IEEE P802.11
Wireless LANs

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| CIDs related to Multiple BSSID topic – Part 1 |
| Date: January 9, 2018 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Inc. |  |  | appatil@qti.qualcomm.com |
| Alfred Asterjadhi | Qualcomm Inc. |  |  | aasterja@qti.qualcomm.com |
| George Cherian | Qualcomm Inc. |  |  | gcherian@qti.qualcomm.com |
| Jouni Malinen | Qualcomm Inc. |  |  | jouni@qca.qualcomm.com |

Abstract

This submission proposes resolutions for following CID received for TGax LB230 (9):

11023, 11876, 13141, 11355, 11028, 11877, 11029, 13140, 11878

Revisions:

* Rev 0: Initial version of the document.

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.***

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| **CID** | **Commenter** | **Pg / Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 11023 | Abhishek Patil | 149.25 | 9.4.2.238 | Since support for Multiple BSSID feature is mandatory for HE non-AP STAs, HE STAs can identify a beacon from transmitted BSSID by following the procedure described in baseline spec. Further non-AP HE STAs can decode the Multiple BSSID element carried in the transmitted BSSID's beacon to derive the address of their corresponding nontransmitted BSSID. HE Operations element doesn't need to advertise any fields related to multiple BSSID feature. | As in comment | RevisedAgree with the comment.In a multiple BSSID set, only the transmitted BSSID beacons and carries the Multiple BSSID element. The HE Operations element doesn’t need to advertise that the AP belongs to a multiple BSSID set. It is determined based on the presence of Multiple BSSID element. Therefore, HE Operation element doesn’t need to advertise it. Propose to remove inconsistent text from this section. Further clarification text has been proposed to section 11.1.3.8.**TGax editor, please make changes as suggested in doc 11-17-1847r0 under CID 11023** |
| 11876 | Hemanth Sampath | 149.25 | 9.4.2.238 | Per baseline spec, only the transmitted BSSID beacons in a multiple BSSID set. Therefore, 11ax spec doesn't need to define an alternate (or redundant) procedure to identify transmitted BSSID. Remove fields Multiple BSSID AP, TxBSSID Indicator and MaxBSSID Indicator from HE Operations element. Reduce the size of HE Operation Parameters field accordingly. | As in comment | RevisedAgree with the comment.HE Operations element doesn’t need to advertise multi-BSS AP and whether or not the BSS is a TxBSSID. Please see resolution for CID 11023.**TGax editor, please make changes as suggested in doc 11-17/1847r0 under CID 11876** |
| 13141 | Po-Kai Huang | 149.51 | 9.4.2.238 | When Multiple BSSID AP subfield is set to 1, and the TxBSSID subfield is set to 0, the STA is required to scan the transmitted BSSID beacon to understand the broadcast AID assigned to its associated AP. The scanning process takes time and can be greatly simplified if the transmitted BSSID can be indicated to the STA in some ways. | Propose to have a mechanism to indicate transmitted BSSID to the STA direclty. Alternatively, having indication like BSSID index in multiple BSSID-index element for the STA to understand the relative location of its associated AP's BSSID in the multiple BSSID set. | RevisedPer baseline spec, there is only one beacon per multiple BSSID set. Further, 802.11ax mandates non-AP STAs to support multiple BSSID feature. As a result, the STAs are expected to parse the beacon from the transmitted BSSID. Therefore, there should not be any ambiguity in identifying the address of the transmitted BSSID. Additional text has been proposed to the sections on multiple BSSID to clarify the expected behavior on both AP and STA side. In addition, inconsistencies in HE Operations element are removed.Please see resolution for CID 11023.**TGax editor, please make changes as suggested in doc 11-17/1847r0 under CID 13141** |
| 11355 | Alfred Asterjadhi | 211.27 | 11.1.3.8 | What is the purpose of these new rules? I thought the whole point was to use baseline multiple BSSID operation. | Delete those paragraphs that make the procedure non-backwards compatible. | RevisedAgree with the comment.Baseline spec already defines the AP/STA behavior when the BSS is part of a multiple BSSID set. The cited text has been deleted. Additional text was added to provide further clarification and consistency with baseline.**TGax editor, please make changes as suggested in doc 11-17-1847r0 under CID 11355** |
| 11028 | Abhishek Patil | 211.36 | 11.1.3.8 | The MaxBSSID Indicator field is present in the Multiple BSSID element carried in the mgmt frames of transmitted BSSID. There is no need to duplicate this field in HE Operations element which is carried by the same mgmt frames. Also, since (by definition), there would be only one transmitted BSSID in a multiple BSSID set, there is no need to have an TxBSSID Indicator field in HE Operations element. | The paragraph (starting on line 36 on pg 211) should be removed from this section. | RevisedAgree with the commentPlease see resolution for CIDs 11023 and 11355**TGax editor, please make changes as suggested in doc 11-17/1847r0 under CID 11028** |
| 11877 | Hemanth Sampath | 211.36 | 11.1.3.8 | What is the need to advertise MaxBSSID Indicator field in HE Operations element? The mgmt frame carrying this element shall also be carrying the Multiple BSSID element which contains the MaxBSSID Indicator. There is no reason to have TxBSSID indicator in a frame carried by the transmitted BSSID. | Delete cited paragraph | RevisedAgree with the commentPlease see resolution for CIDs 11023 and 11355**TGax editor, please make changes as suggested in doc 11-17/1847r0 under CID 11877** |
| 11029 | Abhishek Patil | 211.40 | 11.1.3.8 | Since all non-AP HE STAs are multi-BSS capable, they can identify the TxBSSID by following the procedure mentioned in this section (11.1.3.8) in the baseline spec. TGax doesn't need to provide an alternate mechanism for identifying TxBSSID. The paragraph (starting on line 40 on pg 211) should be removed from this section. | Remove the cited paragraph | RevisedAgree with the commentPlease see resolution for CID 11355**TGax editor, please make changes as suggested in doc 11-17/1847r0 under CID 11029** |
| 13140 | Po-Kai Huang | 211.40 | 11.1.3.8 | HE MU PPDU may have broadcast AID for an AP in the multiple BSSID set (see 27.11.1). An HE STA needs to scan the transmitted BSSID beacon to understsand the broadcast AID for its associated AP. | Revise the text to emphasize that every HE STA shall scan the transmitted BSSID beacon to understand the broadcast AID assigned to its associated AP. | RevisedWhile it is correct that STAs need to identify the address of the transmitted BSSID, we don’t need a new mechanism to aid this process. Since non-AP HE STAs are required to support multiple BSSID operation and only the transmitted BSSID sends a beacon, the non-AP STAs can naturally determine the address of the transmitted BSSID. Also, please see resolution for CID 13141.**TGax editor, please make changes as suggested in doc 11-17/1847r0 under CID 13140** |
| 11878 | Hemanth Sampath | 211.40 | 11.1.3.8 | This paragraph assumes a nontransmitted BSSID would beacon which is not the case by definition. There should not be any ambiguity regarding identifying the transmitted BSSID since it is the only BSS in the multiple BSSID set that would send beacons and respond to probes. Besides if we allow nontransmitted BSSIDs to beacon, it can lead to other issues like multiple traffic advertisements which can confuse STAs. Also procedures like BSS Color change or Channel Switching announcements would break | As in comment | RevisedAgree with the commentPlease see resolution for CID 11355**TGax editor, please make changes as suggested in doc 11-17/1847r0 under CID 11878** |

