IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Remaining comment resolutions to 27.8 | | | | |
| Date: 2017-02-22 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Jarkko Kneckt | Apple Inc. | Cupertino, CA |  | jkneckt@apple.com |
|  |  |  |  |  |

Abstract

The submission contains comment resolutions related to clause 27.8. The submission solves 7 CIDs:

CID4784, CID5948, CID5949, CID7404, CID7613, CID7617 and CID9938.

The text modifications are shown to 802.11ax D1.1.

CID4784

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 4784 | Alfred Asterjadhi | 189.05 | 27.8.2 | "Rx Channel Width" => "Channel Width". "To sent PPDUs" => "as transmit parameters for sending PPDUs" | As in comment. |

Discussion:

The RX Channel Width is changed to Channel Width as a resolution to CID7200.

The second proposal to change the text from to send PPDUs to "as transmit parameters for sending PPDUs" make the standard more readable.

Proposed Resolution: Accepted. The RX Channel Width is changed to Channel Width as a resolution to CID7200.

The normative text for the comment resolution is provided in submission 11-17-0281-r0.

CID5948

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5948 | James Yee | 188.48 | 27.8.2 | The information provided by ROM is partially overlapping with the informatiom from BQR. It is not clear if there is a rule how one relates to the other. | Please clarify. |

Discussion:

The Bandwidth Query Report contains CCA indication per 20 MHz channel, the ROM indicates the maximum channel width in which the STA is capable to receive.

The ROM should define the maximum channel width in which the STA is required to assess CCA for BQR. If the STA is having difficulties to operate in the current channel, the STA is allowed to optinally assess CCA to larger BW and provide this measurement report to the AP. The STA is not mandated to perform CCA for larger BW all the time, because performing CCA to multiple 20 MHz channels consumes non-AP STA battery.

Proposed resolution:

Revised. The Channel Width subfield of the Receive Mode Indication defines the bandwidth the STA is required to assess for BQR. The STA may optionally measure CCA for larger BW and provide this result to the AP.

The normative text for the comment resolution is provided in submission 11-17-0281-r0.

CID5959

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5949 | James Yee | 189.03 | 27.8.2 | The spec says "The OMI responder shall use the values indicated by the Rx Channel Width and Rx NSS subfields of the most recently received OMI A-Control field sent by the OMI initiator to send PPDUs to the OMI initiator in subsequent TXOP". It seems the channel availability information obtained from BQR is not considered here. | Please clarify. |

Discussion: The channel availability information obtained from BQR contains CCA for separate 20 MHz channels. The transmitter may use the BQR information to select the best channel for transmission, but the BQR is not limiting the channels use. BQR should be considered in the transmitter scheduling decisions, but the scheduling logic is outside the 802.11 standards. The ROM limits the BW in which the transmissions may be performed. This is the reason why ROM is discussed here and BQR is not considered.

Proposed resolution Rejected. The channel availability information obtained from BQR contains CCA for separate 20 MHz channels. The transmitter may use the BQR information to select the best channel for transmission, but the BQR is not limiting the channels use. BQR should be considered in the transmitter scheduling decisions, but the scheduling logic is outside the 802.11 standards. The ROM limits the BW in which the transmissions may be performed. This is the reason why ROM is discussed here and BQR is not considered. No changes to the ax specification and thus the comment is rejected.

CID7404

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7404 | Laurent Cariou | 188.22 | 27.8.1 | The spec says: "An HE STA can change its operating mode setting either using the procedure described in 11.42 (Notification of operating mode changes), or the procedure described in this subclause. " The 2 procedures should be harmonized so that they provide the same capabilities (same changes of mode of operation) | Modify the notification of operating mode changes using omn frames so that the transmit operating mode changes are also supported. |

Discussion: The Comment does not provide reasoning why the Operating Mode Notification and Operating Mode Indication should provide the same operation and should be harmonized.

The Operating Mode Notification and Operating Mode Indication have fundamental differences in their capabilities. For instance, Operating Mode Notification enables an AP to indicate its operating mode change signaling by using Beacon frames.

Also, the signaling in Operating Mode Notification, 9.4.2.166(Operating Mode Notification element) and signaling in Operating Mode Indication, 9.2.4.6.4.3(Operating Mode) are different. For instance, No LDPC field and RX NSS Type field are not present in OMI. Similarly, TX NSS and UL MU Disallow fields are not present in OMN element.

Proposed Resolution:

Rejected. The Operating Mode Notification and Operating Mode Indication mechanisms are different and they are not planned to offer the same capabilities. No Changes done to the ax draft.

CID7613

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7613 | Liwen Chu | 188.29 | 27.8.1 | Why management frmae is not mentioned here? | Add management frame. |

Discussion: The HT Control field may be part of the Management frame, so the OM Control subfield may be present in Management frames.

The Operating Mode Notification (OMN) may be present in the management frames. OMI is similar to OMN, but it controls also UL MU transmissions. The UL MU transmissions parameters should be possible to set correctly immediately at the (re)association to avoid situations where the AP allocates resources to the STA that it cannot use. When a non-AP STA sets the TX NSS and Channel Width values correctly, the use of UL MU transmissions is efficient immediately from the association and resources are not wasted due to parameter mismatch.

Proposed Resolution: Revised. Agree in principle with the comment.

The normative text for the comment resolution is provided in submission 11-17-0281-r0.

CID7617

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 7617 | Liwen Chu | 188.17 | 27.8 | NSS behavior is not harmonized with HE Capabilities element. | Change the nomative behavior to make them consistent. |

Discussion: The comment is pointing to the clause 9.4.2.218.4 Tx Rx HE MCS Support field that defines combination of the NSS and BW that may not be supported by the STA. The current OMI description does not define how it takes these into account.

