### IEEE P802.11Wireless LANs

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| 11ax D1.0 MAC Comment Resolution for 27.5.2.4 |
| Date: 2017-02-27 |
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Abstract

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

3142, 5992, 4830, 7650, 8061, 9712, 9912, 9913, 9914, 10271, 10272, 9297, 10011, 4831, 7575, 10014, 3012

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Editorial revision and rearranging sentence based on the suggestion from Alfred
* Rev 2: Revision to clarify UL MU transmission based on the comment from Kiseon. Add CID 3012.

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** |
| 4831 | Alfred Asterjadhi | 170.61 | 27.5.2.4 | By followng this rule then the behavior described at line 29 will never be used.Simply say that the STA considers the ED and NAV if CS Required is 1 and does not if the CS Required is 0. | either keep line 29 or keep this one | Revised -Agree in principle with the comment. TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 4831. |
| 7575 | Liwen Chu | 170.26 | 27.5.2.4 | Here the virtual carrier sensing is not needed if the responding are Ack/BA and the length is less than 418. However CS Required is set to 0 when the length is less than 418 and the responding from all STAs are Ack/BA. | harmonize them | Revised - Agree in principle. We delete the requirement on the STA side to check if the response contains ACK/BA.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 4831. |
| 5992 | Jarkko Kneckt | 170.32 | 27.5.2.4 | The current conditions are not in the most simple format. The most important issue for the UL MU CS is when the CS indicates idle. Also the conditions when one or two NAVs are being used are not confusing. | The virtual CS indicates idle, if: - the response generated by the STA contains an ACK frame or a BlockAck frame and the value of the Length subfield in the Common Info field of the TRigger frame is less than or equal to 418 - if one NAV is considered, the NAV was set by an intra-BSS frame, - if two NAVs are considered, the duration of the basic NAV is zero. | Revised –Agree in principle with the commenter. We have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. As a result, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 3142 | Adrian Stephens | 170.26 | 27.5.2.4 | "A NAV is considered in virtual CS" - awkward | "A non-zero value of NAV indicates virtual CS busy" or similar | Revised –Agree in principle with the commenter. We clarify that the word “considered is used” because if the NAV is set by Intra-BSS frame, then the NAV is not considered even if the NAV counter is not 0.To align with the suggestion of the commenter, we have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. As a result, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 4830 | Alfred Asterjadhi | 170.37 | 27.5.2.4 | "If one or both of the NAVs are considered and the considered NAV's counter is not zero." which NAVs? Explicitly state. Also, what are the cases where one or the other or both NAV are considered? | Please clarify. | Revised –Agree in principle with the commenter. We have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. The referred sentence has been revised. Specifically, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992.  |
| 7650 | Liwen Chu | 170.37 | 27.5.2.4 | "both of the NAVs are considered"Clarify when both NAVs are considered for UL MU transmission. | As in comment | Revised –Agree in principle with the commenter. We have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. The referred sentence has been revised. Specifically, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 8061 | Massinissa Lalam | 170.26 | 27.5.2.4 | From the text, it seems that a STA that is sollicited by a trigger frame for an UL transmission will not consider a NAV set by intra-BSS, i.e. by a STA from the same BSS ... is it really the wanted behavior? If so, then "If one or both of the NAVs are considered and the considered NAV's counter is nonzero" only refers to the inter-BSS NAV and should be rephrased accordingly. | As in comment. | Revised –Agree in principle with the commenter. We clarify that the intention is to ignore the NAV set by intra-BSS frame. We also add condition that a NAV is not considered if the NAV counter is 0. As a result, the referred sentence has been revised. Specifically, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 9712 | Yongho Seok | 170.31 | 27.5.2.4 | "The NAV was set by an intra-BSS frame"Because an HE non-AP STA always maintains two NAVs, the above sentence shall be re-writtend for two NAVs.Change it as the following:"The value of the basic NAV is 0." | As per comment. | Revised –Agree in principle with the commenter. We have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. The referred sentence has been revised. Specifically, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 9912 | Young Hoon Kwon | 170.29 | 27.5.2.4 | It is misleading. For a STA that is solicited by a Trigger frame needs to consider NAV if CS\_Required bit is set to 1 in the Trigger frame and will not consier NAV if CS\_Required bit is set to 0. So, the first bullet should be th AP's behavior on when to set the CS\_Required bit to 1. | Change the first bullet to "The CS Required subfield in the Trigger frame is set to 1." | Revised –Agree in principle with the commenter. We have deleted the first bullet since the condition is already covered by the setting rule of CS required bit. We do not add additional condition because the following sentence has described that when CS required bit is set to 0, then the STA ignore any busy/idle status of the medium.*If the CS Required subfield in a Trigger frame is set to 0 or an UL MU response scheduling A-Control field is included in the received (A-)MPDU that solicits a response, the STA may respond with an HE triggerbased PPDU without regard to the busy/idle state of the medium.*TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 4831. |
