### IEEE P802.11Wireless LANs

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| 11ax D1.0 MAC Comment Resolution for 10.3.2.4 and 27.2.2 Part I |
| Date: 2017-03-06 |
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Abstract

This submission proposes resolutions for comments of TGax Draft 1.0 with the following CIDs:

10250, 10320, 10321, 10322, 10323, 10247, 10005, 10006, 10246, 9584, 9386, 9285, 8592, 8354, 8211, 7233, 6068, 6056, 5930, 5559, 5468, 5466, 5463, 5358, 5169, 3057, 8268, 8269, 7844, 9442

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Revised the resolution for CID 3057 based on the suggestion from Sean

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 D1.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax D1.0 Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 10250 | Yusuke Tanaka | 152.56 | 27.2.2 | Two NAVs is defined in this spec but the current RA field of CF-END is broadcast and an HE STA can not decide which NAV should be reset when it receives CF-END. | Define a new CF-END frame whose RA is the address of the intended STA. | Rejected – Currently, the TA field of the CF-End is always set to the BSSID. As a result, the STA can always classify the frame as Intra-BSS or Inter-BSS based on the BSSID. Hence, there is no need to define a new CF-End Frame. |
| 10320 | Zhou Lan | 150.25 | 27.2.2 | "An HE non-AP STA shall maintain two NAV timers. An HE AP STA may maintain two NAV timers." clarify the different requirement between AP and Non-AP STA | per comment | Rejected – One of the main motivation for maintiatning two NAV timers is for the non-AP STA to be able to ignore the Intra-BSS NAV and considers the basic NAV in response to Trigger frame. Since AP STA will never receive a Trigger frame. Maintaining two NAV timers is then optional for AP STA.  |
| 10321 | Zhou Lan | 150.31 | 27.2.2 | "if one of the two NAV timers is nonzero, thevirtual CS indication is that the medium is busy." clarify if the intra NAV is zero and inter NAV is non zero, in such case, what is the idle status? | per comment | Rejected – The referred sentence says if one of the two NAV timers is nonzero, then virtual CS indication is that the medium is busy. Hence, if the intra-BSS NAV is zero and basic NAV is nonzero, then the virtual CS indication is that the medium is busy |
| 10322 | Zhou Lan | 150.40 | 27.2.2 | "The duration information is indicated by a frame in a PSDU as follows" clarify the case when the duration field is in the SIG-A (not part of PSDU),how the NAV update is performed | per comment | Rejected – The description for updating the NAV based on the RXVECTOR parameter TXOP\_DURATION is described in page 151 line 8 to lin 36. Also note that the description refers to a frame in a PSDU rather than a packet in a PPDU. Hence, the phrase does not refer to the SIG-A portion. |
| 10323 | Zhou Lan | 150.52 | 27.2.2 | "A STA shall update the intra-BSS NAV with the duration information indicated by the received frame in aPSDU if and only if all the following conditions are met:". Clarify if the duration filed is in the SIGA (i.e not part of the PSDU), how the intra NAV will be updated. | per comment | Rejected – The description for updating the Intra-BSS NAV based on the RXVECTOR parameter TXOP\_DURATION is described in page 151 line 8 to lin 22. Also note that the description refers to a frame in a PSDU rather than a packet in a PPDU. Hence, the phrase does not refer to the SIG-A portion. |
| 10247 | Yusuke Tanaka | 151.51 | 27.2.2 | The condition does not cover the case two NAVs are reset at the same time. | Add "or two NAVs are reset at the same time" after "other NAV timer is 0," | Revised – Agree in principle with the commenter. Revised correspondingly based on the suggestion. TGax editor to make the changes shown in 11-17/0324r1 under all headings that include CID 10247. |
| 8268 | Pascal VIGER | 151.50 | 27.2.2 | Is it useful to mention "10.4.3.3 (NAV operation during the CFP)" for an HE STA ?As according to 27.1, the use of HCCA is banned at HE STAs, is there still exist a CFP period? | as per comment | Revised – Agree in principle with the commenter. The related description of CFP is deleted.TGax editor to make the changes shown in 11-17/0324r1 under all headings that include CID 8268. |
| 8269 | Pascal VIGER | 115.12 | 10.3.2.4 | Is it useful to mention "10.4.3.3 (NAV operation during the CFP)" for an HE STA ?As according to 27.1, the use of HCCA is banned at HE STAs, is there still exist a CFP period? | as per comment | Revised – Agree in principle with the commenter. We clarify that this statement is for a STA that is not a HE STA.TGax editor to make the changes shown in 11-17/0324r1 under all headings that include CID 8269. |
