### IEEE P802.11Wireless LANs

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| 11ax D1.2 MAC Comment Resolution for 10.3.2.4 and 27.2.2 Part II |
| Date: 2017-05-07 |
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Abstract

This submission proposes resolutions for comments of TGax Draft 1.2 with the following CIDs:

3182, 3192, 5160, 5170, ~~5384~~, 5457, 5458, 5459, 5460, 5464, 5465, 5467, 5558, 5794, 5800, ~~6177~~. 6593, ~~7160~~, 7567, 7568, 7662, 7794, 8139, 8146, 8148, 8353, 8402, ~~8403~~, 9273, 9284, ~~9381~~, ~~9414~~, 9419, 9420, 9421, 9680, 9700, 9701, 9847, 9874, 10325, 10326, 6132

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Remove CID 9636 and CID 9699 based on the request from Yongho. Revise the explanation for the resolution of CID 7567 and CID 7662 based on the suggestion from Yongho. Clarify that the update rule from TXOP duration field in 10.3.2.4 Setting and resetting the NAV is only for HE AP STA.
* Rev 2: Editorial revision based on the comment from Alfred
* Rev 3: Editorial revision based on the comment received during the presentation. Remove 6 CIDs 5384, 6177, 7160, 8403, 9381, 9414 for further 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 D1.2 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D1.2 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** |
| 7568 | Liwen Chu | 114.49 | 10.3.2.4 | "If the STA is an HE STA and the STA is solicited for an immediate response by the PPDU carrying the received frame, the STA shall not update its NAV."This is not needed since the solicited STA is the receiver of the soliciting frame which is similar to NDPA in 11ac. | Remove the sentence | Revised – Agree in principle with the commenter. The original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 3182 | Ahmadreza Hedayat | 114.51 | 10.3.2.4 | This is not clear and confusing: "If the STA is an HE STA, the STA is a TXOP holder, and the frame is solicited by the STA, then the STA shall not update its NAV." | Rewrite. | Revised – Agree in principle with the commenter. The original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 8402 | Po-Kai Huang | 150.59 | 27.2.2 | The fourth bullet for the setting of Intra-BSS NAV with the duration information is a conditional bullet that is only reuqired if the STA is a TXOP holder. The concept is there, but the description may need be revised for clear presentation. | Several option for better presentation. Option 1: Have two set of descriptions: one for the STA that is a TXOP holder. One for the STA that is not a TXOP holder. Option 2: Add note or description to clarify that the fourth bullet is a conditional bullet that is only required for checking when the STA is a TXOP holder. | Revised – Agree in principle with the commenter. The original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 5465 | Graham Smith | 150.59 | 27.2.2 | "The frame is not solicited by the STA if the STA is a TXOP holder" I have no idea what this means. Clarify | Clarify the meaning | Revised – Agree in principle with the commenter. The original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 5467 | Graham Smith | 151.05 | 27.2.2 | "The STA is not solicited an immediate response by the PPDU carrying the frame." This does not read right. | Should it be "The PPDU carrying the frame is not soliciting an immediate response from the STA." | Revised – Agree in principle with the commenter. The original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 5464 | Graham Smith | 150.57 | 27.2.2 | "The STA is not solicited an immediate response by the PPDU carrying the frame." This does not read right. | Should it be "The PPDU carrying the frame is not soliciting an immediate response from the STA." | Revised – Agree in principle with the commenter. Sentence has been revised to align with the suggestion of the commenter.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 5558 | Graham Smith | 114.47 | 10.3.2.4 | "If the STA is not an HE STA and When the received frame's RA is equal to the STA's own MAC address, the STA shall not update its NAV. If the STA is an HE STA and the STA is solicited for an immediate response by the PPDU carrying the received frame, the STA shall not update its NAV. If the STA is an HE STA, the STA is a TXOP holder, and the frame is solicited by the STA, then the STA shall not update its NAV." The original text simply said if the STA is the recipient (RA = STA) then do not update NAV. I think that in both of these examples that an HE STA does not update NAV this is still true? Does this now create conditions where the HE STA, receiving a packet now does update the NAV? I suspect it would be beter to leave this alone and not make the indicated changes. | Remoive the changes from cited text. | Revised – Agree in principle with the commenter. The original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 7567 | Liwen Chu | 114.51 | 10.3.2.4 | "If the STA is an HE STA, the STA is a TXOP holder, and the frame is solicited by the STA, then the STA shall not update its NAV."If the STA is a TXOP holder, the STA will never update the NAV per the received PPDU from the TXOP resopnder. This is true for 11a/b/g/n/ac STA, and is also true for HE STA. The reason is that the received Duration will not be larger than the NAV timer value. | Remove the sentence | Revised – Agree with first part of the comment, which is that a TXOP holder in 11a/b/g/n/ac never update the NAV per received from the TXOP responder. However, the reasoning needs clarification. Specifically, in 11a/b/g/n/ac, a TXOP holder never update its NAV because the received frame’s RA is equal to the TXOP holder’s own MAC address. Now, the rule is revised based on the suggestion from 11-16/1195r1, which then affects the behaviors of HE STA. Note that the original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.To cover the case that a TXOP holder may solicit HE PPDU response and does not decode the MAC portion, we also add the rule that if the STA is a TXOP holder, and the RXVECTOR parameter BSS\_Color matches the BSS color of the STA, then the TXOP holder does not update NAV from TXOP Duration field in the PHY header. The description of TXOP holder are put in a separate paragraph for clarity.Finally, we revise the description of “all 1s” for TXOP Duration field with “UNSPECIFIED” as agreed in 11-17/345r2.