### IEEE P802.11Wireless LANs

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| 11ax D0.3 Comment Resolution for Two NAVs - Part I |
| Date: 2016-08-18 |
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Abstract

This submission proposes resolutions for comments in clause 25.2.2 of TGax Draft 0.3 with the following CIDs:

* 1743, 1775, 1638, 785, 1742, 164, 1636, 28, 163, 2317, 1463, 2625, 2702, 2703, 2704, 2705, 422, 748, 1216, 1744, 1759, 866, 788, 2739, 220, 1014, 1011, 746, 1466, 709, 27, 1469, 2473, 747, 2491, 1215, 29

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revise for some editorial comment. Add a note to clarify the operation when a STA receives both a Duration field and a TXOP Duration field as suggested by Jeongki. Difference are marked with green.

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 D0.3 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D0.3 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** |
| 1743 | Osama Aboulmagd | 53.19 | 25.2.1 | What is the reason for running two NAVs? Does the added complexity achieve any benefit? | add a statement for the need to run two NAVs. Alternatively remove the two NAV and run only a singe NAV is usual. | Revised –Agree in principle with the commenter. Add the statement at the end of 25.2.2 to describe the motivation.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1743. |
| 1775 | Robert Stacey | 53.14 | 25.2.1 | The new style for amending the MAC requires explicit statements about which parts of the baseline apply and which don't. Explicitly state which parts of the baseline related to NAV apply here. | Add statements along the following lines: "The requirements in 10.3.2.1 (CS mechanism) {apply, do not apply} to an HE STA" | Revised –Agree in principle with the commenter. Statements for 10.3.2.1 CS mechanism that applied to two NAVs are added at the beginning of 25.2.2 with the exception of virtual CS indication of medium, and texts for virtual CS indication of medium are added in 25.2.2. Texts are also added in 10.3.2.1 CS mechanism to refer the virtual CS indication of two NAVs to 25.2.2.Description in 10.3.2.4 Setting and resetting the NAV are added to refer the NAV setting rule to 25.2.2. Rules in 10.3.2.4 that applies to HE STAs are added in 25.2.2. Rules in 10.3.2.4 that needs to be modified for HE STAs with two NAV timers are added in 25.2.2.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1775. |
| 1638 | Matthew Fischer | 53.18 | 25 | Is "regular NAV" the same as the existing baseline NAV? If so, need to state this and then reconcile NAV operation of regular NAV in this clause with NAV operation in clause 10. If these are not the same NAV, then the draft needs to identify how all three NAVs work together. | Not certain how to do this - it will be difficult if this clause 25 will remain in the document because there are clearly operations of the MAC that are occurring according to clause 10 which might conflict with the operations here and or at least, operations here might depend on activities identified in clause 10 and vice versa. Clarify the interaction between the two subclauses. | Revised –Agree in principle with the commenter. Statements for 10.3.2.1 CS mechanism that applied to two NAVs are added at the beginning of 25.2.2 with the exception of virtual CS indication of medium, and texts for virtual CS indication of medium are added in 25.2.2. Texts are also added in 10.3.2.1 CS mechanism to refer the virtual CS indication of medium for two NAVs to 25.2.2.Description in 10.3.2.4 Setting and resetting the NAV are added to refer the NAV setting rule to 25.2.2. Rules in 10.3.2.4 that applies to HE STAs are added in 25.2.2. Rules in 10.3.2.4 that needs to be modified for HE STAs with two NAV timers are added in 25.2.2.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1775. |
