IEEE P802.11
Wireless LANs

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| Partial AID and GID |
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Abstract

This document provides resolution for the comments listed below

Comments are from: 11-12-0223-03-00ac-lb187-comment-tgac-d2-0.xlsx

Comments refer to: Draft P802.11ac\_D2.0.pdf

Comments refer to MAC

**Comments**

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| 4711 | 109.00 | 9.17a | PARTIAL\_AID and GROUP\_ID violate layering, i.e. they require the PHY to have knowledge of MAC properties (e.g. whether the peer is an AP or not).  Is the benefit of such layer violation really worth the architectural cost? | Delete PARTIAL\_AID from the spec.  Change the "wilcard" value for GROUP\_ID to 0 in all cases (not sometimes 63) |

Proposed resolution: REJECT

There is no layer violation because these parameters are included in the TXVECTOR and RXVECTOR.

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| 5359 | 110.31 | 9.17a | In table 9-19, why in 'otherwise' case the partial AID is set to 0? Why not using the same partial AID processing as mesh STA(using RA[39:47] as partial AID)? | A STA that transmits a VHT SU PPDU to an IBSS peer STA, or a STA that transmits a VHT NDP PPDU fol-lowing  an  NDPA  frame  addressed  to  an  IBSS  peer  STA,  shall  set  the  TXVECTOR  parameterPARTIAL\_AID to RA[39:47]. |

Proposed resolution: REJECT

An IBSS in general is not a very suited network architecture for power save STAs, because the ATIM is typically not supported in practical implementations. Given the low volume of IBSS traffic (now and likely also in the future), it is probably not interesting to change this setting at this point.

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| 5315 | 110.55 | 9.17a | Do we really mean "should"? I think is better to use "shall". If the AP assigned partial AID = 0 the existing mechanism would not work right? | An AP "shall" not assign an AID ... |

Proposed resolution: REJECT

The odds that a specific BSSID and AID pair results in a partial AID equal to 0 are quite low, therefore a "should" requirement is deemed sufficient in this case. A partial AID equal to 0 will not cause interoperability issues, but only reduced power save capabilities in the BSS (but with very low probability of occurrence).

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| 5358 | 110.62 | 9.17a | In current draft,unicast frame,MU-MIMO frame and broadcast frame can be identified via PHY header (i.e., SIG), which can help non-target receivers to achieve power saving by stop processing earlier. However, there is no differentiation between real broadcast and multicast in PHY header so that receivers can only realize whether a multicast frame is for them or not after decoding MAC data which cause unnecessary power consumption. It is better to also provide a mechanism to identify whether a frame is a muliticast frame and for which group of STAs in PHY header. | One resvered bit is used to indicate multi-cast frame and Partial AID bits may used to indicate lower 9 bits of the group broadcast address.If the STA detects Group broadcast bit =1, STA will know the frame is group broadcast frame. And then, if the STA detects Partial AID is not the lowest 9 bits of the STA's group broadcast address, the STA will ignore this frame. If Partial AID=lowest 9 bits of the STA's group broadcast, the STA will receive the frame. |

Proposed resolution: REJECT

In DCN 11/0991r2 the following comment resolution for CID 3704 was proposed and approved by the TG, with ample description of why it is not appropriate to define a specific Partial AID for multicast frames; text is reported below for reference. CID 5358, poses same general question as below CID 3704.

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| *3704* | *78.51* | *9.17a* | *The all group addressed frames have partial AID field set to 0. This mechanism does not enable the receiver to detect the TA of the group addressed frames. Thus: - the receivers need to receive every single group addressed frame that consumes a lot of power. - the group addressed frames use different principle to set the AID field than SU individually addressed frames. The SU individually addressed frames have BSSID present in the partial AID field. - Presentations to describe this comment more precisely have been given. Please see: 11-11-0313-02-00ac-SU-MIMO-type-for-group-addressed-frames.ppt or 11-11-0314-01-00ac-SU-MIMO-type-for-group-addressed-frames-text.doc.* | *Please enable the receivers of SU group addressed frames transmissions to detect TA and RA of the transmission. For RA it could be enough to simply indicate that the transmitted frame is individually addressed or group addressed. For instance use the same logic to set Parital AID field for group addressed frames as used for individually addresssed frames, i.e. Partial AID of group addressed could be in form: AID = 0 and BSSID= BSSID.*  | *DISAGREE* | *MAC* |

*Discussion*

*Including the transmitter address.*

*Note that a straw poll was run regarding this topic on March (11/826r0) and the results indicated that group was not in favor of including the transmitter address in the partial AID of broadcast frames*

* ***Are you in favor of having a part of the transmitter address present in the Partial AID of the SU VHT PPDU that carries group addressed MPDUs?***

***Y: 2*** ***N: 8 A: 14***

*Further discussion:*

*Broadcast messages, especially management ones, are likely to be transmitted by using non-HT format, in which case the Partial AID is not present.*

*Also, the Partial AID is mainly useful in reducing the energy consumption in case of A-MPDU; In case of single MPDU the benefit is limited; Broadcast frames are likely single MPDUs;*

