IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LB 200 Comment Resolution for Clause 9.3.2.5a and 9.3.2.6 | | | | |
| Date: 2014-01-01 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92109 | +1-858-658-5302 | aasterja@qti.qualcomm.com |
| Amin Jafarian | Qualcomm Inc. |  |  | jafarian@qti.qualcomm.com |

Abstract

This submission proposes resolutions for comments in clause 9.3.2.5a and 9.3.2.6 of TGah Draft 1.0 with the following CIDs:

2102, 2899, 1714, 2125, 2308, 2309, 2743, 2744, 2745, 2783, 2900

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 TGah Draft. This introduction is not part of the adopted material.

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

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 2102 | 155.40 | 9.3.2.5a | It is not clear how freely a STA sending RTS frame can set the Bandwidht Indication field, especially when only supporting static bandwidth negotiation | Clarify that STA shall not send bandwidht indication field set to wider bandwidth than receving STA capability when only supporting static bandwidth, i.e. has set the dynamic indication to 0. | Agree in principle with the commenter. Proposed resolution is to clearly indicate how the Bandwidth indication field is set depending on the TXVECTOR parameter and the format of the frame that elicits the response.  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 2899 | 155.44 | 9.3.2.5a | static bandwidth operation is supported regardless of "Dynamic Indication field" setting. In other words, setting "Dynamic Indication field" to zero does not mean "it is capable of static bandwidth operation" but "it does not support dynamic bandwidth operation". | Modify the last sentence from "... of the RTS frame to 0 to indicate that it is capable of static bandwidth operation" to "... of the RTS frame to 0 to indicate that it does not support dynamic bandwidth operation.". | Agree with the commenter.  Resolution takes into account the proposed change.  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 1714 | 156.25 | 9.3.2.6 | A legacy STA is allowed to transmit a CTS frame that contains no data. So either the term "NDP CTS frame" is incorrectly named or the requirement on line 25 violates legacy 802.11 specifications. | Either delete this requirement or rename "NDP CTS frame" with a name that is more accurate. | Rejected –  The NDP CTS frame is and NDP MAC frame which is defined in 8.3.5 and it is a “NDP MAC frame: A physical layer (PHY) protocol data unit (PPDU) with no Data field that carries medium access control (MAC) information in the SIGNAL field of the sub 1 GHz (S1G) PPDU.” |
| 2125 | 155.60 | 9.3.2.6 | An S1G STA shall transmit NDP CTS frames instead of CTS frames, so delete the brackets. | as the comments | Agree with the commenter.  Resolution takes into account the proposed change.  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 2308 | 156.38 | 9.3.2.6 | "shall follow the rules of clause 9.3.2.6 for a CTS frame reception"  This is self reference. | Remove the self reference. | Agree with the commenter.  Resolution takes into account the proposed change.  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 2309 | 156.40 | 9.3.2.6 | "the STA disregards the received NDP CTS frame."  It seems to me you can't discard the frame. Instead NAV needs to be set. Let us say that a STA can't receive the following NDP CTS training frames. The STA may transmit frames to the AP when the AP is transmitting the following NDP CTS frames. | Fix the problem. | Agree with the commenter. The confusion is related to the fact tha not all the cases of NAV Setting/Disregardin are covered. Proposed resolution is to list all the possible cases (per Address Indicator, Early Sector Indicator, and RA/PBSSID values).  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 2743 | 156.06 | 9.3.2.6 | 1 MHz NDP CTS does not have bandwidth field. | Please modify/clarify | Agree with the commenter.  Proposed resolution clarifies the ambiguity.  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 2744 | 155.55 | 9.3.2.6 | Shall the NDP CTS frame's TXVECTOR parameters CH\_BANDWIDTH be set to the same value as the RTS frame's RXVECTOR parameter CH\_BANDWIDTH. | Please clarify | Agree with the commenter. Proposed resolution clarifies the ambiguity.  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 2745 | 156.41 | 9.3.2.6 | How about when Early Sector Indication is set to 1? | Please clarify | Proposed resolution is to list all the possible cases (per Address Indicator, Early Sector Indicator, and RA/PBSSID values).  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 2783 | 155.52 | 9.3.2.6 | NAV and RID counter shall be used to determine whether the channel is idle | Add the text "A S1G STA that receives an RTS frame addressed to it considers the NAV and RID in determining whether to respond with CTS, unless the NAV and RID was set by a frame originating from the STA sending the RTS frame (see 9.19.2.2 (EDCA TXOPs)). In this subclause for S1G STA, "NAV indicates idle" means that the NAV and RID counters are 0 or that the NAV or RID counter is nonzero but the non-bandwidth signaling TA obtained from the TA field of the RTS frame matches the saved TXOP holder address." | Agree with the commenter. Resolution accounts for the suggestion.  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |
| 2900 | 156.28 | 9.3.2.6 | "The RA Address field" should be "The RA field". | As mentioned in the Comment. | Agree with the commenter.  Revised –  TGah editor to make changes shown in 14/0081r0 under the heading for CIDs from 2102 to 2900. |