| 785 | Jeongki Kim | 39.46 | 10.3.2.4 | According the texts in subclause 10.3.2.4, all STAs except for DMG STA support only a single NAV timer."This subclause describes the setting and resetting of the NAV timer for non-DMG STAs and DMG STAs that support a single NAV timer. DMG STAs that support multiple NAV timers shall update their NAV timers according to the procedures described in 10.36.10 (Updating multiple NAV timers(11ad)). "But, HE STA can maintain two NAV according to subclause 25.2.1.If we don't describe any texts of NAV timer for two NAVs in the spec, it means two NAVs are maintained with a single NAV timer by HE STA. If two NAVs are maintained by a single NAV timer, we need to describe how to operate it. However, it's simpler for HE STA to use two NAV timers (each timer per each NAV). | Add the following text at the end of the first paragraph in subclause 10.3.2.4 "HE STAs that maintain two NAVs shall support two NAV timers and shall update their NAV timers according to the procedures described in 25.2.1 (Updating two NAVs)" | Revised –Agree in principle with the commenter. Description in 10.3.2.4 Setting and resetting the NAV are added to refer the NAV setting rule to 25.2.2.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1775. |
| 1742 | Osama Aboulmagd | 53.19 | 25.2.1 | Intra-BSS NAV and Regular NAV need to be defined | As in Comment | Revised –Agree in principle with the commenter. High level description for Intra-BSS NAV and Regular NAV are added to 25.2.2.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1742. |
| 164 | Alfred Asterjadhi | 71.22 | 25.2.1 | The separation of the behaviors in different paragraphs adds to the uncertainty of how a third party STA is expected to set its NAV. Organize this subclause to specify the normative behavior as an itemized list, with a list of actions to be performed upon reception of a PPDU, with items for SIG-A TXOP duration, for Duration/ID fields in MPDUs, based on RA/TA, BSS Color etc. | As in comment. | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 1636 | Matthew Fischer | 53.21 | 25.2.1 | Insufficient normative language. Statements in this subclause regarding NAV setting all seem to use "can". I doubt that everything here was meant to be optional, which is what the use of "can" seems to imply. | Clearly describe which behaviors are optional and which are mandatory. Clearly describe the interaction of the behavior here with the behavior described in clause 10. | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour. The interaction of the behavior here with the behavior described in clause 10 is added.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164 and 1775. |
| 28 | Ahmadreza Hedayat | 53.13 | 25.2.1 | Throughout this cluase, STAs' behavior is defined like "A STA ... can update its NAV etc". This is not a normative languag. Furthermore, maintaining one (or eventually maybe both) of these NAVs are mandatory and STAs have to update them. | Update the language throughout this clause so that STAs' behavior include mandatory updating or whichever NAV that is mandatory. | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 163 | Alfred Asterjadhi | 71.16 | 25.2.1 | The subclause is a bit confusing on the expected behavior on NAV settings because of the fact that it is not clear whether support of two NAVs is mandatory or optional. It appears that two NAVs are needed for the normative behaviors described below (where by the way "can" is not normative so please use appropriate normative terminology). In addition, use consistent terminology regular and Intra NAV, refer to baseline NAV update for regular NAV and specify in this subclause the intra NAV update rules. Same considerations are applicable to 25.5.2.4 (UL MU CS mechanism). | As in comment. | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour. The interaction of the behavior here with the behavior described in clause 10 is added.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164 and 1775. |
| 2317 | Yasuhiko Inoue | 53.21 | 25.2.1 | "A STA that receives at least one valid frame in a PSDU and identifies the frame as Intra-BSS can update its Intra-BSS NAV with the information from any valid Duration field in the PSDU." | "can" is not appropriate to be used in a standard . If it is somethig like mandatory behavior, please use "shall", or please use should if optional.Similar expressions can be seen through out this subclause. Please modify all these expressions. | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 1463 | Mark RISON | 53.00 | 25.2.1 | "can update" (5x) -- what does this mean | Change to "may update" in each case if it's indicating that one is not required to update the NAV, or "shall update" if one is. The "from any valid Duration field in the PSDU" further confuses the matter because it can be read as suggesting the Duration field can be different in different MPDUs in a PSDU | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.As for the phrase “from any valid Duration field in the PSDU”, the corresponding phrase is revised as well.