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 7662 | Liwen Chu | 114.52 | 10.3.2.4 | "If the STA is an HE STA, the STA is a TXOP holder, and the frame is solicited by the STA, then theSTA shall not update its NAV."This sentence is not needed since in 11baseline, a TXOP holder will not update its NAV. Delete it. | As in comment | Revised – Agree with first part of the comment, which is that a TXOP holder in 11a/b/g/n/ac never update the NAV per received from the TXOP responder. However, the reasoning needs clarification. Specifically, in 11a/b/g/n/ac, a TXOP holder never update its NAV because the received frame’s RA is equal to the TXOP holder’s own MAC address. Now, the rule is revised based on the suggestion from 11-16/1195r1, which then affects the behaviors of HE STA. Note that the original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.To cover the case that a TXOP holder may solicit HE PPDU response and does not decode the MAC portion, we also add the rule that if the STA is a TXOP holder, and the RXVECTOR parameter BSS\_Color matches the BSS color of the STA, then the TXOP holder does not update NAV from TXOP Duration field in the PHY header. The description of TXOP holder are put in a separate paragraph for clarity.Finally, we revise the description of “all 1s” for TXOP Duration field with “UNSPECIFIED” as agreed in 11-17/345r2.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 8146 | Michael Montemurro | 114.65 | 10.3.2.4 | What does "is not all 1s" mean? I assume you mean all bits in the field are "not all set to 1". | Reword the condition to be more precise. For instance, you could say if all bits included in the field are not set to 1. | Revised – Agree in principle with the commenter. We have revised the description of “all 1s” for TXOP Duration field with “UNSPECIFIED” as agreed in 11-17/345r2.When the TXOP Duration field is set to UNSPECIFIED, it means that the TXOP Duration field does not indicate duration information for NAV setting.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 8148 | Michael Montemurro | 151.10 | 27.2.2 | What does "is not all 1s" mean? I assume you mean all bits in the field are "not all set to 1". | Reword the condition to be more precise. For instance, you could say if all bits included in the field are not set to 1. Same issue with 151.26 (and potentially other areas). | Revised – Agree in principle with the commenter. We have revised the description of “all 1s” for TXOP Duration field with “UNSPECIFIED” as agreed in 11-17/345r2.When the TXOP Duration field is set to UNSPECIFIED, it means that the TXOP Duration field does not indicate duration information for NAV setting.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 5160 | Dorothy Stanley | 114.62 | 10.3.2.4 | Regarding, "A STA shall update the NAV...", this seems pretty broad. Would legacy STAs now be required to update NAV based on new HE information? Or are we counting on the fact that legacy STAs would not be able to decode this PHY format? Perhaps limit this to HE STA? | as in comment | Revised – Agree in principle with the commenter. We have revised the sentence to clarify that this only applies to HE STA.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 8353 | Peter Loc | 114.48 | 10.3.2.4 | Redundant instruction for non-HE STAs because this has been addressed in the current IEEE802.11 standard. | Remove "If the STA is not an HE STA and When the received frame's RA is equalto the STA's own MAC address, the STA shall not update its NAV" | Rejected – We note that this description is used to preserve the legacy NAV updating rule and differentiate from the new rule introduced to HE STA. Hence, this sentence can not be removed. |
| 9419 | Xiaofei Wang | 114.51 | 10.3.2.4 | The sentence "If the STA is an HE STA, the STA is a TXOP holder, and the frame is solicited by the STA, then the STA shall not update its NAV." is not well written and is confusing. It should be rephrased. | change the sentence "If the STA is an HE STA, the STA is a TXOP holder, and the frame is solicited by the STA, then the STA shall not update its NAV." into "If the STA is an HE STA and a TXOP holder, and if the received frame is solicited by the STA, then the STA shall not update its NAV." | Revised – Agree in principle with the commenter. The original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 9420 | Xiaofei Wang | 115.02 | 10.3.2.4 | The RXVECTOR parameter TXOP\_DURATION is not carried by the frame. Instead, RXVECTOR is generated by the receiving STA when receiving the frame. This sentence is not correct and should be rephrased. | change the phrase "the PPDU carrying the RXVECTOR parameter TXOP\_DURATION" into "the PPDU that is associated with the RXVECTOR parameter TXOP\_DURATION" | Revised –Agree in principle with the commenter. We revise the sentence as follows.“the PPDU with the RXVECTOR parameter TXOP\_DURATION ..”Note that this way of description is used by the baseline spec 802.11 2016.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 9420. |