**Discussion:** *Agree with the commenters. Proposed resolution is to clearly indicate how the BW indication field in S1G Control frames is set and this depends on the TX/RXVECTOR parameter CH\_BANDWIDTH value of the control/response frame.*

* **VHT and S1G RTS procedure**

**Instructions to TGah Editor*: Change the inserted paragraph as follows:*** (#484)

An S1G STA using dynamic bandwidth operation (see 9.3.2.6 (CTS and DMG CTS procedure)) that transmits an RTS carried in a 2MHz duplicated frame (i.e., TXVECTOR parameter FORMAT equal to S1G\_DUP\_2M) shall set the Dynamic Indication field in the Frame Control field of the RTS frame to 1. Otherwise, the S1G STA shall set the Dynamic Indication field in the Frame Control field of the RTS carried in any other frame to 0 to indicate that it shall not use dynamic bandwidth operation (see 9.3.2.6 (CTS and DMG CTS procedure)).

* **CTS and DMG CTS procedure**

**Instructions to TGah Editor*: Change the paragraph below as follows (@802.11ac D5.0):*** (#484)

A STA that receives an RTS frame addressed to it considers the NAV in determining whether to respond with

CTS unless the NAV was set by a frame originating from the STA sending the RTS frame (see 9.19.2.2 (EDCA TXOPs)). In this subclause for a non-S1G STA, “NAV indicates idle” means that the NAV count is 0 or that the NAV count is nonzero but the non-bandwidth signaling TA obtained from the TA field of the RTS frame matches the saved TXOP holder address. For an S1G STA, “NAV indicates idle” means that both NAV and RID counters are 0 or that either NAV or RID counter is nonzero but the TA field of the RTS frame matches the saved TXOP holder address.”

**Instructions to TGah Editor*: Change the inserted paragraphs below as follows:*** (#484)

An S1G STA that is addressed by an RTS frame that has the Dynamic Indication field in the Frame Control field set to 0 (Static) behaves as follows:

* If the NAV indicates idle and the CCA has been idle for all secondary channels within the channel width indicated in the Bandwidth Indication field of the Frame Control field of the RTS frame for a PIFS period prior to the start of the RTS frame, then the STA shall respond with a NDP CTS frame after a SIFS period. The STA shall set the TXVECTOR parameter CH\_BANDWIDTH to a value that is equivalent to the value of the Bandwidth Indication field of the Frame Control field in the received RTS frame. The NDP CTS (≥2 MHz) frame shall have the Bandwidth Indication field set to the value of the Bandwidth Indication field of the received RTS frame.
* Otherwise the STA shall not respond with a NDP CTS frame.

An S1G STA that is addressed by an RTS carried in a 2 MHz duplicated frame that has the Dynamic Indication field in the Frame Control field set to 1 (Dynamic) behaves as follows:

* If the NAV indicates idle, then the STA shall respond with a NDP CTS (≥2 MHz) frame after a SIFS period. The NDP CTS frame's TXVECTOR parameter CH\_BANDWIDTH may be set to any channel width for which the CCA on all secondary channels has been idle for a PIFS prior to the start of the RTS frame and that is equal to or less than the channel width indicated in the Bandwidth Indication field of the Frame Control field of the RTS frame. The NDP CTS (≥2 MHz) frame shall have the Bandwidth Indication field set to a value that is equivalent to the value of the TXVECTOR parameter CH\_BANDWIDTH.
* Otherwise the STA shall not respond with a NDP CTS frame.

NOTE – NDP CTS (1 MHz) frame is not used for dynamic bandwidth indication.