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 2625 | Young Hoon Kwon | 53.48 | 25.2.1 | Last four paragraphs of the subclause does not have any additional meaning compared to those sentences described above. | Delete the last four paragraphs. | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 2702 | Yuichi Morioka | 53.48 | 25.2.1 | "For all other received frames..." Other than what? This text seems to be a duplication of page 53, line 23 | Remove sentence starting "For all other received frames that are identified by the STA as Intra-BSS..." | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 2703 | Yuichi Morioka | 53.52 | 25.2.1 | "For all other received frames..." Other than what? This text seems to be a duplication of page 53, line 25 and 29 | Remove sentence starting "For all other received frames that are identified by the STA as Inter-BSS..." | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 2704 | Yuichi Morioka | 53.57 | 25.2.1 | "For all other received HE-SIG-As..." Other than what? This text seems to be a duplication of page 53, line 33 | Remove sentence starting "For all other received HE-SIG-As that are identified by the STA as Intra-BSS..." | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 2705 | Yuichi Morioka | 53.62 | 25.2.1 | "For all other received HE-SIG-As..." Other than what? This text seems to be a duplication of page 53, line 36 | Remove sentence starting "For all other received HE-SIG-As that are identified by the STA as Inter-BSS..." | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 422 | Brian Hart | 53.52 | 25.2.1 | Pra at L57-64 seems to be made redundant due to paras at L33-38, excepting only in invalid HE-SIGA ... but the PPDU will be discarded | Delete cited paras or add a note why anyone would process an HE PPDU with an invalid SIGA | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 748 | Jarkko Kneckt | 53.18 | 25.2.1 | The text in lines 18 - 38 seems to be described more precisely the operation. The first lines in the page seem redundant and unnecessary. | Delete lines 18 - 38. | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 1216 | Liwen Chu | 53.13 | 25.2.1 | The condition when should update inter/intra-BSS NAV is not clear. Make the ruels clear. | As in comment. | Revised –Agree in principle with the commenter. The rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 1744 | Osama Aboulmagd | 53.36 | 25.2.1 | What if the value in the Duration field doesn't match the value in the SIG-A field? Which one takes precedence? | Clarify | Revised –It is described in this section that “When a STA receives both a valid HE-SIG-A in a HE PPDU and a valid frame in the PSDU of the HE PPDU, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the TXOP Duration field in the HE-SIG-A.”Hence, it is clear that the value in the Duration field will take precedence. A note is also added to clarify the point.Note that the rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164, CID 1744. |
| 1759 | Po-Kai Huang | 53.14 | 25.2.1 | It is possible that a valid frame in the PSDU of the HE PPDU does not have Duration field such as PS-Poll frame. In this case, TXOP field is the only place with explicit NAV information in the PPDU although it is possible that the NAV may still be derived. Depending on the design of TXOP field, we may then be able to decide the option in this case. | Propose the following change. "When a STA receives both a valid HE-SIG A in a HE PPDU and a valid frame with Duration field in the PSDU of the HE PPDU, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the TXOP Duration in the HE-SIG-A. When a STA receives both a valid HE-SIG-A in a HE PPDU and a PS-Poll frame in the PSDU of the HE PPDU, the NAV setting rule is TBD." | Revised –Agree in principle with the commenter. In 16/953r2, the group has agreed with the following.*A STA that transmits an HE SU PPDU, HE extended range SU PPDU, or HE MU PPDU may indicate no duration information for NAV setting by setting the TXVECTOR parameter TXOP\_DURATION to all 1s.**If a STA transmits an HE SU PPDU, HE extended range PPDU, or HE MU PPDU that carries a PS-Poll frame, the STA shall set the TXVECTOR parameter TXOP\_DURATION to all 1s.*Hence, it is now impossible for a STA to receive both a valid HE-SIG-A in a HE PPDU and a PS-Poll frame in the PSDU of the HE PPDU. As for the case that a STA receives a PS-Poll frame in the PSDU without a RXVECTOR parameter TXOP\_DURATION, description are added to follow the legacy rules.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1759. |
