IEEE P802.11
Wireless LANs

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| D0.1 Comment Resolution – CID 21, 704, 1254, 768, 548, 753, 800, 1198, 791, 1607, 552, 792, 1374, 1608, 965, 793, 99, 758, 1723, 1789, 696, 678, 695, 659, 1202, 964, 794, 795, 1203, 1199 |
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Abstract

This document addresses the comments with CID: 21, 704, 1254, 768, 548, 753, 800, 1198, 791, 1607, 552, 792, 1374, 1608, 965, 793, 99, 758, 1723, 1789, 696, 678, 695, 659, 1202, 964, 794, 795, 1203, 1199.

**Comments on TXOP PS field in VHT capabilities Info field:**

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| 704 | Kneckt, Jarkko | 7.3.2.61.2 | 31 | 4 | TR | VHT TXOP PS encoding is not specifying the frames to which the encoding is valid. The encoding is saying in negative message, it is better to define what does the value mean in posite way. | Change the text as in comment | AGREE.Changed the text accordingly |
| 1254 | Stephens, Adrian | 7.3.2.61.2 | 31 | 4 | TR | "Set to 0 if VHT TXOP PS Mode at STAs in theBSS is not allowed.Otherwise, set to 1.Set to 0 if STA is not in VHT TXOP PS mode.Otherwise, set to 1." - this is internall conflicting. | Add "When transmitted by an AP" and "When transmitted by a non-AP STA" as approprite | AGREE.Changed the text accordingly. |
| 768 | Liu, Yong | 7.3.2.61.2 | 31 | 3 | ER | The encoding description is not very clear | In Beacon and Probe Response frames:Set to 0 if the BSS does not allow use of VHT TXOP PS modeSet to 1 if the BSS does allow use of VHT TXOP PS modeOtherwise:Set to 0 if the STA is not in VHT TXOP PS modeSet to 1 if the STA is in VHT TXOP PS mode | Changed the text accordingly |
| 548 | Hsieh, Jing-Rong | 7.3.2.61.2 | 31 | 3-7 | ER | The description for the encoding of VHT TXOP PS subfield used by AP is suggested to be modified since it is used in the initial capabilities negotiation and advertisement. It is used to indicate whether or not AP supports VHT TXOP PS mode. However, the terms "allow" and "not allow" seem to presume that both sides already support this feature.  | Set to 0 if AP does not support VHT TXOP PS mode in the BSS. Otherwise, set to 1. | Changed the text accordingly |

**Comments on More Data bit field in Frame control:**

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| 99 | Au, Edward (Kwok Shum) | 7.1.3.1.7 | 4 | 48 | TR | The sentence "… during a downlink MU TXOP to indicate..." shows the More Data field will be used in MU TXOP. Since TXOP power save can now be used in both MU and SU modes, the sentence should be updated accordingly to include SU TXOP. | Change the sentence into "… during a downlink SU/MU TXOP to indicate...” | AGREE.Changed the text accordingly |
| 758 | Liu, Yong | 7.1.3.1.7 | 4 | 48 | TR | What is the definition of "downlink MU TXOP"? Does the TXOP power save mode only apply to MU TXOP?  | remove "MU" | AGREE.Changed the text accordingly |
| 1723 | Lee, Jae Seung | 7.1.3.1.7 | 4 | 48 | TR | Since TXOP Power Save has been extended to SU, the More Data field has to be set to 1 in frames transmitted by VHT AP during a downlink MU TXOP and SU TXOP to indicate to the non-AP VHT STA that AP has more frames for transmission when the non-AP VHT STA is in TXOP power save mode | Change "during a downlink MU TXOP" to "during a downlink MU TXOP and SU TXOP" | AGREE.Changed the text accordingly |
| 1789 | Patil, Sandhya | 7.1.3.1.7 | 4 | 48 | TR | The use of More data bit is extended for SU TXOP also | Change MU TXOP to SU or MU TXOP | AGREE.Changed the text accordingly |
| 696 | Kneckt, Jarkko | 7.1.3.1.7 | 4 | 48 | TR | The more data bit is set to 1 to indicate further buffered frames and set to 0 to indicate that no buffered frames are present for STAs in power save mode.Currently the more data bit is set to 0 in all individually addressed frames destined to active mode STA. Having the More Data bit constantly set to 0 in active mode requires very precise book keeping of the devices that operate in TXOP power save. To simplify AP implementation the same More Data field values for all active and power save mode.  | Please use the same more data bit values for all devices in active mode, regardless are they operating in TXOP power save mode. The more data bit indication helps the non-AP STAs to decide when to change their power mode or when to perform handover to new AP.  | AGREE IN PRINCIPLE. The importance of More Data bit in TXOP power save scheme is confined only to the duration of TXOP duing which AP allows TXOP power save. For other purpose, AP need not allow the TXOP power save during that TXOP. |
| 21 | Asai, Yusuke | 7.1.3.1.7 | 4 | 48 | TR | "MU TXOP" should be defined in section 3.2. | Insert the following definitions in section 3.2:MU TXOP: A TXOP using MU-MIMO transmission. | Changed the description of More data bit. Not necessary to define. |

