IEEE P802.11
Wireless LANs

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| LB 200 Comment Resolution for CID 1391 |
| Date: 2014-05-01 |
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Abstract

This submission proposes resolutions for comments in clause 10.1.3.8 of TGah Draft 1.0 with the following CIDs:

1391

Revisions:

* Rev 0: Initial version of the document
* Rev 1: Included some feedback received during Rev0 presentation

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGah Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGah Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGah Editor: Editing instructions preceded by “TGah Editor” are instructions to the TGah editor to modify existing material in the TGah draft. As a result of adopting the changes, the TGah editor will execute the instructions rather than copy them to the TGah Draft.***

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1391 | 214.01 | 10.1.3.8 | 10.1.3.8 Multiple BSSID procedure; how is it done in 11ah beacon? | Describe procedure for 11ah | Revised –TGah Editor to make the changes shown in 11/14-0569r1 |

**Discussion:** *None.*

**10.1.3.8 Multiple BSSID procedure**

**Instructions to TGah Editor: *Change this subclause as follows:***

Implementation of the Multiple BSSID capability is optional for a WNM STA, a DMG STA and for an S1G STA. A STA that implements the Multiple BSSID capability has dot11MultiBSSIDImplemented set to true. When dot11MultiBSSIDImplemented is true, dot11WirelessManagementImplemented shall be set true except for a DMG STA and for an S1G STA, in which case it may be set to false. A STA that has a value of true for dot11MultiBSSIDActivated is defined as a STA that supports the Multiple BSSID capability. A STA for which dot11MultiBSSIDActivated is true shall set the Multiple BSSID field of the Extended Capabilities element to 1.

The Partial Virtual Bitmap field in the transmitted BSSID Beacon, S1G Beacon or DMG Beacon frame shall indicate the presence or absence of traffic to be delivered to all stations associated to a transmitted or nontransmitted BSSID. The first 2n bits of the bitmap are reserved for the indication of group addressed frame for the transmitted and all nontransmitted BSSIDs. The AID space is shared by all BSSs and the lowest AID value that shall be assigned to a non-S1G STA is 2n (see 8.4.2.6 (TIM element)). The lowest AID value that shall be assigned to an S1G STA shall be 2n for each page. The Encoded Blocks that contain these first 2n bits (if any) shall precede the Encoded Blocks that contain AIDs in the S1G Partial Virtual Bitmap field of each page.

Operation in a BSS that is neither DMG nor S1G is subject to the following additional rules.(11ad) If the Contention Free Period is supported and if more than one BSS’s CFPCount becomes 0 in the same Beacon frame, the AP shall concatenate the Contention Free Periods of all CFPs that coincide and shall not transmit a CF-End or CF-End+Ack frame(#2069) until the end of the concatenated CFP, indicated with a single CF-End or CFEnd+Ack frame(#2069), if required. The CF Parameter Set in the transmitted BSSID contains times that are an aggregate of CFP times of the nontransmitted BSSIDs.

Multiple BSSID rate selection is defined in 9.7.8 (Multiple BSSID Rate Selection).

**10.2.2.17 TIM Broadcast**

**Instructions to TGah Editor: *Change the paragaraph below as follows:***

When dot11MultiBSSIDActivated is true, the A1 field of the TIM frame is the Broadcast address, the A2 field and the A3 field are set to the transmitted BSSID.

**8.4.2.6 TIM element**

**Instructions to TGah Editor: *Change the paragaraph below as follows:***

When dot11MultiBSSIDActivated is false and dot11S1GoptionImplemented is false, the Partial Virtual Bitmap field consists of octets numbered N1 to N2 of the traffic indication virtual bitmap, where N1 is the largest even number such that bits numbered 1 to (N1 x 8) – 1 in the traffic indication virtual bitmap(#234) are all 0 and N2 is the smallest number such that bits numbered (N2 + 1) x 8 to 2007 in the traffic indication virtual bitmap are all 0. In this case, the Bitmap Offset subfield value contains the number N1/2, and the Length field is set to (N2 – N1) + 4.

**Instructions to TGah Editor: *Change the paragaraph below as follows:***

When dot11MultiBSSIDActivated is true, the Partial Virtual Bitmap field of the TIM element is constructed as follows, where the maximum possible number of BSSIDs is an integer power of 2, n = log2 (maximum possible number of BSSIDs), k is the number of actually supported nontransmitted BSSIDs, and k <= (2n – 1).