| 866 | Jun Luo | 53.44 | 25.2.1 | This rule should exclude the cases that the valid frame without duration field in MAC header(e.g. PS-poll frame). | Change "When a STA receives both a valid HE-SIG-A in a HE PPDU and a valid frame in the PSDU of the HE PPDU, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the TXOP Duration field in the HE-SIG-A. " to "When a STA receives both a valid HE-SIG A in a HE PPDU and a valid frame with Duration field in the PSDU of the HE PPDU, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the TXOP Duration field in the HE-SIG-A. When a STA receives both a valid HE-SIG-A in a HE PPDU and a PS-Poll frame in the PSDU of the HE PPDU, the NAV setting rule is TBD." | Revised –Agree in principle with the commenter. In 16/953r2, the group has agreed with the following.*A STA that transmits an HE SU PPDU, HE extended range SU PPDU, or HE MU PPDU may indicate no duration information for NAV setting by setting the TXVECTOR parameter TXOP\_DURATION to all 1s.**If a STA transmits an HE SU PPDU, HE extended range PPDU, or HE MU PPDU that carries a PS-Poll frame, the STA shall set the TXVECTOR parameter TXOP\_DURATION to all 1s.*Hence, it is now impossible for a STA to receive both a valid HE-SIG-A in a HE PPDU and a PS-Poll frame in the PSDU of the HE PPDU. As for the case that a STA receives a PS-Poll frame in the PSDU without a RXVECTOR parameter TXOP\_DURATION, description are added to follow the legacy rules.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1759. |
| 788 | Jeongki Kim | 53.44 | 25.2.1 | Need to clarify the operation of receiving a frame without Duration value (e.g., PS-Poll) | Add the operation for a frame without Duration value (e.g., PS-Poll) | Revised –Agree in principle with the commenter. In 16/953r2, the group has agreed with the following.*A STA that transmits an HE SU PPDU, HE extended range SU PPDU, or HE MU PPDU may indicate no duration information for NAV setting by setting the TXVECTOR parameter TXOP\_DURATION to all 1s.**If a STA transmits an HE SU PPDU, HE extended range PPDU, or HE MU PPDU that carries a PS-Poll frame, the STA shall set the TXVECTOR parameter TXOP\_DURATION to all 1s.*Hence, it is now impossible for a STA to receive both a valid HE-SIG-A in a HE PPDU and a PS-Poll frame in the PSDU of the HE PPDU. As for the case that a STA receives a PS-Poll frame in the PSDU without a RXVECTOR parameter TXOP\_DURATION, description are added to follow the legacy rules.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1759. |
| 2739 | yujin noh | 53.33 | 25.2.1 | When it comes to reception of a HE PS-Poll frame, a STA shall update its NAV with the value which required to transmit one Ack frame plus one SIFS. When a STA happens to receive HE PS-poll frame incorrectly with payload error such that there is no clue this is the PS-Poll frame, it may set NAV with the value in TXOP duration field in SIG-A | add the setense "In HE PS-Poll frame, the value of TXOP duration field in HE-SIG-A shall be required to transmit one ACK frame plus and SIFS." Then a STA shall update its intra-BSS NAV with a duration value equal to the time required to transmit one ACK frame plus and SIFS in valid TXOP Duration field in SIG-A. | Revised –Agree in principle with the commenter. In 16/953r2, the group has agreed with the following.*A STA that transmits an HE SU PPDU, HE extended range SU PPDU, or HE MU PPDU may indicate no duration information for NAV setting by setting the TXVECTOR parameter TXOP\_DURATION to all 1s.**If a STA transmits an HE SU PPDU, HE extended range PPDU, or HE MU PPDU that carries a PS-Poll frame, the STA shall set the TXVECTOR parameter TXOP\_DURATION to all 1s.*Hence, it is now impossible for a STA to receive both a valid HE-SIG-A in a HE PPDU and a PS-Poll frame in the PSDU of the HE PPDU. For the case that a STA receives a PS-Poll frame in the PSDU without a RXVECTOR parameter TXOP\_DURATION, description are added to follow the legacy rules. Finally, when a STA happens to receive HE PS-poll frame incorrectly with payload error such that there is no clue this is the PS-Poll frame, EIFS will be used as described in 16/835r1.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1759. |
