**IEEE P802.11
Wireless LANs**

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| CR for PPDU End Time Alignment |
| Date: 2022-04-01 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Yongho Seok | Mediatek |  |  |  |
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Abstract

This submission proposes resolutions for multiple comments related to TGbe D1.0 with the following CIDs (38 CIDs):

* 4225, 4226, 4227, 4228, 4402, 4406, 4407, 4408, 4409, 4410, 4475, 4476, 4477, 4478, 4479, 5101, 5102, 5150, 5221, 5364, 5384, 5842, 5843, 5929, 5948, 5994, 6141, 6495, 6738, 6772, 6928, 6996, 7375, 7607, 7788, 7879, 8207, 8213

Revisions:

* Rev 0: Initial version of the document.

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 subsequent TGbe Draft. This introduction is not part of the adopted material.

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

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

| **CID** | **Clause** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 7607 | 35.3.14.5 | 0.00 | This mechanism is for NSTR. So, this subclause should be under 35.3.14.3. | As in comment. | Rejected- The PPDU end time alignment is for the NSTR. But, if this subclause is moved under 35.3.16.4 (Nonsimultaneous transmit and receive (NSTR) operation), the depth of the subclause exceeds level 5.  |
| 4402 | 35.3.14.5 | 274.42 | The transmission / reception operations on the links can occur only if the setup links are enabled (i.e has at least on TID mapped to each fo these links) | Revise the sentence as follows: " After the AP MLDhas set up link 1 and link 2 with the non-AP MLD, then AP 2 may receive data frames from STA 2 on link 2, if enabled, while AP 1 contends for the WM and then transmits data frames to STA 1 on link 1, if enabled. | Rejected- Figure 35-11 is just an example. There is no reason to clarify all possible condition. |
| 6772 | 35.3.14.5 | 276.51 | The concept of NSTR MLD or NSTR non-AP MLD is not defined in the document. Currently, NSTR link pair and STA NSTR limited are defined. | Please define NSTR MLD and NSTR non-AP MLD or change the wording by using A STA affiliated with a non-AP MLD that belongs to a NSTR link pair instead of NSTR MLD | Revised- TGbe editor to make the changes shown in 11-22/0077r0 under all headings that include CID 4402. |
| 5994 | 35.3.14.5 | 276.52 | The PPDU ending time allignment is not complete. | Add later requirement ( 4us) and MAC frame decoding requriement (4us) |  |
| 4225 | 35.3.14.5 | 276.54 | Replace "is transmitted" with "are transmitted". Also in the third line simply say TB PPDU rather than HE or EHT TB PPDU. | As in comment. |  |
| 6495 | 35.3.14.5 | 276.54 | The meaning of "simultaneously transmit" better moved to the definition clause. | As in comment |  |
| 5842 | 35.3.14.5 | 276.57 | What's the definition of "NSTR MLD"? Is it an MLD that does not have any STR link pairs? This term needs to be clearly defined. | Provide a clear definition for "NSTR MLD". For example, in Section 3.1, add the following definition:Nonsimultaneous transmit and receive Multi-Link Device (NSTR MLD): an MLD that does not have any STR link pairs. |  |
| 5948 | 35.3.14.5 | 276.57 | Whether the first link and the second link is in the same NSTR link pair is not clear from the description. | the proposed change is:If a NSTR MLD that is receiving a PPDU on a first link of its NSTR link pair simultaneously transmits another PPDU on a second link of the NSTR link pair, then the NSTR MLD might fail to receive the PPDU on the first link because of the interference caused by its transmission on the second link. |  |
| 7375 | 35.3.14.5 | 276.57 | What happens when there are 3 links in the MLD? The sentence only discusses first and second links. | Change the cited sentence to read "If a NSTR MLD that is receiving a PPDU on a link simultaneously transmits another PPDU on another link, then the NSTR MLD might fail to receive the PPDU on the link because of the interference caused by its transmission on the other links." |  |
| 8207 | 35.3.14.5 | 276.57 | There are several places in this subclause use "NSTR MLD", base on previous discussion, the term of "NSTR MLD" is not defined in the spec. Please rewrite the sentences to avoid the use of "NSTR MLD". | as in comment |  |