| 9421 | Xiaofei Wang | 114.62 | 10.3.2.4 | Since this is for HE STAs, which NAV would the STA be updating? Also, since this is specifically for HE STAs, should this be clearly stated? | please revise and clearly indicate which NAV to update and this is for HE STAs only. | Rejected –The description for the NAV setting in 10.3.2.4 is for the HE AP STA that only maintains one NAV. Hence, there is no need to clarify which NAV to update since there is only one. |
| 9680 | Yongho Seok | 115.08 | 10.3.2.4 | "The PPDU that carried information of the RXVECTOR parameter is not HE trigger-based PPDU triggered by the STA"A control response frame can be sent in an HE PPDU.For example, if a control frame is sent as a response to a soliciting HE extended range SU PPDU, the frame shall be carried in an HE extended range SU PPDU.Above rule for the NAV update does not cover this case. So, change it as the following:"The PPDU that carried information of the RXVECTOR parameter is not an HE extended range SU PPDU, HE SU PPDU, orHE trigger-based PPDU solicited by the STA" | As per commnet. | Revised –Agree in principle with the commenter. To cover the case that a TXOP holder may solicit HE PPDU response and does not decode the MAC portion, we have revised the rule that if the STA is a TXOP holder, and the RXVECTOR parameter BSS\_Color matches the BSS color of the STA, then the TXOP holder does not update NAV from TXOP Duration field in the PHY header. The description of TXOP holder are put in a separate paragraph for clarity.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 9700 | Yongho Seok | 151.20 | 27.2.2 | "The PPDU that carried information of the RXVECTOR parameter is not an HE trigger-based PPDU triggered by the STA"A control response frame can be sent in an HE PPDU.For example, if a control frame is sent as a response to a soliciting HE extended range SU PPDU, the frame shall be carried in an HE extended range SU PPDU.Above rule for the NAV update does not cover this case. So, change it as the following:"The PPDU that carried information of the RXVECTOR parameter is not an HE extended range SU PPDU, HE SU PPDU, orHE trigger-based PPDU solicited by the STA" | As per commnet. | Revised –Agree in principle with the commenter. To cover the case that a TXOP holder may solicit HE PPDU response and does not decode the MAC portion, we have revised the rule that if the STA is a TXOP holder, and the RXVECTOR parameter BSS\_Color matches the BSS color of the STA, then the TXOP holder does not update NAV from TXOP Duration field in the PHY header. The description of TXOP holder are put in a separate paragraph for clarity.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 9847 | Young Hoon Kwon | 115.08 | 10.3.2.4 | It is not clear how to check if the received PPDU is not triggered by the STA. Need further clarification. | Modify the third bullet in P115L8 to "The RXVECTOR parameter FORMAT is not HE\_TRIG or the RXVECTOR parameter BSS\_COLOR is different from the BSS Color of the STA.". | Revised –Agree in principle with the commenter. To cover the case that a TXOP holder may solicit HE PPDU response and does not decode the MAC portion, we have revised the rule that if the STA is a TXOP holder, and the RXVECTOR parameter BSS\_Color matches the BSS color of the STA, then the TXOP holder does not update NAV from TXOP Duration field in the PHY header. The description of TXOP holder are put in a separate paragraph for clarity.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 9874 | Young Hoon Kwon | 151.20 | 27.2.2 | It is not limited to the case of receiving an HE trigger-based PPDU triggered by the STA. For example, if an AP transmits an HE extended-range SU PPDU and expecting a response frame in the HE extended-range SU PPDU, the AP shall not update intra-BSS NAV by the response frame (even if the AP fails to decode the payload). Therefore, if the STA is a TXOP holder and receives an intra-BSS frame without any valid payload, the STA shall update the intra-BSS NAV based on the RXVECTOR parameter TXOP\_DURATION. Clarification is needed. | As in the comment. | Revised –Agree in principle with the commenter. To cover the case that a TXOP holder may solicit HE PPDU response and does not decode the MAC portion, we have revised the rule that if the STA is a TXOP holder, and the RXVECTOR parameter BSS\_Color matches the BSS color of the STA, then the TXOP holder does not update NAV from TXOP Duration field in the PHY header. The description of TXOP holder are put in a separate paragraph for clarity.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7567. |
| 5800 | Huizhao Wang | 151.15 | 27.2.2 | Need an example to clarify the following rule of updating intra-BSS NAV: "The STA does not receive a frame with the duration information indicated by a Duration field in the PSDU of the PPDU carrying the RXVECTOR parameter TXOP\_DURATION" | Please add an example to depict this rule clearly | Rejected – We clarify the rule in the following. A STA may receive a PPDU that has the RXVECTOR parameter TXOP\_DURATION. Further, the STA may receive the duration information indicated by a Duration field in the PSDU of the PPDU. In this case, the STA shall not update the NAV based on the RXVECTOR parameter TXOP\_DURATION because the duration information indicated by a Duration field in the PSDU of the PPDU has more accurate information. |