* The bits 1 to k of the bitmap are used to indicate that one or more group addressed frames are buffered for each AP corresponding to a nontransmitted BSSID and are called BSS assigned identifiers (BSS AIDs). The AIDs from 1 to k are not allocated to a STA (in each page for an S1G STA). The AIDs from (k + 1) to (2n – 1) are reserved and set to 0 (in each page for an S1G STA). The remaining AIDs are shared by the BSSs corresponding to the transmitted BSSID and all nontransmitted BSSIDs.
* When the DTIM Count field is 0 for a BSS that has a nontransmitted BSSID, and one or more group addressed frames are buffered at the AP for this BSS, the corresponding bits from bit 1 to bit k is set to 1.
* Each bit starting from bit 2n in the traffic-indication virtual bitmap corresponds to individually addressed traffic buffered for a specific STA within any BSS corresponding to a transmitted or nontransmitted BSSID at the time the Beacon frame is transmitted. The correspondence is based on the AID of the STA.
* Based upon its knowledge of the capability of associated stations to support the multiple BSSID capability, as indicated by the corresponding field in the Extended Capabilities element and the content of the traffic indication virtual bitmap, an AP encodes the Partial Virtual Bitmap and the Bitmap Control field of the TIM element using one of the three following methods. Specifically, a non-S1G AP uses Method B when it determines that the bit for each associated non-AP STA in the traffic indication virtual bitmap that is reconstructed by each non-AP STA from the received TIM element encoded using Method B is set correctly. Otherwise, a non-S1G AP uses Method A while an S1G AP uses Method C.

**Instructions to TGah Editor: *Change the paragaraph below as follows:***

Method A, Method B, and Method C are described as follows:

1. Method A: The Partial Virtual Bitmap field consists of octets numbered 0 to N2 of the traffic indication virtual bitmap, where N2 is the smallest number such that bits numbered (N2 + 1) × 8 to 2007 in the traffic indication virtual bitmap(#234) are all 0. If such a value N2 does not exist, that is, when not all bits in the last octet of the traffic indication virtual bitmap are equal to 0, N2 = 250. When using this method, the Bitmap Offset subfield value always contains the number 0, and the Length field is N2 + 4.
2. Method B: The Partial Virtual Bitmap field consists of a concatenation of octets numbered 0 to N0 – 1 and octets numbered N1 to N2 of the traffic indication virtual bitmap, where N0 is the smallest positive integer such that N0 × 8 – 2n < 8. If N0 is an odd number, then N1 is the largest odd number such that N0 < N1and each of the bits N0 × 8 to (N1 × 8 – 1) is equal to 0. When N0 is an even number, N1 is the largest even number such that N0 < N1 and each of the bits N0 × 8 to (N1 × 8 – 1) is equal to 0. If such a value N1 > N0 does not exist, N1 = N0. Additionally, N2 is the smallest integer value for which the values for bit (N2+1) × 8 to 2007 in the traffic indication virtual bitmap(#234) are all 0. If such a value N2 does not exist, that is, when not all bits in the last octet of the traffic indication virtual bitmap are equal to 0, N2 = 250. When using this method, the Bitmap Offset subfield contains the value of (N1 – N0)/2, and the Length field is N0 + N2 – N1 + 4.
3. Method C: The S1G Partial Virtual Bitmap field consists of a concatenation of Encoded Block subfields that contain BSS AIDs and Encoded Block subfields that contain AIDs as described in 8.4.2.6.1(S1G Partial Virtual Bitmap encoding). When using this method, the Page Slice Number subfield is equal to 31, and the Page Index subfield is equal to any value.

NOTE—When *N*1 = *N*0, Method B reduces to Method A.

**Instructions to TGah Editor: *Change the paragaraph below as follows:***

For both Method A and Method B, when there are no frames buffered for any BSS corresponding to a transmitted or nontransmitted BSSID supported, the Partial Virtual Bitmap field is encoded as a single octet equal to 0, the Bitmap Offset subfield is 0, and the Length field is 4 while for Method C the Partial Virtual Bitmap field is not present in the TIM element and the Length field is 3. For both Method A and Method B, when there are no buffered individually addressed frames for any BSS corresponding to a transmitted or nontransmitted BSSID, but there are buffered group addressed frames for one or more of the BSSs, the Partial Virtual Bitmap field consists of the octets number 0 to N0 – 1 where N0 is the smallest positive integer such that (N0 × 8 – 2n < 8), while for Method C, the Partial Virtual Bitmap field consists of Encoded Blocks that contain the BSS AIDs of the BSSs for which there are buffered group addressed frames. In this case for Method A and Method B, the Bitmap Offset subfield value contains the number 0, and the Length field is N0+3, while for Method C, the Length field is equal to 3 plus the size of the encoded blocks that carry the BSS AIDs which are present in the TIM element.

