### IEEE P802.11Wireless LANs

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| 11ax D4.1 MAC Comment Resolution for NAV part I |
| Date: 2019-04-30 |
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Abstract

This submission proposes resolutions for comments of TGax Draft D4.1 with the following CIDs:

20308, 21106, 20386, 20387, 20722, 20796, 20848, 21022, 21474, 21487, 20761, 20889

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revision based on the discussion during the adhoc
* Rev 2: Add related CIDs 21106 and 20761
* Rev 3: Add CID 20889
* Rev 4: minor revision.

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 D4.1 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D4.1 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** |
| 20308 | kaiying Lv | 299.61 | 26.2.5 | Please change "inter-BSS frame" to "inter-BSS PPDU" in the spec. | As in comment. | Revised – We note that “intra-BSS frame” and “inter-BSS frame” are described in various places of the spec. However, we recognize that “intra-BSS PPDU” and “inter-BSS PPDU” are used in 26.2.2 (Intra-BSS and inter-BSS PPDU classification). We add sentence in 26.2.2 to describe that a frame carried in a PPDU identified as intra-BSS is an intra-BSS frame. Similar sentence is added for inter-BSS frame. We also go through the spec to make sure that the text is consistent. TGax editor to make the changes shown in 11-19/0604r4 under all headings that include CID 20308 |
| 21106 | Oghenekome Oteri | 26.2.2 | 296.58 | Sentence is wrong : "If the received frame satisfies both intra-BSS and inter-BSS conditions by using the MAC address, thereceived frame have to be classified into an intra-BSS frame" | change to "If the received frame satisfies both intra-BSS and inter-BSS conditions by using the MAC address, thereceived frame HAS to be classified AS an intra-BSS frame" | Revised – Agree in principle with the comment. The sentence has been revised as “If the received frame satisfies both intra-BSS and inter-BSS conditions by using the MAC address, then the received frame is classified as an intra-BSS frame.(#21106)“ TGax editor does not need to do any change for this CID. |
| 20387 | Li-Hsiang Sun | 298.62 | 26.2.4 | "A STA that is not a TXOP holder shall update the intra-BSS NAV with the duration information indicated by the RXVECTOR parameter TXOP\_DURATION if and only if all the following conditions are met:"Shall STA still do this if it has determined from HE-SIG-B that it is the intended receiver? | change "shall" to "should" | Rejected – We note that the STA still needs to do this because in DL HE MU case, the STA may not be solicited for immediate response, and the STA needs to set intra-BSS NAV to avoid disruption of other HE TB PPDU that are solicited for immediate response.  |
| 20722 | Mark RISON | 408.00 | 26.11.5 | Re CID 16030: the duration is not "potential", it's as actual as any other duration, and serves the same NAV-setting purpose as the duration in the MAC header. (Perhaps something was missing from the resolution, as it talks of "First" but there's no "Second"?) | Change all 7 instances of "potential duration" to "duration". Also change "TXOP DURATION" to "TXOP\_DURATION" at 407.61 and 408.6 | Revised – Agree in principle with the commenter. TGax editor to make the changes shown in 11-19/0604r4 under all headings that include CID 20722 |
| 20796 | Mark RISON | 299.48 | 26.2.4 | CTS\_Time is undefined | Add " (see 10.3.2.4 for the definition of CTS\_Time)" to the end of the last sentence of the referenced subclause | Revised – Agree in principle with the commenter. TGax editor to make the changes shown in 11-19/0604r4 under all headings that include CID 20796 |
| 20848 | Mark RISON | 88.05 | 9.2.5.2 | Duration field setting for NFRP with single protection is missing | Change 3a from "In an MU-BAR Trigger frame, BSRP Trigger frame," to "In an MU-BAR Trigger frame, BSRP Trigger frame, NFRP Trigger frame," | Revised – Agree in principle with the commenter. TGax editor to make the changes shown in 11-19/0604r4 under all headings that include CID 20848 |
