IEEE P802.11  
Wireless LANs

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| LB225 11ax D1.0 Comment Resolution 10.3.x | | | | |
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| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Huizhao Wang | Quantenna Communications | 3450 W. Warren Ave, Fremont, CA 94538 |  | hwang@quantenna.com |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.3 with the following CIDs :3136,4834,5159,5161,5162,5163,5557,5560,5568,6514,6515,7530,7779,7781,7872,7873,8208,8209,8349,8350,8451,9422,9686

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: second version of the document, incorporate some input from Alfred.

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

***Editing instructions formatted like this are intended to be copied into the TGax 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** | **Clause** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 3136 | 10.3.1 | 113 | 46 | "When HE duration-based RTS is disabled, " - how do we know? | Add reference to condition that describes how we can differentiate - e.g. in a MIB variable setting or a BSS operaton element. Ditto at line 50. | Revised:  Add test to reference MIB object: dot11DurationRTSThreshold  Encoding  TGax editor to make the changes shown in this document under all headings containing CID 3136. Please apply throughout these CIDs. |
| 4834 | 10.3.1 | 113 | 50 | "When HE duration-based RTS is enabled". No mention of where that is indicated. Is it referring to a MIB or to a field somewhere? dot11DurationRTSThreshold: can it be configured through a management message? (I found no such possibility) If not, this mechanism is not enforcing anything. | Specify that this dotBLAH shall be set to the most recent value of the HE Duration Based field of the HE Operation element transmitted by the AP to which it is associated. | Agreed:  See CID 3136 resolution. |
| 5159 | 10.3.1 | 113 | 45 | "HE duration-based RTS" sounds like a name of a function/feature. But I don't see any definition for it. | Define the protocol for establishing "HE duration-based RTS". Perhaps turn 10.3.2.4a into something useful. | Rejected:  HE duration-based RTS is described in following clauses:  9.4.2.238 HE Operating IE and C.3 MIB object specification of dot11DurationRTSThreshold |
| 5161 | 10.3.2.4 | 115 | 38 | How is the "HE duration-based RTS threshold" used by the non-AP HE STAs? | Define the protocol and provide normative language for how the non-AP HE STAs behaves upon receipt of this threshold. Perhaps turn 10.3.2.4a into something useful. | Agreed:  Add a paragraph to describe the behavior |
| 5162 | 10.3.2.4 | 115 | 38 | Clarify that "HE duration-based RTS threshold" is in the HE Operation Parameters field | as in comment | Agreed:  See resolution of CID 5161 |
| 5163 | 10.3.2.4a | 115 | 46 | Regarding "10.3.2.4a Duration-based RTS/CTS. In dense environments, managing RTS usage by an AP can help the overall interference situation since the AP may have better view of the network situation.", while this a good start in adding control by the AP over non-AP STAs other aspects of client management need to addressed. In an large, dense, managed ESS, the network has much better visibility into the best selection of AP and band that the client should initially associate with and then subsequently select during roaming. The network also needs to be able to control usage of probe request and probe response in an ESS in improve network efficiency. | Add tighter management by the network of client association and roaming | Rejected:  Discussion: the commentor is suggesting new mechanisms of managing non-AP STA, outside the scope of this particular feature |
| 5557 | 10.3.1 | 113 | 50 | "When HE duration-based RTS is enabled, the use of the RTS/CTS mechanism is under control of dot11DurationRTSThreshold." I note that 'HE' is missing from the dot11DurationRTSThreshold. So presumeably any STA could use the duration based RTS threshold, but only an HE STA will advertize it. Is that the real intention? In looking at the HE duration based RTS threshold subfield in the HE Operation Parameter field it appears as though it is for an AP to make its STA use duration RTS. Is this intended only for HE STAs? | Clarify if only HE STAs or not. | Accepted:  Add the word “HE” in front of the word “STA” |
