An EHT STA with dot11EHTTXOPSharingTFOptionImplemented equal to true shall follow the rules defined
in 35.2.2 (MU-RTS trigger/CTS frame exchange procedure for EHT STAs) when transmitting or responding
to an MU-RTS TXS Trigger frame and the additional rules defined in 35.2.1.2.2 (AP behavior) and
35.2.1.2.3 (Non-AP STA behavior).

An EHT STA that uses information from a received MU-RTS TXS Trigger frame as the most recent basis to
update its NAV should not reset its NAV after the NAVTimeout has expired (see 10.3.2.4 (Setting and
resetting the NAV)) unless the STA receives a CF-End frame that satisfies the conditions in
26.2.5 (Truncation of TXOP) and 10.23.2.10 (Truncation of TXOP) (#10407).

**35.2.1.2.2 AP behavior**
An EHT AP may allocate time within an obtained TXOP (see 10.23.2.4 (Obtaining an EDCA TXOP)) to an
associated non-AP EHT STA by transmitting an MU-RTS TXS Trigger frame as defined in 9.3.1.22.9 (MURTS Trigger frame format) parametrized as follows (#11091):

* The MU-RTS TXS Trigger frame, if transmitted by an AP with
dot11EHTBaseLineFeaturesImplementedOnly equal to true, shall have only one User Info field that is not
a Special User Info field.
* The User Info field shall be addressed to an associated non-AP STA
.
* The MU-RTS TXS Trigger frame may contain
a Special User Info field as defined in 9.3.1.22.9 (MU-RTS Trigger frame format) and 9.3.1.22.5 (Special User Info) (#10094).

The time allocated to the associated non-AP EHT STA is specified in the Allocation Duration subfield in
the MU-RTS(#11119, 13961) TXS Trigger frame.

(#11094,12477, 13204, 13336, 13972)

An EHT AP shall not send an MU-RTS TXS Trigger frame with (#12943)Triggered TXOP Sharing Mode
subfield equal to 1 and with the User Info field that is addressed to an associated non-AP STA from which it
has not received an EHT Capabilities element with the Triggered TXOP Sharing Mode 1 Support subfield
equal to 1.

An EHT AP shall not send an MU-RTS TXS Trigger frame with (#12943)Triggered TXOP Sharing Mode
subfield equal to 2 and with the User Info field that is addressed to an associated non-AP STA from which it
has not received an EHT Capabilities element with the Triggered TXOP Sharing Mode 2 Support subfield
equal to 1.

If the EHT AP determines that its transmission of an MU-RTS TXS Trigger frame to a non-AP EHT STA
with the (#12943)Triggered TXOP Sharing Mode subfield equal to 1 is successful (see 26.2.6.2 (MU-RTS
Trigger frame transmission)), then the AP shall not transmit any PPDU within the allocated time specified in
the MU-RTS TXS Trigger frame unless any of the following conditions are true(#12500):
— The PPDU carries an immediate response that is solicited by the non-AP STA.
— The CS mechanism indicates that the medium is idle at the TxPIFS slot boundary after the end of
either the transmission of an immediate response frame sent to that STA or the reception of a frame
from that STA that did not require an immediate response.

If the EHT AP determines that its transmission of an MU-RTS TXS Trigger frame to a non-AP EHT STA
with the (#12943)Triggered TXOP Sharing Mode subfield equal to 2 is successful, then the AP shall not
transmit any PPDU within the allocated time specified in the MU-RTS TXS Trigger frame unless any of the following conditions are true(#12501):
— The PPDU carries an immediate response that is solicited by the non-AP STA.

— The AP with the TXOP Return Support In TXOP Sharing Mode 2 subfield set to 1 received a frame
from the non-AP STA containing a CAS Control subfield, in which the RDG/More PPDU subfield (#11927) is set to 0.

If the EHT AP determines that the transmission of an MU-RTS TXS Trigger frame is successful and *TTXOP-REMAINING*as specified in 9.2.5.2 (Setting for single and multiple protection under enhanced distributed channel

access (EDCA)) is non-zero (#13845), then the
AP may transmit a PPDU after the end of the allocated time (#13845)if any
of the following conditions are satisfied:
— The medium is determined to be idle by the CS mechanism at the end of the allocated time in which
case it may transmit (#10779) PIFS after the end of the allocated time.
— The last PPDU transmitted(#13881) by the AP ended less than aSIFSTime before the end of the allocated
time in which case it may transmit (#13253, 10780)SIFS after the end of the last PPDU transmission.