| 21022 | Mark RISON | 88.11 | 9.2.5.2 | "1a) In an MU-RTS Trigger frame, the Duration/ID field is set to the estimated time, in microsec-onds, required to transmit the pending frame, plus one CTS frame, plus the time to transmit thesolicited HE TB PPDU if required, plus the time to transmit the acknowledgment for the solic-ited HE TB PPDU if required, plus applicable IFSs." is missing the time for the subsequent (non-MU-RTS) Trigger frame that solicits the HE TB PPDU(s) | As it says in the comment | Rejected – The pending frame should cover all the other frames that the transmitter of MU-RTS wants to transmit.  |
| 21474 | Wookbong Lee | 298.27 | 26.2.4 | Are the conditions in 6th paragraph of 26.2.4 valid? It appears that, by definition, TXOP holder has already won the contention of the medium and should have a zero NAV. Also, no other STA should transmit because that STA should be defering based on the TXOP holder transmissions. Is this belong to 26.2.4 even? | reconsider the scenario | Rejected – We note that in the 10.3.2.4 Setting and resetting the NAV, we have the following baseline NAV setting rule that applies to both TXOP holder and non-TXOP holder. The sentence is added to preserve the baseline condition. *A STA that receives at least one valid frame in a PSDU can update its NAV with the information from any valid Duration field in the PSDU. When the received frame’s RA is equal to the STA’s own MAC address, the STA shall not update its NAV. Further, when the received frame is a DMG CTS frame and its TA is equal to the STA’s own MAC address, the STA shall not update its NAV. For all other received frames the STA shall update its NAV when the received Duration is greater than the STA’s current NAV value.* |
| 21487 | Xiaofei Wang | 300.06 | 26.2.5 | Please clarify why the basic NAV should also be reset after receiving intra-BSS CF-end. Also does this mean whether the STA needs keep track how the last frame updating the basic NAV is due to a frame that cannot be identified? That seems to be extra parameters to keep track with. | please consider to remove this paragraph is there is no clear benefit why this should be done and will not cause extra interference for another neighboring BSS. | Rejected – We clarify that the sentence says that a basic NAV may be reset. A STA is allowed to choose not to reset and take the risk that the NAV is not set by intra-BSS PPDU. A STA can also just reset it, which is the baseline behaviour of reseting a NAV.   |
| 20761 | Mark RISON |  |  | Re CID 16184: OK, then in 10.3.2.4 and 26.2.4 change "a frame with the duration information indicated by a Duration field inthe PSDU of the PPDU with the RXVECTOR parameter TXOP\_DURATION" to "a frame with a Duration field in a PPDU with the RXVECTOR parameter TXOP\_DURATION"; "If a STA receives a frame with the duration information indicated by both a Duration field in the PSDU andthe RXVECTOR parameter TXOP\_DURATION" to "If a STA receives a PPDU with duration information indicated by both a frame with a Duration field andthe RXVECTOR parameter TXOP\_DURATION" | As it says in the comment | Revised – Agree in principle with the commenter. We only do minor revision of “the PPDU with the RXVECTOR parameter TXOP\_DURATION”TGax editor to make the changes shown in 11-19/0604r4 under all headings that include CID 20761 |