| 220 | Alfred Asterjadhi | 71.13 | 25.2.1 | Clarify back off rules for 2 NAV. The backoff counter should decrement based on the or of the two NAV.Add this clarification to section 10.3.2.1, it is currently in 25.5.2.4When two NAVs are supported by a STA, if one or both of the NAVs are considered and the considered NAV's counter is nonzero, then the virtual CS indicates busy. Otherwise, the virtual CS is idle. | As in comment. | Revised –Agree in principle with the commenter. Virtual CS indication of medium for two NAVs are added in 25.2.2. TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1775. |
| 1014 | Kazuyuki Sakoda | 53.18 | 25.2.1 | Although two NAVs are introduced to HE STAs, it is not clear how the STA will use these NAVs for channel access. | Please clarify the channel access rules utilizing 2 NAVs. | Revised –Agree in principle with the commenter. Virtual CS indication of medium for two NAVs are added in 25.2.2. TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1775. |
| 1011 | Kazuyuki Sakoda | 3.10 | 3.2 | The definition for "inter-BSS NAV" and "intra-BSS NAV" are missing. | Add definition for "inter-BSS NAV" and "intra-BSS NAV" under subclause 3.2 Definitions specific to IEEE802.11 | Revised –Agree in principle with the commenter, high level description for Intra-BSS NAV and Regular NAV are added to 25.2.2. Note that the phrase “Inter-BSS NAV” appears in P73|12 should be changed to regular NAV. Corresponding revisions have been incorporated.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1742 and 164. |
| 746 | Jarkko Kneckt | 53.18 | 25.2.1 | The clause is using three NAV types, inter, intra and regular. All these should be clearly explained. | Define all three NAV types and describe and introduce them in the clause. Now the text seems to be missing the inter-BSS NAV that is used in P53l61. | Revised –Agree in principle with the commenter, high level description for Intra-BSS NAV and Regular NAV are added to 25.2.2. Note that the phrase “Inter-BSS NAV” appears in P73|12 should be changed to regular NAV. Corresponding revisions have been incorporated.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1742 and 164. |
| 1466 | Mark RISON | 53.00 | 25.2.1 | The concept of "inter/intra-BSS frames" has not been introduced at this point | Add a forward reference to 25.9.2 | Revised –Agree in principle with the commenter. Reference to 25.2.1 (Intra-BSS and inter-BSS frame detection) are added to clarify the identification of a frame as inter/intra-BSS based on document 16/889r1.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1466. |
| 709 | Jarkko Kneckt | 3 | 3.2 | Add the definition of three different NAV types in 802.11ax. Define Intra, Inter and Regular NAV. | Regular NAV seems to be legacy NAV or the NAV when a STA cannot know is it Intra or inter NAV. Intra NAV is own BSS, Inter NAV is other than own BSS. | Revised –Agree in principle with the commenter, high level description for Intra-BSS NAV and Regular NAV are added to 25.2.2. Note that the phrase “Inter-BSS NAV” appears in P73|12 should be changed to regular NAV. Corresponding revisions have been incorporated.Reference to 25.2.1 (Intra-BSS and inter-BSS frame detection) are added to clarify the identification of a frame as inter/intra-BSS based on document 16/889r1.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1742, 164 and 1466. |
| 27 | Ahmadreza Hedayat | 53.13 | 25.2.1 | It is not clear whether the two NAVs can be maintained/updated at the same time, or at any given point only one NAV is maintained. | Secify STAs' behavior on how the two NAVs should be maintained wrt each other. | Revised –Agree in principle with the commenter. As described in P72L28, two separate NAVs are maintained by the STA. As for the update, the rules in this subclause is organized with itemized list to describe the normative behaviour.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 1469 | Mark RISON | 53.00 | 25.2.1 | "identifies the HE-SIG-A as Intra-BSS" -- frames are intra-BSS, not HE-SIG-As | Change to "uses the HE-SIG-A to identify the PSDU as intra-BSS" | Revised –Agree in principle with the commenter, the rules in this subclause is organized with itemized list to describe the normative behaviour.Further, the identification method based on HE-SIG-A or MAC header is refered to 25.2.1 (Intra-BSS and inter-BSS frame detection) based on document 16/889r1.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164 and 1466. |
