IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolution for CIDs related to Multiple BSSID – Part 2 | | | | |
| Date: October 15, 2018 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Inc. |  |  | appatil@qti.qualcomm.com |
| Jouni Malinen | Qualcomm Inc. |  |  | jouni@qca.qualcomm.com |
| Alfred Asterjadhi | Qualcomm Inc. |  |  | aasterja@qti.qualcomm.com |
| George Cherian | Qualcomm Inc. |  |  | gcherian@qti.qualcomm.com |

Abstract

This submission proposes resolutions for CID 16589 received for TGax LB233

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Added text to HE Operation element based on offline feedback
  + Updated HE Operation element description on Co-located BSS subfield to capture the case of 6GHz AP setting the subfield value to 0.

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 TGax Draft. This introduction is not part of the adopted material.

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

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Pg / Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 16589 | Po-Kai Huang | 237.15 | 11.1.3.8 | Group addressed frame transmission under multiple BSSID concept can only be achieved in the following two methods. First, group addressed frames of different BSSs in the Multiple BSSID set are transmitted one after the other after one beacon frame. Second, group addressed frames of different BSSs in Multiple BSSID set are transmitted in different beacon interval based on DTIM indication. The first approach increases power concumption of the STAs because STAs may need to wait for group addressed frames from other BSSs to be transmitted before received the group addressed frames from its own BSS. The second approach increase the delay of transmitting group addressed frame if the group addressed transmission are spreaded out in different Beacon Intervals. | Enable group addressed frame transmission for different BSSs in the multiple BSSID set to be spreaded out withn a beacon interval. | **Revised**  Baseline spec allows each nonTxBSSID to have a different DTIM interval. A multi-AP has the flexibility to select an appropriate DTIM interval for each nonTxBSSID such that the BSS can satisfy the delay constraints required by the STAs associated with that BSS.  **TGax editor, please make changes as shown in doc 11-18/18140r1 for CID 16589** |

**Discussion:**

[16589]

* Multiple BSSID procedure

***TGax Editor: Please change the 5th paragraph of this section in baseline spec as shown below:***

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 9.4.2.5 (TIM element)). The decimal value of the 11 LSBs of the AID assigned to an S1G STA shall be greater than 2n. The Encoded Blocks that contain these first 2n AIDs (if any) shall precede the Encoded Blocks that contain AIDs for the S1G STAs in the S1G Partial Virtual Bitmap field of each page. Each BSS of the Multiple BSSID set may have a different DTIM interval which is signaled in the DTIM Period and DTIM Count fields that are present in the Multiple BSSID-Index element carried in the nontransmitted BSSID profile for that BSS.

***TGax Editor: There are no CIDs associated with the following updates. The changes below were approved during the September 2018 meeting (doc 11-18/1320r4 motion #686). However, since there was a conflict in the instructions to the editor, the changes were not incorporated to D3.2***

***TGax Editor: Please makes the changes/additions as shown below to the paragraphs in this section.***

* Multiple BSSID procedure

***Replace the 2nd paragraph with the following:***

An AP with dot11MultiBSSIDActivated equal to true does not belong to a co-located BSSID set (see 27.16.6 (Co-located BSSID set)) and shall not set the Co-Located BSS subfield in HE Operation element to 1 in the Management frames that it transmits.

The BSSID of the AP belonging to a multiple BSSID set is referred to as the transmitted BSSID if the AP includes the Multiple BSSID element in the Beacon frame that it transmits. In a multiple BSSID set, there shall not be more than one AP corresponding to the transmitted BSSID. The BSSID of an AP belonging to a multiple BSSID set is a nontransmitted BSSID if the AP's BSSID is derived according to 9.4.2.46 (Multiple BSSID element) and 9.4.2.74 (Multiple BSSID-Index element). Among all AP STAs in multiple BSSID set, only the AP corresponding to the transmitted BSSID shall transmit a Beacon frame.