8.4.2.6.1 S1G Partial Virtual Bitmap encoding

**Instructions to TGah Editor: *Change the paragaraph below as follows:***

When dot11S1GOptionImplemented is true, the Partial Virtual Bitmap field is constructed with one or more Encoded Block subfields if at least one bit in the traffic indication virtual bitmap is equal(#1185) to 1 as shown in Figure 8-122c (Partial Virtual Bitmap field). The Encoded Block subfield consists of the Block Control subfield, the Block Offset subfield, and the Encoded Block Information subfield as shown in Figure 8-122d (Encoded Block subfield). When dot11MultipleBSSIDActivated is true, the Partial Virtual Bitmap field contains zero or more Encoded Block subfields that contain BSS AIDs.

**8.2.4.1.8 More Data field**

**Instructions to TGah Editor: *Insert the following paragraph at the end of Subclause 8.2.4.1.8:***

An S1G STA sets the More Data field to 1 to indicate that the S1G STA has MSDUs, MMPDUor A-MSDUs buffered for transmission to the frame's recipient during the current SP or TXOP. An S1G STA does not set the More Data field to 1 if it does not have any MSDUs, MMPDU(#2113) or A-MSDUs buffered for transmission to the frame's recipient during the current SP or TXOP.

An S1G AP sets the More Data field to 1 in group addressed frames when additional group addressed BUs remain to be transmitted by the AP during this (short) beacon interval. The S1G AP sets the More Data field to 0 in group addressed frames transmitted by the AP when no more group addressed BUs remain to be transmitted by the AP during this (short) beacon interval.

**8.4.2.45 Multiple BSSID element**

**Instructions to TGah Editor: *Change the 5th paragraph of this subclause:***

When the Multiple BSSID element is transmitted in a Beacon, DMG Beacon, or Probe Response frame, the reference BSSID is the BSSID of the frame. More than one Multiple BSSID element may be included in a Beacon, S1G Beacon or DMG Beacon frame. The AP or DMG STA determines the number of Multiple BSSID elements. The AP or DMG STA does not fragment a nontransmitted BSSID profile subelement for a single BSSID across two Multiple BSSID elements unless the length of the nontransmitted BSSID profile subelement exceeds 255 octets. When the Multiple BSSID element is transmitted as a subelement in a Neighbor Report element, the reference BSSID is the BSSID field in the Neighbor Report element.

**Instructions to TGah Editor: *Change the 9th paragraph of this subclause:***

The Nontransmitted BSSID Profile subelement contains a list of elements for one or more APs or DMG STAs(11ad) that have nontransmitted BSSIDs, and is defined as follows:

— For each nontransmitted BSSID, the Nontransmitted BSSID Capability element (see 8.4.2.71 (Nontransmitted BSSID Capability element)) is the first element included, followed by a variable number of elements, in the order defined in 8-27 (Beacon frame body).

— The SSID and multiple BSSID-index subelements are included in the Nontransmitted BSSID Profile subelement.

— The FMS Descriptor element is included in the Nontransmitted BSSID Profile subelement if the Multiple BSSID element is included in a Beacon frame and if the TIM field indicates there are buffered group addressed frames for this nontransmitted BSSID.

— The Timestamp and Beacon Interval fields, DSSS Parameter Set, IBSS Parameter Set, Country, Channel Switch Announcement, Extended Channel Switch Announcement, Wide Bandwidth Channel Switch, VHT Transmit Power Envelope, Supported Operating Classes, IBSS DFS, ERP Information, HT Capabilities, HT Operation, VHT Capabilities, VHT Operation, S1G Capabilities, and S1G Operation elements are not included in the Nontransmitted BSSID Profile field; the values of these elements for each nontransmitted BSSID are always the same as the corresponding transmitted BSSID element values.