| 20889 | Mark RISON |  |  | Still some confusion/poor wording regarding Duration fields | At 233.1/13 change "The HE AP does not receive a frame with the duration information indicated by a Duration field in the PSDU of the PPDU with the RXVECTOR parameter TXOP\_DURATION" to "An MPDU with a Duration field is not received".  At 233.23, 299.27 delete "in the PSDU ".  At 259.39 change "If the Duration field value in the MAC header of an MPDU" to "If the Duration field in a frame".  At 298.16 delete " in a PSDU".  At 299.3/18 change "The STA does not receive a frame with the duration information indicated by a Duration field in the PSDU of the PPDU with the RXVECTOR parameter TXOP\_DURATION." to "An MPDU with a Duration field is not received.".  At 316.56, 402.22 delete " value" in "Duration field value".  At 408.1 change "For a TXOP responder, the Duration field in the MAC header of an MPDU carried in the response PPDU is set based on the Duration field in the MAC header of an MPDU carried in the soliciting PPDU" to "For a TXOP responder, the Duration field in a frame carried in a response PPDU is set based on the Duration field in a frame carried in the soliciting PPDU" | Revised – Agree in principle with the commenter. For 233.1/13, we revise according to CID 20761 as follows.“The HE AP does not receive a frame with a Duration field in the PPDU with the RXVECTOR parameter TXOP\_DURATION”For 233.23 and 299.27, , we revise according to CID 20761 to delete “in the PSDU”.For 259.39, we revise as suggested by the commenter. For 298.16, we revise as suggested by the commenter.For 299.3/18, we revise according to CID 20761 as follows.*“The STA does not receive a frame with a Duration field in the PPDU with the RXVECTOR parameter TXOP\_DURATION.”*For 316.56, 402.22, we revise as suggested by the commenter.For 408.1, we revise based on the suggestion from the commenter.TGax editor to make the changes shown in 11-19/0604r4 under all headings that include CID 20889 |
| 20386 | Li-Hsiang Sun | 298.13 | 26.2.4 | "The procedure in 10.3.2.7 (CTS and DMG CTS procedure) applies to an HE STA maintaining two NAVs,and the NAV referred by the description in 10.3.2.7 is the basic NAV." contradicts with the paragraph begins in L7, also the sentence does not seem to address how does STA determines the TXOP holder addressFor example, in 10.3.2.7, it says 'In this subclause (11ah)for a non-S1G STA, "NAV indicates idle" means that the NAV count is 0 or that the NAV count is nonzero but the nonbandwidth signaling TA obtained from the TA field of the RTS frame matches the saved TXOP holder address'Substitute the NAV above with basic NAV would be in conflict with the paragraph in L7Also it does not say how does STA handles the saved TXOP holder address with 1) 2 NAVs, 2) when STA has only decoded 11ax preamble but not MAC header | Modify 10.3.2.7 to make it usable for 11ax STAs | Revised – We clarify that the reference should be 10.3.2.9.Further we clarify that the sentence in 26.2.4 does not contradict with 10.3.2.9. Specficially, in the baseline, we also have the following description for virtual CS, and it does not contradict with 10.3.2.9. *10.3.2.1 CS mechanism**In non-S1G STAs, when**the NAV counter is 0, the virtual CS indication is that the medium is idle; when the counter is nonzero, the**indication is busy.* The reaon is that 10.3.2.9 is specifically about the medium state for responding to RTS frame, which is the reason why "NAV indicates idle" is quoted.As for the saving the TXOP holder address, the following baseline sentence applies for any MAC frame received with Address 2 field. *A STA shall save the TXOP holder address for the BSS in which it is associated, which is the MAC address**from the Address 2 field of the frame that initiated a frame exchange sequence except when this is a CTS**frame, in which case the TXOP holder address is the Address 1 field.*The TXOP holder address is used for identifying if the sender of the RTS is from the same BSS based on the following text.*A STA that receives an RTS frame addressed to it considers the NAV in determining whether to respond**with CTS, unless the NAV was set by a frame originating from the STA sending the RTS frame*For 11ax STA that maintains two NAVs, because only the basic NAV is consider in response for RTS, it does not matter whether TXOP holder address is saved for intra-BSS NAV or not. TGax editor to make the changes shown in 11-19/0604r4 under all headings that include CID 20386 |