| 4406 | 35.3.14.5 | 276.58 | The term "simultaneously transmits" used in the sentence "If a NSTR MLD that is receiving a PPDU on a first link \*simultaneously transmits\* another PPDU on a second link, then the NSTR MLD might fail to receive the PPDU on the first link because of the interference caused by its transmission on the second link." has a different meaning than the definition of "simultaneously transmit" term that is defined in the first sentence of section 35.3.14.5 (P276L54) where the meaning is for transmission of two PPDUs on two different links of an MLD at the same time. Please resolve the conflict. | Propose to use "concurrent transmission" in the sentence, as follows: "If a NSTR MLD that is receiving a PPDU on a first link is concurrently transmitting another PPDU on a second link, then the NSTR MLD might fail to receive the PPDU on the first link because of the interference caused by its transmission on the second link." |  |
| 7879 | 35.3.14.5 | 276.58 | The definitions of 'NSTR MLD' and 'NSTR non-AP MLD' are not specified in the draft 1.0. Either define the term or substitute the corresponding to text using 'NSTR link pair'. Apply the text modification through the subclause 35.3.14.5 | As in the comment |  |
| 4475 | 35.3.14.5 | 276.62 | 1. Add "to" before the verb "reduce" in the following sentence:"....which helps reduce the chances of the occurrence of such self-interference among STAs affiliated to the same NSTR MLD"2. Use the term "NSTR non-AP MLD" instead of "NSTR MLD" in the above sentence. | The correct sentence shall be: "..."....which helps to reduce the chances of the occurrence of such self-interference among STAs affiliated to the same NSTR non-AP MLD" |  |
| 5843 | 35.3.14.5 | 276.62 | Can all the NSTR non-AP MLDs simultaneously receive on multiple links or simultaneously transmit on multiple links? If not, then should the simultaneous-receiving and simultaneous-transmitting be signalled as capabilities?Also, in general, does NSTR only mean non-simultaneous Tx and Rx (Tx/Rx) or does it include non-simultaneous all the comibinations, Tx/Rx, Tx/Tx, and Rx/Rx? | Please address the questions asked in the comment. |  |
| 4407 | 35.3.14.5 | 277.01 | Remove the words "more than one PPDU" and "same" from the following sentence, since it is part from the previously definition of "simultaneously transmit" term, as defined in the start of section 35.3.14.5 above | The revised sentece should be:"When an AP MLD simultaneously transmits to the associated NSTR non-AP MLD and..." |  |
| 4226 | 35.3.14.5 | 277.02 | Does the frame need to be a QoS Data frame? I.e., wouldn't it apply to any frame that solicits an immediate response? Please clarify | As in comment. |  |
| 5150 | 35.3.14.5 | 277.02 | If only one of PPDUs solicits an immediate response, it is not required to align PPDU end time. | As in comment |  |
| 4408 | 35.3.14.5 | 277.03 | Why only Qos Data soliciting an immediate response is the only frame included in this sentence and not any frame that solicits immediate response? | Remove the words " a QoS Data" from the sentence as follows:"...at least one of the PPDUs carries a frame that is soliciting an immediate response, ..." |  |
| 5221 | 35.3.14.5 | 277.04 | Why a high priority PPDU is exempted from this requirement? If the high priority PPDU carried frame requires immediate response, the same issue of Tx interference to the on-going Rx exists. | Remove "except if the PPDU carries a high priority frame" |  |
| 6141 | 35.3.14.5 | 277.04 | This requirement is excessive in that it presumes that the stated rule always produces a better outcome, but that is not true. | Change "The AP shall align the end time" to "The AP should align the end time" |  |
| 4227 | 35.3.14.5 | 277.05 | There is no definition of high priority frame. Is it related to the high priority AC or is it something else? | As in comment. |  |
| 4409 | 35.3.14.5 | 277.05 | It is not clear what does "high priority frame" mean? | Please clarify (or refer to exist definition of) the term "high priority frame" |  |
| 5101 | 35.3.14.5 | 277.05 | The definition of a high priority frame is missing. | Define a high priority frame. |  |
| 5102 | 35.3.14.5 | 277.05 | Even for a PPDU including a high priority frame, there is a case where PPDU end time alignment is required.When PPDU 1 including a high priority frame started before the start of PPDU 2, if PPDU 2 ends earlier than the end of PPDU 1, the response to PPDU 2 gives interference to the high priority frame. In this case, the transmitter should align PPDU end time. | Define PPDU end time alignment for a high priority frame. |  |