| 7794 | Mark Hamilton | 150.27 | 27.2.2 | Use proper normative verbs | Change this paragraph to, "An HE STA maintaining two NAVs shall fulfil the requirements in 10.3.2.1 (CS mechanism). For such a STA, when both the NAV timers are 0, the virtual CS indication shall be idle; if one or both of the NAV timers is nonzero, the virtual CS indication shall be busy." | Rejected – We note that the description “apply” refers the HE STA to comply with the normative behaviour in 10.3.2.1. As for the description of indicating medium busy or idle, we note that the description aligns with the wording used in 10.3.2.1. Hence, the current wording is accurate, and we do not do further revision. |
| 5794 | Huizhao Wang | 115.01 | 10.3.2.4 | The rule is not clear about updating NAV from RXVECTOR TXOP\_DURATION field, when it is indicating using the PSDU's Duration field | Replace the text: "The STA does not receive a frame with the duration information indicated by a Duration field in the PSDU of the PPDU carrying the RXVECTOR parameter TXOP\_DURATION"with following text: "The STA does not receive a frame with valid duration information inside Duration field in the PSDU, but it is indicated by the RXVECTOR parameter TXOP\_DURATION field to use PSDU Duration field" | Rejected – We note that the indication in the RXVECTOR parameter TXOP\_DURATION field and the indication by a Duration field in the PSDU of the PPDU are different. Specifically, the indication in the RXVECTOR parameter TXOP\_DURATION field are the duration information indicated in the HE PHY header. The indication by a Duration field in the PSDU of the PPDU are the duration information indicatd in the MAC header. As a result, the suggested change in the commenter is not accurate, and we do not do further revision. |
| 8139 | Matthew Fischer | 114.48 | 10.3.2.4 | Referring to:If the STA is not an HE STA and the received frame's RA is equal to the STA's own MAC address, the STA shall not update its NAV. If the STA is an HE STA and the STA is solicited for an immediate response by the PPDU carrying the received frame, the STA shall not update its NAV. If the STA is an HE STA, the STA is a TXOP holder, and the frame is solicited by the STA, then 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.Consider the case:The receiving STA is an HE STA and the RA matches the STA, but the PPDU does not solicit an immediate response from the STA, then the STA does set its NAV.Is this really desired? | Not certain | Revised – Agree in principle with the commenter. The original proposal from 11-16/1195r1 is to allow the STA to set NAV when the STA is not solicited for immediated response when receiving unicast data in DL MU. However, agree that applying this rule in general may change the agreed behaviour for NAV setting when receiving frame like NDPA or other cases. Since the description in section 10.3.2.4 for HE STA only applies to HE AP STA, which is not covered by the case proposed in 11-16/1195r1. Propose to stay with the legacy rule. As for the description in section 27.2.3, propose to only change rule for a STA htat is not TXOP holder such that the STA can set NAV under the case that the frame is from intra-BSS, the non-AP STA is not a TXOP holder, RA of the received frame matches MAC address of the STA, and immediate response is not solicited. As a result, for other cases, STA can still follow the legacy behavior.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 9273 | Tomoko Adachi | 114.49 | 10.3.2.4 | There is no need to differentiate between whether the STA is solicited for an immediate response or not. Even if the STA is solicited for an immediate response and updated its intra-BSS NAV, the STA can still respond to the Trigger frame because the condition of intra-BSS NAV won't matter. It will just make the condition complex with no meaning. | Delete the sentence "If the STA is an HE STA and the STA is solicited for an immediate response by the PPDU carrying the received frame, the STA shall not update its NAV." | Revised – Agree in principle with the commenter. We note that it is still useful to differentiate if immediate response is solicited because when receiving RTS, the NAV shall not be set so that CTS can be responded.However, we agree that we should limit this change to only TXOP responder rather than chaning the rule for TXOP holder as well.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 9284 | Tomoko Adachi | 150.58 | 27.2.2 | There is no need to differentiate between whether the STA is solicited for an immediate response or not. Even if the STA is solicited for an immediate response and updated its intra-BSS NAV, the STA can still respond to the Trigger frame because the condition of intra-BSS NAV won't matter. It will just make the condition complex with no meaning. | Delete the item "The STA is not solicited an immediate response by the PPDU carrying the frame." | Revised – Agree in principle with the commenter. We note that it is still useful to differentiate if immediate response is solicited because when receiving RTS, the NAV shall not be set so that CTS can be responded.However, we agree that we should limit this change to only TXOP responder rather than chaning the rule for TXOP holder as well.TGax editor to make the changes shown in 11-17/0744r3 under all headings that include CID 7568. |
| 10325 | Zhou Lan | 150.00 | 27.2.2 | "The STA is not solicited an immediate response by the PPDU carrying the frame.". This condition needs fix. If AP wants to schedule different group of STAs to participate UL MU operation in one TXOP, this condition will only allow the STAs that are scheduled in the first round to transmit later in the same TXOP | need a contribution to fix it | Rejected –We note that 11ax has introduced the mechanism of two NAVs to fix the scenario mentioned by the commenter. Specifically, only intra-BSS NAV is set by the Trigger frame from its own BSS, and intra-BSS NAV can be ignored when responding to a following Trigger frame as described in 27.5.2.4.Hence, there is no need to propose further mechanism. |