***Change the 4th paragraph of the subclause as follows:***

A non-VHT STA that is not an S1G STA that is addressed by an RTS frame or a VHT STA that is addressed by an RTS frame carried in a non-HT or non-HT duplicate PPDU that has a non-bandwidth signaling TA or a VHT STA that is addressed by an RTS frame in a format other than non-HT or non-HT duplicate behaves as follows:

* If the NAV indicates idle, the STA shall respond with a CTS frame after a SIFS period.
* Otherwise, the STA shall not respond with a CTS frame.

***Insert the following paragraphs at the end of subclause 9.3.2.6 as follows:***

An S1G STA shall transmit NDP CTS frames instead of CTS frames. A non-S1G STA shall not transmit NDP CTS frames.

The RA field of the NDP CTS shall be generated as described in 8.3.5.1.1 (NDP CTS). The Duration field in the NDP CTS frame shall be set to the same value as the Duration field from the received RTS frame, adjusted by subtraction of aSIFSTime and the NDPTxTime required to transmit the NDP CTS frame, where NDPTxTime is calculated according to 9.3.2.4a (Setting and resetting the RID).

An S1G STA that receives an NDP CTS frame shall follow the rules described in this subclause for CTS frame reception if any of the following conditions are satistifed:

* The value of the Address Indicator field is equal to 0 and the value of the RA/PBSSID field indicates that the S1G STA is not the intended receiver of this frame
* The value of the Address Indicator field is equal to 1, and the value of the Early Sector Indicator field is equal to 0, and the value of the RA/PBSSID field is not equal to the PBSSID of the AP with which the non-AP STA is associated .
* The value of the Address Indicator field is equal to 1, and the value of the Early Sector Indication field is equal to 1, and the value of the RA/PBSSID is equal to the PBSSID of the AP with which the non AP- STA is associated

An S1G STA that receives an NDP CTS frame should disregard the value of the Duration field of the NDP CTS frame if any of the following conditions are satisfied:

* The value of the Address Indicator field is equal to 1, and the value of the Early Sector Indicator field is equal to 0, and the value of the RA/PBSSID field is equal to the PBSSID of the AP with which the non-AP STA is associated to.The value of the Address Indicator field is equal to 1, and the value of the Early Sector Indicator field is equal to 0, and the value of the RA/PBSSID is not equal to the PBSSID of the AP with which the non-AP STA is associated.

An S1G AP that receives an NDP CTS frame with a value of the Address Indicator field equal to 1 shall compare the value of the RA/PBSSID field with its own PBSSID value for the purpose of checking that any of the conditions listed above are satisfied.

**9.7.6.6 Channel Width selection for control frames**

**Instructions to TGah Editor*: Insert at the end of this subclause:*** (#484)

An S1G STA transmitting an S1G Control frame or an NDP Control frame shall set the TXVECTOR parameter FORMAT depending on the value of the TXVECTOR parameter CH\_BANDWIDTH:

* If CH\_BANDWIDTH is equal to CBW1 then the FORMAT shall be S1G
* If CH\_BANDWIDTH is equal to CBW2 then the FORMAT shall be:
  1. S1G\_DUP\_1M if the RXVECTOR parameter CH\_BANDWIDTH of the eliciting S1G Control frame is equal to CBW1 and the Bandwidth Indication field in the Frame Control field is 1.
  2. S1G\_DUP\_1M if the S1G STA intends to transmit a duplicated 1MHz control frame to an S1G STA that supports duplicated 1 MHz frames as indicated in the Duplicated 1 MHz Support field of the most recently received S1G Capabilities element from that S1G STA.
  3. S1G otherwise
* Otherwise, the FORMAT shall be S1G DUP\_2M
* **Channel Width in non-HT and non-HT duplicate PPDUs**

**Instructions to TGah Editor*: Change the inserted paragraph as follows:*** (#484)

An S1G STA transmitting an S1G Control frame that is not a control response frame shall set the Bandwidth Indication field in the Frame Control field of the frame toa value that is equivalent to the TXVECTOR's parameter CH\_BANDWIDTH.

An S1G STA shall not transmit an S1G Control frame or an NDP MAC frame with the TXVECTOR parameter S1G\_DUP\_1M to another S1G STA, unless the Duplicated 1MHz Support field of the most recently received S1G Capabilities element from that STA contained a value of 1.