| 2473 | Yongho Seok | 53.57 | 25.2.1 | "For all other received HE-SIG-As that are identified by the STA as Intra-BSS, the STA shall update its Intra-BSS NAV when the received value of the TXOP Duration field is greater than the STA's current Intra-BSS NAV value."When all HE trigger-based PPDUs have errors in PSDUs but still decode correctly HE-SIG-A, what is the NAV update rule of the TXOP holder (i.e., HE AP)?If the TXOP holder updates its NAV from the TXOP Duration field in the HE-SIG-A, the PIFS recovery is always failed.Suggested behavior is that the TXOP holder shall not update its Intra-BSS NAV even if the received value of the TXOP Duration field is greater than the STA's current Intra-BSS NAV value.Please clarify the NAV update constraint from the TXOP Duration field in the HE-SIG-A for the TXOP holder. | As per comment | Revised –Agree in principle with the commenter. AP should not update the NAV from the TXOP duration field of the HE trigger-based PPDU triggered by itself. NAV updating rule for this case are added for clarification. TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 2473. |
| 747 | Jarkko Kneckt | 53.22 | 25.2.1 | What is a valid frame? | Please clarify what is meant with valid frame. | Revised –Based on the discussion with TGax editor, the phrase “valid frame” has been used to describe that operations like FCS check have been passed for receiving a frame. Note that the phrase “a valid frame” has also been used in 10.3.2.4 for legacy NAV setting rule. However, those detailed operations shall have been included in the receiving procedure, and it is true that having additional description like “valid” may confuse people. Hence, propose to remove “valid” from the phrase.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 164. |
| 2491 | Yongho Seok | 53.18 | 25.2.1 | "For the two NAVs maintained by a HE STA, one is identified as Intra-BSS NAV, and the second one is identified as regular NAV."When a HE STA is associated with multiple APs (for example, a mesh network and Wi-Fi Direct), what is the meaning of the the corresponding sentence?Do you mean that an HE STA shall maintain two NAVs for each associated AP? It is too complicted. Please clarify it. | As per comment | Revised –For HE STAs, only two NAVs are maintained. Intra-BSS NAV is used to store NAV value, if needed, from a frame identified as Intra-BSS. Regular NAV is used to store NAV value, if needed, from a frame identified as Inter-BSS or cannot be identified as Intra-BSS or Inter-BSS.Further, the identification method based on HE-SIG-A or MAC header is refered to 25.2.1 (Intra-BSS and inter-BSS frame detection) based on document 16/889r1.Hence, the operation of two NAVs has been clarified. TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1742 and 1466. |
| 1215 | Liwen Chu | 53.29 | 25.2.1 | If a PPDU can't be identified as inter or intra BSS, CCA should be done by assuming intra-BSS PPDU. So the updated NAV should also be inter-BSS NAV. | As in comment. | Revised –Agree in principle that the virtual CS for two NAVs need clarification. Virtual CS indication of medium for two NAVs are added in 25.2.2, and if one of the NAV counters is nonzero, then virtual CS indication is busy. Hence, updating either NAV has the same effect on CCA indication.As for the updated NAV, regular NAV is used to store NAV value, if needed, from a PPDU identified as Inter-BSS or cannot be identified as Intra-BSS or Inter-BSS. Further, the identification method based on HE-SIG-A or MAC header is refered to 25.2.1 (Intra-BSS and inter-BSS frame detection) based on document 16/889r1, and this section does not do further modification for classification.TGax editor to make the changes shown in 11-16/1106r1 under all headings that include CID 1742 and 1775. |
| 29 | Ahmadreza Hedayat | 53.13 | 25.2.1 | Regarding "A STA that receives at least one valid frame in a PSDU and cannot identify the frame as Intra-BSS or Inter-BSS can update its regular NAV with the information from any valid Duration field in the PSDU.", it seems that if the Intra- vs Inter-BSS origin of a frame cannot be identified updating both NAVs is a more reasonable choice to do (if maintaing both NAVs is mandatory). | Suggest to change this clause accordingly. | Rejected –The design of two NAVs is to use Intra-BSS NAV for NAV setting from PPDU that can be identified as Intra-BSS frame and can be ignored during UL MU response. If a PPDU can not be identified as Intra-BSS or Inter-BSS, then setting the regular NAV is enough for reserving the medium, and the setting in Intra-BSS NAV will not be corrupted and can be ignored during UL MU response. |

