IEEE P802.11  
Wireless LANs

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| Resolution for CID 11742 | | | | |
| Date: January 11, 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 |

Abstract

This submission proposes resolutions for CID 11742 received for TGax LB230

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: No technical change – rearranged section for continuity
  + moved section 9.4.2.22.10 before 9.4.2.37 since 9.4.2.246 refers to content in 9.4.2.22.10

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** |
| 11742 | George Cherian | 290.38 | 27.9.2.1 | When an AP hosts multiple BSSs, but does not support Multi-BSSID feature (for various reasons), the STAs that are associated to one of the BSS of the AP would not know what other BSSs are that are hosted by the same AP. Hence the STA may perform SR over those packets for other BSSs hosted by the same AP. Fix it. | As in the comment. May need some indication from the AP. | Revised  Agree with the comment.  11ax D2.0 doesn’t provide guidance on AP/STA behavior when multiple BSSs are co-located on the same device but the BSSs are not part of a multiple BSSID set. It is critical to for an AP to signal the presence of co-located BSS as it affects features such as SR, intra-PPDU PS and NAV setting.  Defined a new element (Co-Located BSSID List) which provides a list of BSSIDs that are co-located on the device but are not part of a multiple BSSID set. A bit in Neighbor Report element can also be used to provide an indication of a co-located BSS. Further, section 27.2.1 has been updated to classify frames belonging to co-located BSS as intra-PPDU. Rules on advertising and identification of co-located BSSID are added to 11.1.3.8 (Multiple BSSID) and in a new section in 27.2.7. Further section 27.11.4 is updated to indicate that all co-located BSS shall have the same BSS Color. Various updates in section 9 to identify the element and advertisement via mgmt. frames.  **TGax editor, please make changes as suggested in doc 11-17-1859r1 under CID 11742** |

***TGax Editor: Please add a new section after 9.4.2.245 as follows (11ax D2.0 P159L49):***

9.4.2.246 Co-Located BSSID List element

The Co-Located BSSID List element is used to report the list of BSSIDs of the BSSs which share the same antenna connector(s) as the reporting AP when the reporting AP has dot11MultiBSSIDActivated set to false.

The format of the Co-Located BSSID List element is shown in Figure 9-589xx (Co-Located BSSID List element format)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | | Length | Element ID Extension | MaxBSSID Indicator | BSSID #1 | ••• | BSSID #n |
| Octets: | 1 | | 1 | 1 | 1 | 0 or 6 |  | 0 or 6 |
|  | | **Figure 9-589xx – Co-Located BSSID List element format** | | | | | | |

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

The description of MaxBSSID Indicator field and BSSID fields is as defined for Co-Located BSSID List subelement in 9.4.2.22.10 (LCI report (Location configuration information report))

* LCI report (Location configuration information report)

***TGax Editor: Please modify the paragraph starting with “The Co-Located BSSID List subelement …” in this section as follows (802.11-2016 P861):***

The Co-Located BSSID List subelement is used to report the list of BSSIDs of the BSSs which share the same antenna connector(s) with the reporting STA.

The format of the Co-Located BSSID List subelement is shown in Figure 9-224 (Co-Located BSSID List subelement format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Subelement ID | Length | MaxBSSID Indicator | BSSID #1 | ••• | BSSID #n |
| Octets: | 1 | 1 | 1 | 0 or 6 |  | 0 or 6 |
| * **Figure 9-224 – Co-Located BSSID List subelement format** | | | | | | |

The Subelement ID field is equal to the value for Co-Located BSSID list in Table 9-116 (Subelement IDs for LCI Report).

The Length field is defined in 9.4.3 (Subelements).

The MaxBSSID Indicator field is as defined in 9.4.2.46 (Multiple BSSID element). When set to a nonzero value (n), it indicates the maximum possible number of BSSs (2n), including the reference BSS, which share the same antenna connector(s) and have the same 48-n MSBs of the BSSIDs. When the BSSIDs of the co-located BSSs are configured at the reporting STA but not represented by the MaxBSSID Indicator field, the BSSID fields are present in the Co-located BSSID List subelement to provide an explicit list of such BSSID values.

When the MaxBSSID Indicator field is equal to zero, the BSSID fields contain an explicit list of the BSSID values of the BSSs which share the same antenna connector(s) with the reporting STA.

NOTE—For example, if there are 4 BSSs which share the same antenna connector(s) and their BSSIDs end with 16, 24, 30 and 31, and the range of MAC addresses ending with 16-31 inclusive are not assigned to other BSSs using a different antenna connector, then this list of 4 BSSIDs can be indicated with a value of 5 in the MaxBSSID Indicator field. Otherwise, the MaxBSSID Indicator field is set to zero and the BSSIDs are listed separately.