**Discussion:** *None.*

**Propose:** Revised for CID 20308, 20386, 20722, 20796, 20848, 20761, 20889 per discussion and editing instructions in 11-19/0604r4.

***TGax editor: Change 26.2.2 Intra-BSS and inter-BSS PPDU classification as follows:***

**26.2.2 Intra-BSS and inter-BSS PPDU classification**

(…existing texts…)

Otherwise, the PPDU cannot be determined as an intra-BSS or inter-BSS PPDU.

If the received PPDU satisfies both intra-BSS and inter-BSS conditions by using the MAC address information of a frame carried in the PPDU, then the received PPDU is classified as an intra-BSS PPDU.(#21106, #20308)

If the received PPDU satisfies the intra-BSS conditions using the RXVECTOR parameter BSS\_COLOR and also satisfies the inter-BSS conditions using MAC address information of a frame carried in the PPDU, then the classification made using the MAC address information takes precedence.(#20308)

A frame carried in a PPDU identified as an intra-BSS PPDU is an intra-BSS frame. A frame carried in a PPDU identified as an inter-BSS PPDU is an inter-BSS frame. (#20308)

 (…existing texts…)

***TGax editor: Change 26.14.1 Intra-PPDU power save for non-AP HE STAs as follows:***

**26.14.1 Intra-PPDU power save for non-AP HE STAs**

Intra-PPDU power save is the power save mechanism for an HE STA to enter the doze state or become unavailable until the end of a received PPDU that is identified as an Intra-BSS PPDU by the below condi-tions listed in this subclause. The STA can enter the doze state if it is in PS mode and can become unavail-able if it is in Active mode (see 11.2.3.2 (Non-AP STA power management modes)).(#20308)

(…existing texts ….)

A non-AP HE STA that is in intra-PPDU power save mode may discard a PPDU identified as an inter-BSS PPDU as defined in 26.2.2 (Intra-BSS and inter-BSS PPDU classification) until the end of the PPDU.(#20308)

(…existing texts ….)

***TGax editor: Change 10.3.2.4 Setting and resetting the NAV as follows: (track changes on)***

(…existing texts ….)

An HE AP that is not a TXOP holder shall update the NAV with the duration indicated by the RXVECTOR parameter TXOP\_DURATION if all of the following conditions are met, and shall not update the NAV otherwise:

* The RXVECTOR parameter TXOP\_DURATION is not UNSPECIFIED
* The HE AP does not receive a frame with a Duration field in the PPDU with the RXVECTOR parameter TXOP\_DURATION(#20761, #20889)
* The duration indicated by the RXVECTOR parameter TXOP\_DURATION is greater than the current NAV value of the HE AP

An HE AP that is a TXOP holder shall update the NAV with the duration indicated by the RXVECTOR parameter TXOP\_DURATION if all of the following conditions are met, and shall not update the NAV otherwise:

* The RXVECTOR parameter TXOP\_DURATION is not UNSPECIFIED
* The HE AP does not receive a frame with a Duration field in the PPDU with the RXVECTOR parameter TXOP\_DURATION(#20761, #20889)
* The duration indicated by the RXVECTOR parameter TXOP\_DURATION is greater than the current NAV value of the HE AP
* The RXVECTOR parameter BSS\_COLOR is not equal to the BSS color of the HE AP

NOTE 1—A non-AP HE STA maintains two NAVs, but an HE AP might only maintain one NAV (see 26.2.4 (Updating two NAVs)).

NOTE 2—If a STA receives a PPDU with the duration information indicated by both a frame with a Duration field and the RXVECTOR parameter TXOP\_DURATION, then the duration information indicated by the RXVECTOR parame-ter TXOP\_DURATION is ignored.(#20761, #20889)

(…existing texts ….)

a frame with a Duration field in a PPDU with the RXVECTOR parameter TXOP\_DURATION

***TGax editor: Change* 26*.2.4 Updating two NAVs as follows:***

**26.2.4 Updating two NAVs**

(…existing texts…)

The procedure in 10.3.2.9 (CTS and DMG CTS procedure) applies to an HE STA maintaining two NAVs, and the NAV referred by the description in 10.3.2.7 is the basic NAV.(#20386)

The duration information is indicated by a frame as follows: (#20889)

— If there is a Duration field in the frame, then the duration information is indicated by the Duration field.

— If the frame is a PS-Poll, then the duration information is equal to the time, in microseconds, required to transmit one Ack frame plus one SIFS under the data rate selection rules. If the calculated duration information includes a fractional microsecond, that duration information is rounded up to the next higher integer.