**Discussion:** *None.*

**Propose:**

Revised for CID 1775, CID 1742, and CID 1466 per discussion and editing instructions in 11-16/1106r1.

***TGax editor: Add the underlined texts in 10.3.2.1 CS mechanism as the following:***

The CS mechanism combines the NAV state and the STA’s transmitter status with physical CS to determine
the busy/idle state of the medium. The NAV may be thought of as a counter, which counts down to 0 at a
uniform rate. When the counter is 0, the virtual CS indication is that the medium is idle; when the counter is
nonzero, the indication is busy. The virtual CS indication of medium for HE STAs with two NAVs is described in 25.2.2 (Updating two NAVs).(#1775)

***TGax editor: Add the underlined texts in 10.3.2.4 Setting and resetting the NAV as the following:***

This subclause describes the setting and resetting of the NAV timer for non-DMG STAs and DMG STAs
that support a single NAV timer. DMG STAs that support multiple NAV timers shall update their NAV
timers according to the procedures described in 10.36.10 (Updating multiple NAV timers). HE STAs with two NAV timers shall update their NAV timers according to the procedures described in 25.2.2 (Updating two NAVs).(#1775)

***TGax editor: Add the Paragraph on page 72 line 27 as the following:***

The requirements in 10.3.2.1 (CS mechanism) applies to an HE STA maintaining two NAVs with the exception of virtual CS indiction 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.(#1775)

***TGax editor: Add the underlined texts on page 72 line 30 as the following:***

For the two NAVs maintained by an(#2829) HE STA, one is identified as intra-BSS(#1465) NAV, and the
second one is identified as regular NAV. Intra-BSS NAV is used to store NAV value, if needed, from a PPDU identified as intra-BSS. Regular NAV is used to store NAV value, if needed, from a PPDU identified as inter-BSS or cannot be identified as intra-BSS or inter-BSS.(#1742) Note that the method of identifying a PPDU as intra-BSS or inter-BSS is described in 25.2.1 (Intra-BSS and inter-BSS frame detection).(#1466)

***TGax editor: Add the Paragraph on page 73 line 14 as the following:***

Various additional conditions may set or reset the intra-BSS NAV or regular NAV, as described in 10.4.3.3 (NAV operation during the CFP). When one NAV is reset, if the other NAV timer is 0, a PHY-CCARESET.request primitive shall be issued. The intra-BSS NAV or regular NAV update operation is performed when the PHY-RXEND.indication primitive is received.(#1775)

**Propose:**

Revised for CID 1743 per discussion and editing instructions in 11-16/1106r1.

***TGax editor: Add the Paragraph on page 73 line 14 as the following:***

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 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 regular 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 25.5.2.4 (UL MU CS mechanism).(#1743)

**Propose:**

Revised for CID 164, CID 1759, CID 2473, CID 1466, CID 1743, CID 1744 per discussion and editing instructions in 11-16/1106r1.

***TGax editor: Modify the texts from page 72 line 32 to page 73 line 13 (25.2.2 Updating two NAVs) as the following:***

**25.2.2 Updating two NAVs**

The duration information is indicated by a frame in a PSDU as follows: (#164)

* If there is a Duration field in the frame, then the duration information is indicated by the Duration field(#164)
* If the frame is 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.(#1759)

A STA 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(#164)

* the frame is identified as intra-BSS according to the rule described in 25.2.1 (Intra-BSS and inter-BSS frame detection)(#164, #1466)
* the indicated duration information is greater than the STA's current intra-BSS NAV value(#164)
* the received frame's RA is not equal to the STA's own MAC address(#164)

A STA shall update the regular NAV with the duration information indicated by the received frame in a PSDU if and only if all the following conditions are met(#164)

* the frame is identified as inter-BSS or cannot be identified as intra-BSS or inter-BSS according to the rule described in 25.2.1 (Intra-BSS and inter-BSS frame detection) (#164, #1466)
* the indicated duration information is greater than the STA's current regular NAV value(#164)
* the received frame's RA is not equal to the STA's own MAC address(#164)

A STA 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(#164)