| 10326 | Zhou Lan | 151.00 | 27.2.2 | "The STA is not solicited an immediate response by the PPDU carrying the frame.". This condition needs fix. If AP wants to schedule different group of STAs to participate UL MU operation in one TXOP, this condition will only allow the STAs that are scheduled in the first round to transmit later in the same TXOP | need a contribution to fix it | Rejected –We note that 11ax has introduced the mechanism of two NAVs to fix the scenario mentioned by the commenter. Specifically, only intra-BSS NAV is set by the Trigger frame from its own BSS, and intra-BSS NAV can be ignored when responding to a following Trigger frame as described in 27.5.2.4.Hence, there is no need to propose further mechanism. |
| 5457 | Graham Smith | 150.24 | 27.2.2 | "An HE non-AP STA shall maintain two NAV timers" This should not be mandatory. It goes totally against the basic contention for 802.11. If two BSSs are next to each other and overlapping (as per the cell enterprise scenario 3CH) then maintaining a special NAV for each BSS does not make sense. It could cause chaos as the two BSSs cannot now share. At the best this should be deleted, at the least it should be optional. | Replace cited text with"An HE non-AP STA may maintain two NAV timers", or delete the entire section. | Rejected –First, we clarify that the two NAVs mechanism is not the same as the mechanism of having one NAV for each neighboring BSS, which is rejected during the early development of 11ax. Second, we note that the the proposal of two NAVs is to accommodate the following two goals: 1. when receiving Trigger frame, STA can set NAV to avoid disruption of UL MU transmission due to not solicited immediate response or not responding due to UL MU CS. 2. When the NAV is set by the Trigger frame, STA can preserve the NAV set by inter-BSS frame so that the NAV set by inter-BSS frame can be considered in UL MU CS rather than overrided by the duration information indicated in the Trigger frame, which will be ignored in UL MU CS. |
| 5458 | Graham Smith | 150.36 | 27.2.2 | "basic NAV" is the inter-BSS or don't know, note the non capitalized 'b'. This therefore re-defines NAV as not using intra-BSS packet durations. Surely this IS the basic NAV. What is the justification for doing this seperation anyhow? If either is nonzero then the medium is busy. The NAV is always set by the last received packet so even in this two NAV case, one of them will be set. So I fail to see the difference. | Scrap this idea | Rejected –We note that the the proposal of two NAVs is to achieve the following conflicting two goals: 1. when receiving Trigger frame, STA can set NAV to avoid disruption of UL MU transmission due to not solicited immediate response or not responding due to UL MU CS. 2. When the NAV is set by the Trigger frame, STA can preserve the NAV set by inter-BSS frame so that the NAV set by inter-BSS frame can be considered in UL MU CS rather than overrided by the duration information indicated in the Trigger frame, which will be ignored in UL MU CS.Hence, the motivation of two NAVs mechanism is justified. |
| 3192 | Ahmadreza Hedayat | 151.56 | 27.2.2 | This explanation that highlights the benefits of two-NAV setting is more useful to be at the beginning of 27.2.2, or under a general subclause at the beginning of 27.2. | As in the comment | Rejected – The description of the benefits for the two NAV mechanism has been moved to the beginning of section 27.2.3 in D1.2. |
| 5170 | Dorothy Stanley | 151.56 | 27.2.2 | The language "Maintaining two NAV is beneficial in dense deployment scenarios where a STA requires protection from frames transmitted by STAs within its BSS, i.e., intra-BSS, and avoid interference from frames transmitted by STAs in neighboring BSS, i.e., inter-BSS." doesn't seem to match the rules.Consider the situation where an HT STA and HE STA are both associated to the same AP in the same BSS. The HT STA transmits a 2-SS PPDU. The HE STA is only capable of receiving 1-SS PPDUs. My understanding is that this PPDU would be unclassified by the HE STA in terms of intra-BSS PPDU or inter-BSS PPDU since MAC addresses in the frame would not be decodable by the HE STA. So the basic NAV duration would be updated, not the intra-BSS NAV. | Define how STAs are "intra-BSS" protected in the presence of undecodable PPDUs. Or modify this paragraph to actually match the defined rules. | Rejected –If the HE STA is only capable of decoding 1-SS PPDU, then the HE STA can not decode MAC portion of the 2-SS PPDU from the HT STA. As a result, there is no classification for the PPDU since no MAC frame can be decoded, and there is also no NAV setting from the Duration field of the PPDU since no MAC frame can be decoded.  |
| 5459 | Graham Smith | 151.57 | 27.2.2 | " Maintaining two NAV is beneficial in dense deployment scenarios where a STA requires protection from frames transmitted by STAs within its BSS, i.e., intra-BSS, and avoid interference from frames transmitted by STAs in neighboring BSS, i.e., inter-BSS. " The whole idea of NAV is to keep the medium clear for a time to allow the packet exchange to complete. Hence the claim that this provides protection to intra packets is nothing new, also nothing to do with dense environments, so this statement is meaningless. | Delete this or explain better what the diffrerence is. This is nothing new. | Rejcted – We note that the the proposal of two NAVs is to achieve the following conflicting two goals: 1. when receiving Trigger frame, STA can set NAV to avoid disruption of UL MU transmission due to not solicited immediate response or not responding due to UL MU CS. 2. When the NAV is set by the Trigger frame, STA can preserve the NAV set by inter-BSS frame so that the NAV set by inter-BSS frame can be considered in UL MU CS rather than overrided by the duration information indicated in the Trigger frame, which will be ignored in UL MU CS.Hence, the motivation of two NAVs mechanism is justified and new due to UL MU introduced in 11ax. |