*Special MAC mechanisms targeted are improving the power saving in case of broadcast/multicast transmission already exist, and should be implemented and supported whenever there is a concern related to power saving;*

*STAs operating in power save mode will wake up only at the intended DTIM and receive broadcast traffic from the AP in the time immediately following the DTIM. In other moments in time the STA should be in Doze state.*

*Adding the transmitter address would not provide additional power saving opportunities*

*Moreover directed Multicast Service (DMS) allows a STA to instruct the AP to convert certain multicast frames into unicast frames for the STA. This allows the STA to go back to sleep after every beacon that does not have the STA's TIM bit set. Clearly, DMS is much more effective than receiving every PHY header of the multicast frames that are sent after each DTIM beacon.*

*DMS is effective in reducing the power consumption related to control/management multicast frames; it clearly may lead to some overhead in some cases; please note that converting frames from multicast to unicast allows the use of higher data rates and in some cases may even improve efficiency*

*Flexible Multicast Service (FMS) allows a STA to negotiate a delivery schedule for certain multicast traffic that is a multiple of the DTIM period. This is especially useful when multiple multimedia streams are active at the same time: a STA can be awake only for the streams it needs to decode.*

*When these mechanisms are used, the additional benefit of including the transmitter address in a PLCP header brings no benefits.*

*Including the receiver address.*

*Note that a straw poll was run regarding this topic on March (11/826r0) and the results indicated that group was not in favor of including the receiver address in the partial AID of broadcast frames*

* ***Are you in favor of having a part of the receiver address (Group address) present in the Partial AID of the SU VHT PPDU that carries group addressed MPDUs?***

***Y:2*** ***N:9*** ***A:11***

*Further discussion*

*Inserting the receiver multicast MAC address in the computation of the partial AID is a significant difference from the existing approach for unicast frames*

*Multicast MAC address is derived from IP address, hence it is inherently dynamic, requiring an instantaneous computation of the Partial AID per each sent packet;*

*The reason for introducing a PLCP based power save for unicast frames is that most of the MAC payload of unicast frames cannot be decode by STAs other than the intended recipient (due to high MCS or BF); PLCP header instead is likely to be decoded by all STAs.*

*In case of multicast frames, the transmission rate has to be low, in order to allow for decoding at all recipients; in this case the MAC address can also be decoded correctly, allowing for efficient power saving; in this case the additional benefit from a PLCP header based power save is limited.*

*Power save based on the recipient address filtering is already possible at MAC; whenever this mechanism can be used, it already provides an efficient power saving; the MAC address is present in each MPDU, hence in case of A-MPDU, power saving is already possible after the first MPDU; PLCP based power save in most of the cases (high 11ac rates) only gives few us of extra power saving;*

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| 5087 | 110.04 | 9.17a | Table applies only to SU PPDUS with single recipient | Change Table caption to "TXVECTOR parameters GROUP\_ID and PARTIAL\_AID settings for VHT SU PPDUs or VHT NDPs with single recipient" |

Proposed resolution: REVISE

Change table caption to "TXVECTOR parameters GROUP\_ID and PARTIAL\_AID settings for VHT SU PPDUs carrying one or more individually addressed MPDUs or a VHT NDP intended for a single recipient".

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| 4689 | 109.45 | 9.17a | This subclause can not work with a BSS that have multiple BSSID. | Harmonize them. |

Proposed resolution: REJECT

Each BSS will have a different BSSID, and therefore a different hash that serves as the offset into the Partial AID range (assuming up to 16 incremental BSSIDs). Therefore, each BSS will have a different set of partial AIDs per BSS, at least when less than 32 STAs are associated per BSS, which is not unlikely.

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| 5314 | 110.26 | 9.17a | Partial AID "can be used for power saving". (9.17a, Pg108, L50/51) So this is not a requirement. Therefore we should add option to not use it. | Add normative text in 9.17a near Table 9.19 to say if Partial Aid = 0, then the receiving STA shall not use power saving. |

Proposed resolution: REJECT

Power saving based on a Partial AID is never a requirement at a receiving STA. But for GID/Partial AID = 0/0, only APs or Mesh STAs with a Partial BSSID equal to 0 need to continue to listen, while other device may suspend receiving. For GID/Partial AID = 63/0, receiving STAs will already not use power save because the frame might be for them.

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| 4397 | 110.18 | 9.17a | TDLS STA or TDLS peer STA? | Change |

Proposed resolution: AGREE

In Table 9.19 change:

Sent by an AP and

addressed to a STA associated

with that AP or

sent by a DLS or TDLS

STA in a direct path to a

DLS or TDLS peer STA

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| 4828 | 9.17a | The NOTE indicates that it is always allowed to set GID to 63 and PAID to 0, but this is not what the normative text says | Change "shall set the TXVECTOR parameters GROUP\_ID and PARTIAL\_AID as shown in Table 9-19" to "shall set the TXVECTOR parameters GROUP\_ID and PARTIAL\_AID as shown in Table 9-19 or to 63 and 0 respectively", delete the last row in Table 9-19, and change the NOTE to say "The GROUP\_ID and PARTIAL\_AID might for example be set to 63 and 0 respectively in the cases of PPDU carrying MPDUs- sent to an IBSS STA- sent by an AP to a non associated STA- sent to a STA for which it is not know which condition is applicable |

Proposed resolution: REJECT

For reference, comment refers to the following note:

NOTE—In Table 9-19 (TXVECTOR parameters GROUP\_ID and PARTIAL\_AID settings for VHT SU PPDUs) the

last row includes the cases of PPDU carrying MPDUs

— sent to an IBSS STA

— sent by an AP to a non associated STA

— sent to a STA for which it is not know which condition is applicable

and any other condition not explicitly listed in the other rows of the table.

