IEEE P802.11
Wireless LANs

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| 802.11 TGac WG Letter Ballot LB187Proposed resolutions to comments on clause 10.2.1.4a |
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Abstract

The document provides the comment resolution for the CIDs: 4169, 4170, 4225, 4448, 4444, 4450, 4451, 5424, 4453, 4619, 4690, 4843, 5040, 5035, 4115.

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| 4169 | 134.43 | 10.2.1.4a | "The STA receives a frame with an RXVECTOR parameter NUM\_STS equal to 0, if it is a member of group indicated by RXVECTOR GROUP\_ID." What if during the TXOP AP wants to send no MPDU to this STA in one of the multiple MU MPDUs it sends, by setting the associated NUM\_STS to zero? It would be more efficient to allow this felexibility to AP. | Do not allow a STA to go to doze state with this condition. |
| 4170 | 134.43 | 10.2.1.4a | Is a STA allowed to go to doze state if it receives SU PPDU during a TXOP that has started by a MU PPDU which the STA is a member of the associated GID? It'd give AP more flexibility and efficiency in MU scheduling if a STA is not allowed to go to doze state in this situation. This also makes TXOP PS more efficient, otherwise AP might disallow TXOP PS. | Do not allow a STA to go to doze in this situation; state this in the bullet. Also, remove the note in P134L59. |

**Discussion:**

In a VHT MU PPDU, if AP has set the NUM\_STS = 0 for a STA that is member of the GROUP\_ID in the VHT-SIG-A, one of the reason for this is that there was no frame available for transmission for that STA. It is possible that the frames will become available for transmission at some point of time in the TXOP. However, in that case, AP has to wait until the STA is Awake. Such trade-off is always associated with the power saving. It is reasonable to allow the STAs to enter Doze state to save power based on the current availability of the frame for transmission rather than staying in Awake state for future availability.

The STA that is a member of the GROUP\_ID received in the VHT MU PPDU can enter the Doze state if it later receives VHT SU PPDU not addressed itself. One of the reasons for AP to transmit SU PPDU transmission could be that there were no frames available for transmission for more than one STA in same group. Hence, STA should be allowed to enter Doze state in this context.

**Proposed resolution:**

CID 4169:

Reject. There is always a tradeoff between power saving and the flexibility in scheduling frames for transmission and it is reasonable to allow STAs to save power when NUM\_STS for STA in VHT MU PPDU is 0 as discussed in 12/0331r0 for CID 4169.

CID 4170:

Reject. See the discussion for CID 4710 in12/0331r0.The note here is necessary to clarify the case of VHT SU PPDU frame that may follow the VHT MU PPDU and AP does not want the STAs in Awake state to enter Doze. (Eg. BAR)

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| 4225 | 134.51 | 10.2.1.4a | There is a case receiver could not feedback a ACK after successfully receive a packet, in this case the receiver should also go to sleep if there's no following packet. | Add a condition of entering the Doze state:The STA receives a frame not causing a response with More Data field equal to 0,and the RA in the MAC header of the frame that is received correctly matches the MAC address of the STA. |

**Discussion:**

If the AP is not expecting acknowledgement for a particular frame, STA may find any of the conditions listed true for the next VHT PPDU transmitted by AP and enter Doze state. This seems more reasonable than defining another rule based on the service class requirements.

**Proposed resolution:**

Reject: See the discussion for CID 4225 in 12/0331r0.

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| 4448 | 134.49 | 10.2.1.4a | Setting More Data to 0 doesn't just enter doze state until the end of the TXOP as per intro at P134L32 - needs more clarification | As in comment |

**Discussion:**

If AP is expecting an acknowledgement, then it is necessary for STA to stay awake till it sends an acknowledgement in response to frame with More Bit Set to 0. By not allowing STA to enter Doze state after receiving an MPDU with More Data bit set to 0, AP has a flexibility to solicit the acknowledgement at its convenience within the same TXOP.

**Proposed resolution:**

Reject. If the AP expects an acknowledgement from a STA in response to the frame with More Data bit set to 0, then STA should be awake till it sends one to AP.

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| 4444 | 134.20 | 10.2.1.4a | "to enter the Doze state... shall indicate this using parameter X" but silent on which value X is set to to indicate Doze. | Either generalize to power state (from Doze) or specify value to set X to |

**Proposed resolution:**

Revise.. Make the changes as specified for CID 4444 in 12/0331r0.