| 5460 | Graham Smith | 151.60 | 27.2.2 | "For example, in a TXOP initiated by the associated AP for UL MU transmission, the intra-BSS NAV of the STA can be set by the AP to prevent the STA from contending the channel, and the basic NAV will not be updated by the associated AP so that NAV set by inter-BSS PPDU can be considered in UL MU CS as described in 27.5.2.4 (UL MU CS mechanism)." I try to understand the example. So the intra NAV is set, as normal, but the basic NAV is not. The example then says look at 27.5.2.4. I look but there all I see is "If one or both of the NAVs are considered and the considered NAV's counter is nonzero, then the virtual CS indicates busy." (P170L37) So if either NAV is set, which it will be, the medium is busy. Try as I might I don't get it. | Either use an example that actually explains the idea and shows that it actually does something, or, if this is not possible, lose this dual NAV idea. | Rejcted – We note that based on the rule specific in 27.5.2.4, intra-BSS NAV is not considered. As a result, the statement from the commenter that “So if either NAV is set, which it will be, the medium is busy.” is not correct. Hence, we reject this comment. |
| 6593 | John Coffey | 151.64 | 27.2.2 | The illustrative example is extraordinarily unconvincing. Is this really the best justification for forcing all HE STAs to go through the extended rigmarole of classifying every PPDU as intra-BSS or inter-BSS? Even taking the example at face value, what is gained by having the STA set its "intra-BSS NAV" when it receives its AP's initial frame, as opposed to setting the plain old NAV? Either way that STA wouldn't be permitted to transmit, so what has all the extra processing and classification bought? The straightforward way would be to have all STAs other than those addressed by the AP to set the (N.B. "the", since there would be only one) NAV. The NAV is one of the basic underpinnings of the entire current success of 802.11 and extraordinary justification should be necessary before any changes are made to it. | Delete this section, the definition of dual NAV, and all references to dual NAV in the draft. | Rejcted – We note that the the proposal of two NAVs is to achieve the following conflicting two goals: 1. when receiving Trigger frame, STA can set NAV to avoid disruption of UL MU transmission due to not solicited immediate response or not responding due to UL MU CS. 2. When the NAV is set by the Trigger frame, STA can preserve the NAV set by inter-BSS frame so that the NAV set by inter-BSS frame can be considered in UL MU CS rather than overrided by the duration information indicated in the Trigger frame, which will be ignored in UL MU CS.If we only have one NAV and the NAV is not set when receiving a Trigger frame, then the UL MU transmission may be disrupted. If we only have one NAV and the NAV is set when receiving a Trigger frame, then NAV set by inter-BSS may be overrided and can not be considered in UL MU CS. Hence, the mechanism of two NAVs is required as explained in the provided example. |
| 9701 | Yongho Seok | 151.56 | 27.2.2 | "A STA that maintains two NAVs has the capability to maintain NAV set by intra-BSS PPDU and inter-BSS PPDU separately. Maintaining two NAV is beneficial in dense deployment scenarios where a STA requires protection from frames transmitted by STAs within its BSS, i.e., intra-BSS, and avoid interference from frames transmitted by STAs in neighboring BSS, i.e., inter-BSS. For example, in a TXOP initiated by theassociated AP for UL MU transmission, the intra-BSS NAV of the STA can be set by the AP to prevent the STA from contending the channel, and the basic NAV will not be updated by the associated AP so that NAV set by inter-BSS PPDU can be considered in UL MU CS as described in 27.5.2.4 (UL MU CS mechanism)."The above paragraph is a general introduction of two NAVs.Move the above paragraph to the end of 4.3.14a (HE STA). | As per comment. | Rejected – The referred senetence has been revised in D1.2 to simply be the description for the motivation of two NAVs. Hence, there is no need to move to 4.3.14a, where general capability and descrition of MU for 11ax is described. |
| 6132 | Jing Ma | 151.56 | 27.2.2 | Clarify the benefit of updating two NAVs more clearly. The description about the need to run two NAVs in the draft is not clear enough. What if update one NAV considering OBSS-based SR operation (described in 27.9) which is simpler than running two NAVs. | as the comment | Rejected – We note that the NAV setting should not be confused with spatial reuse operation. Specfiically, if a STA applies spatial reuse operation to a PPDU, then the NAV from the PPDU is nevet set by the STA, which is true when STA maintains one NAV or two NAVs. We also note that the the proposal of two NAVs is to achieve the following conflicting two goals: 1. when receiving Trigger frame, STA can set NAV to avoid disruption of UL MU transmission due to not solicited immediate response or not responding due to UL MU CS. 2. When the NAV is set by the Trigger frame, STA can preserve the NAV set by inter-BSS frame so that the NAV set by inter-BSS frame can be considered in UL MU CS rather than overrided by the duration information indicated in the Trigger frame, which will be ignored in UL MU CS. |