(…existing texts…)

A STA that is not a TXOP holder shall update the intra-BSS NAV with the duration information indicated by the RXVECTOR parameter TXOP\_DURATION if and only if all the following conditions are met:

* The RXVECTOR parameter TXOP\_DURATION is not UNSPECIFIED.
* The PPDU that carried information of the RXVECTOR parameter is identified as intra-BSS according to the rule described in 26.2.2 (Intra-BSS and inter-BSS PPDU classification).
* The STA does not receive a frame with a Duration field in the PPDU with the RXVECTOR parameter TXOP\_DURATION.(#20761, #20889)
* The duration information indicated by the RXVECTOR parameter TXOP\_DURATION is greater than the current intra-BSS NAV of the STA.

A STA shall update the basic NAV with the duration information indicated by the RXVECTOR parameter TXOP\_DURATION if and only if all the following conditions are met:

* The RXVECTOR parameter TXOP\_DURATION is not UNSPECIFIED.
* The PPDU that carried information for the RXVECTOR parameter is identified as inter-BSS or cannot be identified as intra-BSS or inter-BSS according to the rule described in 26.2.2 (Intra-BSS and inter-BSS PPDU classification).
* The STA does not receive a frame with a Duration field in the PPDU with the RXVECTOR parameter TXOP\_DURATION.(#20761, #20889)
* The duration information indicated by the RXVECTOR parameter TXOP\_DURATION is greater than the current basic NAV of the STA.

NOTE 1—If a PS-Poll frame is received in an HE SU PPDU, HE ER SU PPDU, or HE MU PPDU, then the RXVECTOR parameter TXOP\_DURATION does not indicate duration information (see 26.11.5 (TXOP\_DURATION).

NOTE 2—If a STA receives a PPDU with the duration information indicated by both a frame with a Duration field and the RXVECTOR parameter TXOP\_DURATION, then the duration information indicated by the RXVECTOR parameter TXOP\_DURATION is ignored.(#20761, #20889)

(…existing texts…)

An HE STA that used information from an RTS or MU-RTS Trigger frame as the most recent basis to update its NAV is permitted to reset the NAV that is updated by the RTS or MU-RTS Trigger frame if no PHY-RXSTART.indication primitive is received from the PHY during a period with a duration of 2×aSIFSTime + CTS\_Time + aRxPHYStartDelay + 2 ×aSlotTime starting when the MAC receives a PHY-RXEND.indication primitive corresponding to the detection of the RTS or MU-RTS Trigger frame (see 10.3.2.4 (Setting and resetting the NAV) for the definition of CTS\_Time). (#20796)

***TGax editor: Change 26.11.5 TXOP\_DURATION as follows:***

**26.11.5 TXOP\_DURATION**

(…existing texts…)

A STA that transmits a frame with a Duration field in an HE PPDU with the TXVECTOR parameter TXOP\_DURATION(#20722) not set to UNSPECIFIED shall set the TXVECTOR parameter TXOP\_DURATION to the duration information indicated by the Duration field if the value of the Duration field is smaller than 8448. Otherwise, the STA shall set the TXVECTOR parameter TXOP\_DURATION to 8448.

NOTE—For a TXOP responder, the Duration field in a frame carried in the response PPDU is set based on the Duration field in a frame carried in the soliciting PPDU as described in 9.2.5.7 (Set-ting for control response frames) or 9.2.5.8 (Setting for other response frames). (#20889)

If a STA transmits either an HE TB feedback NDP or an HE TB PPDU carrying a PS-Poll frame with the TXVECTOR parameter TXOP\_DURATION not set to UNSPECIFIED, it shall calculate the duration information and set the TXVECTOR parameter TXOP\_DURATION for the HE TB feedback NDP or HE TB PPDU to the value of the computed duration information. The TXOP responder shall calculate duration information equal to the duration information indicated by the Duration field of the frame that solicits the response minus the time, in microseconds, between the end of the PPDU carrying the frame that soliciting the HE TB PPDU and the end of the HE TB PPDU. If the calculated duration information includes a fractional microsecond, the duration information is rounded up to the next higher integer. If the calculated duration information is smaller than 8448 s, the TXVECTOR parameter TXOP\_DURATION shall be set to the calculated duration information. Otherwise, the TXVEC-TOR parameter TXOP\_DURATION shall be set to 8448.(#20722)