**Proposed text changes:**

A VHT AP shall indicate this by transmitting a VHT PPDU with the TXVECTOR parameter TXOP\_PS\_NOT\_ALLOWED set to 0.

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| 4450 | 134.65 | 10.2.1.4a | "AP ... transmit ... frames to the STAs that entered the Doze state" but AP does not know who they were - the AP only knows the STAs that were \*permitted\* to enter the Doze state | Change as per comment |
| 4451 | 134.65 | 10.2.1.4a | "NAV duration" is ambiguous given is just got truncated | original/untruncated NAV duration |

**Discussion:**

AP only knows which STAs were allowed to enter the Doze state. The NAV duration here refers to the original TXOP duration that is getting truncated now.

**Proposed Resolution:**

CID 4450:

Revise. Make the changes as specified for CID 4450 in 12/0331r0

CID 4451:

Revise. Make the changes as specified in for CID 4451 in 12/0331r0

**Proposed text change:**

If a VHT AP truncates the TXOP in which it allowed STAs to enter Doze state, then the VHT AP shall not transmit frames to the STAs that were allowed to enter the Doze state until the NAV set at the start of the TXOP has expired.

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| 5424 | 10.2.1.4a | 134.46 | In this sentence, "Partial AID" is referred as a parameter of RXVECTOR and should be changed to "PARTIAL\_AID." | As in comment. |

**Proposed Resolution:**

Accept. Make the changes as specified CID 5424 in 12/0331r0.

**Proposed text change:**

— The STA finds that the PARTIAL­\_AID in the RXVECTOR is 0 and the AID in the STA Info field in the received NDPA frame does not match with its AID.

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| 4453 | 10.2.1.4a | 135.14 | asleep - or Doze? | in Doze state |

**Proposed resolution:**

Revise. Make the changes as specified for CID 4453 in 12/0331r0.

**Proposed text changes:**

NOTE— After transmitting an A-MPDU containing MPDUs in which the More Data field is set to 0 to a VHT non-AP STA that is in VHT TXOP power save mode, if the AP receives a BlockAck that does not acknowledge all of those MPDUs, it cannot retransmit any missed MPDUs within the current TXOP because the destination STA might now be in Doze state.

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| 4619 | 135.6 | 10.2.1.4a | It is not clear enough what "the rules on TXOP sharing" means and a reference section number would be aslo helpful for the readability. | Clarify it and add the reference for the section number. |

**Discussion:**

If the VHT PPDU that is getting retransmitted belongs to secondary AC then it is required to meet the conditions that are described for the secondary AC during a shared TXOP. If the VHT PPDU that is retransmitted is going to be a part of VHT MU PPDU then there is atleast one primary AC frame that is part of VHT MU PPDU and the duration of the secondary AC frame shall not be more than the primary AC frame. If there are no frames for transmission that belong to the primary AC, then only the secondary AC frame shall not be transmitted/retransmitted.

**Proposed Resolution:**

Accept. Make the changes as specified for CID 4619 in 12/0331r0.

**Proposed text changes:**

If the AP does not receive an acknowledgment after it transmitting an individually addressed frame containing all or part of an MSDU, A-MSDU or MMPDU sent with the More Data field equal to 0 to a VHT non-AP STA that is in VHT TXOP power save mode and the AP had set the TXOP\_PS\_NOT\_ALLOWED bit to 0, it shall retransmit that frame at least once within the same TXOP, time permitting and subject to applicable retry or lifetime limit, subject to the rules on TXOP sharing (see 9.19.2.2a (Sharing an EDCA TXOP)).

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| 4690 | 135.01 | 10.2.1.4a | This is not true for the first PPDU transmission. | Fix the problem. |

**Discussion:**

It is not clear what the commenter is trying to say.

**Proposed resolution:**

Reject. The comment is not clear. Please describe the problem statement.

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| 4843 | 135.25 | 10.2.1.4a | Why is a special probe delay needed? | Replace "dot11VHTPSProbeDelay" with ProbeDelay and delete dot11VHTPSProbeDelay from Annex C |  |

**Discussion:**

The ProbeDelay parameter that is received in the MLME.SCAN request is the delay to be used before transmitting a Probe Request frame during active scanning. However, the ProbeDelay parameter in the MLME.START and MLME.JOIN request is used as a delay prior to the transmission when STA enters Awake state.

