### IEEE P802.11Wireless LANs

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| 11ax D5.0 MAC Comment Resolution for Duration-based RTS/CTS |
| Date: 2019-10-31 |
| 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 |
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Abstract

This submission proposes resolutions for comments of TGax Draft D5.0 with the following CIDs:

22000, 22001, 22105, 22143, 22144, 22234, 22235, 22288

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revision based on the discussion

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 D5.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D5.0 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.***

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 22000 | Albert Petrick | 307.29 | 26.2.1 | The TXOP Duration RTS Threshold is a subfield of the HE Operation Parameters Field in Figure 9-787i (pg. 199, line 37) and the HE Operation Parameters field is a subfield of the HE Operation element in Figure 9-787h (pg. 199, line 18). The text for the TXOP Duration RTS Threshold doesn't follow the logical path between the two figures. Fix text. | Add the following new text in quotes:An HE AP may set the TXOP Duration RTS Threshold subfield "in the HE Operation Parameters field" of HE Operation element it transmits...... | Revised –We add “of the HE Operation Parameters field".TGax editor to make the changes shown in 11-19/1816r1 under all headings that include CID 22000 |
| 22001 | Albert Petrick | 307.37 | 26.2.1 | Text is missing reference to HE Operation Parameters field. | Add the following text: If the TXOP Duration RTS Threshold subfield "of the HE Parameters field" in the most recently..... | Accepted – |
| 22105 | Liwen Chu | 243.30 | 10.3.1 | the duration should not be compared with dot11TXOPDurationRTSThreshold directly since 8TUs are the unit of TXOP duration RTS threshold. | Change the text to "...greater than or equal to the meidum time related to dot11TXOPDurationRTSThresholdas defined in 26.2.1 (TXOP duration-based RTS/CTS). | Revised – Agree in principle with the commenter. TGax editor to make the changes shown in 11-19/1816r1 under all headings that include CID 22105 |
| 22143 | Mark RISON | 243.27 | 10.3.1 | "The use of the RTS/CTS mechanism is under control of dot11TXOPDurationRTSThreshold if dot11TXOPDurationRTSThreshold is not 1023." assumes the MIB attribute is present | Change the cited text to "The use of the RTS/CTS mechanism is under control of dot11TXOPDurationRTSThreshold if dot11TXOP-DurationRTSThreshold is present and is not 1023." | Accepted - |
| 22144 | Mark RISON | 243.22 | 10.3.1 | "The use of the RTS/CTS mechanism under control of dot11RTSThreshold if dot11TXOPDurationRTS-Threshold is 1023 or it is not present is described in 10.3.5 (Individually addressed MPDU transfer proce-dure).The use of the RTS/CTS mechanism is under control of dot11TXOPDurationRTSThreshold if dot11TXOP-DurationRTSThreshold is not 1023. If this mechanism is enabled, a non-AP HE STA shall use an RTS/CTSexchange for individually addressed frames if the duration of the TXOP is greater than or equal to dot11TX-OPDurationRTSThreshold as defined in 26.2.1 (TXOP duration-based RTS/CTS)." -- too much detail on the latter, and inconsistent wording, and spurious "is" | Change the cited text to "The use of the RTS/CTS mechanism under control of dot11RTSThreshold if dot11TXOPDurationRTS-Threshold is 1023 or is not present is described in 10.3.5 (Individually addressed MPDU transfer procedure).The use of the RTS/CTS mechanism under control of dot11TXOPDurationRTSThreshold if dot11TXOPDurationRTSThreshold is present and is not 1023 is described in 26.2.1 (TXOP duration-based RTS/CTS)." | Revised –Agree in principle with the commenter. TGax editor to make the changes shown in 11-19/1816r1 under all headings that include CID 22144 |
| 22288 | Mark RISON |  | C.3 | dot11RTSThreshold in the baseline is limited to 4692480, which is the maximum VHT PSDU size. Needs to be changed to 6500631, which is the HE maximum | As it says in the comment | Revised – Agree in principle with the commenter.TGax editor to make the changes shown in 11-19/1816r1 under all headings that include CID 22288 |
| 22235 | Mark RISON | 1850.39 | 10.23.3.5.3 | Locations in the baseline that refer to dot11RTSThreshold need to be amended to also refer to dot11TXOPDurationRTSThreshold, since this supersedes the former when present and not 1023 | In 10.23.3.5.3 change "In order to provide improved NAV protection, a STA may send an RTS frame as the first frame of any frameexchange sequence (#65)without regard for dot11RTSThreshold." to "In order to provide improved NAV protection, a STA may send an RTS frame as the first frame of any frameexchange sequence (#65)without regard for dot11RTSThreshold and dot11TXOPDurationRTSThreshold." | Accepted -  |
| 22234 | Mark RISON |  |  | Locations in the baseline that refer to dot11RTSThreshold need to be amended to also refer to dot11TXOPDurationRTSThreshold, since this supersedes the former when present and not 1023 | Fix 10.3.2.6, 10.3.3, 10.3.4.4, 10.23.3.5.3, C.3 (under dot11ShortDEIRetryLimit, dot11LongDEIRetryLimit, dot11ShortRetryLimit, dot11LongRetryLimit) in the baseline | Revised – Agree in principle with the commenter. For dot11ShortDEIRetryLimit used in EDCA, revmd D3.0 removes the usage of this MIB variable based on dot11RTSThreshold, and the description of this MIB variable shall be updated in revmd D3.0.For dot11LongDEIRetryLimit, revmd D3.0 removes the usage of this MIB variable, and this MIB variable shall be just deleted in revmd D3.0.For dot11ShortRetryLimit used in EDCA, revmd D3.0 removes the usage of this MIB variable based on dot11RTSThreshold, and the description of this MIB variable for QoS or non-QoS STA shall be updated in revmd D3.0.For dot11LongRetryLimit, revmd D3.0 removes the usage of this MIB variable in EDCA, and and the description of this MIB variable for QoS or non-QoS STA shall be updated in revmd D3.0.TGax editor to make the changes shown in 11-19/1816r1 under all headings that include CID 22234 |