An S1G STA transmitting a non-NDP S1G Control response frame that is sent as a response to an S1G Control frame shall set the Bandwidth Indication field in the Frame Control field of the frame to the value of the Bandwidth Indication field in the Frame Control field of the eliciting frame, except for an S1G STA that has indicated the use of 1MHz control response frames (see 9.7.6.6 (Channel Width selection for control frames)) in which case the Bandwidth Indication field in the Frame Control field of the non-NDP S1G Control response frame shall be set to 0.

An S1G STA shall set the Dynamic Indication field in the Frame Control field of S1G Control frames, other than RTS, to 0.

**24.3.9.12.2 2MHz duplicate transmission**

**Instructions to TGah Editor*: Change the third paragraph of this subclause as follows:*** (#484)

2MHz NDP sounding shall not be duplicated. Instead, a 4MHz, 8MHz or 16MHz NDP shall be transmitted whenever needed. NDP MAC frames transmitted over a 4MHz, 8 MHz or 16MHz channel shall be carried in a 2 MHz duplicated frame.

* **S1G Capabilities info field**

**Instructions to TGah Editor*: Change Figure 8-401dg (S1G Capabilities Info field) as follows:*** (#484)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 | B5 | B6 | B7 |
|  | Traveling Pilot Support | Short GI for  1 MHz | Short GI for  2 MHz | Short GI for  4 MHz | Short GI for  8 MHz | Short GI for 16 MHz | Supported Channel Width | |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 2 | |
|  | B8 | B9 | B10 | B11 | B12 | B13 |  | B15 |
|  | Rx LDPC | Tx STBC | Rx STBC | SU Beamformer Capable | SU Beamformee Capable | Beamformee STS Capability | | |
| Bits: | 1 | 1 | 1 | 1 | 1 | 3 | | |
|  | B16 |  | B18 | B19 | B20 | B21 | B22 | B23 |
|  | Number Of Sounding Dimensions | | | MU Beamformer Capable | MU Beamformee Capable | +HTC-VHT Capable | VHT Link Adaptation Capable | 2 MHz Long Format |
| Bits: | 3 | | | 1 | 1 | 1 | 1 | 1 |
|  | B24 | B25 | B26 | B27 | B28 | B29 |  | B31 |
|  | RD Responder | HT-Delayed Block Ack | Maximum A-MSDU Length | Maximum A-MPDU Length Exponent | | Minimum MPDU Start Spacing | | |
| Bits: | 1 | 1 | 1 | 2 | | 3 | | |
|  | B32 | B33 | B34 | B35 | B36 | B37 | B38 | B39 |
|  | Uplink  Synch  Capable | Dynamic  AID | BAT  Support | TIM ADE  Support | Non-TIM  Support | TWT  Support | STA  Type  Support | |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 2 | |
|  | B40 | B41 | B42 | B43 | B44 | B45 | B46 | B47 |
|  | Centralized  Authentication  Control(#482) | Distributed  Authentication  Control(#482) | A-MSDU  Supported(#10) | A-MPDU  Supported(#10,321) | Asymmetric Block Ack Supported | STA Sectorized Beam-Capable | AP Sectorized Beam-Capable | |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 2 | |
|  | B48 | B49 | B50 | B51 | B52 | B53 | B54 | B55 |
|  | OBSS Mitigation Support | Fragment BA Support | NDP PS-Poll Supported | RAW Operation Support | TIM Segmentation Support | TXOP Sharing Implicit ACK support | Multicast ID Support | Duplicated 1MHz Support |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| * **S1G Capabilities Info field** | | | | | | | | |

**Instructions to TGah Editor*: Add a new row in Table 8-191d as follows:*** (#484)

|  |  |  |
| --- | --- | --- |
| * **Subfields of the S1G Capabilities Info field (continued)** | | |
| **Subfield** | **Definition** | **Encoding** |
| … |  |  |
| Multicast ID Support | This bit indicates support of Flexible Multicast described in 9.51 (  Flexible Multicast). | Set to 1 if dot11MulticastIDActivated is true. Set to 0 otherwise. |
| Duplicat 1MHz Support | This bit indicates support for transmission of Duplicated 1 MHz PPDUs | Set to 1 if transmission of PPDUs in duplicate 1MHz format is supported.  Set to 0 otherwise |