*
* **HE Operation element** [11023, 11876, 13141]

***TGax Editor: Please make the following changes to this section (11ax D2.0 P149L25):***

The operation of HE STAs in an HE BSS is controlled by the HT Operation element, the VHT Operation element and the HE Operation element. The format of the HE Operation element is defined in Figure 9-589cq (HE Operation element format).

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|  |  |  |  |  |  |  |  |
|  | Element ID | Length | Element ID Extension | HE Operation Parameters | Basic HE-MCS And NSS Set(#7718) | VHT Operation Information |  |
| Octets: | 1 | 1 | 1(#Ed) | 4 | 2(#9674) | 0 or 3(#3035) |  |
| **Figure 9-589cq – HE Operation element format** |

The Element ID, Length, and Element ID Extension fields are defined in 9.4.2.1 (General).

The format of the HE Operation Parameters field is defined in Figure 9-589cr (HE Operation Parameters field format).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0   B5 | B6       B8 | B9 | B10      B19 | B20 | B21 | B22    B27 |  |  | B30 | B31 |
|  | BSS Color | Default PE Duration | TWT Required | TXOP Duration RTS Threshold(#Ed) | Partial BSS Color | VHT Operation Information Present | Reserved |  |  | BSS Color Disabled | Reserved |
| Bits: | 6 | 3 | 1 | 10 | 1 | 1 | 6 |  |  | 1 | 1 |
| **Figure 9-589cr – HE Operation Parameters field format** |

The BSS Color subfield is an unsigned integer whose value is the BSS Color of the BSS corresponding to the AP, IBSS STA, mesh STA or TDLS STA that transmitted this element and is set as defined in 27.11.4 (BSS\_COLOR).

The Default PE Duration subfield indicates the Packet Extension (PE) field duration in units of 4 μs for an HE TB PPDU that is solicited with an UMRS Control subfield and is used as defined in 27.5.3.3 (STA behavior for UL MU operation). Values 5-7 of the Default PE Duration subfield are reserved.

The TWT Required subfield is set to 1 to indicate that the AP requires its associated non-AP HE STAs to operate in the role of either TWT requesting STA, as described 27.7.2 (Individual TWT agreements), or TWT scheduled STA, as described in 27.7.3 (Broadcast TWT operation) and set to 0 otherwise.