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| 695 | Kneckt, Jarkko | 7.1.3.1.7 | 4 | 48 | TR | Why the more data bit is set only to devices that are operating in TXOP power save?  | The more data bit should be set for all active and power save mode terminals without restrictions. The more data bit indication helps the non-AP STAs to decide when to change their power mode or when to perform handover to new AP. Change the text in 7.1.3.1.7 page 86 line 8 in 802.11 revMb: "The More Data field is 1 bit in length and is used to indicate to a STA in PS mode that more BUs(#4023) are buffered for that STA at the AP. The More Data field is valid in directed data or management type frames transmitted by an AP to a STA in PS mode. A value of 1 indicates that at least one additional buffered BU(#4023) is present for the same STA."to: "The More Data field is 1 bit in length and is used to indicate to a STA in PS mode or VHT STA in active mode that more BUs(#4023) are buffered for that STA at the AP. The More Data field is valid in directed data or management type frames transmitted by an AP to a STA in PS mode. A value of 1 indicates that at least one additional buffered BU(#4023) is present for the same STA." | AGREE IN PRINCIPLEThe text presented is “append” to the existing. It defines the usage of More Data bit for TXOP PS and is in addition to the existing use of it. Each paragraph in the section discusses the use of More Data bit in different scenarios. The last paragraph discusses the usage of More Bit in VHT STA and AP for TXOP Power save. |

**Comments on section 11.2.1.4a and 11.2.1.4b:**

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| 753 | Kneckt, Jarkko | 11.2.1.4a | 61 | 13 | TR | May a STA that is part of Group ID operate in power save mode? | Please clarify. | Yes, the VHT STA that is a member of Group ID can operate in TXOP Power Save mode provided, it has advertised TXOP PS mode that is set to value 1 in VHT Capabilities Info field as mentioned in section 7.3.2.61.2 |

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| 657 | Kneckt, Jarkko | 11.2.1.4a | 61 | 13 | ER | The structure of the clause is unclear. The Power management during VHT transmissions having the same content as the clause 11.2.1.4b VHT TXOP Power Management. Please organise sections to describe AP operations and non-AP STA operations.  | Please clarify the structure of the clause | AGREE. Modified the sections accordingly. |

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| 795 | Liu, Yong | 11.2.1.4b | 61 | 61-62 | TR | TXOP trunction will cause some problems. For example, the STA in Awake mode will have advantage to get the medium. The STA in Doze state cannot get the NAV setting information for the next TXOP. Not only AP but other peer STA cannot transmit to the STA in Doze mode (how does the peer STA know that?)  | Suggest disallowing TXOP trunction for TXOP PS mode | DISAGREE. If AP does not have frames to schedule to STAs during the acquired TXOP during which the TXOP PS is allowed, then the medium remains IDLE. The medium will not get used if the TXOP truncation is not allowed.  |
| 659 | Kneckt, Jarkko | 11.2.1.4a | 61 | 13 | TR | The VHT TXOP power save could operate also with SU-MIMO transmissions and when STA is operating in normal PS mode. Please allow TXOP power save mode usa on these power save modes as well | Please allow TXOP power save mode use on all power save modes. | The proposed power save mechanism is when the STA is in Active mode as we have conventional power save mechanism when in Power save mode. Also, In legacy power save mechanism once STA transmits the poll/Trigger to AP, it should stay awake to receive the buffered units from AP. It becomes difficult for STAs to switch between the states and also for AP, to keep track of the state of STAs to schedule frames when multiple power saving mechanisms are allowed together. |
| 1202 | Stephens, Adrian | 11.2.1.4b | 61 | 56 | TR | The interaction of TXOP power mode with other power management modes is unclear. However, the logic for disallowing a conventional power saver (i.e. in PS power managment mode) from also being a TXOP power saver escapes me. | Allow combinations of TXOP power mode and PS power management mode and describe here how they operate together. | As in comment #659 |
| 794 | Liu, Yong | 11.2.1.4b | 61 | 55-56 | TR | "Note that, the state of the non-AP VHT STA at the end of the TXOP could be governed by other power save mechanisms." what does this sentence mean?  | clarify | AGREE IN PRINCIPLE.Since the TXOP Power Save mechanism is allowed only when the STA in the Active mode of operation, there is no other PS mechanism.Deleted the sentence. |
| 964 | Santosh Abraham, Simone Merlin | 11.2.1.4b | 61 | 56 | TR | "Note that, the state of the non-AP VHT STA at the end of the TXOP could be governed by other power save mechanisms." sentence is not clear; | interaction with other power save modes should be described more precisely. Also the behavior of a STA in doze mode at the end of the TXOP need be clarified (e.g can the STA contend o teh medium?) | As in comment #794 |
| 1203 | Stephens, Adrian | 11.2.1.4b | 61 | 61 | TR | "If the TXOP is truncated, then the VHT AP shall not transmit frames to non-AP VHT STAs in the Doze stateuntil the NAV duration of the TXOP has expired."This may be read to imply that the AP can transmit to STAs in the doze state after the NAV has expired. While this may be true for TXOP power savers, it is not true for conventional power-savers that are in the Doze state. | Add note as follows:"NOTE--The operation of any other power-save mechanism used by a STA might prevent the AP from transmitting to the STA once the NAV has expired." | The TXOP power save mechanism is applicable only when the STA is in Active mode, so the state of STA is decided only by the TXOP power save mechanism.  |