| 5560 | 10.3.2.4a | 115 | 48 | "In dense environments, managing RTS usage by an AP can help the overall interference situation since the AP may have better view of the network situation. To improve spectrum utilization, RTS usage should be duration-based, rather than length-based." This is a very general comment. There is no explianation of why duration based RTS should be better than packet length. It may be true but this would not convince anyone. PAcket length RTS was seldom used, if at all, so what does duration based bring and why would it be used? | Write a better reasoning as to why duration based RTS is either superior or will improve matters. | Rejected:  Clause 10.22.3.5.3 in baseline spec has the text describing the benefit of using RTS/CTS.  For Duration based RTS/CTS, following documents describe the background and benefits of it: 802.11-15/0059, |
| 5568 | 10.3.5 | 122 | 63 | "When HE duration-based RTS is disabled, a STA using the DCF shall use an RTS/CTS exchange for indi-vidually addressed frames when the length of the PSDU is greater than the length threshold..." How does a STA know that the HE Duration-based RTS is disabled unless it is an HE STA? As written this is for any STA. Is this intended to be for any STA or just HE STAs? If RTSTHreshold is set then use that, if DurationRTSThreshold is set, then use that. Is there a problem if both set? Can set a rule for the HE STA to only obey Duration RTSThreshold. I think this needs a bit more thought or to be made clear. | Clarify if only for HE STAs or all STAs. How does a legacy STA know if duration based RTS in use? Does it matter if both or either set? | Revised:  See resolution of CID 5161 |
| 6514 | 10.3.5 | 121 | 5 | A STA may use RTS/CTS when it is "necessary" to distribute the NAV or when it is "necessary" to establish protection. Here "necessary" seems too strong a word: whether establishing protection is "necessary" depends on whether other STAs would transmit if protection was not established, which is never known to a STA. Perhaps this isn't what is intended by "necessary", but if not, why is the word there? We would have more-or-less the same meaning without it. | Delete "when it is necessary" (two places). | Rejected:  These two places are in the baseline text. So, suggest to bring this comment to REVmd. |
| 6515 | 10.3.5 | 122 | 1 | "When HE duration-based RTS is enabled, a non-AP STA shall ...". Shouldn't that be an HE non-AP STA? | Change "a non-AP STA" to "an HE non-AP STA". | Accepted. |
| 7530 | 10.3.5 | 122 | 11 | How to set attribute to enable duration based RTS but also disable length-based RTS? Currently disableing length based RTS by setting dot11RTSThreshold to larger than maximum PSDU, also disables the duration-based RTS, based on this sentence | In p122.11 Removes "If dot11RTSThreshold is larger than the maximum PSDU length, all PSDUs shall be delivered without RTS/CTS exchange"  Add in clause C.3 dot11RTSThreshold OBJECT-TYPE, but remove "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" | Accepted |
| 7779 | 10.3.1 | 113 | 51 | Use proper normative verbs | Change "This mechanism requires STAs to" to When this mechanism is enabled, STAs shall" | Revised  “When this mechanism is enabled, HE STAs shall” |
| 7781 | 10.3.5 | 122 | 13 | Is this "non-requirement" stated somewhere? | Add to the NOTE a reference to where this is stated normatively. | Revised:  “NOTE—A non-AP STA that transmits the MPDUs in an HE TB PPDU is exempt from these requirements because it is the TXOP responder to the Trigger” |