* **Neighbor Report element**

***TGax Editor: Please make the following changes to this section (11ax D2.0 P120L45):***

Change Figure 9-296 (BSSID Information field) as follows:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B1 | | B2 | B3 | B4 B9 | B10 | B11 | B12 | B13 | B14 | B15 | B16 | B1~~4~~7 B31 |
|  | AP Reachability | | Security | Key Scope | Capabilities | Mobility  Domain | High Throughput | Very High Throughput | FTM | High Efficiency | ER BSS | Co-Located BSS | Reserved |
| Bits: | 2 | | 1 | 1 | 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 15 |
|  | | **Figure 9-296 – BSSID Information field** | | | | | | | | | | | |

***Insert the following after the paragraph beginning “The FTM field...”:***

The High Efficiency subfield is set to 1 to indicate that the AP represented by this BSSID is an HE AP and that the HE Capabilities element, if included as a subelement in the report, is identical in content to the HE Capabilities element included in the AP's Beacon frame. Otherwise the High Efficiency subfield is set to 0.

When the High Efficiency subfield is 1 the ER BSS subfield is set to 1 to indicate that the BSS corresponding to the HE AP representing this BSSID is an extended range BSS (see 27.16.5 (ER Beacon Generation in an ER BSS)). Otherwise the ER BSS subfield is set to 0.

The Co-Located BSS subfield is set to 1 to indicate the AP represented by this BSSID shares the same antenna connector(s) with the reporting AP. Otherwise the Co-Located BSS subfield is set to 0.

Delete the paragraph “Bits 14-31 are reserved.”

Insert new rows for subelement IDs 72, 193 and 194 in Table 9-151 as follows and update the corresponding reserved rows:

|  |  |  |
| --- | --- | --- |
| Table 9-151 – Optional subelement IDs for Neighbor report | | |
| Subelement ID | Name | Extensible |
| 71 | Multiple BSSID | Subelements |
| 72 | Co-Located BSSID List | Yes |
| 193 | HE Capabilities | Yes |
| 194 | HE Operation | Yes |

TGax Editor: Please add the following paragraph after the paragraph starting “The Multiple BSSID subelement” (802.11-2016 P920):

The Co-Located BSSID subelement has the same format as the Co-Located BSSID List element (see 9.4.2.246 (Co-Located BSSID List element)). This subelement is present if the neighbor AP shares the same antenna connector(s) with at least one other BSS and has dot11MultiBSSIDActivated set to false.

* BSS\_COLOR

***TGax Editor: Please update the 9th paragraph in this section as follows (11ax D2.0 P305L61):***

All APs that are members of a multiple BSSID set shall use the same BSS color. All co-located BSS (see 27.2.7 (Co-Located BSS)) shall use the same BSS color.

* **Multiple BSSID procedure**

***TGax Editor: Please add the following sentence at the end of this section (11ax D2.0 P211L23):***

An AP with dot11MultiBSSIDActivated set to true shall not advertise co-located BSS (see 9.4.2.246 (Co-Located BSSID List element) and 9.4.2.37 (Neighbor Report element)) in the Management frames that it transmits.

***TGax Editor: Please add a new section after 27.2.6 as follows (11ax D2.0 P229L26):***

* + 1. **Co-Located BSS**

An AP that is not part of a multiple BSSID set (i.e., dot11MultiBSSIDActivated is set to false) but shares the same antenna connector(s) with at least one other BSS shall advertise the presence of the co-located BSS by including either the Co-Located BSSID List element or the Neighbor Report element (with the Co-Located BSS subfield set to 1) in the Management frames that it transmits.

A non-AP STA shall identify an OBSS as a co-located BSS if any one of the condition is satisfied:

* the BSSID is reported in the Co-Located BSSID List element as advertised by the associated BSS
* the Co-Located BSS subfield is set to 1 in the BSSID Information field of the Neighbor Report element corresponding to the OBSS as advertised by the associated BSS

**27.2.2 Intra-BSS and inter-BSS frame determination**

***TGax Editor: Please change the 1st and 2nd paragraph in this section as follows (11ax D2.0 P221L51):***

A STA that obtains at least the RXVECTOR for a PPDU shall classify the PPDU as an inter-BSS frame if at least one of the following conditions is true:

* The RXVECTOR parameter BSS\_COLOR is not 0 and is not the BSS color of the BSS of which the STA is a member.
* The PPDU is an HE PPDU with the RXVECTOR parameter BSS\_COLOR not equal to 0 and the STA is an HE STA associated with a non-HE AP.
* The PPDU is a VHT PPDU with RXVECTOR parameter PARTIAL\_AID not equal to the BSSID[39:47] of the BSS with which the STA is associated or the BSSID of any BSS that is a member of the same multiple BSSID set as the BSS of which the STA is a member or the BSSID of any BSS that is identified as a co-located BSS (see 27.2.7 (Co-Located BSS)) and the RXVECTOR parameter GROUP\_ID is 0.
* The PPDU is a VHT PPDU with RXVECTOR parameter PARTIAL\_AID[5:8] not equal to the partial BSS color announced by the BSS of which the STA whose dot11PartialBSSColorImplemented is equal to true is a member and RXVECTOR parameter GROUP\_ID equal to 63 when the Partial BSS Color field in the most recent HE Operation element is 1.
* The PPDU is either a VHT MU PPDU or an HE MU PPDU with the RXVECTOR parameter UL\_FLAG equal to 0 and the STA is an AP.
* The PPDU carries a frame that has a BSSID field, the value of which is not the BSSID of the BSS with which the STA is associated or any BSS that is a member of the same multiple BSSID set as the BSS of which the STA is a member or the BSSID of any BSS that is identified as a co-located BSS (see 27.2.7 (Co-Located BSS)).
* The PPDU carries a frame that does not have a BSSID field but has both an RA field and TA field, neither value of which is equal to the BSSID of the BSS with which the STA is associated or the BSSID of any BSS that is a member of the same multiple BSSID set as the BSS of which the STA is a member or the BSSID of any BSS that is identified as a co-located BSS (see 27.2.7 (Co-Located BSS)). The Individual/Group bit in the TA field value is forced to 0 prior to comparison.

Otherwise, a STA that obtains at least the RXVECTOR for a PPDU shall classify the PPDU as an intra-BSS frame if at least one of the following conditions is true:

* The RXVECTOR parameter BSS\_COLOR of the PPDU carrying the frame is 0 or the BSS color of the BSS of which the STA is a member.
* The PPDU is a VHT PPDU with RXVECTOR parameter PARTIAL\_AID equal to the BSSID[39:47] of the BSS with which the STA is associated or of any BSS that is a member of the same multiple BSSID set as the BSS of which the STA is a member or the BSSID of any BSS that is identified as a co-located BSS (see 27.2.7 (Co-Located BSS)), and the RXVECTOR parameter GROUP\_ID equal to 0
* The PPDU is a VHT PPDU with RXVECTOR parameter PARTIAL\_AID[5:8] equal to the partial BSS color of the BSS of which the STA whose dot11PartialBSSColorImplemented is equal to true is a member, the RXVECTOR parameter GROUP\_ID is equal to 63 and the Partial BSS Color field in the most recent HE Operation element is 1.
* The PPDU carries a frame that has an RA, TA or BSSID field value that is equal to the BSSID of the BSS with which the STA is associated or the BSSID of any BSS that is a member of the same multiple BSSID set as the BSS of which the STA is a member or the BSSID of any BSS that is identified as a co-located BSS (see 27.2.7 (Co-Located BSS)). The Individual/Group bit in the TA field value is forced to the value 0 prior to the comparison.
* The PPDU carries a Control frame that does not have a TA field and that has an RA field value that matches the saved TXOP holder address of the BSS with which the STA is associated or any BSS that is a member of the same multiple BSSID set as the BSS of which the STA is a member or the BSSID of any BSS that is identified as a co-located BSS (see 27.2.7 (Co-Located BSS)).
* Power management
* Intra-PPDU power save for non-AP HE STAs

***TGax Editor: Please make the following changes to this section (11ax D2.0 P331L28):***

A non-AP HE STA that is in intra-PPDU power save mode may enter the doze state until the end of a PPDU currently being received when one of the following conditions is met:

* The PPDU is an HE MU PPDU where the RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA is associated, the RXVECTOR parameter UL\_FLAG is 0 and the RXVECTOR parameter STA\_ID\_LIST does not include the identifier of the STA or the broadcast identifier(s) intended for the STA and the BSS Color Disabled subfield is 0 in the most recently received HE Operation element from the AP to which it is associated.
* The PPDU is an HE MU PPDU, HE SU PPDU or HE ER SU PPDU and one of the following conditions are true:
* The RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA is associated, the RXVECTOR parameter UPLINK\_FLAG is 1 and the BSS Color Disabled subfield is 0 in the most recently received HE Operation element from the AP to which it is associated.
* The RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA is associated, the RXVECTOR parameter UL\_FLAG is 0 and a PHY-RXEND.indication(UnsupportedRate) primitive was received and the BSS Color Disabled subfield is 0 in the most recently received HE Operation element from the AP to which it is associated.
* The PPDU is an HE TB PPDU where the RXVECTOR parameter BSS\_COLOR is the BSS color of the BSS with which the STA is associated and the BSS Color Disabled subfield is 0 in the most recently received HE Operation element from the AP to which it is associated.
* The PPDU is a VHT PPDU where the RXVECTOR parameter PARTIAL\_AID is the BSSID[39:47] of the BSS with which the STA is associated or the BSSID of any BSS that is a member of the same multiple BSSID set as the BSS of which the STA is a member or the BSSID of any BSS that is identified as a co-located BSS (see 27.2.7 (Co-Located BSS)) and the RXVECTOR parameter GROUP\_ID is 0.
* The PPDU is a PPDU with:
* An A-MPDU including TA or RA equal to either the BSSID of the BSS with which the STA is associated or the BSSID of any BSS of a multiple BSSID set that the STA's associated BSS belongs to or the BSSID of any BSS that is identified as a co-located BSS (see 27.2.7 (Co-Located BSS)) and,
* The RA is not the individual MAC address of the STA or the group address(es) of the STA
* The PPDU is either an HE MU PPDU with the RXVECTOR parameter UL\_FLAG set to 0 or a VHT MU PPDU containing an A-MPDU with
* The RA(s) in the A-MPDU is(are) equal to the STA's individual address and,
* The STA has received in the A-MPDU at least one MPDU delimeter with EOF equal to 1 and with MPDU length field equal to 0.
* Autonomous reporting of BSS color collision

***TGax Editor: Please make the following changes to the note below the 1st paragraph in this section (11ax D2.0 P322L36):***

NOTE—All BSSs that are members of a multiple BSSID set or are co-located BSS (see 27.2.7) use the same BSS color (see 27.11.4 (BSS\_COLOR)). A non-AP HE STA should filter such BSSs while determining if there is a BSS color collision.

* **Elements**
* **General**

***TGax Editor: Please add a new row to Table 9-77 (11ax D2.0 P118L10) as follows:***

***Insert the following new rows into Table 9-77 (Element IDs) (header row shown for convenience):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 9-77 – Element IDs** | | | |
| **Element** | **Element ID** | **Element ID Extension** | **Extensible** |
| Co-Located BSSID List (see 9.4.2.246 (Co-Located BSSID List element)) | 255 | <ANA> | Yes |

* **Management frames**
* **Beacon frame format**

***TGax Editor: Please add a new row to Table 9-27 (11ax D2.0 P98L27) as follows:***

***Insert the following new rows into Table 9-27 (Beacon frame body):***

|  |  |  |
| --- | --- | --- |
| **Table 9-27 – Beacon frame body** | | |
| **Order** | **Information** | **Notes** |
| <ANA> | Co-Located BSSID List | The Co-Located BSSID List element is optionally present when dot11MultiBSSIDActivated is set to false and the AP transmitting the frame shares the same antenna connector(s) with at least one other BSS. |

* **Association Response frame format**

***TGax Editor: Please add a new row to Table 9-30 (11ax D2.0 P99L27) as follows:***

***Change Table 9-30 (Association Response frame body) as follows maintaining numeric order:***

|  |  |  |
| --- | --- | --- |
| **Table 9-30 – Association Response frame body** | | |
| **Order** | **Information** | **Notes** |
| <ANA> | Co-Located BSSID List | The Co-Located BSSID List element is optionally present when dot11MultiBSSIDActivated is set to false and the AP transmitting the frame shares the same antenna connector(s) with at least one other BSS. |

* **Reassociation Response frame format**

***TGax Editor: Please add a new row to Table 9-32 (11ax D2.0 P101L1) as follows:***

***Change Table 9-32 (Reassociation Response frame body) as follows maintaining numeric order:***

|  |  |  |
| --- | --- | --- |
| **Table 9-32 – Reassociation Response frame body** | | |
| **Order** | **Information** | **Notes** |
| <ANA> | Co-Located BSSID List | The Co-Located BSSID List element is optionally present when dot11MultiBSSIDActivated is set to false and the AP transmitting the frame shares the same antenna connector(s) with at least one other BSS. |

* **Probe Response frame format**

***TGax Editor: Please add a new row to Table 9-34 (11ax D2.0 P102L12) as follows:***

***Insert the following new rows into Table 9-34 (Probe Response frame body):***

|  |  |  |
| --- | --- | --- |
| **Table 9-34 – Probe Response frame body** | | |
| **Order** | **Information** | **Notes** |
| <ANA> | Co-Located BSSID List | The Co-Located BSSID List element is optionally present when dot11MultiBSSIDActivated is set to false and the AP transmitting the frame shares the same antenna connector(s) with at least one other BSS. |