A nontransmitted BSSID profile represents information about a particular nontransmitted BSSID and consists of a set of elements that are carried in the Nontransmitted BSSID Profile subelement of the Multiple BSSID element. Each nontransmitted BSSID profile, at a minimum, shall include the elements that are mandatory for that BSS (i.e., Nontransmitted BSSID Capability element (see 9.4.2.72), SSID element (see 9.4.2.2), Multiple BSSID-Index element (see 9.4.2.74) and FMS Descriptor element (see 9.4.2.75) when dot11FMSActivated is true and the TIM element (see 9.4.2.6) indicates there are buffered group addressed frames for this nontransmitted BSSID). The AP or PCP may include two or more Multiple BSSID elements containing elements for a given BSSID index in a Probe Response frame, a Beacon frame, S1G Beacon frame, or a DMG Beacon frame. A nontransmitted BSSID profile consists of all elements carried in all such Multiple BSSID elements sharing the same BSSID index. When there is a need to carry a nontransmitted BSSID profile across multiple Multiple BSSID elements in a frame, an EMA AP shall not split an element in the profile into multiple Multiple BSSID elements, and it shall place the next element in the profile as the first subelement of the immediately following Multiple BSSID element. [#Ed – new paragraph]

An AP or PCP may choose to include only a partial list of nontransmitted BSSID profiles in the Probe Response frame, Beacon frame, S1G Beacon frame, or DMG Beacon frame or to include different sets of nontransmitted BSSID profiles in different Probe Response frames, Beacon frames, S1G Beacon frame or DMG Beacon frames. An AP advertising a complete list of nontransmitted BSSID profiles shall set the Complete List Of NonTxBSSID Profiles field of Extended Capabilities element to 1. An EMA AP, when advertising a partial list of BSSID profiles, shall include Multiple BSSID Configuration element (see 9.4.2.237 (Multiple BSSID Configuration element)) in its Beacon frame, S1G Beacon frame, DMG Beacon frame or Probe Response frame to indicate the configuration of the multiple BSSID set. The BSSID Count field of the Multiple BSSID Configuration element indicates number of active BSSIDs in the multiple BSSID set while the Profile Periodicity field indicates the number of beacons a scanning STA is required to receive in order to discover all the active nontransmitted BSSIDs in the set.

An unassociated non-AP STA may send a directed Probe Request frame containing Known BSSID element (see 9.4.2.252 (Known BSSID element)) to an EMA AP that advertises partial list of nontransmitted BSSID profiles to gather information on nontransmitted BSSIDs it has not discovered. An EMA AP, when transmitting a Probe Response frame in response to a Probe Request frame containing Known BSSID element, should not include the nontransmitted BSSID profiles for BSSIDs listed in the Known BSSID element.

An EMA AP that includes a partial list of nontransmitted BSSID profiles in its Beacon frame, S1G Beacon frame, or DMG Beacon frame, should advertise a particular nontransmitted BSSID profile in a repeating pattern such that the profile is present in at least one Beacon in a sequence of beacons indicated by the Profile Periodicity field of the Multiple BSSID Configuration element. If there is any change in a particular nontransmitted BSSID's profile (i.e., set of elements belong to the profile or the element values), the EMA AP shall include the profile in the next DTIM beacon of that BSS so that STAs with that BSS become aware of the change immediately.

Note - It is recommended that an AP selects the periodicity in which the profile repeats to be a multiple of the BSS’s DTIM interval so that associated STAs in PS mode don't have to wake-up for additional beacons.