***TGax editor: Change 9.2.5.2 Setting for single and multiple protection under enhanced distributed channel access (EDCA) as follows:***

* Setting for single and multiple protection under enhanced distributed channel access (EDCA)

Change the 2nd paragraph as follows:

The STA selects between single and multiple protection when it transmits the first frame of a TXOP. All subsequent frames transmitted by the STA in the same TXOP use the same class of duration settings. A STA always uses multiple protection in a TXOP that includes:

* Frames that have the RDG/More PPDU subfield equal to 1
* PSMP frames
* VHT/HE NDP Announcement frames ~~or~~, Beamforming Report Poll frames or BFRP Trigger frames

***Change item a) of the 3rd paragraph as follows:***

The Duration/ID field is determined as follows:

* Single protection settings.
* For an RTS frame that is not part of a dual clear-to-send (CTS) exchange and is not part of a BDT exchange, the Duration/ID field is set to the estimated time, in microseconds, required to transmit the pending frame, plus one CTS frame, plus one Ack or BlockAck frame if required, plus any NDPs required, plus explicit feedback if required, plus applicable IFSs.
* In an MU-RTS Trigger frame, the Duration/ID field is set to the estimated time, in microseconds, required to transmit the pending frame, plus one CTS frame, plus the time to transmit the solicited HE TB PPDU if required, plus the time to transmit the acknowledgment for the solicited HE TB PPDU if required, plus applicable IFSs.
* In a BlockAckReq frame, the Duration/ID field is set to the estimated time required to transmit one Ack or BlockAck frame, as applicable, plus one SIFS.
* In an MU-BAR Trigger frame, BSRP Trigger frame, GCR MU-BAR Trigger frame, BQRP Trigger frame, and NFRP Trigger frame, the Duration/ID field is set to the time required to transmit the solicited HE TB PPDU plus one SIFS.(#20848)
* In individually addressed QoS Data frames with the Ack Policy subfield equal to No Ack or Block Ack, for Action No Ack frames, and for group addressed frames, the Duration/ID field is set to one of the following:
* i) If the frame is the final fragment of the TXOP, 0
* ii) Otherwise, the estimated time required for the transmission of the following frame and its response frame, if required (including appropriate IFSs)
* In a Basic Trigger frame, the Duration/ID field is set to the estimated time required to transmit the solicited HE TB PPDU, plus the estimated time required to transmit the acknowledgment for the solicited HE TB PPDU, plus applicable SIFSs.

***TGax editor: Change 10.24.2.9 TXOP limits as follows:***

**10.24.2.9 TXOP limits**

***Change the subclause as follows:***

(…existing texts ….)

If the Duration field in a frame carried in an HE TB PPDU is set to 0, the HE TB PPDU shall not include any frames that solicit a control response frame from the AP.(#20889)

**26.4.3 Negotiation of block ack bitmap lengths**

(…existing texts…)

The originator of a BlockAckReq frame, MU-BAR Trigger frame, GCR MU-BAR Trigger frame or a AMPDU that includes QoS Data frames or Management frame that solicits an immediate BlockAck frame response shall set the Duration field accounting for the largest BlockAck Bitmap length based on negotiated buffer size.(#20889)

(…existing texts…)

**26.10.3.2 SRP-based spatial reuse initiation**

(…existing texts…)

An HE STA that identifies an SRP opportunity may eschew the NAV update operations normally executed based on the receipt of the RXVECTOR parameter TXOP\_DURATION and the Trigger frame Duration field .(#20889)

(…existing texts…)