IEEE P802.11
Wireless LANs

|  |
| --- |
| MAC: Triggered SU Operation |
| Date: 2021-01-13 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Dibakar Das | Intel |  |  | Dibakar.das@intel.com |
| Laurent Cariou | Intel |  |  |  |
| Dmitry Akhmetov | Intel |  |  |  |
| Arik Klein | Huawei |  |  |  |
| Yunbo Li |  |  |  |

Abstract

Spec text proposal for 11be D0.4 related to motions on AP assisted non-TB transmission procedures.

Revisions

* Rev 0: Initial version.
* Rev 1: incorporate comments from Young Hoon, Alfred, Zhiqiang, Zhou.
* Rev 2: clarify that the non-TB PPDU transmission can be from non-AP STA to any other STA.
* Rev 4: update EHT capabilities for Triggered SU operation, renamed the “MU-RTS TS TF” to “MU-RTS TXS TF”.

**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 TGbe Draft. The introduction and the explanation of the proposed changes are 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).

**This document proposes spec text contribution for the following motions that passed in 11be:**

The 802.11be amendment shall define mechanism(s) for an AP to assist a STA that communicates with another STA.

[Motion 22, [9] and [153]]

802.11be supports defining a procedure for an AP to share time resource obtained in a TXOP for peer to peer (STA-TO-STA) frame exchanges.

• Whether it is in R1 or R2 is TBD.

[Motion 111, #SP0611-24, [19] and [154]]

In R1, 802.11be shall define a mechanism for an AP to transmit a modified MU-RTS Trigger frame that allocates time within a TXOP for transmitting one or more non-TB PPDUs.

• The time allocation starts after the end of transmission of the MU-RTS frame.

• It is TBD whether the AP can optionally not solicit CTS.

• This is an optional mechanism for non-AP and AP STAs.

NOTE – The non-TB PPDUs may be transmitted by the non-AP STA to AP or to a peer of a peer-to-peer link.

[Motion 146, #SP354, [30] and [158]]

**Discussion:**

We have following main additions beyond whats covered in the motions:

1. Use the term “MU-RTS TXOP Sharing TF” to refer to the modified MU-RTS frame that carries signalling for Triggered non-TB PPDU transmissions. The name “TXOP Sharing” is TBD.
2. Clarify that GI And HE-LTF Mode in the Common Info field is used to differentiate the TS-TF from baseline MU-RTS frame. The motivation is to let EHT non-AP STAs identify early on that this TF is not baseline MU-RTS frame.
3. Define the MIB variable and the field used in Capabilities to be used to signal support for this feature.
4. Clarify that the allocation is portion of the TXOP that was obtained by the AP.
5. Based on feedback from many members, CTS transmission as response to the new TF is mandatory as default.
6. Clarify that the non-TB PPDU transmission can be from the scheduled STA to any other STA.
7. Added a note to clarify that transmissions can be for P2P.

**Proposed spec text:**

***TGbe editor: Add the following paragraph starting in P129L49 of 11ax draft 7.0 as follows:***

**9.3.1.22.5 MU-RTS Trigger frame format**

The GI And HE-LTF Mode subfield in the Common Info field is set to a TBD non-zero value to signal an MU-RTS Trigger frame by an EHT AP that allocates time within an obtained TXOP to an EHT non-AP STA for transmitting one or more non-TB PPDUs sequentially (see 35.2.1.3 Triggered TxOP sharing procedure); an EHT AP sets it to 0 otherwise. (Motion 146, #SP354)

An MU-RTS Trigger frame with the GI And HE-LTF Mode subfield set to TBD non-zero value is called an MU-RTS TXOP Sharing (TXS) Trigger frame for the remainder of this subclause and Clause 35.

 A TBD subfield in the MU-RTS TXS Trigger frame indicates the time duration allocated to the non-AP STA within the TXOP obtained by the AP.

