IEEE P802.11
Wireless LANs

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| Comment resolutions on TXOP Bandwidth in 9.9.1.4 |
| Date: 2011-05-09 |
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Abstract

This document proposes a resolution for CIDs 174, 656, 944, 173, 782, and 1283 (comments on P802.11ac/D0.1).

Changes in the text refer to: Draft P802.11ac/D0.4.

Comments

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| 174 | Chu, Liwen | 9.9.1.4 | 52 | 55 | TR | Why isn't TXOP bandwidth text normative? | Make the text normative. | Reject. Transmission rules on wider BW TXOP are already normative | MAC |

Discussion

Disagree

The intention of this text is to specify the transmission rules on wider bandwidth TXOP, especially on the bandwidth limitation when PPDUs are transmitted. Rules on how to set the CH\_BANDWIDTH and limitation on the bandwidth that can be used for transmission is already normative in the text.

**Proposed resolution**:

Reject

Comments

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| 656 | Kneckt, Jarkko | 9.9.1.4 | 52 | 55 | TR | Why the bandwidth of the TXOP cannot be increased after the first PPDU trnasmission? The bandwidth increase during the TXOP would increase the efficiency of the system by reducing the number of TXOP terminations and being able to increase the bandwidth without obtaining the TXOP.  | Allow the possibility to increase bandwidth during the TXOP.  | Reject. The bandwidth increase during the TXOP is prohibited from the 802.11 baseline standard. | MAC |

Discussion

Disagree.

802.11 baseline standard prohibits the bandwidth increase during the TXOP. 11ac inherits this rule.

In 10.15.9 of P802.11REVmb D8.0, there is a normative text on it.

“When a TXOP is obtained for a 40 MHz PPDU, the STA may transmit 40 MHz PPDUs and/or 20 MHz PPDUs during the TXOP. When the TXOP is obtained by the exchange of 20 MHz PPDUs only in the primary channel, the STA shall not transmit 40 MHz PPDUs during the TXOP.”

More submissions with enough analysis and simulation are necessary for justification if we should change the behaviour inherited from the baseline standard.

**Proposed resolution**:

Reject

Comments

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| 944 | Santosh Abraham, Simone Merlin | 9.9.1.4 | 52 | 55 | TR | "A TXOP is obtained after a STA transmitting an initial frame successfully receives a response frame. If the initial frame is a data frame with bandwidth indication, the bandwidth indicated in the data frame determines the bandwidth obtained for the TXOP " Why specify behavior for only "data" frames? what about control or management frames etc.?  |  The text for second sentence should be more generic and include all frames with a valid BW indication and not only 'data' frames | Agree in principle. Changed the text accordingly.  | MAC |

Discussion

Agree in principle.

The meaning of “bandwidth indication” in this paragraph is vague.

The paragraph states that the bandwidth indicated in the data frame determines the bandwidth obtained for the TXOP, but the CH\_BANDWIDTH\_IN\_NON\_HT TXVECTOR parameter does not present in PPDUs carrying management or data frames.

“bandwidth indication” in the paragraph may be interpreted as the bandwidth indicated in the CH\_BANDWIDTH\_IN\_NON\_HT parameter or in the CH\_BANDWIDTH parameter.

The TXOP BW determination rule should be more generic.

 We propose to update the text accordingly for clarification.

**Proposed resolution**:

See the proposed text at the end of this document.

Comments

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| 173 | Chu, Liwen | 9.9.1.4 | 52 | 58 | TR | "For VHT STAs, if the response frame to the initial frame is the CTS frame, the bandwidth indicated in the CTS frame determines the bandwidth obtained for the TXOP."This statement can not be used by multiple RTS/CTS scenario in a TXOP. | Option 1:For VHT STAs, when there are multiple RTS/CTS exhcanges for protection and channel bandwith negotiation in a VHT TXOP, the bandwidh use for a MPDU/MPDUs in a PPDU shall be the smallest bandwidth indicated by CTS that the receiver/receivers of the PPDU transmited.Option 2:For VHT STAs, when there are multiple RTS/CTS exchange for protection and channel bandwith negotiation in a VHT TXOP, the minimum bandwidth indicated in the CTS frames determine the bandwidth obtained for the TXOP. | Agree in principle. The concept is already covered by current spec and 609r5. Some update is necessary. | MAC |

Discussion

Agree in principle.

The baseline standard and current 11ac Draft allows multiple RTS/CTS exchanges in one TXOP. Since the TXOP holder cannot transmit non-initial RTS whose BW is greater than the negotiated BW by the preceding RTS/CTS in the same TXOP, TXOP BW determined by the last RTS/CTS exchange is always the smallest and it is the minimum bandwidth for the remainder of TXOP.

Following is the sentence suggested by 609r5 in the last TGac Ad hoc meeting in May 5th, and it can also cover the concept:

“If a TXOP is protected by non-HT or non-HT duplicate RTS/CTS, the TXOP holder shall set the CH\_BANDWIDTH parameter in TXVECTOR of a PPDU to be the same or narrower than the CH\_BANDWIDTH parameter in RXVECTOR of the last received CTS in the same TXOP.”