***TGax Editor: There are no CIDs associated with the following updates. There was an editorial error when doc 11-18/1320r4 (motion #686) was incorporated. The size of Bitmap field in figure 9-768ac should be n-bits. D3.2 incorrectly shows the size as 1 bit. The remainder of the changes based on offline feedback.***

**9.4.2.252 Known BSSID element**

***TGax Editor: Please make changes to figure 9-768ac and the following paragraph of this section as shown below:***

The format of the BSSID Bitmap field is as shown in Figure 9-589dj2 (BSSID Bitmap field format).

|  |  |  |
| --- | --- | --- |
|  | Bitmap | Pad |
| Bits: | 2n | 0 or 4 or 6 |
|  | **Figure 9-768ac – Known BSSID element format** | |

The Bitmap subfield has a length of 2n bits where n is the value carried in the MaxBSSID Indicator field of the Multiple BSSID element advertised by the AP to which the Probe Request frame is being sent to. Bit position 0 is reserved. The remainder of the bits represents one of 2n – 1 possible BSSID Index values (see 9.4.2.74 (Multiple BSSID-Index element)) in the multiple BSSID set. A value of 1 at bit position *k* indicates that the non-AP STA has knowledge of nontransmitted BSSID whose BSSID Index value is *k*. Otherwise the bit is set to 0.

***TGax Editor: There are no CIDs associated with the following updates. The following changes are necessary to fix a conflict in terminology with baseline spec.***

**Discussion**:

Baseline spec is already using the term Co-Located BSSID. This was added during REVmc in the context of FTM as a resolution to CIDs 3151 & 3269. Please see <https://mentor.ieee.org/802.11/dcn/14/11-14-1024-01-000m-resolution-to-cid-3151.docx>. The purpose of this addition was to prevent a non-AP from starting an FTM session with other BSSIDs present on the same device (since the location of all such BSSIDs will be the same). Therefore, the term co-located BSSID is meant to represent BSSIDs that located on the same physical device but not necessarily operating on the same bands or channels. Baseline has been careful not to mention ‘same operating class and channel’. On the other hand, 11ax is using the term co-located BSS to identify BSSIDs that are operating on the same channel/band and as such it conflicts with the intended use in baseline spec. To preserve the original meaning of the term, 11ax should change the name. In order to be consistent with baseline spec, co-located BSSID set represents any BSSID that is hosted on the same physical device. Co-Hosted and multiple BSSID set represent special case of co-located BSSID set where all the BSSIDs are operating on the same channel.

***TGax Editor: please replace all occurrences of the term co-located BSSID set in the 11ax to co-hosted BSSID set.***

***TGax Editor: please replace all occurrences and references to the field name Max Co-Located BSSID Indicator (in HE Operation element) in the 11ax to Max Co-Hosted BSSID Indicator.***

***TGax Editor: please replace all occurrences and references to the subfield name Co-Located BSS (in HE Operation element) in the 11ax to Co-Hosted BSS.***

***TGax Editor: please replace all occurrences of the term co-located BSSID in the 11ax to co-hosted BSSID.***

***TGax Editor: please replace all occurrences of the term co-located AP in the 11ax to co-hosted AP.***

**3.2 Definitions**

***TGax Editor: Please add the following definition to this section in alphabetical order:***

**co-located basic service set identifier (BSSID) set:** A collection of access points (APs) operating on the same physical device.

**co-hosted** **basic service set identifier (BSSID) set:** A type of co-located BSSID set such that the access points (APs) use a common operating class, channel, and antenna connectors and advertise information using multiple Beacon or Probe Response frames each corresponding to a single BSSID.

***TGax Editor: Please modify the following definition in this section as shown below:***

**multiple basic service set identifier (BSSID) set:** A ~~collection of cooperating access points (APs),~~ type of co-located BSSID set such that all of the access points (APs) use a common operating class, channel, and antenna connectors and have the capability to advertise information using a single Beacon or Probe Response frame instead of multiple Beacon or Probe Response frames each corresponding to a single BSSID.

* HE Operation element

***TGax Editor: Please change the 8th paragraph of this section as shown below:***

The Co-Located BSS subfield is set to 1 to indicate that the AP transmitting this element shares the same operating class, channel and antenna connectors with at least one other BSS and is set to 0 otherwise. An AP operating in 6 GHz or a TDLS STA or an IBSS STA or mesh a STA transmitting this element sets the subfield to 0.