| 7872 | 10.3.5 | 121 | 61 | There are several issues with duration-based RTS threshold: 10.3.1 suggests this applies to the AP too 10.3.2.4a doesn't have any actual normative behavioural specification (and misses "HE" before "duration-based") 10.3.5 has a NOTE that seems normative 10.3.1 says that this is driven by dot11DurationRTSThreshold, but nothing ties this to the value in the HE Duration Based RTS Threshold field in the HE Operation element C.3 talks of "receiving duration-based RTS threshold notification frame" but there is no such frame C.3 says "TxOP" C.3 says "should be" but 10.3.5 says "should" C.3 refers to the undefined concept "transmission or TXOP" C.3 has broken grammar | Change 10.3.1 to say the mechanism only applies to non-AP STAs (APs continue to use dot11RTSThreshold) Delete 10.3.2.4a Promote the first NOTE in 10.3.5 to a non-NOTE Add wording in 10.3.1 to say that dot11DurationRTSThreshold is updated whenever an HE non-AP STA receives an HE Operation element from an AP to which it is associated Change C.3 422.31 to talk of receiving an HE Operation element from an AP to which an HE non-AP STA is associated Change "TxOP" to "TXOP" in C.3 Delete "Value zero means the RTS should be always used for TxOP transmission." in C.3 Delete "transmission or" at 422.35 Add "The" at the start of the sentence at 422.38, and a full stop at the end | Revised:  Discussion:  The duration-based RTS applies to HE non-AP STA, add “HE non-AP STA” into 10.3.1 to clarify this.  10.3.2.4a indicates the duration-based RTS is preferred over length based RTS, so reject the deletion request.  Accept the comment on promoting the first NOTE in 10.3.5  Revised:  C.3, the description of dot11DurationRTSThreshold |
| 7873 | 10.3.5 | 121 | 63 | dot11RTSThreshold should be used for EDCA as well as DCF, as for dot11DurationRTSThreshold | Add "or EDCA" after "DCF" at the cited location | Accepted |
| 8208 | 10.3.1 | 113 | 50 | what is "duration-based" RTS? It needs to be defined | as in comment | Rejected:  Duration-based RTS is defined in 9.4.2.238 HE Operation Element and C.3 dot11DurationRTSThreshold |
| 8209 | 10.3.2.4a | 115 | 47 | the paragraph of clause 10.3.2.4a is very vague. What does manaing RTS usage mean? What does length-based mean? The whole paragraph needs to be rewritten explaining those words like duration-based, etc. | as in comment | Accepted:  Add text to describe Duration-based RTS and Length-based RTS |
| 8349 | 10.3.2.4a | 115 | 38 | HE Duration-based RTS threshold is not defined | The HE duration threshold may be defined by adding dot11HEDurationRTSThreshold. A question still remains: how does an HE STA enable the use of HE duration threshold? To simplify the 11ax standard, suggest to remove this HE Duration threshold. | Revised:  Added the text of referencing dot11DurationRTSThreshold |
| 8350 | 10.3.5 | 113 | 45 | The procedure to disable HE duration-based RTS is not described. | Unless the procedure is clearly defined, the draft should follow the existing RTS/CTS procedure. Remove the paragraph starting from lines 45 to line 48 | Revised:  The revised 10.3.2.4a has added the text of describing disable HE duration-based RTS |
| 8351 | 10.3.1 | 113 | 50 | The procedure to enable HE duration-based RTS is not described. | Unless the procedure is clearly defined, the draft should follow the existing RTS/CTS procedure. Remove the paragraph starting from lines 50 to line 54 | Revised:  The revised 10.3.2.4a has added the text of describing enable HE duration-based RTS |
| 9422 | 10.3.2.4a | 115 | 50 | It is unclear which "network situation" it is referring to. This sentence is also unnecessary. Please consider to remove or rephrase. | Remove this sentence. | Revised:  Replace “network” with “interference” |
| 9686 | 10.3.2.10.3 | 122 | 1 | "When HE duration-based RTS is enabled, a non-AP STA using the DCF or EDCA shall use an RTS/CTS exchange for individually addressed frames when the duration of the TXOP is greater than the duration threshold indicated by dot11DurationRTSThreshold." When HE duration-based RTS is enabled, what is a rule of an AP STA? Probably, same rule should be used. Change it as the following: "When HE duration-based RTS is enabled, a STA using the DCF or EDCA shall use an RTS/CTS exchange..." | As per comment. | Rejected:  Wrong clause number indicated.  Also the text in 10.3.5 already has the text as indicated by the comment. |
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**10.3.1 General**