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| 800 | Loc, Peter | 11.2.1.4a | 61 | 16 | TR | The TXOP\_PS\_NOT\_ALLOWED bit does not apply to non-AP STAs that are currently operating under the IEEE PS mode. | Change the first paraph of this sub-clause (lines 16 to 21) to: "The power management scheme described in this section is applicable to non-AP STAs that are not operating under the PS mode and only when VHT AP allows VHT TXOP power save mode (see section 11.2.1.4b) at non-AP VHT STAs. " | AGREEModified the text accordingly. |
| 1198 | Stephens, Adrian | 11.2.1.4a | 61 | 18 | ER | "transmissions shall indicate non-AP VHT STAs using" - this is almost impenetrable | Reword in plain English | AGREEModified text accordingly. |
| 791 | Liu, Yong | 11.2.1.4a | 61 | 18-19 | ER | which frame the TXVECTOR associated with? | clarify | TXVECTOR associated with VHT PPDU.Added the text to clarify this. |
| 1607 | Zhu, Chunhui | 11.2.1.4a | 61 | 20 | ER | amend "during a TXOP" at the end of the sentence. | change accordingly | AGREEChanged the text accordingly. |

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| 552 | Hsieh, Jing-Rong | 11.2.1.4a | 61 | 16-17 | ER | In the TXOP PS mode, STA stays in the Awake state unless it is allowed to enter the Doze state for certain conditions. Therefore, to clarify, should it be more appropriate that "the non-AP VHT STAs in TXOP PS mode to enter Doze state" rather than "VHT TXOP power save mode at non-AP VHT STAs" the VHT AP allows or disallows? As an alternative, the sentence "the power management scheme is applicable only when VHT AP "supports" VHT TXOP power save mode" should also be an more appropriate statement. | Two possible changes are provided. 1. The power management scheme described in this section is applicable only when VHT AP allows non-AP VHT STAs in TXOP PS mode (see section 11.2.1.4b) to enter Doze state during a TXOP. 2. The power management scheme described in this section is applicable only when VHT AP supports TXOP PS mode (see section 11.2.1.4b).  | AGREE IN PRINCIPLE.Modified the text accordingly. |

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| 792 | Liu, Yong | 11.2.1.4a | 61 | 31 | ER | "it finds that the frame is not destined to it." does it mean the RA address in MAC header is not matched? | clarify | STA may receive the frame with the partial AID in the VHT-SIG-A matching its partial AID, but it may not be able to receive the frame beyond VHT-SIG-A. The intention is to say that the frame is not directed to it.Changed the text wording accordingly. |

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| 1374 | Zhao, Shiwei | 11.2.1.4a | 61 | 43, 52 | TR | What matters is whether a STA is allowed to enter Doze state but not whether it is IN Doze state. | change from "that is in Doze state" to "that is allowed to enter Doze state" | AGREE.Changed the text accordingly |

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| 1608 | Zhu, Chunhui | 11.2.1.4a | 61 | 43 | ER | delete "for the remainder of the TXOP" from the sentence. Note when a non-AP STA is not a member of the group it can enter Doze state for the entire TXOP. So the use of remainder here does not cover all cases. | change accordingly | DISAGREE.Before entering the Doze state, the VHT STA decodes VHT SIG-A of first VHT PPDU that is transmitted by VHT AP. Hence the term “remainder of TXOP” covers all the cases. |