| 7844 | Mark RISON | 151.50 | 27.2.2 | Reference is made to additional conditions that may set or reset the NAV in 10.4.3.3, but it is not explicit whether this applies to the intra-BSS NAV, the basic NAV, or both. | Specify that:i) The NAV updated from the CDPMaxDuration or CFPDurRemaining value is selected based on the intra-BSS or inter-BSS designation of the received Beacon or Probe Response frame.Ii) The NAV is reset in response to CF-End or CF-End +CF-Ack frames as specified in 10.22.2.9. | Revised – Agree in principle with the commenter. 11ax bans HCCA as described in 27.1. The related description of CFP is deleted.TGax editor to make the changes shown in 11-17/0324r1 under all headings that include CID 8268. |
| 9442 | Xiaofei Wang | 151.50 | 27.2.2 | There are no rules in Section 10.4.3.3 regarding setting or resetting the intra-BSS NAV or basic NAV, which are newly defined in 11ax, the reference is incorrect and should be rephrased. | Correct the reference to 10.4.3.3 or add additional text in section 10.4.3.3 regarding setting and resetting intra-BSS NAV or basic NAV. | Revised – Agree in principle with the commenter. 11ax bans HCCA as described in 27.1. The related description of CFP is deleted.TGax editor to make the changes shown in 11-17/0324r1 under all headings that include CID 8268. |
| 10005 | Yuichi Morioka | 150.24 | 27.2.2 | The specification shall allow for more than two NAVs to be managed,i.e. maintain a NAV per OBSS, in order to avoid inter-BSS collision when there are more than one OBSS. | Define an option where STA maintains NAVs per BSS/OBSS. | Rejected –The option of maintaining one timer for each OBSS is discussed offline in the past among companies. The main concern is that in the dense environment, which is the main scenario dealt by 11ax, this proposal implies that a STA may need to maintain many NAV timers, i.e., one for each OBSS as proposed by the commenter. Note that a STA can not control beforehand for the potential number of OBSSs. The only benefit along this line is for better regulation of NAV under CF-End. However, the additional complexity does not justify the benefit, and the design then does not go to the proposed direction. |
| 10006 | Yuichi Morioka | 150.24 | 27.2.2 | In order to allow efficient spatial reuse, the specification should define a mechanism where the a STA may transmit at lowered power during NAV set by OBSS, based on the reception power of the inter-BSS PPDU. | Expand the current OBSS-PD mechanism so MAC level spatial reuse can be realized. The commenter is willing to provide details of the resolution. | Rejected –11ax has defined OBSS-PD mechanism such that if spatial reuse is applied, then NAV is not updated. As a result, there is no need to design additional scheme when NAV is set, i.e., spatial reuse is not even applied at the first place. |
| 10246 | Yusuke Tanaka | 150.48 | 27.2.2 | Static NAV can provide MAC level power save without suffering with unpredictable NAV updating. | Add the following rule at L48."An HE AP may indicate that the NAV set by the Duration field in the PPDU will not be updated."Add the following rule at L59 and P151L5"If an HE non-AP STA receives a PPDU with indication that the NAV set by the Duration field in the PPDU will not be updated, the HE non-AP STA may enter the doze state until the end of the NAV." | Rejected –We reject this proposal due to the following three reasons.First, currently, there is no way to signal this kinds of indication in any packet. Without propsing the specific indication, it is not appropriate to directly assume that the signaling exists. Second, the TXOP holder may also not be able to control exact behaviour in a TXOP beforehand because TXOP holder can not predict what will happen in the established TXOP like retransmission operations and so on. It will hard for TXOP holder to decide if the remaining TXOP will be cancel or not.Third, it is unlikely that a STA will sleep when receiving an inter-BSS PPDU in case there could be additional intra-BSS PPDU transmission. Based on this understanding, 11ax has introduced intra-BSS PPDU power save, so the proposal will only add benefits on top of the power save benefit provided by intra-BSS PPDU power save. It is not clear how much benefits can be added on top of intra-BSS PPDU power save after introducing this signaling. |
| 9584 | Yongho Kim | 115.13 | 10.3.2.4 | NAV reset procedure needs to be described if the NAV is set by Trigger frame | As in comment. | Rejected –The Trigger frame generally triggers a long UL transmission before the AP can transmit M-BA as an example. As a result, if we add NAV reset procedure, the timeout for NAV reset will be very long for the STA, and the benefit is then not that significant. It will be reasonable to rely on the AP to send CF-End, which can already be done in the current spec rather than introducing additional NAV reset scheme.  |