The TX RX HE MCS Support field should configure the BW, NSS and MCS values that the STA is capable to use. The OMI should change the maximum BW and NSS that a STA is able to use, but not change the limitations defined by 9.4.2.218.4.

Proposed Resolution: Revised. Agree in principle with the comment.

The limitations defined by the clause 9.4.2.218.4 are not changed by the OMI signaling. The OMI sets the current maximum BW and NSS that the STA is capable to use and does not define MCS, BW and RX/TX NSS combination specific limitations for the STA.

The normative text for the comment resolution is provided in submission 11-17-0281-r0.

CID9938

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 9938 | Young Hoon Kwon | 189.26 | 27.8.3 | Main purpose of including Tx NSS in OMI is to use less number of Tx RF chains for power savings. However, different from Rx NSS, the number of Tx RF chains is more closely related with the number of space-time streams (N\_STS) compared to the number of spatial streams (N\_SS). For example, even in case a STA indicates Tx NSS to be 1, an serving AP can still allocate the STA single spatial stream with STBC, which requires at least two transmit RF chains to be turned on. Because this is still possible, even if a STA supporting STBC indicates Tx NSS = 1 to the serving AP, the STA shall have at least two Tx RF chains on, which defeats the original purpose of having Tx NSS subfield in OMI. For this issue, a simple remedy is to change Tx NSS subfield to indicate the maximum number of space-time streams (N\_STS) and modify the related operation accordingly. | As in the comment. |

Discussion: It is true that TX NSS limits the number of spatial streams that a STA may transmit. The TX NSS =1 does not define whether a STA may use STBC which would require two spatial streams. If the number of the space time streams Nsts is used to limit the TX operation, then value TX\_NSTS =2 is unclear as well. It is not clear whether STA is capable to do two spatial streams or 1 spatial stream with STBC.

The operation could be controlled more clearly, by using the TX\_NSS field and a field to control the use of the STBC. The TX STBC field in TOM could control the use of the STBC field in the Trigger frame.

Proposed Resolution: Revised. Agree that comment describes a situation in which the operation is currently not well specified. Add TX STBC field to TOM parameter. The TX STBC field controls the use of the STBC field in the Trigger frame.

The normative text for the comment resolution is provided in submission 11-17-0281-r0.

**9.2.4.6.4.3 Operating Mode**

*Instructions to ax Editor: Make the changes to figure 9-15d as shown below.Add a new paragraph to the end of the clause as shown.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B2 | B3 B4 | B5 | B6 B8 | B9 | B10 B11 |
|  | RX NSS | Channel Width | UL MU Disable | TX NSS | TX STBC | Reserved |
| Bits: | 3 | 2 | 1 | 3 | 1 | 1 |

**Figure 9-15d—Control Information subfield format when Control ID subfield is 1**

The TX STBC subfield indicates whether the STA can transmit with STBC and is set to 1 to indicate that the STA can transmit with STBC; otherwise it is set to 0. (#9938)

**27.8 Operating mode indication**

**27.8.1 General**

*Instructions to ax Editor: Make the changes as shown below.*

An HE STA may send to a STA that indicated value 1 in the OMI A-Control Support field in its HE Capabilities element an individually addressed Class 2 and Class 3 Management (#7613), QoS Data or QoS Null frame that contains the OMControl subfield to indicate a change in its receive and/or transmit operating parameters. If dot11OMIOptionImplemented is true, an HE STA implements the reception of an individually addressed Class 2 and Class 3 Management (#7613), QoS Data or QoS Null frame that contains the OM Control subfield that indicates a change in receive and/or transmit operating parameters and the HE STA shall set the OMI A-Control Support subfield in the HE MAC Capabilities Information field to 1.

The OMI initiator shall indicate a change in its transmit operating mode by including the OM Control subfield in an individually addressed Class 2 and Class 3 Management (#7613), QoS Data or QoS Null frame that solicits an immediate acknowledgement ~~frame~~ and is addressed to the OMI responder as defined in 27.8.3 (Rules for transmit operation mode (TOM) indication). The Channel Width subfield also indicates the largest bandwidth the STA is required to assess the CCA for Bandwidth Query Report (BQR). Optionally STA may assess CCA on larger bandwidth for the Bandwidth Query Report (BQR). (#5948)

**27.8.2 Receive operating mode (ROM) indication**

*Instructions to ax Editor: Make the changes as shown below.*

The OMI responder shall use the values indicated by the Channel Width and Rx NSS subfields of the most recently received OM Control subfield sent by the OMI initiator and supported combinations of HE-MCS, Rx NSS and Channel Width as defined in 27.15.4.1(Rx Suppoted HE-MCS and NSS Set)(#7617) ~~to send~~ as transmit parameters for sending (#4784) PPDUs to the OMI initiator in subsequent TXOP.

**27.8.3 Rules for transmit operation mode (TOM) indication**

*Instructions to ax Editor: Insert the followingbullet to the end of the first bulleted list of this clause.*

— The TX STBC subfield to 1 indicate that STA is capable to use STBC in response to the Trigger frames and 0 to indicate that STBC is not supported.(#9938)

*Instructions to ax Editor: Insert the following paragraphs at the end of this clause.*

The OMI responder shall set the STBC subfield of the Common Info field of the Trigger frame to value 0, if any of the Per User Info fields of the Trigger frame contains the AID of the OMI initiator, that has TX STBC subfield set to value 0.(#9338)

The OMI responder shall indicate a HE-MCS, a Channel Width and a number of spatial streams in the User Info field of a Trigger frame, containing the AID of the OMI initiator supporting the transmission with the combination of the values as defined in 27.15.4.2(Tx Supported HE-MCS and NSS Set).(#4784)