**Discussion:** *None.*

***TGax editor: Change 26.2.1 TXOP duration-based RTS/CTS as follows: (Track change on)***

**26.2 HE channel access**

 **26.2.1 TXOP duration-based RTS/CTS**

In an HE BSS, the use of RTS/CTS can be TXOP duration-based or PSDU length-based. An HE AP can
configure a non-AP HE STA to use the TXOP duration-based RTS/CTS exchanges to help mitigate interference in dense environments.

An HE AP may set the TXOP Duration RTS Threshold subfield of the HE Operation Parameters field of the(#22000) HE Operation element it transmits to a value between 1 and 1022 to enable TXOP duration-based RTS/CTS exchanges of its associated STAs. The AP may set the TXOP Duration RTS Threshold field to 1023 to disable TXOP duration-based RTS/CTS exchanges of its associated STAs. The AP may in Beacon and Probe Response frames set the TXOP Duration RTS Threshold field to 0 to make no changes to TXOP duration-based RTS/CTS exchanges of its associated STAs.

If the TXOP Duration RTS Threshold subfield of the HE Operation Parameters field(#22001) in the most recently received HE Operation element sent by the AP to which a non-AP HE STA is associated is equal to a nonzero value, then the non-AP HE STA shall set dot11TXOPDurationRTSThreshold to the value of the TXOP Duration RTS Threshold subfield. Otherwise, the non-AP HE STA shall not update dot11TXOPDurationRTSThreshold.

***TGax editor: Change 10.3.1 General as follows: (Track change on)***

**10.3 DCF**

**10.3.1 General**

The use of the RTS/CTS mechanism under control of dot11RTSThreshold if dot11TXOPDurationRTSThreshold is 1023 or (#22144)is not present is described in 10.3.5 (Individually addressed MPDU transfer procedure).

The use of the RTS/CTS mechanism is under control of dot11TXOPDurationRTSThreshold if dot11TXOPDurationRTSThreshold is present and(#22143, #22144) is not 1023. If this mechanism is enabled, a non-AP HE STA shall initiate a TXOP that is used for individually addressed frames with a RTS/CTS exchange(#22105, #22144) as defined in 26.2.1 (TXOP duration-based RTS/CTS).