The note does not indicate that “it is always allowed to set GID to 63 and PAID to 0”, so the comment is not consistent with the spec text.

The table defines setting for Partial AID and Group ID for all unicast PPDUs.

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| 4623 | 110.65 | 9.17a | The example is wrong (i.e., doesn't reflect the normative text above). In this paragraph, "229" should be changed to "164" and "165" should be changed to "229". To an AP: the BSSID in hexadecimal is 00-21-6A-AC-53-52. According to the discussion in 11-11-0991r2, which comment 2171 points to, we should convert to binary and then bit-reverse each octet. When we do this, the last two octets become 53-52 = 01010011 - 01010010 (hex) -> bit reverse: 11001010 : 01001010. Then BSSID[39:47] tells us to take the last 9 bits here: 001001010, which is (taking lsb at left) 164. From an AP: we get 5 + dec(1110) x 32 mod 512 = 5+ 7 x 32 mod 512 = 229. | Change "229" to "165" and change "164" to "229". |
| 5265 | 111.01 | 9.17a | Example on the PAID values is incorrect. | Correct:For transmission to the AP: 164For transmission to the STA: 229The following is the correct settingBSSID = 00-21-6A-AC-53-52AID = 5;ExplanationPAID = mod( dec(AID[0:8]) + dec(BSSID[44:47] XOR BSSID[40:43]) \* 2^5) MOD  2^9BSSID[44:47] = 1010 (represent the '5' with LSB on the left, according to bit reverse representation, see below picture)BSSID[40:43] = 0100 (represent the '2' with LSB on the left, according to bit reverse representation, see below picture)BSSID[44:47] XOR BSSID[40:43]) = 1110   ïƒ  7 in decimal (according to definition in the specs, LSB is assumed on the left in the conversion)AID[0:8] = 10100000  ïƒ  5 in decimal (according to definition in the specs, LSB is assumed on the left in the conversion)PAID = (5 + 7\*2^5)  MOD 2^9 = 229For transmission to an APPAID = BSSID[39:47] =    001001010  (conversion to decimal assuming LSB on the left)  = 164 |
| 4399 | 111.02 | 9.17a | I'm unconvinced by this example. To AP should be tail of MAC address: i.e. 256+5\*16+2 =338.To non-AP STA should be AID + mangled BSSID = 5 + 32\*(5 xor 2) = 5 + 32\*(7) = 229 | As in comment |
| 4693 | 111.02 | 9.17a | Shouldn't the PARTIAL\_AID in PPDU to AP be 165 and  the PARTIAL\_AID in PPDU to STA with AID 5 be 229? | Clarify it. |
| 4830 | 111.02 | 9.17a | I'm failing to see how you can get the PARTIAL\_AID to be 229, assuming "an AP" should be "the AP" | Change "229" to "338" (0x152) and change "an AP" to "the AP" |
| 5013 | 111.03 | 9.17a | There is and error in the example. Downlink should be (0, 164) while uplink is (63, 229). | Correct example as in comment |

Proposed resolution: REVISE

Comments correctly point out that there is a mistake in the example. Below computations indicate the correct values

BSSID = 00-21-6A-AC-53-52

AID = 5;

For a transmission from the AP to the STA:

* PAID = mod( dec(AID[0:8]) + dec(BSSID[44:47] XOR BSSID[40:43]) \* 2^5) MOD 2^9
	+ BSSID[44:47] = 1010 (= 5,in decimal, according to bit reverse representation, see below picture)
	+ BSSID[40:43] = 0100 (= 2 in decimal)
	+ 1010 XOR 0100 = 1110 (= 7 in decimal)
	+ AID[0:8] = 10100000 (= 5 in decimal)
* Hence: PAID = (5 + 7\*32)  MOD 512 = 229

For a transmission to the AP:

* PAID = BSSID[39:47] = 001001010 = 164

MAC address representation conventions:



See also DCN 11/587r2 for more explanations.

***Change last paragraph of 9.17a as***

As an example of the GROUP\_ID and PARTIAL\_AID setting, consider the case of a BSS with BSSID 00-

21-6A-AC-53-52 that has as a member a non-AP STA assigned AID 5. In VHT PPDUs sent to an AP, the

GROUP\_ID is set to 0 and the PARTIAL\_AID is set to 164. In VHT PPDUs sent by the AP to the non-AP

STA associated with that AP, the GROUP\_ID is set to 63 and PARTIAL AID is set to 229.