The description of ProbeDelay parameter in the MLME.START and the MLME.JOIN requests in Draft P802.11-REVmb/D12 November 2011 is as follows:

“Delay (in microseconds) to be used prior to transmitting when changing from Doze to Awake, if no frame sequence is detected by which the NAV can be set.”

However the context in which these two MIB variables are used is different. Hence it is better to add a new MIB variable for dot11VHTPSProbeDelay.

**Proposed Resolution:**

Reject. The same MIB variable cannot be across the power save schemes as this is TXOP based power save mechianism and the default values of these MIB variables differ.

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| 5040 | 135.25 | 10.2.1.4a | Clarify or show how VHTPSProbeDelay should be set to ensure for avoiding unneccesary contention. | e.g. "? a period equal to the dot11VHTPSProbeDelay has transpired, which value should be set within a half of TXOP Limit." |

**Proposed Resolution:**

Reject. The dot11VHTPSProbeDelay is set as mentioned in the Annex C. It is used in the same way as ProbeDelay used for the Power Management mode as described in section 10.2.1.2.

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| 5035 | 135.4 | 10.2.1.4a | It is not sure whether the station has failed to receive the frame or the AP was not able to receive the acknowledgement from the station.The retransmission of the frame is not be useful in the latter case and contradicts the statement that AP should not transmit to the STA that it has allowed to enter the doze state. Once the AP has transmitted frame with More Data with 0, then it should not attempt any more transmission to that station till the next TXOP. | The behaviour should be kept simple and should be similar to the Power management of legacy devices. That is, AP should wait until the station wakes up and the AP gets a chance to transmit to that station. |

**Discussion:**

In the Power Management mode, if the AP has transmitted Data frame in response to the PS-Poll and has not received any acknowledgment, then the AP retransmits it in response to the next PS-Poll received from that STA. The transmission in this case is initiated by the STA and recovery is STAs responsibility.

However, if the AP transmits ACK in response to PS-Poll, then the frame delivery, error recovery is now the responsibility of AP. AP transmits the Data frame to this STA in the subsequent frame exchanges initiated by AP and retries the transmission of frames for which it has not received the acknowledgement till the relevant retry limit has reached.

**Proposed Resolution:**

Reject. DL MU MIMO transmission is AP initiated and error recovery is AP’s responsibility. Hence it is reasonable to retransmit the frame for which AP has not received the acknowledgement. See the discussion for CID 5035 in 12/0331r0.

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| 4115 | 134.59 | 10.2.1.4a | "NOTE--A VHT AP must not transmit VHT SU PPDUs if TXOP\_PS\_NOT\_ALLOWED has been already set to 0 in the current TXOP and it does not want the STAs in Awake state to enter the Doze state."Try as I can, I cannot understand this. What STAs is it not "wanting" to enter the Doze state?Why are SU PPDUs special - i.e. why is the operation of the TXOP power saving dependent on the SU vs MU PPDU format rather than beind dependent on admission of the Group ID and Address 1 fields? | Delete note, or reword to something I can understand.Or, if it really makes sense to everybody else, buy me a beer and explain it on the back of a beer mat. |

**Discussion:**

The VHT MU PPDUs transmitted by AP may be followed by the individually address frames such as BAR to solicit the BA from the recipients of the VHT MU PPDU. If these frames are of VHT format, it may cause the STAs other than the recipient to enter Doze state which may is not the intention of AP to do so. Hence, AP needs to transmit such frames in a non-VHT format to avoid the unintentional change of state of the STAs.

**Proposed resolution:**

REVISE. Make the changes as specified in 12/0331r0.

**Proposed text change:**

NOTE--A VHT AP must not transmit VHT SU PPDUs in the current TXOP if the AP has already transmitted a VHT PPDU with TXOP\_PS\_NOT\_ALLOWED parameter in the TXVECTOR set to 0 in the same TXOP and does not want the STAs that are in Awake state to enter the Doze state.

NOTE 2 - If the VHT AP needs to transmit non-MU PPDUs without allowing the remaining STAs in Awake state to enter Doze state (e.g., to solicit acknowledgements sequentially from each such STA) the VHT AP can do this using non-VHT PPDUs."

**References:**

1. IEEE Draft P802.11ac\_D2.0
2. IEEE 11-12-0223-02-00ac-lb187-comment-tgac-d2-0.xls