### IEEE P802.11 Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11ax D6.0 MU-RTS/CTS | | | | |
| Date: 2020-02-10 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Po-Kai Huang | Intel Corporation | 2200 Mission College Blvd, Santa Clara, CA 950542200 |  | po-kai.huang@intel.com |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission proposes resolutions for the following CIDs:

24287, 24292, 24362

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revision based on the feedback received offline from Mark
* Rev 2: Revision based on the feedback received in teleconference
* Rev 3: Revise resolution for CID 24362
* Rev 4: Revise resolution for CID 24287
* Rev 5: Submit the right version of document. Defer 24292 based on the request offline.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax D6.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D6.0 Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 24287 | Mark RISON | 128.34 | 9.3.1.22.5 | For MU-RTS, the AP TX Power and UL Target RSSI fields in the Trigger frame are reserved, so it is not clear what power the STAs are to use for the response (CTS) | At the end of 26.2.6.3 CTS frame response to an MU-RTS Trigger frame add a para: "The CTS frame sent in response to an MU-RTS Trigger frame is transmitted at a power chosen by the STA.  NOTE---The AP Tx Power and UL Target RSSI fields in the Trigger frame are reserved." | Revised –  In the current RTS/CTS exchange, there is no normative behaviour on the power of the response CTS frame, and we do not have sentence as proposed by the commenter.  The intention is probably to clarify that there is no power pre-correction for CTS response as described in 27.3.15.2 Power pre-correction. This is true in the spec since 27.3.15.2 only applies for HE TB PPDU.  We add sentence in the note as follows and simply describe that there is no power pre-correction.  “NOTE- The AP Tx Power and UL Target RSSI fields in an MU-RTS Trigger frame are reserved, and there is no power pre-correction requirement for the CTS frame sent in response to an MU-RTS Trigger frame (i.e., the AP that sends the MU-RTS frame does not specify the transmission power of the solicited CTS frame).”  TGax editor to make the changes shown in 11-20/0303r5 under all headings that include CID 24287 |
| 24292 | Mark RISON |  |  | Various places assume an HE TB PPDU is sent in response to a Trigger frame, but this is not true for MU-RTS | As it says in the comment | Revised –  The commenter only provides vague instructions on suggestion to resolve the comment.  We search “in response to a trigger” and change “HE TB PPDU in response to a Trigger frame” with “HE TB PPDU in response to a Trigger frame that is not an MU-RTS Trigger frame” across the spec (354.15, 356.64, 358.21, 365.52, 367.9, 370.48 ).  We also propose revision when there may have confusion.  We further fix a bug in OMI description.  TGax editor to make the changes shown in 11-20/0303r5 under all headings that include CID 24292 |
| 24362 | Mark RISON | 128.49 | 9.3.1.22.5 | "B0 of the RU Allocation subfield is set to 0 to indicate primary 20 MHz channel, primary 40 MHz channel  and primary 80 MHz channel. For 160 MHz and 80+80 MHz indication, B0 of the RU Allocation subfield is  set to 1. A non-AP STA ignores B0 for 160 MHz and 80+80 MHz indication." -- if it's ignored by the non-AP STA, what's the point? | Change to "B0 of the RU Allocation subfield is reserved." | Rejected –  MU-RTS is a variant of Trigger frame. To align with indication with other variant of Trigger frame and minimize the implementation complexity of MU-RTS Trigger frame, the RU allocation field that is used for MU-RTS/CTS aligns the indication of 20 MHz, 40 MHz, 80 MHz, 160 MHz, 80+80 MHz with other variants of Trigger frame. As a result, the indication of B0 for 160 MHz/80+80 MHz does not need to have a special change. Please see the text below for the B0 indication of other variants of Trigger frame.  *If the UL BW subfield indicates 160 MHz or 80+80 MHz, B7–B1 of the RU Allocation subfield is set to 68 and B0 is set to 1 to indicate a 2×996-tone RU. A non-AP STA ignores B0 for 2×996-tone RU indication.* |

**Discussion:** *None.*

**Propose:**

***TGax editor: Change 26.2.6.3 CTS frame response to an MU-RTS Trigger frame as follows: (Track change on)***

**26.2.6.3 CTS frame response to an MU-RTS Trigger frame**

(…existing texts…)

A non-AP STA that transmits a CTS frame in response to an MU-RTS Trigger frame shall follow the synchronization requirement defined in 27.3.15.3 (Pre-correction accuracy requirements).