| 9913 | Young Hoon Kwon | 170.31 | 27.5.2.4 | This is wrong. The STA may ignore intra-NAV but still needs to repect basic NAV. Therefore, even though NAV was set by an intra-BSS frame (intra-NAV is set), if there's non-zero basic NAV, the STA shall consider NAV. | Change the second bullet to "The basic NAV has non-zero value.". | Revised –Agree in principle with the commenter. We note that the bullet indicates condition for not considering the NAV. We also have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. As a result, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 9914 | Young Hoon Kwon | 170.37 | 27.5.2.4 | It needs further clarification that even though virtual CS is busy, the STA is allowed to transmit if basic NAV is zero. | As in the comment. | Revised –Agree in principle with the commenter. We note that the bullet indicates condition for not considering the NAV, and the NAV sets by Intra-BSS NAV is not considered. We also have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. As a result, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 10271 | Yusuke Tanaka | 170.26 | 27.5.2.4 | Two-NAVs is mandatory for HE non-AP STA. | Replace "A NAV is" with "An intra-BSS NAV and a basic NAV are". | Revised –Agree in principle with the commenter. We keep the writing in general form so that we do not need to list the conditions twice. We also have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. As a result, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 10272 | Yusuke Tanaka | 170.32 | 27.5.2.4 | This sentence can be simple using "a intra-BSS NAV". | Replace this sentence with as follows."The intra-BSS NAV was set." | Revised –Agree in principle with the commenter. We note that the bullet indicates condition for not considering the NAV. Hence, the current language is technically correct.We also have revised the sentence to add condition that a NAV is not considered if the NAV counter is 0. As a result, virtual CS for UL MU indicates idle if no NAV is considered. Otherwise, virtual CS for UL MU indicates busy.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 5992. |
| 9297 | Tomoko Adachi | 170.37 | 27.5.2.4 | The contents of this paragraph is already mentioned in clause 27.2.2, from page 150 line 27. Also, as the CS after the Trigger frame doesn't case the intra-BSS NAV, emphasizing the general interpretation under two NAVs by setting this paragraph after the paragraph starting from line 26 is misleading. | Describe that the CS for UL-MU is done during SIFS after the reception of the Trigger frame and refer clause 27.2.2 for the virtual CS operation for HE STAs. Delete the paragraph starting from line 37 in page 170. | Revised –We clarify that 27.2.2 is for the NAV setting rather than the indication of virtual CS for UL MU, where NAV set by Intra-BSS frame can be ignored. Hence, we think the sentence in 27.5.2.4 is required. To differentiate the virtual CS indication for UL MU, we have added corresponding sentence. We also add description that the CCA and NAV consideration for UL MU is done SIFS after the Trigger frame and state upfront that STA can respond without regard to busy/idle status.Finall, we clarify that UL MU transmission means transmission of HE trigger-based PPDU or non-HT PPDU or non-HT duplicate PPDU.TGax editor to make the changes shown in 11-17/0302r2 under all headings that include CID 9297. |
| 10011 | Yuichi Morioka | 167.51 | 27.5.2.4 | When STA sets the basic NAV and then receives Trigger Frame in CS required bit = 1, STA can't transmit MU PPDU. This may create inefficiency. | Add texts as follow.Upon reception of a Trigger Frame with CS Required bit = 1, if the reception power of the PPDU that set the basic NAV is lower than the OBSS-PD threshold, the STA may ignore the basic NAV and transmit an UL PPDU. | Rejected –If spatial reuse is performed when a STA receives the PPDU, the STA can already ignore the NAV. Hence, it is not needed to add condition in this section. |
| 10014 | Yuichi Morioka | 170.53 | 27.5.2.4 | HE AP may be able to more effectively allocate UL MU resource if it has knowledge of the interference level observed at the HE STA. | Add Interference Level measurement feedback operation like HE buffer status feedback operation. | Rejected –11ax has introduced new Trigger variant Bandwidth Query Report Poll (BQRP) that can ask for busy/idle status of the STA on different 20 MHz channel. This scheme has provided some notion of checking if the interference on the STA is high or low on certain 20 MHz band. It is not justified why we need to go beyond the existing techniques and ask the STA to report exact interference level. To report exact interference level, STA also needs to have capability to collect energy for only certain RU unit like 2/4/8 MHz RU, this introduces new requirement on the STA side, and the benefit are not justified to introduce additional implementation complexity on the STA side. |
| 3012 | Abhishek Patil | 43.01 | 9.3.1.23 | The expected behavior of a STA that receives the CS Required set to a certain value is somehow sparsed and confusing in all normative subclauses I checked. Please add a reference here to where the normative behaviro is defined. It should be something along this lines: If CS Required is 0 then STA is not requred to check ED and NAV, if CS Required is 1 then STA is required to check both ED and NAV. | As in comment. | Revised –Agree in principle with the commenter. Reference in 9.3.1.23 are added to refer the reader to 27.5.2.3 and 27.5.2.4 for further details about determining how to respond to Trigger frame and how to determine busy/idle status in UL MU CS. Note that the normative behaviour for response is already described in 27.5.2.3. In 27.5.2.4, we rearrange the sentence and state upfront that if CS required is 0, then the STA ignore the busy/idle status of the medium. The following texts then describe how virtual CS and physical CS indicate busy/idle status of the medium.   |

