IEEE P802.11
Wireless LANs

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| Proposed CR for Clause 35.2.1.2.3 |
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Abstract

This submission addresses the following CIDs relative to 11be draft 2.2.

13063, 13773, 12756 11866 11022

Revisions:

* Rev 0: Initial version of the document.
* Rev 1. Added CID 12756 11866 11022

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| **CID** | **Commenter** | **Comment** | **Proposed Change** | **Resolution** |
| 13063 | Chittabrata Ghosh  | The MU-EDCA timer is updated as per the following spec text: "The updated MUEDCATimer[AC] shall start at the end of the immediate response if a 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 that AC that requires immediate acknowledgment, and shall start at the end of the non-TB PPDU if the transmitted non-TB PPDU to its associated AP does not contain any QoS Data frames for that AC that requires immediate acknowledgment." However, there is no spec text on MU-EDCA timer update when the response frame is received from a peer STA (and not its associated AP) or for the scenario when the non-TB PPDU is transmitted to the peer STA and that does not require immediate acknowledgement, when the TXOP Sharing Mode subfield value is 2. Please add spec tect on MU-EDCA timer update for the cases mentioned above. | As in comment | RevisedDuring 11be r1 the group discussed whether to add MU EDCA rules for P2P and did not approve itHowever, after ofline discussion commenter pointed out that lack of text makes STA behavior after responding with CTS frame unclear. Added clarification:“A non-AP EHT STA that receive MU-RTS TXS trigger frame may initiate frame exchange with another STA SIFS after responding with CTS frame to a received MU-RTS TXS Trigger frame.”**TGbe editor:** Apply the changes tagged with #13063 in this document  |
| 13773 | Yuchen Guo | The MU EDCA is only used after UL transmission? what about P2P transmission?. | Please clarify, or add corresponding rules for P2P transmission | RejectedDuring 11be r1 the group discussed whether to add MU EDCA rules for P2P and did not approve it |
| 12756 | Patrice Nezou | The updated MUEDCATimer[AC] should start at the end of the allocated time because a non-AP STA could transmit multiple non-TB PPDU from multiple ACs | Modify the sentence as:The updated MUEDCATimer[AC] shall start at the end of the allocated time. | Rejected.The timer is per-AC, so in case if STA has transmitted multiple PPDUs belonging to multiple ACs, the STA start MUEDCA timer for each AC independently and it does that after reception of the expected response frame or after the end of the last PPDU that does not require an acknowledgement for that AC.  |
| 11866 | Alfred Asterjadhi | 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. | RevisedNothing to change as the corresponding text on 26.2.7 is removed in Draft 2.2  |
| 11022 | Hanqing Lou | It is not clear how soon the non-AP STA should start the non-TB PPDU transmission after the CTS transmission, SIFS? Or DIFS plus backoff? | Please clarify | RevisedSimilar to CID13063,Added clarification “A non-AP EHT STA that receive MU-RTS TXS trigger frame may initiate frame exchange with another STA SIFS after responding with CTS frame to a received MU-RTS TXS Trigger frame.”**TGbe editor:** Apply the changes tagged with #11022 in this document  |
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***TGbe editor: revise the following text in P410L27 of 11be draft 2.2 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 (#13974)carry
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.

(#14027)(#13317)(#14056)The non-AP EHT STA may use the time allocated by the associated AP in the
MU-RTS TXS Trigger frame with the Triggered TXOP Sharing Mode subfield value set to 2 for
transmission of non-TB PPDUs to the AP or another STA(s) if the (#12943)Triggered TXOP Sharing Mode
subfield value is 2. The non-AP EHT STA may (#13722)return a QoS Data or QoS Null frame to an
associated AP to terminate the allocated time, (#12503)in which case the RDG/More PPDU subfield in the
CAS Control subfield of the HE variant HT Control field of the frame is equal to 0.

The non-AP EHT STA that receive MU-RTS TXS trigger frame may initiate frame exchange with another STA SIFS after responding with CTS frame to a received MU-RTS TXS Trigger frame (#13063, 11022)

NOTE 1—For example, the other STA can be a peer STA of a peer-to-peer link.

(#14027)(#14028)(#10781)The non-AP EHT STA may use the time allocated by the 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.

A (#11019)non-AP EHT 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.

(#11021)(#10775)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 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.

After sending the CTS solicited by MU-RTS TXS (#12504)frame from the associated AP, the STA that
sends the responding CTS shall ignore the NAV that is set by the AP within the time allocation signaled in
the MU-RTS TXS Trigger frame.

After sending the CTS solicited by MU-RTS TXS, the STA shall set the Duration field of its frame to peerto-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. 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 a STA in the same BSS as the AP will become 0 if the
basic NAV timer is set per the P2P transmission frames during the allocated time period, so the STA can do the
transmission in the remain TXOP that after allocated time period due to a nonzero basic NAV value.

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 (#14027)the 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 (#14027)the associated AP

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 equal 1 only for the transmission of one or more non-TB PPDUs that are addressed to the 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.

**CID 13063, 13773 additionla discussion:**

MU EDCA parameters were introduced to balance unfairness in channel access at a STA side that can both perform EDCA contention and transmit TB PPDU after receiving TF from an AP. An AP can track STA buffer status both before and after sending TF by analyzing buffer status reports received from a STA. Same is true in the case with the transmission of MU RTS TXS trigger frame that allocate time to a STA to transmit non-TB PPDU. An AP can analyze QoS field or A-CTRL field or track reception of UL PPDU to estimate STAs needs for the airtime. In that regards it totally make sense use MU EDCA rules in case when MU RTS TXS frame sent with Triggered TXOP Sharing Mode field equal to 1.

At the same time, when AP send MU RTS TXS frame with Triggered TXOP Sharing Mode field equal to 2 (i.e. allocate time for P2P transmission) AP lack the information about air time requirements as well as it cannot track frame exchange between two P2P STAs and thus it does not know if allocated time a) sufficient to deliver buffered MPDUs or b) was successfully used at all.

Lack of efficient mechanisms that allow STA to quickly indicate P2P link status to the AP and request more resources to support P2P link does not allow STA to fully rely on MU RTS TXS triggering. Also, for the p2p exchange, the expectation is that such link is established for some latency sensitive traffic and preventing or limiting STA from using EDCA channel access for that link completely relying on AP’s triggering while having no mechanisms to inform AP of link status or for the AP to track it independently will lead to link degradation.