* the RXVECTOR parameter TXOP\_DURATION is not set to all 1s(#164)
* the PPDU that carried information of the RXVECTOR parameter is identified as intra-BSS according to the rule described in 25.2.1 (Intra-BSS and inter-BSS frame detection) (#164, #1466)
* the STA does not receive a frame with the duration information indicated by a Duration field in the PSDU(#164)
* the duration information indicated by the RXVECTOR parameter TXOP\_DURATION is greater than the STA's current intra-BSS NAV (#164)
* the PPDU that carried information of the RXVECTOR parameter is not HE trigger-based PPDU triggered by the STA(#2473)

A STA shall update the regular NAV with the duration information indicated by the RXVECTOR parameter TXOP\_DURATION if and only if all the following conditions are met(#164)

* the RXVECTOR parameter TXOP\_DURATION is not set to all 1s. (#164)
* the PPDU that carried information for the RXVECTOR parameter is identified as inter-BSS according to the rule described in 25.2.1 (Intra-BSS and inter-BSS frame detection) (#164, #1466)
* the STA does not receive a frame with the duration information indicated by a Duration field in the PSDU(#164)
* the duration information indicated by the RXVECTOR parameter TXOP\_DURATION is greater than the STA's current regular NAV (#164)

NOTE 1 – If a PS-Poll is received~~carried~~ in a ~~received~~ HE SU PPDU, HE extended range PPDU, or HE MU PPDU, then the RXVECTOR parameter TXOP\_DURATION does not indicate duration information (see 25.12 TXVECTOR parameters TXOP\_DURATION for an HE PPDU). (#1759)

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.(#164, #1744)

~~A STA that receives at least one valid frame in a PSDU and identifies the frame as intra-BSS(#1465) can
update its intra-BSS(#1465) NAV with the information from any valid Duration field in the PSDU.~~ (#164)

 ~~A STA that receives at least one valid frame in a PSDU and identifies the frame as inter-BSS(#1465) can
update its regular NAV with the information from any valid Duration field in the PSDU.~~ (#164)

 ~~A STA that receives at least one valid frame in a PSDU and cannot identify the frame as intra-BSS(#1465)
or inter-BSS(#1465) can update its regular NAV with the information from any valid Duration field in the
PSDU.~~ (#164)

 ~~A STA that receives a valid HE-SIG-A in an(#2829) HE PPDU and identifies the HE-SIG-A as intraBSS(#1465) can update its intra-BSS(#1465) NAV with the information from the TXOP Duration field in
the HE-SIG-A.~~ (#164)

 ~~A STA that receives a valid HE-SIG-A in an(#2829) HE PPDU and identifies the HE-SIG-A as interBSS(#1465) can update its regular NAV with the information from the TXOP Duration field in the HE-SIGA.~~ (#164)

 ~~When the received frame's RA is equal to the STA's own MAC address, the STA shall not update its intraBSS(#1465) NAV or regular NAV with the information from the Duration field.~~ (#164)

 ~~When a STA receives both a valid HE-SIG-A in an(#2829) HE PPDU and a valid frame in the PSDU of the
HE PPDU, the STA shall not update its intra-BSS(#1465) NAV or regular NAV with the information from
the TXOP Duration field in the HE-SIG-A.~~ (#164)

 ~~For all other received frames that are identified by the STA as intra-BSS(#1465), the STA shall update its
intra-BSS(#1465) NAV when the received value of the Duration field is greater than the STA's current intraBSS(#1465) NAV value.~~ (#164)

~~For all other received frames that are identified by the STA as inter-BSS(#1465) or cannot be identified as
intra-BSS(#1465) or inter-BSS(#1465), the STA shall update its regular NAV when the received value of the
Duration field is greater than the STA's current regular NAV value.~~ (#164)

 ~~For all other received HE-SIG-As that are identified by the STA as intra-BSS(#1465), the STA shall update
its intra-BSS(#1465) NAV when the received value of the TXOP Duration field is greater than the STA's
current intra-BSS(#1465) NAV value.~~ (#164)

 ~~For all other received HE-SIG-As that are identified by the STA as inter-BSS(#1465), the STA shall update
its inter-BSS(#1465) NAV when the received value of the TXOP Duration field is greater than the STA's
current regular NAV value.~~ (#164)