But, TXOP BW of the VHT STAs is determined by CH\_BANDWIDTH\_IN\_NON\_HT parameter instead of CH\_BANDWIDTH parameter in RXVECTOR of the CTS frame if Dynamic bandwidth operation is used. In other cases, TXOP Bandwidth is determined by CH\_BANDWIDTH parameter in TXVECTOR of the RTS frame. So, we propose to update this sentence.

**Proposed resolution**:

See the proposed text at the end of this document.

Comments

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| 782 | Liu, Yong | 9.9.1.4 | 52 | 61 | TR | "the STA" here is not very clear. Is it TXOP holder only or both the TXOP holder and TXOP responder? | clarify | Agree in principle. Changed “the STA” to “the TXOP holder”  | MAC |

Discussion

Agree in Principle.

“the STA” should be changed to “the TXOP holder”. Since CH\_BANDWIDTH of the response frame is determined by other rules in the spec once the TXOP responder receives the frame from the TXOP holder, (for example, by 9.7.5.6 Channel Width selection for control frames) it is not necessary to mention the TXOP responder in the sentence.

**Proposed resolution**:

See the proposed text at the end of this document.

Comments

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| 1283 | Stephens, Adrian | 9.9.1.4 | 53 | 1 | TR | "If there is no non-HT duplicate frame exchange in a TXOP, the TXOP holder shall set the CH\_BANDWIDTHparameter in TXVECTOR of a PPDU to be the same or narrower than the CH\_BANDWIDTH parameter inTXVECTOR of the preceding PPDU that it has transmitted in the same TXOP." - this creates a problem when attempted to be applied to the first PPDU in the TXOP. | Limit this statement to non-initial PPDUs. | Agree. Changed the text as suggested. | MAC |

Discussion

Agree.

The statement should be limited to non-initial PPDUs.

**Proposed resolution**:

See the proposed text at the end of this document.

**Editing Instructions**:

[Note: Text in yellow mark is from the document ‘11-11-0609-05-00ac-comment-resolution-cid-178-172’ which has passed the straw poll during the TGac Ad hoc meeting on May 5th, 2011. It is not the text proposed by this contribution.]

***Change the following sentence in Section 9.19.2.4 of TGac Draft D0.4: (P72L63)***

A TXOP is obtained after a STA transmitting an initial frame successfully receives a response frame. If the initial frame is a non-HT or non-HT duplicate RTS frame with the Individual/Group bit of the TA set to one and the TXVECTOR parameter DYN\_BANDWIDTH\_IN\_NON\_HT set to Dynamic, the bandwidth indicated in the CH\_BANDWIDTH\_IN\_NON\_HT parameter in RXVECTOR of the response CTS frame is the bandwidth obtained for the TXOP. In all other cases, the bandwidth indicated in the CH\_BANDWIDTH parameter in TXVECTOR of the initial frame is the bandwidth obtained for the TXOP. When a TXOP is obtained for a bandwidth that is greater than 20MHz by non-HT duplicate frame exchange, the TXOP holder may transmit PPDUs using CH\_BANDWIDTH that are up to and including the bandwidth obtained for the TXOP. During the TXOP, the TXOP holder shall not transmit PPDUs using CH\_BANDWIDTH greater than the obtained bandwidth for the TXOP.

If a TXOP is protected by non-HT or non-HT duplicate RTS/CTS, the TXOP holder shall set the CH\_BANDWIDTH parameter in TXVECTOR of a PPDU as follows:

* To be the same or narrower than CH\_BANDWIDTH\_IN\_NON\_HT parameter in RXVECTOR of the last received CTS frame in the same TXOP, if the RTS frame with the Individual/Group bit of the TA set to one and the TXVECTOR parameter DYN\_BANDWIDTH\_IN\_NON\_HT set to Dynamic has been sent by the TXOP holder in the last RTS/CTS exchange.
* Otherwise, to be the same or narrower than the CH\_BANDWIDTH parameter in TXVECTOR of the RTS frame that has been sent by the TXOP holder in the last RTS/CTS exchange in the same TXOP.

If there is no non-HT duplicate frame exchange in a TXOP, the TXOP holder shall set the CH\_BANDWIDTH parameter in TXVECTOR of a non-initial PPDU to be the same or narrower than the CH\_BANDWIDTH parameter in TXVECTOR of the preceding PPDU that it has transmitted in the same TXOP. If there is no RTS/CTS exchange in non-HT duplicate format in a TXOP and there is at least one non-HT duplicate frame exchange in a TXOP, the TXOP holder shall set the CH\_BANDWIDTH parameter in TXVECTOR of a PPDU to be the same or narrower than the CH\_BANDWIDTH parameter in TXVECTOR of the initial frame in the first non-HT duplicate frame exchange in the same TXOP.

If a TXOP is protected by non-HT or non-HT duplicate CTS-to-Self, the TXOP holder shall set the CH\_BANDWIDTH parameter in TXVECTOR of a PPDU to be the same or narrower than the CH\_BANDWIDTH parameter in TXVECTOR of the CTS-to-Self in the same TXOP.