**Discussion:** *None.*

**Propose:**

Revised for CID 3102 per discussion and editing instructions in 11-17/0302r2.

***TGax editor: Add the sentence on page 44 line 6 in 9.3.1.23 as the following:***

The CS Required subfield is set to 1 to indicate that the STAs identified in the User Info fields are required
to use ED to sense the medium and to consider the medium state and the NAV in determining whether or not
to respond. The CS Required subfield is set to 0 to indicate that the STAs identified in the User Info fields
are not required to consider the medium state or the NAV in determining whether or not to respond. Details are described in 27.5.2.3 (STA behavior) and 27.5.2.4 (UL MU CS mechanism).(#3102)

**Propose:**

Revised for CID 5992, CID 4831, CID 9297 per discussion and editing instructions in 11-17/0302r2.

***TGax editor: Modify the sentence on page 170 line 26 to line 56 in 27.5.2.4 as the following:***

If the CS Required subfield in the received Trigger frame is 0 or an UMRS Control field is included in the received (A-)MPDU that solicits a response, then the STA may respond with the solicited PPDU without regard to the busy/idle state of the medium.(#9297)

A NAV is considered in virtual CS for a STA that is solicited by a Trigger frame for transmission unless one of the following conditions is met:
 ~~— The response generated by the STA contains an Ack frame or a BlockAck frame and the Length
 subfield in the Common Info field of the Trigger frame is less than or equal to 418~~(#4831)
 — The NAV was set by an intra-BSS frame

 — The NAV counter is 0 (#5992)

NOTE 1—The details of how a STA is solicited by the Trigger frame for transmission are described in 27.5.2.2.2 (Allowed settings of the Trigger frame fields and UL MU Response Scheduling A-Control subfields).

For a STA that is solicited by a Trigger frame for transmission, the indication of the virtual CS is described as follows. (#5992) If ~~one or both of the~~ no NAV is ~~are~~ considered ~~and the considered NAV’s counter is nonzero~~, then the virtual CS indicates idle~~busy~~. Otherwise, the virtual CS indicates busy~~is idle~~. (#5992)

If the CS Required subfield in a Trigger frame is set to 1, the STA shall consider the status of the CCA (using Energy Detect defined in 21.3.18.5.2 CCA sensitivity for operating classes requiring CCA-ED) and the virtual carrier sense (NAV) during SIFS after the Trigger frame(#9297) before the transmission of the solicited PPDU ~~UL MU transmission~~(#9297) in response to the Trigger frame. In this case, the STA shall sense the medium using energy-detect (ED) after receiving the PPDU that contains the Trigger frame (i.e. during the SIFS time), and it shall perform the energy-detect (ED) at least in the subchannel that contains the STA’s UL allocation, where the sensed subchannel consists of either a single 20 MHz channel or multiple of 20 MHz channels. The STA may transmit ~~an HE trigger-based PPDU~~the solicited PPDU(#9297) when the 20 MHz channels containing the allocated RUs in the Trigger frame are considered idle; if the STA detects that the 20 MHz channels containing the allocated RUs are not all idle, then the STA shall not transmit anything in the allocated RUs.

NOTE - The solicited PPDU is a non-HT or non-HT duplicate PPDU if the Trigger frame is an MU-RTS Trigger frame (see 27.4a (MU-RTS/CTS procedure)); otherwise, the solicited PPDU is an HE trigger-based PPDU (see 27.5.2.3 (STA behaviour)).(#9297)

Note to TGax editor: the change of section for MU-RTS/CTS procedure is part of 11-17/0264.

~~If the CS Required subfield in a Trigger frame is set to 0 or an UL MU response scheduling A-Control field
is included in the received (A-)MPDU that solicits a response, the STA may respond with an HE triggerbased PPDU without regard to the busy/idle state of the medium.~~(#9297)