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| 965 | Santosh Abraham, Simone Merlin | 11.2.1.4b | 61 | 48 | TR | there is no reference to the fact that mechanism is optional and a capability is present | Need to add text specifying that mechanism support is indicated in capability elements and add the correct references. | AGREE.For completeness, there should be a MIB for TXOP PS Support at both VHT AP and VHT STA. The value of VHT TXOP PS in VHT capabilities Info Field in VHT capabilities is set using this MIB value. |
| 793 | Liu, Yong | 11.2.1.4b | 61 | 49 | TR | What is "VHT transmissions"? The VHT AP can only transmit VHT PPDUs in the whole TXOP? Why this constraint is needed? | Clarify | There is no restriction that AP can only transmit the VHT PPDUs in the TXOP. What is needed is, AP to indicate this in the first VHT PPDU that it transmits in the TXOP.Added the text accordingly. |

**Editing Instructions:**

**7.3.2.61.2 VHT Capabilities Info field**

*Change the VHT TXOP PS field in VHT Capabilities as followsin Table 7-16*

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| VHT TXOP PS | Indicates whether or not APsupports VHT TXOP PS Modefor STAs in BSS when includedin Beacon,Probe Response, Association and Reassociation Response frames.Indicates whether or not STA isin VHT TXOP PS mode whenincluded in Association,Reassociation Request, and Probe request frames | When transmitted by VHT AP:Set to 0 if VHT AP does not support VHT TXOP Power Save in BSS.Set to 1 if VHT AP supports TXOP Power Save in the BSSWhen transmitted by non-AP VHT STA:Set to 0 when the VHT STA is not in TXOP Power Save ModeSet to 1 when the VHT STA is in TXOP Power Save Mode |

**7.1.3.1.7 More Data field**

***Append the following paragraph to section 7.1.3.1.7:***

The More Data field is set to 1 in frames transmitted by VHT AP to indicate that it has more frames to transmit to non-AP VHT STA when the TXOP PS bit in the VHT Capabilities Info field is set to 1 by the non-AP VHT STA and VHT AP, and the non-AP VHT STAs are allowed to enter the Doze state by VHT AP during a TXOP.

**11.2.1.4a Power management during VHT transmissions**

The power management scheme described in this section is applicable only when the dot11VHTTXOPPowerSave is true at VHT AP. The non-AP VHT STAs that are in Active mode (see Table 11-1—Power Management modes) and have dot11TXOPPowerSave set to true operate in TXOP power save mode. A VHT AP may or may not allow non-AP VHT STAs in TXOP power save mode to enter the Doze state during a TXOP. A VHT AP shall indicate this using TXOP\_PS\_NOT\_ALLOWED parameter in TXVECTOR of a frame with FORMAT VHT..The value of this parameter in the TXVECTOR of all VHT PPDUs transmitted by VHT AP shall remain same for the duration of TXOP. If the dot11VHTTXOPPowerSave at VHT AP is set to false then the VHT AP shall set the TXOP\_PS\_NOT\_ALLOWED to 1 in the TXVECTOR of the frames with FORMAT VHT.If the non-AP VHT STAs are allowed to enter Doze state during a TXOP, then the non-AP VHT STA that is in

VHT TXOP power save mode may enter the Doze state till the end of that TXOP when one of the following conditions exists:

— The STA finds that it is not a member of group indicated by RXVECTOR GROUP\_ID parameter.

— The STA finds that PARTIAL\_AID in the RXVECTOR does not matches with its partial AID or it finds that the frame is not directed to it.

— The STA receives RXVECTOR with NUM\_STS parameter set to 0, if it is a member of group indicated by RXVECTOR GROUP\_ID.

— The STA sends an acknowledgement in response to frame received with More Data field set to 0.

Note that, a VHT AP shall include NAV-set sequence (e.g. RTS/CTS) at the beginning of such a TXOP with the Duration/ID value set to the remainder of the TXOP duration. A VHT AP shall not transmit frames to a non-AP VHT STA that is allowed to enter Doze state for the remainder of the TXOP.

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If the VHT AP truncates TXOP in which it allowed non-AP VHT STAs to enter Doze state, then the VHT AP shall not transmit frames to non-AP VHT STAs that operate in TXOP power save mode until the NAV duration of the TXOP has expired.

**Pre-motion 1:**

Do you support to include the text changes in the specification as mentioned in the Editing Instructions section of this document for CIDs 21, 704, 1254, 768, 548, 753, 800, 1198, 791, 1607, 552, 792, 1374, 1608, 965, 793, 99, 758, 1723, 1789, 696, 678, 695, 659, 1202, 964, 794, 795, 1203, 1199?

Yes:

No:

Abstain:

**References:**

1. IEEE Draft P802.11ac\_D0.1
2. IEEE 11-11-0276-05-00ac-tgac-d0-1-comments