— The last PPDU transmitted by the allocated STA to its associated AP did not contain any MPDU soliciting immediate acknowledgement from the AP and ended less than aSIFSTime before the end of the allocated
time in which case it may transmit (#13253) SIFS after the end of the last PPDU transmission (#13337).

If the EHT AP determines that the transmission of the MU-RTS TXS Trigger frame is successful and the CS
mechanism indicates that the medium is busy at the end of the allocated time, then the AP might transmit
after the CS mechanism indicates that the medium is idle at the TxPIFS slot boundary or invoke the backoff
procedure as described in 10.23.2.2 (EDCA backoff procedure) or wait for the TXNAV timer to expire and
invoke the backoff procedure.

Figure 35-1 (Example of MU-RTS TXS Trigger frame with Triggered TXOP Sharing Mode subfield value
equal to 1 soliciting UL PPDU(#12943)) shows an example of the exchange of MU-RTS TXS Trigger frame
with (#12943)Triggered TXOP Sharing Mode subfield value equal to 1 preceded by an optional CTS-to-self transmission (#12984) and transmission of UL non-TB PPDUs by a scheduled STA within the allocated time. Additionaly, the figure shows the case where the AP transmits to another non-AP STA within TxPIFS boundary within the allocated time in MU-RTS TXS Trigger frame, since the CS mechanism indicates that the medium is idle after the transmission of the last BlockAck frame to STA1(#12614).



**Figure 35-1—Example of MU-RTS TXS Trigger frame with Triggered TXOP Sharing Mode
subfield value equal to 1 soliciting UL PPDU(#12943,11766, 12984)**

Figure 35-2 (Example of MU-RTS TXS Trigger frame with Triggered TXOP Sharing Mode subfield value
equal to 2(#12943)) shows an example of the exchange of MU-RTS TXS Trigger frame with (#12943)Triggered TXOP Sharing Mode subfield value equal to 2 preceded by an optional CTS-to-self transmission (#12984) and transmission of PPDUs by a scheduled STA to another STA within the allocated time. Additionaly, Figure 35-2 shows the case where the AP transmits to another non-AP STA after PIFS from the end of the allocated time in MU-RTS Trigger TXS frame for STA 1 (#12614).



**Figure 35-2—Example of MU-RTS TXS Trigger frame with Triggered TXOP Sharing Mode
subfield value equal to 2(#12943, 11766, 12984)**

***TGbe editor: revise the following paragraph in P410L27 of 11be draft 2.1.1 as:***

**35.2.1.2.3 Non-AP STA behavior**After a non-AP EHT STA receives an MU-RTS TXS Trigger frame from its associated AP that contains a
User Info field that is addressed to it, the STA may transmit one or more non-TB PPDUs within the time
allocation signaled in the MU-RTS TXS Trigger frame. The first PPDU of the exchange shall carry(#13974) a CTS frame transmitted per the rules defined in 26.2.6.3 (CTS frame response to an MU-RTS Trigger frame).

The time allocation shall start when the PHY-RXEND.indication primitive of the PPDU that contains the
MU-RTS TXS Trigger frame has occurred.

The non-AP EHT STA may use the time allocated by the(#14027) associated AP in the MU-RTS TXS Trigger frame with the (#12943, 13317)Triggered TXOP Sharing Mode subfield value set to 2 (#14056) for transmission of non-TB PPDUs to the AP or another STA(s) (#13252). The non-AP EHT STA may transmit a QoS Data or QoS Null frame containing CAS Control subfield with the RDG/More PPDU subfield equal to 0 to the associated AP from which it has received EHT Capabilities element with the TXOP Return Support In TXOP Sharing Mode 2 subfield set to 1(#11928, 13771, 12985, 13975).
NOTE 1—For example, the allocated STA may transmit to a peer STA of a peer-to-peer link or use the allocated time for non-infrastructure network communication (#13252).

The non-AP EHT STA may use the time allocated by the (#14027) associated AP in the MU-RTS TXS Trigger frame with the (#12943)Triggered TXOP Sharing Mode subfield value set to 1 for transmission of non-TB PPDUs only to its associated AP(#13771, 10781,14028).