| 9386 | Weimin Xing | 114.62 | 10.3.2.4 | Which NAV shall be updated? In 27.2.2, updating two NAVs are described, therefore it is not necessary to describe NAV updating here | Please remove it. | Rejected –The referred sentence is for the NAV update from the RXVECTOR parameter TXOP\_DURATION, which is required for the HE AP STA that may only maintain one NAV. Hence, the referered sentence shall not be removed. |
| 9285 | Tomoko Adachi | 151.42 | 27.2.2 | NOTE 2 should be a baseline text, not a note. | Move the content of NOTE 2 to a baseline text and remove NOTE 2. | Rejected –The note is used to rephrease the following rule. *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 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*Since there are already spec texts to describe the rule, we keep the phrase as the note. |
| 8592 | Sheng Sun | 150.34 | 27.2.2 | My ubderstading is the single NAV currently supported by 802.11 devices is updated baed on the Duration value in the MAC header of all received frame (Inter or Intra BSS). The so called "Basic NAV" is only updated based on Inter-BSS frames received. | it is better to find another name other than Baisc NAV. Mayve Iter-BSS NAV. | Rejected –We clarify that not all the frames can be classified as intra-BSS or inter-BSS frame. There exists frames such as CTS frame or ACK frame that can not be classified as intra-BSS or inter-BSS frame. As a result, the rule specifies that Basic NAV can be updated by inter-bss frame or frame that can not be classified as intra-BSS or inter-BSS. This is the main reason why we call it basic NAV rather than inter-BSS NAV.  |
| 8211 | Osama Aboulmagd | 150.34 | 27.2.2 | My ubderstading is the single NAV currently supported by 802.11 devices is updated baed on the Duration value in the MAC header of all received frame (Inter or Intra BSS). The so called "Basic NAV" is only updated based on Inter-BSS frames received. | it is better to find another name other than Baisc NAV. Mayve Iter-BSS NAV. | Rejected –We clarify that not all the frames can be classified as intra-BSS or inter-BSS frame. There exists frames such as CTS frame or ACK frame that can not be classified as intra-BSS or inter-BSS frame. As a result, the rule specifies that Basic NAV can be updated by inter-bss frame or frame that can not be classified as intra-BSS or inter-BSS. This is the main reason why we call it basic NAV rather than inter-BSS NAV. |
| 8354 | Peter Loc | 150.29 | 27.2.2 | The statement "For an HE STA maintaining two NAVs, ..." implies that there are HE STAs may only support one NAV. Since supporting 2 NAVs is a requirement for HE-STAs, this statement should be rephrase. | Change "For an HE STA maintaining two NAVs, ...." to "For HE STAs,...." | Rejected –We clarify that it is optional for an AP STA to maintain two NAVs. Hence, the phrase is correct for the intention.  |
| 7233 | Kazuyuki Sakoda | 151.57 | 27.2.2 | In subclause 27.2.2 (Updating two NAVs), a sentence reads "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". I could find how to set inter-BSS NAV in D1.0. However, I could not find how the inter-BSS NAV is used to control channel access. | Add a new subclause under 27.2 describing how these 2 NAVs are used to control channel access. | Rejected –We clarify that channel access is basically controlled by the CS indication for medium busy/idle status, and NAV is the virtual CS mechanism to indicate medium busy/idle status. Since we have already described the medium busy/idle indication at the beginning of the section as shown below. We do not need to add new subclasue to describe channel access.*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, thevirtual CS indication is that the medium is busy.* |
| 6068 | Jeongki Kim | 114.62 | 10.3.2.4 | The STA with one NAV should know if the NAV updated by TXOP\_DURATION was set by Intra-PPDU or not before sending UL MU frame. | Insert the following thext in 10.3.2.4:"When a STA updates its NAV with RXVECTOR parameter TXOP\_DURATION, the STA shall save the RXVECTOR parameter BSS\_COLOR". | Rejected –We clarify that only HE non-AP STA will send HE TB PPDU. Further, it is mandatory for non-AP STA to maintain two NAVs. As a result, we do not need the additional mechanism. |
| 6056 | Jeongki Kim | 151.12 | 27.2.2 | When BSS Color is diabled, the STA should not update its Intra-BSS NAV with the TXOP\_DURATION of the received Intra-BSS PPDU. In subclause 27.2.2, the related texts should be updated. | Change the related text in 27.2.2 as follows: -- 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 detection) and the most recently received HE Operation element from the AP to which it is associated contained a value of 0 in the BSS Color Disabled subfield | Rejected –Based on the offline discussion, wee clarify that there are three aspects for the possible problem under BSS color collision.1. STA may miss spatial reuse opportunity
2. STA can not do intra-BSS PPDU power save
3. If the STA receives the CF-End from the OBSS, STA may not cancel the NAV properly based on the new CF-End rule