***TGbe editor: Add an entry for the EHT MAC Capabilities Information field corresoponding to Triggered TXOP Sharing procedure as follows: (Track change on)***

9.4.2.295c.2 EHT MAC Capabilities Information field

The format of the EHT MAC Capabilities Information field is defined in Figure 9-xxx (EHT MAC Capabilities Information field format).

|  |  |  |
| --- | --- | --- |
|  | B0 | TBD |
|  | Triggered TXOP Sharing Support | TBD |
| Bits: | 1 | TBD |

|  |
| --- |
| Figure 9-xxx - EHT MAC Capabilities Information field format |

The subfields of the EHT MAC Capabilities Information field are defined in Table 9-xxxa (Subfields of the EHT MAC Capabilities Information field).

|  |
| --- |
| * Subfields of the EHT MAC Capabilities Information field
 |
| Subfield | Definition | Encoding |
| Triggered TXOP Sharing Support | Indicates support for transmitting or responding to a TXOP sharing TF that does not solicit TB PPDU. . | For an EHT AP:  Set to 1 to indicate that the AP is capable of transmitting a modified MU-RTS frame that allocates time to a STA to transmit non-TB PPDUs (see 35.2.1.3 Triggered TxOP sharing procedure). Set to 0 otherwise.For an non-AP EHT STA:  Set to 1 to indicate that the non-AP STA is capable of responding to a modified MU-RTS frame that allocates time to a STA to transmit non-TB PPDUs (see 35.2.1.3 Triggered TxOP sharing procedure). Set to 0 otherwise. |

***TGbe editor: Insert the new subclause 35.2.1.3 Triggered TxOP sharing procedure as follows:***

**35.2.1.3 Triggered TxOP sharing procedure (Motion 146, #SP354, Motion 111, #SP0611-24, Motion 22)**

**35.2.1.3.1 General**

The Triggered TxOP sharingprocedure allows an AP to allocate a portion of the time within an obtained TXOP to a non-AP STA for transmitting one or more non-TB PPDUs.

A STA with dot11TxopSharingTFOptionImplemented equals to true shall set the Triggered TXOP Sharing Support subfield in EHT Capabilities element to 1; otherwise, it shall set the subfield to 0.

An AP and non-AP STA shall follow the rules defined in 26.2.6 (MU-RTS Trigger/CTS frame exchange procedure) when transmitting and responding to a MU-RTS TXS Trigger frame respectively with the exceptions defined in 35.2.1.3.2 (AP behaviour) and 35.2.1.3.3 (Non-AP STA behaviour).

**35.2.1.3.2 AP behaviour**

 An AP may allocate time within an obtained TXOP to a non-AP STA by transmitting an MU-RTS TXS Trigger frame as defined in 9.3.1.22.5 (MU-RTS Trigger frame format)parametrized as follows:

* The Trigger frame has a User Info field that is addressed to the non-AP STA. A User Info field is addressed to a non-AP STA if the AID12 subfield of the User Info field is equal to the 12 LSBs of the AID of the STA and the Trigger frame is sent by the AP with which the non-AP STA is associated.

An AP shall not send a MU-RTS TXS Trigger frame to an associated non-AP STA from which it has not received an EHT Capabilities element with the Triggered TXOP Sharing Support subfield set to 1.

**35.2.1.3.3 Non-AP STA behaviour**

After a non-AP STA receives an MU-RTS TXS Trigger frame from its associated AP and addressed to it, the STA shall transmit one or more non-TB PPDUs within the time allocation signalled in the TBD field of the MU-RTS TXS Trigger frame. The first PPDU of the exchange shall be 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 starts after the end of transmission of the MU-RTS TXS Trigger frame.

During this allocated time, the non-AP STA may transmit non-TB PPDUs to its associated AP or another STA.

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

**Straw Poll: Do you support to incorporate the proposed draft text in this document 11-21/87r4, to the next revision of TGbe Draft 0.3?**

**Result: Yes/No/Abstain**