A non-AP EHT (#11019) STA addressed by a User Info field in the MU-RTS TXS Trigger frame shall ensure that its PPDU transmission(s) and any expected responses fit entirely within the allocated time.

A non-AP EHT STA that receives a MU-RTS TXS Trigger frame from its associated AP that contains a User
Info field addressed to the STA shall update its CWmin[AC], CWmax[AC], AIFSN[AC], and
MUEDCATimer[AC] state variables to the values contained in the dot11MUEDCATable, for all the ACs
from which at least one QoS Data frame was transmitted successfully in a non-TB PPDU to the AP within
the time allocated in the Trigger frame. A QoS Data frame is transmitted successfully by the STA for an AC
if it requires immediate acknowledgment and the STA receives an immediate acknowledgment for that
frame, or if the QoS Data frame does not require immediate acknowledgment.

If the last non-TB PPDU transmitted to its associated AP within the time allocated in an MU-RTS TXS Trigger frame contains at least one QoS Data frame for an AC that requires immediate acknowledgment, the updated MUEDCATimer[AC] for that AC shall start at the end of the corresponding immediate response. If the last transmitted non-TB PPDU to its associated AP does not contain any QoS Data frames for an AC that requires immediate acknowledgment, the updated MUEDCATimer[AC] for that AC shall start at the end of the non-TB PPDU (#13882, 11021, 10775, 13883).

After sending the CTS solicited by MU-RTS TXS frame (#12504, 13966) from the associated AP and within the time allocation signaled in the MU-RTS TXS Trigger frame, the STA that sends the responding CTS shall ignore the NAV that was (#13965) set from any frame transmitted by the AP prior to and including the MU-RTS TXS frame (#11537, 12986, 13964, 13963, 13967).

After sending the CTS solicited by MU-RTS TXS frame, the STA shall set the Duration/ID field for all frames within the allocated time per the rules defined in 9.2.5.2 (Setting for single and multiple protection under enhanced distributed channel access (EDCA)) as if the STA obtained a TXOP for an AC with TXOP limit set to the Allocation Duration field value (#13884) in the soliciting MU-RTS TXS frame (#11539, 12505, 12987, 14098, 12988, 11538). Within the allocated time by an MU-RTS TXS Trigger frame with (#12943)Triggered TXOP Sharing Mode subfield equal to 2, the addressed STA by the MU-RTS TXS Trigger frame may transmit QoS Data frames, Management frames and the frames that assists the transmission of QoS Data frames and Management frames, e.g., RTS frame, the frames for sounding.

NOTE 2—With the Duration rule defined here, the basic NAV of any (#12507) STA in the same BSS as the AP will become 0 at the end of the allocated time period (#12989) if the basic NAV timer is set per the P2P transmission frames during the allocated time period, so the STA can transmit in the remaining (#10017, 11637, 13774) TXOP after the allocated time period due to a zero basic NAV value(#10216, 12374, 13254, 11540, 14029, 13775).

A non-AP STA addressed by an MU-RTS TXS Trigger frame shall not transmit non-TB PPDUs occupying
subchannels that are not used for responding the CTS frame to the MU-RTS TXS Trigger frame during the
time allocated by the(#14027) associated AP.

A non-AP STA addressed by an MU-RTS TXS Trigger frame shall set the TXVECTOR parameter
CH\_BANDWIDTH or CH\_BANDWIDTH\_IN\_NON\_HT of a non-TB PPDU to be the same or narrower
than the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT of the CTS frame that it has responded
to the MU-RTS TXS Trigger frame.

If a 20 MHz subchannel is indicated as a punctured subchannel in the most recently exchanged Disabled
Subchannel Bitmap field in the EHT Operation element, the corresponding bit in the TXVECTOR
parameter INACTIVE\_SUBCHANNELS shall be set to 1 and the punctured 20 MHz subchannel shall not
be used by the non-TB PPDU(s) that is transmitted during the time allocated by the(#14027) associated AP.

***TGbe editor: revise the following paragraph in P524L45 of 11be draft 2.1.1 as:***

**35.8 TWT operation**

**35.8.1 General**

A TWT STA shall follow the rules as described in 26.8 (TWT operation) in general. In addition, within
trigger-enabled SPs, the trigger frame may be an MU-RTS(#11119) TXS Trigger frame and the procedure follows
35.2.1.2 (Triggered TXOP sharing procedure).