For 2 and 3, STA can simply turn off the intra-BSS PPDU power save functionality and new TXOP truncation rule based on the BSS color Disabled indication form the AP. There is also an effort for AP to always not specify TXOP Duration under BSS color collision. As a result, there is no need for changing the setting rule on the STA side. |
| 5930 | James Yee | 150.22 | 27.2.2 | With more and more 802.11 devices operating in multiple modes, a STA may grab the channel and allocate partial or whole TXOP time for peer-to-peer communication or other proprietary usage, so that inter BSS STAs receiving the NAV request may not always be forbidden to access the channel.However, in the current text, STAs that receive any NAVs are not able to access the channel. A STA can give an indication showing that its intention to grab the channel does not disable channel access for inter BSS STAs. To improve overall network utilization, it is required to add such indication to enable inter-BSS NAV only mechanism. | Suggest adding mechanisms to enable single NAV (inter-NAV or intra-NAV) update, such as an additional PHY signaling or a specific MAC frame. | Rejected –11ax currently does not have mechanism to allocate part of the TXOP to peer-to-peer communication. Hence, we suggest not to design for something that is not in the spec. For inter-BSS channel access, 11ax also has defined spatial reuse scheme to improve medium access, and the OBSS STA can already ignore NAV by utilizing spatial reuse scheme with the consideration of protecting intra-BSS transmission. Hence, we do not need to introduce additional scheme.  |
| 5559 | Graham Smith | 115.14 | 10.3.2.4 | "The exact time of updating the NAV is described as follows." Do we need this? It does not add anything except to make the reader think tghat there is some very exact measurement taking place. Delete. | Delete cited text. | Rejected –We note that the following texts already exist in the baseline spec. *This NAV update operation is performed when the PHYRXEND.indication primitive is received*As a result, it is agreed by the baseline spec to clarify when NAV update operation is performed, which is at the end of the PPDU. In 11ax, due to the introduction of PPDU power save, it is possible for STA to stop receiption earlier and the PHYRXEND.indication primitive may then be submitted earlier. Henec, it is then required to clarify that the NAV update is at the end of the PPDU. |
| 5468 | Graham Smith | 151.28 | 27.2.2 | "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 detection)". Anything that is not intra, is inter. | Replace cited with "The PPDU that carried information for the RXVECTOR parameter is identified as inter-BSS (see 27.2.1 (Intra-BSS and inter-BSS frame detection))." | Rejected – We clarify that not all the frames can be classified as intra-BSS or inter-BSS frame as described in 27.2.1. There exists frames such as CTS frame or ACK frame that can not be classified as intra-BSS or inter-BSS frame all the time. Simply classifying everything that is not Intra-BSS frmae as Inter-BSS frame will have problem. For example, assume that a frame can not be classified as intra-BSS or inter-BSS, and a STA just classifies the frame as inter-BSS to do spatial reuse. Then the spatial reuse transmission may transmit on top of the intra-BSS transmission and kill the intra-BSS transmission. Hence, it is better to keep the frame as unclassified if it does not satisfy any condition for intra-BSS frame or inter-BSS frame. |
| 5466 | Graham Smith | 151.01 | 27.2.2 | "The frame is identified as inter-BSS or cannot be identified as intra-BSS or inter-BSS" if the frame is not identified as an intra it should be seen as an inter. | Replace sentence with "The frame is not identified as an intra-BSS frame (see 27.2.1 (Intra-BSS and inter\_BSS frame detection))" | Rejected – We clarify that not all the frames can be classified as intra-BSS or inter-BSS frame as described in 27.2.1. There exists frames such as CTS frame or ACK frame that can not be classified as intra-BSS or inter-BSS frame all the time. Simply classifying everything that is not Intra-BSS frmae as Inter-BSS frame will have problem. For example, assume that a frame can not be classified as intra-BSS or inter-BSS, and a STA just classifies the frame as inter-BSS to do spatial reuse. Then the spatial reuse transmission may transmit on top of the intra-BSS transmission and kill the intra-BSS transmission. Hence, it is better to keep the frame as unclassified if it does not satisfy any condition for intra-BSS frame or inter-BSS frame. |