***TGax editor: Change 10.23.3.5.3 Use of RTS/CTS as follows: (Track change on)***

**10.23.3.5.3 Use of RTS/CTS**In order to provide improved NAV protection, a STA may send an RTS frame as the first frame of any frame
exchange sequence (#65)without regard for dot11RTSThreshold or dot11TXOPDurationRTSThreshold(#22235, #22234).(M53)

***TGax editor: Change C.3 MIB detail as follows: (Track change on)***

**C.3 MIB detail**

dot11RTSThreshold OBJECT-TYPE
SYNTAX Unsigned32 (0.. 6500631 (#22288)(#2341))
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This is a control variable.
It is written by an external management entity.
Changes take effect as soon as practical in the implementation.
This attribute indicates the number of octets in a PSDU, below which an
RTS/CTS handshake is not performed ***if dot11TXOPDurationRTSThreshold is 1023 or it is not present(#22234)***, except as RTS/CTS is used as a cross
modulation protection mechanism as defined in 10.27 (Protection mechanisms). An RTS/CTS handshake is performed at the beginning of any frame
exchange sequence where the PSDU (#1465)contains an MPDU with the Type
subfield equal to Data or Management (#1465)and an individual address in
the Address 1 field, and the length of the PSDU is greater than this
threshold. Setting this attribute to be larger than the maximum PSDU size
has the effect of turning off the RTS/CTS handshake for frames of Data or
Management type transmitted by this STA. Setting this attribute to 0 has
the effect of turning on the RTS/CTS handshake for all frames of Data or
Management type transmitted by this STA."
DEFVAL { 6500631 (#22288)(#2341) }
::= { dot11OperationEntry 2 }

***TGax editor: Change 10.3.2.6 RTS/CTS with fragmentation as follows: (Track change on)***

**10.3.2.6 RTS/CTS with fragmentation**

(…existing texts…)

Each fragment and Ack frame acts as a virtual RTS frame and CTS frame; therefore no further RTS/CTS frames need to be generated after the RTS/CTS that began the frame exchange sequence.(#22234)

***TGax editor: Change 10.3.3 Random backoff time as follows: (Track change on)***

(…existing texts…)

The SSRC shall be reset to 0 when a CTS frame is received in response to an RTS frame, when a BlockAck
frame is received in response to a BlockAckReq frame, when an Ack frame is received in response to the
transmission of a frame containing all or part of an MSDU or MMPDU that is contained in a PSDU of length
less than or equal to dot11RTSThreshold, or when a frame with a group address in the Address 1 field is
transmitted.

The SLRC shall be reset to 0 when an Ack frame is received in response to transmission of a frame containing
all or part of an MSDU or MMPDU that is contained in a PSDU of length greater than dot11RTSThreshold, or
when a frame with a group address in the Address 1 field is transmitted.

NOTE - For non-HE STAs that use DCF for channel access, dot11TXOPDurationRTSThreshold is not present, and the use of the RTS/CTS mechanism is under control of dot11RTSThreshold.(#22234)

***TGax editor: Change 10.3.4.4 Recovery procedures and retransmit limits******as follows: (Track change on)***

After transmitting a frame that requires immediate acknowledgment(#1442), the STA shall perform the
acknowledgment procedure, as defined in 10.3.2.11 (Acknowledgment procedure). The SRC for an MPDU
with the Type subfield equal to Data or Management and of length less than or equal to dot11RTSThreshold
and the SSRC shall be incremented every time transmission of that MPDU fails(#282). This SRC and the
SSRC shall be reset when transmission of that MPDU succeeds. The LRC for an MPDU with the Type
subfield equal to Data or Management and of length greater than dot11RTSThreshold and the SLRC shall be
incremented every time transmission of that MPDU fails. This LRC and the SLRC shall be reset when
transmission of that MPDU succeeds. All retransmission attempts for an MPDU with the Type subfield equal
to Data or Management that has failed the acknowledgment procedure one or more times shall be made with
the Retry subfield set to 1. These rules do not apply for frames sent by a non-DMG STA under a block
agreement.(#2358)

NOTE - For non-HE STAs that use DCF for channel access, dot11TXOPDurationRTSThreshold is not present, and the use of the RTS/CTS mechanism is under control of dot11RTSThreshold.(#22234)