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: 11-11-0276-00-00ac-tgac-d0-1-comments.xls

Comments refer to: Draft P802.11ac\_D0.1.pdf

Changes in the text refer to: Draft P802.11ac\_D0.3.pdf

**Comments**

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| 1511 | RISON, Mark | 9.7e | 50 | 35 | ER | It's not totally clear to me that MAC Adresses have, and hence the BSSID has, a well-defined endianness, in terms of the bit numbering. The lsb of the first octet on the air is the I/G bit; is that the octet used in construction of the partial AID for from-AP MPDUs? If so, half of the intended mixing has been lost since the I/G and U/L bits are fixed in an ESS BSSID. | Clarify BSSID[0:7] construction and consider whether BSSID[2:9] should be used instead. | Agree in Principle | Ed |  |

**Discussion on the order of MAC address bits**

The comment points out how the formula for the computation of the Partial AID, for the case of PPDUs sent to non-AP STA, may refer to the incorrect BSSID address bits.

The original intent of the formula is to have a Partial AID which is the sum of the AID and an offset; the offset was selected in such a way that it is likely to be different across OBSSs.

The intent was to use as offset a function of the non-OUI address bits, as they are more likely to be different across neighboring OBSSs, especially in planned deployments.

Based on this criteria, the formula used ‘BSSID[0:7]’, with the assumption that these notation refers to the non-OUI bits, which will likely be different across OBSSs.

The notation ‘BSSID[0:7]’ turned out to be ambiguous, depending on which address representation is considered.

In the following we provide more details and propose a clarification

An exemplary address allocation to APs in OBSSs may be of the kind (hexadecimal representation)

BSS1 = 00:11:22:33:44:56

BSS2 = 00:11:22:33:44:57

BSS3 = 00:11:22:33:44:58

In the partial AID formula the intent was to use the portion of the BSSID address hosting 55, 56, 57 in above examples, so as to maximize the entropy

In the following we identify the bits indicating 55, 56, 57 with reference to a specific representation of the BSSID address; we chose to refer to the representation as appearing in the Address field of a MAC frame.

When written in a Address field of a MAC frame, the bit representation of above hexadecimal addresses appears as a LSB-first representation within an octet (also called bit-reverse in 802-2001; see an example in the below picture), i.e. the octets are in the same relative position as in the hexadecimal representation, but the bit ordering within each octet is reversed;

 



In a Address field, for our purposes, we refer to the leftmost (first transmitted) bit as B0 and the rightmost (last transmitted bit) as B47 as commonly assumed for other MAC fields; note that index B0 maps to the I/G bit (this is also consistent with REVmb\_D7.02 (8.2.2 Convention));

Assuming this representation , the value 5 of the initial hexadecimal representation corresponds to 5 = bin\_to\_hex(Address\_field[44:47]) and the value 6 corresponds to 6= bin\_to\_hex(Address\_field[B40:B43])

Hence, we use BSSID[44:47] and BSSID[40:43] in the Partial AID formula, assuming ‘BSSID[]’ indicates the representation of the BSSID address as appearing in a Address field of a MAC frame.

Based on above discussion, the proposal is to clarify the formula to avoid ambiguous interpretations:

Moreover it was pointed out that the formula was a mix of binary and decimal operations and may have been confusing; new expression uses the explicit dec() operator and removes the bit shift operation, without changing the formula.

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| 721 | Kneckt, Jarkko | 9.7e | 50 | 24 | TR | The partial AID in VHT PPDUs is not explained for mesh BSS.  | Please add the following text to line 43: " In mesh BSS the AID of the peer mesh STA is obtained from the mesh peering establishment". | Simone. Agree in principle | MAC |

Discussion on the Partial AID/GID values for Mesh STAs

We propose to treat the transmission to a Mesh STA similarly to a transmission to an AP

* PARTIAL\_AID set to the 9 LSBs of the recipient MAC address
* GID set to 0

This would enable power save on Mesh transmissions. GID =0 ensures that the PAID space used for Mesh STA is disjoint from the one used for non-Mesh STAs, so that non-Mesh STAs power saving performance are not affected by this change;

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| 669 | Kneckt, Jarkko | 22.3.9.2.3 | 101 | 53 | TR | The Partial AID is not the 9 last bits of the AID. It contains also "specially XORed" and shifted BSSID bits. | Correct the Partial AID field. | See #1341Agree in principle | PHY |
| 1341 | Zhang, Hongyuan | 22.3.9.2.3 | 101 | 51 | TR | partial AID description incorrect | Change description to "B13-B21: Partial AID, defintion refer to clause 9.7e" | Hongyuan, Jarkko (11/314r1)See #1510, resolved in DCN 11/0511r2 | PHY |