| 5463 | Graham Smith | 150.44 | 27.2.2 | Why do we need a duration for a PS-Poll? And why the same as the duration for any data frame (ACK + SIFS)? A PS-poll does not get Ack'd ( I think), and also does this mean the PS-Poll has to be sent as an HE frame? I just don't see where the advantage of this 2 NAV idea comes from. Also why point out a duration is a duration? This obsession with inter and intra is beyond me, it just gets more and more complicated. Maintaining 2 NAVs is not trivial, the advantages are not obvious if at all, and making it mandatory seems adsurd . | Delete Lines 40 - 48 | Rejected – We note that the duration information for PS-Poll follows the baseline operation in 10.3.2.4 as shown below.*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 oneSIFS…*The duration is calculated based on a predetermined equaltion. All these operations follow the baseline operation. Hence, we do not delete the sentence. |
| 5358 | EVGENY KHOROV | 150.25 | 27.2.2 | The reason why AP may maintain 2 NAVs while the STAs shall maintain 2 NAVs (i.e. STAs must support more features than APs) is not clear. | Make an HE AP support 2 NAV timers | Rejected – One of the main motivation for maintiatning two NAV timers is for the non-AP STA to be able to ignore the Intra-BSS NAV and considers the basic NAV in response to Trigger frame. Since AP STA will never receive a Trigger frame. Maintaining two NAV timers is then optional for AP STA.  |
| 5169 | Dorothy Stanley | 151.32 | 27.2.2 | Regarding "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:" and "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", aren't these contradicatory statements? Please clarify intent. | as in comment | Rejecetd – We clarify that this is not a contradicatory sentence. It is possible for a STA to only decode the TXOP\_DURATION field in HE-SIG-A and not decode any MAC header in the same PPDU. In this case, STA will update the NAV based on the indication in the HE-SIG-A. If a STA decodes duration information indicated by a Duration field in the PSDU of the PPDU, since the indication is more accurate, the indication in the HE-SIG-A is then ignored. |
| 3057 | Abhishek Patil | 150.42 | 27.2.2 | Replace Duration with Duration/ID | Replace Duration field with Duration/ID field - this applies to several instances throughout this section | Rejecetd – We note that in the current spec both Duration/ID field and Duration field are used in the current spec. For example, the description in 9.2.5.2 uses Duration/ID field, and the description in 10.3.2.4 uses Duration field. We think that both usage is fine since they have been in the spec for a long time, and we can simply follow the usage in the similar section for consistency. Since 27.2.2 is related to the description in 10.3.2.4, we then keep the same usage. |

**Discussion:** *None.*

**Propose:**

Revised for CID 10247, CID 8268 per discussion and editing instructions in 11-17/0324r1.

***TGax editor: Modify the sentence on page 115 line 12 in 10.3.2.4 as the following:***

Various additional conditions may set or reset the NAV for a STA that is not an HE STA(#8269), as described in 10.4.3.3 (NAV operation during the CFP).

***TGax editor: Modify the sentence on page 151 line 50 to line 54 in 27.2.2 as the following:***

~~Various additional conditions may set or reset the intra-BSS NAV or basic NAV, as described in 10.4.3.3
(NAV operation during the CFP).~~(#8268) ~~When one NAV is reset, if the other NAV timer is 0, a~~ A PHYCCARESET.request primitive shall be issued if one of the following condition is met:~~.~~ (#10247)

* One NAV is reset, and the other NAV timer is 0(#10247)
* Both NAVs are reset simultaneously (#10247)

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