**Discussion:**

**Propose:**

Revised for CID 7567, CID 9420, CID 7568 per discussion and editing instructions in 11-17/0744r3.

***TGax editor: Modify 10.3.2.4 as the following:***

**10.3.2.4 Setting and resetting the NAV**

 ***Change the 1st four paragraph as follows (the 2nd paragraph is broken into three paragraphs):***

This subclause describes the setting and resetting of the NAV for non-DMG STAs and DMG STAs that support a single NAV. DMG STAs that support multiple NAVs shall update their NAVs according to the procedures described in 10.36.10 (Updating multiple NAV). HE STAs with two NAV timers shall update their NAV timers according to the procedures described in 27.2.3 (Updating two NAVs).

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 (#7568)~~When~~ the received frame’s RA is equal to the STA’s own MAC address, the STA shall not update its NAV. (#7568)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. Upon receipt of a PS-Poll frame, a STA shall update its NAV settings as appropriate under the data rate selection rules using a duration value equal to the time, in microseconds, required to transmit one Ack frame plus one SIFS, but only when the new NAV value is greater than the current NAV value. If the calculated duration includes a fractional microsecond, that value is rounded up to the next higher integer.

An HE(#7567) AP, that is not a TXOP holder, shall update the NAV with the duration indicated by the RXVECTOR parameter TXOP\_DURATION if and only if all of the following conditions are met:

* The RXVECTOR parameter TXOP\_DURATION is not set to UNSPECIFIED(#7567).
* The HE AP does not receive a frame with the duration information indicated by a Duration field in the
PSDU of the PPDU with(#9420) the RXVECTOR parameter TXOP\_DURATION
* The duration indicated by the RXVECTOR parameter TXOP\_DURATION is greater than the
HE AP's current NAV value

(#7567)

An HE AP, that is a TXOP holder, shall update the NAV with the duration indicated by the RXVECTOR parameter TXOP\_DURATION if and only if all of the following conditions are met:

* The RXVECTOR parameter TXOP\_DURATION is not set to UNSPECIFIED.
* The HE AP does not receive a frame with the duration information indicated by a Duration field in the
PSDU of the PPDU with(#9420) the RXVECTOR parameter TXOP\_DURATION
* The duration indicated by the RXVECTOR parameter TXOP\_DURATION is greater than the
HE AP's current NAV value
* The RXVECTOR parameter BSS\_COLOR is not equal to the BSS Color of the HE AP(#7567)

NOTE 1—For an HE STA, only HE AP STA can maintain one NAV. See 27.2.3 Updating two NAVs for details.(#7567)

NOTE 2—Based on the setting rule, if a STA receives a frame with the duration information indicated by both a Duration field in the PSDU and the RXVECTOR parameter TXOP\_DURATION, then the duration information indicated by
the RXVECTOR parameter TXOP\_DURATION is ignored.(#7567)

Various additional conditions may set or reset the NAV for a STA that is not an HE STA, as described in 10.4.3.3 (NAV operation during the CFP). When the NAV is reset, a PHY-CCARESET.request primitive shall be issued. The exact time of updating the NAV is described as follows. This NAV update operation is performed when the PHY-RXEND.indication primitive is received, except when the PHYRXEND.indication primitive is received before the end of the PPDU, in which case the NAV update is performed at the expected end of the PPDU.

Figure 10-5 (RTS/CTS/data/Ack and NAV setting) indicates the NAV for STAs that might receive the RTS frame, while other STAs might receive only the CTS frame, resulting in the lower NAV bar as shown (with the exception of the STA to which the RTS frame was addressed).

A STA that used information from an RTS frame or MU-RTS Trigger frame as the most recent basis to update its NAV setting is permitted to reset its NAV if no PHY-RXSTART.indication primitive is received from the PHY during a NAVTimeout period starting when the MAC receives a PHY-RXEND.indication primitive corresponding to the detection of the RTS frame or MU-RTS Trigger frame.

In non-DMG BSS, NAVTimeout period is equal to (2 x aSIFSTime) + (CTS\_Time) + aRxPHYStartDelay + (2 x aSlotTime). When an RTS frame is used for the most recent NAV update, t~~T~~he "CTS\_Time" shall be calculated using the length of the CTS frame and the data rate at which the RTS frame ~~used for the most recent NAV update was received~~. When an MU-RTS Trigger frame was used for the most recent NAV update, the "CTS\_Time" shall be calculated using the length of the CTS frame and the 6 Mb/s data rate (see 27.2.4 (MU-RTS/CTS procedure)).