The TXOP Duration RTS Threshold subfield enables an HE AP to manage RTS/CTS usage by non-AP HE STAs that are associated with it (see 27.2.1 (TXOP duration-based RTS/CTS)). The TXOP Duration RTS Threshold subfield contains the TXOP duration RTS threshold in units of 32 s, which enables the use of RTS/CTS except for the value 1023. The value 1023 indicates that TXOP duration-based RTS is disabled.

The Partial BSS Color subfield is set to 1 to indicate that an AID assignment rule based on the BSS color as defined in 27.16.3 (AID assignment) is applied for the BSS. Otherwise, the Partial BSS Color subfield is set to 0.

The VHT Operation Information Present field is set to 1 to indicate that the VHT Operation Information field is present in the HE Operation element and set to 0 otherwise. The field is set to 0 if the frame containing this element also contains a VHT Operation element.

An HE AP sets the BSS Color Disabled subfield to 1 if the HE AP decides to disable the use of the BSS color for the BSS that it serves, for example, after detecting a BSS Color overlap in the neighborhood as described in 27.11.4 (BSS\_COLOR); otherwise the HE AP sets the BSS Color Disabled subfield to 0.

The Basic HE-MCS And NSS Set field indicates the HE-MCSs for each number of spatial streams in HE PPDUs that are supported by all HE STAs in the BSS (including IBSS and MBSS) in transmit and receive. The Basic HE-MCS And NSS Set field is defined in Figure 9-589cn (Rx HE-MCS Map and Tx HE-MCS Map subfields and Basic HE-MCS And NSS Set field).

The structure of the VHT Operation Information field is defined in Figure 9-564 (VHT Operation Information field) and its subfields are defined in Table 9-252 (VHT Operation Information subfields). The VHT Operation Information field is present if the VHT Operation Info Present field is 1; otherwise not present.

* **Multiple BSSID procedure** [11023, 11355, 11028, 11877, 11029, 13140, 11878]

***TGax Editor: Please add the following two paragraphs after the first paragraph (11ax D2.0 P211L23):***

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 defined by Multiple BSSID element, only the AP corresponding to the transmitted BSSID shall transmit a Beacon frame.

***TGax Editor: Please delete the following paragraphs from this section (11ax D2.0 P211L27):***

***Insert the following at the end of the subclause:***

* Definitions specific to IEEE Std 802.11[11023, 11028, 11878]

***TGax Editor: Please update the definition of nontransmitted BSSID (802.11-2016 P157) as follows:***

**nontransmitted basic service set (BSS) identifier (BSSID):** A BSSID corresponding to one of the basic service sets (BSSs) when the multiple BSSID capability is supported that is not transmitted explicitly, but that can be derived from the information encoded in Probe Response, Beacon and directional multi-gigabit (DMG) Beacon frames and Neighbor reports.

**11.1.4.3.4 Criteria for sending a probe response**

***TGax Editor: Please update bullet g) in this section (802.11-2016 P1594) as follows:***

g) The STA is not a mesh STA and none of the following criteria are met:

1) The SSID in the Probe Request frame is the wildcard SSID.
2) The SSID in the Probe Request frame matches the SSID of the STA’s.

2a) The STA is a member of a multiple BSSID set and the SSID in the Probe Request frame matches any of the SSIDs advertised by the members of that multiple BSSID set.
3) The SSID List element is present in the Probe Request frame and includes the SSID of the
STA’s BSS.

***TGax Editor: Please add a new bullet l) in this section (802.11-2016 P1594) as follows:***

l) The STA is a member of a the multiple BSSID set, STA’s BSSID is a nontransmitted BSSID and the Address 1 field of the Probe Request frame contains the broadcast address.

* **Multiple BSSID element**

***TGax Editor: Please modify the 3rd bullet in this paragraph as follows (11ax D2.0 P121L41):***

 ***(#9756)Change the 7th paragraph as follows:***

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

* For each nontransmitted BSSID, the Nontransmitted BSSID Capability element (see 9.4.2.72 (Nontransmitted BSSID Capability element)) is the first element included, followed by a variable number of elements, in the order defined in 9-27 (Beacon frame body).
* The SSID element (see 9.4.2.2 (SSID element)) and multiple BSSID-index ~~subelements~~ element (see 9.4.2.74 (Multiple BSSID-Index element)) are included in the Nontransmitted BSSID Profile subelement.
* The FMS Descriptor element is included in the Nontransmitted BSSID Profile subelement if dot11FMSActivated is true for the BSS using this nontransmitted BSSID and 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, Transmit Power Envelope, Supported Operating Classes, IBSS DFS, ERP Information, HT Capabilities, HT Operation, VHT Capabilities, ~~and~~ VHT Operation, HE Capabilities, HE Operation, BSS Color Change Announcement, and Spatial Reuse Parameter Set elements are not included in the Nontransmitted BSSID Profile subelement; the values of these elements for each nontransmitted BSSID are always the same as the corresponding transmitted BSSID element values.

NOTE—A Nontransmitted BSSID Profile subelement may carry other element(s) if the content of the element(s) are different for the nontransmitted BSSID than those for the transmitted BSSID.(#6182, #7043, #5401)