**Discussion on Partial AID/GID for NDP and various clarifications**

The Partial AID and GID definitions need some calcifications and specifications for cases that are not covered in current specs (neither in 22.3.9.2.3, nor in 9.7e)

* + Define the Partial AID for NDP;
		- this was not defined in D0.3
		- the proposal in this document is to set Partial AID to be same as set in the preceding NDPA
		- This makes the Partial AID in NDP consistent with Partial AID in other PPDUs
	+ Re-defines the GID value for the NDP
		- The proposal in this document is to set the GID to be same as the one in the preceding NDPA
			* This is to be consistent with GID and Partial AID settings in other PPDUs

In this document we also propose to remove the text addition referred to CID #1512: the condition ‘sent by an AP’ would exclude TDLS;

Moreover, we proposes to add a ‘should’ statement to avoid that AIDs are assigned in such a way that the Partial AID = Formula(AID,BSSID) = 0; this is to avoid that some STAs will not be able to benefit from the power saving coming from Partial AID.

**Editing instructions**

**9.30.6 Transmission of a VHT NDP**

***Change the following paragraph:***

A STA shall transmit(#68) a VHT format NDP using the following TXVECTOR parameters:

— LENGTH shall be set to 0.

— NUM\_USERS shall be set to 1.

— GROUP ID shall be set to 0 if the associated NDPA frame is addressed to an AP; otherwise, the Group ID shall be set to 63.

— NUM\_STS shall indicate two or more space-time streams.

* PATIAL\_AID shall be set according to section 9.17a

— CH\_BANDWIDTH shall be set to the same value as the TXVECTOR CH\_BANDWIDTH in the

preceding NDPA frame.(#1080)

**9.17a Partial AID in VHT PPDUs**

***Change the following section:***

The TXVECTOR parameter PARTIAL\_AID(#1509) is set as follows:

In a VHT PPDU that carries group addressed MPDUs, or in an NDP following a group addressed NDPA frame, the TXVECTOR parameter PARTIAL\_AID(#1509) is set to 0.

In a VHT PPDU that carries MPDUs addressed to a single non-AP STA, or in an NDP following an NDPA frame addressed to a single non-AP STA, the TXVECTOR parameter PARTIAL\_AID(#1509) is set to:

$$\left(\left[\right]c\left(\left[47\right]\left[03\right]\right)^{}\right)^{}$$

(9-1)

Where A[b:c] indicates the bits in positions from b to c of the binary representation of A inclusive, with index 0 being the first transmitted bit; ⨁ is a bitwise exclusive OR operation;; mod X indicates the Xmodulo operation; dec(A[b:c]) is the cast to decimal operator where b is scaled by 20 and c by 2c-b; AID is the AID of the recipient STA; BSSID[] is the representation of the BSSID address as appearing in a Address field of a MAC frame1

NOTE 1 -- In this representation, I/G bit maps to BSSID[0], and BSSID[47] is the last transmitted bit

In DLS or TDLS transmission, the AID for the peer STA is obtained from DLS Setup Request and Response frame or TDLS Setup Request and Response frame.

In a VHT PPDU that carries MPDUs addressed to an AP(#1278), or in an NDP following an NDPA frame addressed to an AP, the TXVECTOR parameter PARTIAL\_AID(#1509) is set to the lower 9 bits of the BSSID.

In a VHT PPDU addressed to an IBSS peer STA, or in an NDP following an NDPA frame addressed to an IBSS peer STA, the TXVECTOR parameter PARTIAL\_AID(#1509) is set to 0.

In a VHT PPDU that carries individually addressed MPDUs to a mesh STA, the TXVECTOR PARTIAL\_AID parameter is set to the 9 LSBs of the recipient MAC address.

An AP should not assign to a STA an AID value such that the TXVECTOR PARTIAL\_AID value computed according to formula (9-1) results to be equal to 0.

*In Table 22-9, modify the following sentence in the Description field at line 27*

In a SU VHT PPDU that is not an NDP and that carries MPDU(s) addressed to an AP or to a Mesh STA, the Group ID field is set to 0; otherwise it is set to 63.

In an NDP PPDU the Group ID is set according to 9.21.6

For a MU-MIMO PPDU the Group ID is set as in 22.3.12.3;