**TGax Editor: *Change the paragraphs below as follows (***[***CID:3136***](CID:3136)***, 4834, 5557, 7779, 7872):***

~~The~~ When HE duration-based RTS is disabled(dot11DurationRTSThreshold value is equal to 1023 or it is not present), the use of the RTS/CTS mechanism is under control of dot11RTSThreshold. This attribute may be set on a per-STA basis. This mechanism allows STAs to be configured to initiate RTS/CTS either always, never, or only on frames longer than a specified length.

 

When HE duration-based RTS is enabled(dot11DurationRTSThreshold value is not equal to 1023), the use of the RTS/CTS mechanism is under control of dot11Du- rationRTSThreshold. ~~This mechanism requires~~When this mechanism is enabled, HE non-AP(CID #7872) STAs ~~to~~ shall use an RTS/CTS exchange for individually addressed frames when the duration of the TXOP is greater than the duration threshold indicated by dot11DurationRTSThreshold.

**10.3.2.4a Duration-based RTS/CTS**

**TGax Editor: *Change the paragraphs below as follows (***[***CID:5161***](CID:5161)***, 6162, 8209, 8349, 8350, 8351, 9422):***

In dense environments, managing RTS usage by an AP can help the overall interference situation since the AP may have better view of the ~~network~~ interference (CID # 9422) situation. To improve spectrum utilization, RTS usage should be duration-based RTS mechanism controlled by dot11DurationRTSThreshold (CID # 8209), rather than length-based RTS mechanism controlled by dot11RTSThreshold (CID# 8209). An HE non-AP STA shall check the value of HE Duration Based RTS Threshold field in the HE Operation Element in Beacon, Association Response, Reassociation Response and Probe Response frames from the HE AP STA it has associated, if the value has changed, the HE non-AP STA shall update its local value of dot11DurationRTSThreshold as well. HE STA shall use RTS/CTS transmitting sequence when one of following conditions are met:

* The dot11DurationRTSThreshold is equal to 0
* The TXOP duration >= 32us \* dot11DurationRTSThreshold

If dot11DurationRTSThreshold value is 1023, this feature is disabled.

**10.3.5 Individually addressed MPDU transfer procedure**

**TGax Editor: *Change the paragraphs below as follows (***[***CID:6515***](CID:6515)***, 7530, 7781, 7872, 7873):***

~~A~~ When HE duration-based RTS is disabled, a STA using the DCF or EDCA(CID# 7873) shall use an RTS/CTS exchange for individually addressed frames when the length of the PSDU is greater than the length threshold indicated by dot11RTSThreshold. When HE duration-based RTS is enabled, an HE non-AP STA using the DCF or EDCA shall use an RTS/CTS exchange for individually addressed frames when the duration of the TXOP is greater than the duration threshold indicated by dot11DurationRTSThreshold. A STA may also use an RTS/CTS exchange for individually addressed frames when it is necessary to distribute the NAV or when it is neces- sary to establish protection (see 10.26 (Protection mechanisms)). Otherwise a STA using the DCF shall not use the RTS/CTS exchange.

If dot11RTSThreshold is 0 or dot11DurationRTSThreshold is 0, all MPDUs shall be delivered with the use of RTS/CTS. ~~If dot11RTSThreshold is larger than the maximum PSDU length, all PSDUs shall be delivered without RTS/CTS exchanges.~~

~~NOTE—~~(CID#7872)A non-AP STA that transmits the MPDUs in an HE TB PPDU is exempt from these requirements because it is the TXOP responder to the Trigger(CID# 7781).

Annex C (normative) ASN.1 encoding of the MAC and PHY MIB

**TGax Editor: *Change the paragraphs below as follows (***[***CID:7530, 7872)***](CID:7530,%207872))***:***

dot11RTSThreshold OBJECT-TYPE

SYNTAX Unsigned32 (0..65536)

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, except as RTS/CTS is used as a cross modulation protection mechanism as defined in 10.26. An RTS/CTS handshake is performed at the beginning of any frame exchange sequence where the PSDU is with the Type subfield equal to Data or Management, the PSDU has

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~~(CID#7530). 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 { 65536 }

::= { dot11OperationEntry 2 }

dot11DurationRTSThreshold OBJECT-TYPE

SYNTAX Unsigned32 (0..1023)

UNITS "32 microseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable.

It is written by an external management entity or by the MAC upon receiving, from the HE AP it has associated with, a management frame, which contains HE Operation Element ~~duration-based RTS threshold notification frame~~(CID# 7872). Changes take effect as soon as practical in the implementation. This attribute indicates the duration of the transmission or TXOP above

which an RTS/CTS handshake is performed. Value zero means the RTS should be always used for ~~TxOP~~TXOP(CID# 7872) transmission. Value 1023 means this feature is disabled"

DEFVAL { 1023 }

::= { dot11HEStationConfigEntry 10}