| 5364 | 35.3.14.5 | 277.05 | except if the PPDU carries a high priority frame. there is no sub clause to introduce the high priority frame delivery on NSTR MLD | reword it, like "except the specified case in this standard" |  |
| 6996 | 35.3.14.5 | 277.06 | "NOTE 1-- In this way the response PPDU to any of the PPDUs transmitted by the AP will not overlap with any of these PPDUs." It is not clear if the response PPDUs need to be aligned and if yes, how that can be achieved. | Clarify in the NOTE if the response PPDUs are required to be aligned and how such alignment can be achieved. |  |
| 5929 | 35.3.14.5 | 277.30 | TXOP sharing rule in 10.23.2.7 for SU PPDU should be revised to allow padding with lower priority ACs for end time alignment | as in comment |  |
| 6928 | 35.3.14.5 | 277.30 | Setting GI for PPDU so that total duration of each OFDM symbol is an integer time of total duration of each OFDM symbol of other transmitted PPDUs(such as 0.8us for non-HE PPDU and 3.2us for HE or EHT PPDU) can reduce end time difference between transmitted PPDUs. | Add "An AP MLD may set GI based on GI of other transmitted PPDUs." |  |
| 8213 | 35.3.14.5 | 277.30 | Selecting GI duration is one of options to adjust PPDU duration. | Add "An AP MLD may select any (allowed) duration of GI to align the end time of transmitted PPDUs." |  |
| 4410 | 35.3.14.5 | 277.35 | since the"simultaneously transmit" term was previously defined (in the start of section 35.3.14.5) consider moodify the sentence to use this term as follows: " When an AP MLD simultaneously solicits transmission from one or more HE or EHT TB PPDUs..." | As in comment |  |
| 4476 | 35.3.14.5 | 277.36 | Use "affiliated with" rather than "affiliated to" in the sentence | the revised sentece should be:"When an AP MLD simultaneously solicits one or more HE or EHT TB PPDUs from the same NSTR non-AP MLD, each AP affiliated with the AP MLD shall independently solicit..." |  |
| 4228 | 35.3.14.5 | 277.39 | These seem to be conflicting conditions. Explicitly call out, in an exclusive way what applies to the first bullet and what applies to the second bullet. | As in comment. |  |
| 5384 | 35.3.14.5 | 277.39 | it's more clear if we change NSTR non-AP MLD to NSTR peers | An AP affiliated to the AP MLD shall not transmit a Trigger frame with the CS Required subfield set to 1 to a STA affiliated to a NSTR non-AP MLD-->...to a STA belong to a NSTR peer of non-AP MLD, when... other STAs belong to the same NSTR peer of non-AP MLD.... |  |
| 4477 | 35.3.14.5 | 277.52 | The "STA MLD" shall be replaced with "non-AP MLD" in the following sentence: "The relationship between the end times of DL PPDUs sent over link 1, link 2, and link 3 between an AP MLD and a \*STA MLD\* is shown in Figure 35-12..." | As in comment |  |
| 4478 | 35.3.14.5 | 277.54 | The "STA MLD" shall be replaced with "non-AP MLD" in the following sentence: "..an HE or EHT TB PPDU requiring the carrier sense from a STA in the \*STA MLD\*." | As in comment |  |
| 4479 | 35.3.14.5 | 277.58 | The "STA MLD" shall be replaced with "non-AP MLD" in the following sentence: "..that is sent from any STA in the same \*STA MLD\* immediately after the soliciting DL PPDU is greater than or equal to 12 μs." | As in comment |  |
| 6738 | 35.3.14.5 | 278.01 | "...the response PPDU to any of the DL PPDUs, the difference between the end times of the DL PPDUs on link 2 and link 3 cannot be greater than 8 μs."Is cannot the intention or is it supposed to be shall not? | Change to "...the response PPDU to any of the DL PPDUs, the difference between the end times of the DL PPDUs on link 2 and link 3 shall not be greater than 8 μs." |  |
| 7788 | 35.3.14.5 | 278.06 | The Figure 35-12 somehows shows the Resoponse frames from STA MLD (TB PPDU, ACKs) end at the same time, which could be quite misleading. Because this figure is just to illustrate that the AP MLD shall align its PPDUs' end time, and there are no PPDU end time alignment about the STA MLD's response frames | Please change the figure per comments, or add a note that says the figure doesn't mean the end time of the STA MLD's response frames are not required to be aligned |  |