***TGax editor: Modify 27.2.3 as the following:***

**27.2.3 Updating two NAVs**

A non-AP HE STA shall maintain and an HE AP may maintain two NAVs, one referred to as intraBSS NAV and the other as basic NAV. Intra-BSS NAV is used to store NAV value, if needed, from a PPDU identified as intra-BSS. Basic NAV is used to store NAV value, if needed, from a PPDU classified as interBSS or from a PPDU that cannot be classified as intra-BSS or inter-BSS. The mechanism by which a PPDU is classified intra-BSS or inter-BSS is defined in 27.2.1 (Intra-BSS and inter-BSS frame determination)

Maintaining two NAVs is beneficial in dense deployment scenarios where a STA requires protection from frames transmitted by STAs within its BSS, i.e., intra-BSS, and avoid interference from frames transmitted by STAs in a neighboring BSS, i.e., inter-BSS. For example, in a TXOP initiated by the AP to which the STA is associated for an UL MU transmission, the intra-BSS NAV of the STA can be set by the AP to prevent the STA from contending for the channel. The basic NAV will not be updated by the AP so that the NAV set by an inter-BSS PPDU can be considered the UL MU CS mechanism described in 27.5.2.4 (UL MU CS mechanism).

The requirements in 10.3.2.1 (CS mechanism) apply to an HE STA maintaining two NAVs with the exception of the virtual CS indication of medium. For an HE STA maintaining two NAVs, if both the NAV timers are 0, the virtual CS indication is that the medium is idle; if one of the two NAV timers is nonzero, the virtual CS indication is that the medium is busy.

The duration information is indicated by a frame in a PSDU as follows:

* 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.

A STA, that is a TXOP holder,(#7568) shall update the intra-BSS NAV with the duration information indicated by the received frame in a PSDU if and only if all the following conditions are met:

* The frame is identified as intra-BSS according to the rule described in 27.2.1 (Intra-BSS and interBSS frame determination).
* The indicated duration is greater than the current intra-BSS NAV value.
* The received frame’s RA is not equal to the STA’s own MAC address (#7568)

A STA, that is not a TXOP holder, shall update the intra-BSS NAV with the duration information indicated by the received frame in a PSDU if and only if all the following conditions are met:

* The frame is identified as intra-BSS according to the rule described in 27.2.1 (Intra-BSS and interBSS frame determination).
* The indicated duration is greater than the current intra-BSS NAV value.
* Either the received frame’s RA is not equal to the STA’s own MAC address or the PPDU carrying the frame does not solicit an immediate response from the STA. (#7568)

A STA shall update the basic NAV with the duration information indicated by the received frame in a PSDU if and only if all the following conditions are met:

* The frame is identified as inter-BSS or cannot be identified as intra-BSS or inter-BSS according to
the rule described in 27.2.1 (Intra-BSS and inter-BSS frame determination).
* The indicated duration is greater than the current basic NAV value.
* The received frame’s RA is not equal to the STA’s own MAC address (#7568)

A STA, that is a TXOP holder, shall not update the intra-BSS NAV with the duration information indicated by the RXVECTOR parameter TXOP\_DURATION.(#7567)

A STA, that is a not a TXOP holder,(#7567) 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 set to UNSPECIFIED(#7567).
* The PPDU that carried information of the RXVECTOR parameter is identified as intra-BSS according to the rule described in 27.2.1 (Intra-BSS and inter-BSS frame determination).
* The STA does not receive a frame with the duration information indicated by a Duration field in the
PSDU of the PPDU with(#9420) the RXVECTOR parameter TXOP\_DURATION.
* The duration information indicated by the RXVECTOR parameter TXOP\_DURATION is greater
than the STA's current intra-BSS NAV.

(#7567)

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 set to UNSPECIFIED(#7567).
* 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 27.2.1 (Intra-BSS and
inter-BSS frame determination).
* The STA does not receive a frame with the duration information indicated by a Duration field in the
PSDU of the PPDU with(#9420) the RXVECTOR parameter TXOP\_DURATION.
* The duration information indicated by the RXVECTOR parameter TXOP\_DURATION is greater
than the STA's current basic NAV.

NOTE 1—If a PS-Poll frame is received carried in a received HE SU PPDU, HE ER SU PPDU, or HE MU PPDU,
then the RXVECTOR parameter TXOP\_DURATION does not indicate duration information (see 27.11.5 (TXOP\_DURATION).

NOTE 2—Based on the setting rule, if a STA receives a frame with the duration information indicated by both a Duration field in the PSDU and the RXVECTOR parameter TXOP\_DURATION, then the duration information indicated by
the RXVECTOR parameter TXOP\_DURATION is ignored.

NOTE 3—The additional rules of NAV consideration for a STA that is solicited for an immediate response are described
in 10.3.2.7 (CTS and DMG CTS procedure), 10.3.2.9 (Acknowledgment procedure), and 27.5.2.4 (UL MU CS mechanism).

A PHY-CCARESET.request primitive shall be issued if one of the following condition is met:

* One NAV is reset, and the other NAV timer is 0.
* Both NAVs are reset simultaneously.

The exact time of updating the NAVs uses the same rule as defined in 10.3.2.4 (Setting and resetting the NAV).

An HE STA that used information from an RTS or MU-RTS Trigger frame as the most recent basis to update its NAV setting is permitted to reset the NAV which is updated by the RTS or MU-RTS 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.