NOTE- The AP Tx Power and UL Target RSSI fields in an MU-RTS Trigger frame are reserved, and there is no power pre-correction requirement for the CTS frame sent in response to an MU-RTS Trigger frame (i.e., the AP that sends the MU-RTS frame does not specify the transmission power of the solicited CTS frame).(#24287)

***TGax editor: Change 9.4.2.199 TWT element as follows: (Track change on)***

**9.4.2.199 TWT element**

(…existing texts…)

NOTE—The TWT requesting STA is expected to send the PS-Poll or APSD trigger frame in response to a Basic Trigger frame  
if the TWT is a trigger-enabled TWT.(#24292)

(…existing texts…)

***TGax editor: Change 26.8.2 Individual TWT agreements as follows: (Track change on)***

***TGax editor:Change “Trigger frame” in Figure 26-9—Example of individual TWT operation to “Basic Trigger frame”(#24292)***

(…existing texts…)

In this example, STA 1 sends a TWT request to the TWT responding STA to setup a trigger-enabled TWT  
agreement. The TWT responding STA accepts the TWT agreement with STA 1 and confirms the acceptance  
in the TWT response sent to STA 1. Subsequently, the TWT responding STA sends an unsolicited TWT  
response to STA 2 to setup a trigger-enabled TWT agreement with STA 2. Both these TWT agreements are  
setup as announced TWTs. During the trigger-enabled TWT SP, the TWT responding STA sends a Basic Trigger  
frame to which the TWT requesting STAs indicate that they are awake during the TWT SP. STA 1 indicates  
that it is awake by sending a PS-Poll frame and STA 2 indicates that it is awake by sending a QoS Null  
frame in response to the Basic Trigger frame. STA 1 and STA 2 receive their DL BUs in a subsequent exchange  
with the TWT responding STA and go to doze state outside of this TWT SP. (#24292)

(…existing texts…)

***TGax editor: Change 26.8.3.1 General as follows: (Track change on)***

***TGax editor:Change “Trigger frame” in Figure 26-10—Example of broadcast TWT operation with optional TBTT negotiation to “Basic Trigger frame”(#24292)***

(…existing texts…)

The TWT scheduling AP includes a broadcast TWT element in the Beacon frame that indicates a broadcast  
TWT SP during which the AP intends to send Trigger frames, or DL BUs to the TWT scheduled STAs. STA  
1 and STA 2 wake to receive the Beacon frame to determine the broadcast TWT. During the trigger-enabled  
TWT SP the AP sends a Basic Trigger frame to which STA 1 and STA 2 indicate that they are awake during the  
TWT SP. STA 1 indicates that it is awake by sending a PS-Poll and STA 2 indicates that it is awake by sending a QoS Null frame in response to the Basic Trigger frame. STA 1 and STA 2 receive their DL BUs in a subsequent exchange with the AP and go to doze state outside of this TWT SP. (#24292)

(…existing texts…)

***TGax editor: Change 26.9.3 Transmit operating mode (TOM) indication as follows: (Track change on)***

**26.9.3 Transmit operating mode (TOM) indication**

TOM indication allows the OMI initiator to suspend and resume responding to variants of the Trigger frame  
and TRS Control subfields per the UL MU Disable and UL MU Data Disable subfields settings as indicated  
in Table 9-24a (UL MU Disable and UL MU Data Disable subfields encoding), or to adapt the maximum  
operating channel width and/or the maximum number of space-time streams, *NSTS*, that it can transmit in response to a triggering frame sent by the OMI responder

NOTE—TOM indication does not relate to transmissions in PPDUs other than HE TB PPDUs. An AP does not perform  
TOM indication as an OMI initiator.

* An OMI initiator that is a non-AP STA may indicate changes in its transmit parameters by sending a frame  
  that contains the OM Control subfield to the OMI responder. The OMI initiator shall set:
* The UL MU Disable subfield to 1 to indicate suspension to response to a triggering frame (see 26.5.2  
  (UL MU operation).  
  • An AP that is an OMI initiator shall set the UL MU Disable subfield to 0.
* The Tx NSTS subfield to the maximum *NSTS* that the STA will use for an HE TB PPDU sent in  
  response to a Trigger frame or frame carrying a TRS Control subfield.
* The Channel Width subfield to the maximum operating channel width that the STA will use for an  
  HE TB PPDUsent in response to a Trigger frame that is not an MU-RTS Trigger frame or frame carrying a TRS Control subfield.
* The Channel Width subfield to the maximum operating channel width that the STA will use for an  
  non-HT (duplicate) PPDU sent in response to a MU-RTS Trigger frame. (#24292)

(…existing texts…)

***TGax editor:*** ***change “HE TB PPDU in response to a Trigger frame” with “HE TB PPDU in response to a Trigger frame that is not an MU-RTS Trigger frame” across the spec (354.15, 356.64, 358.21, 365.52, 367.9, 370.48 )*** (#24292)