IEEE P802.11
Wireless LANs

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| Resolution for CIDs related to Multiple BSSID set (CC 34) |
| Date: March 20, 2021 |
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 Abstract

This submission proposes resolutions for following 6 CIDs received for TGbe CC34:

1096, 2275, 1095, 2292, 2540, 1819

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: contribution was revised based on feedback received from several members (added as co-authors)
* Rev 2: Based on inputs from Jarkko, the titles for clause 35.3.17 and AA.3 are updated to include co-hosted BSSID set
* Rev 3: Updated Annex AA to remove the term standalone AP (CID 1819)
* Rev 4:
	+ Minor updates based on comment in doc 11-21/0218 (Mark Rison) – tagged as [#1]
	+ Proposed spec text changes
		- Issue #2 identified by Yunbo
		- Issue #3 identified by Liwen
		- Issue #4 fixes error in D0.4

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

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

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

#1: indicates changes based on comments/suggestions in doc 11-21/0218r0 (Mark Rison)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Pg/Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 1096 | Alfred Asterjadhi | 87.18 | 11.1.3.8.1 | This sentence is out of place. The requirement needs to be added to MLO subclauses rather than here. | As in comment. | **Revised**The cited sentence was moved to clause 35.3.17 and updated based on resolution to other comments.**TGbe editor please implement changes as shown in doc 11-21/0255r4 tagged as 1096** |
| 2275 | Michael Montemurro | 87.17 | 11.1.3.8.1 | I'm not even sure what this means. Does AP's belonging to a multiple BSSID set refer to the AP's advertised in a multple BSSID set, or does it refer to APs affiliated with an AP MLD? | Update the text to refer to APs affiliated with an AP MLD | **Revised**The cited text was moved to clause 35.3.17 as a resolution to CID 1096. The text is updated to clarify that an AP MLD can have at most one affiliated AP from a multiple BSSID set.**TGbe editor please implement changes as shown in doc 11-21/0255r4 tagged as 2275** |
| 1095 | Alfred Asterjadhi | 123.63 | 26.17 | Not the right location. This should be a requirement at the MLD level. Move to MLO operation (AP MLD side) and specify that the MLD shall not have affiliated APs of the same co-hosted BSS set. | As in comment. | **Revised**The cited sentence was moved to clause 35.3.17 and updated based on resolution to other comments. The titles of the subclause 35.3.17 and that of clause AA.3 were updated to include co-hosted BSSID set.**TGbe editor please implement changes as shown in doc 11-21/0255r4 tagged as 1095** |
| 2292 | Michael Montemurro | 123.62 | 26.17.7 | This text makes no sense. Does it mean "affiliated APs belonging"? Looking at 26.17.6 in P802.11ax D8.0, I'm not exactly sure how to fix it. | Perhaps change the cited sentence to "Affiliated APs of an AP MLD that belong to the same co-hosted BSSID shall not be affiliated with an AP MLD." | **Revised**The cited text was moved to clause 35.3.17 as a resolution to CID 1095. The text is updated to clarify that an AP MLD can have at most one affiliated AP from a co-hosted BSSID set. The titles of the subclause 35.3.17 and that of clause AA.3 were updated to include co-hosted BSSID set.**TGbe editor please implement changes as shown in doc 11-21/0255r4 tagged as 2292** |
| 2540 | Robert Stacey | 123.62 | 26.17.7 | Inappropriate passive statement. Normative statements must identify the implementation. | Change to "An AP that belongs to a co-hosted BSSID set shall not be an affiliated AP in an AP MLD if another affiliated AP in the AP MLD is already present in the co-hosted BSSID set." | **Revised**The cited text was moved to clause 35.3.17 as a resolution to CID 1095. The text is updated to clarify that an AP MLD can have at most one affiliated AP from a co-hosted BSSID set. The titles of the subclause 35.3.17 and that of clause AA.3 were updated to include co-hosted BSSID set.**TGbe editor please implement changes as shown in doc 11-21/0255r4 tagged as 2540** |
| 1819 | James Yee | 146.25 | 35.3.17 | Not sure if a "standalone AP" is well defined. | Clarify | **Revised**Deleted the term standalone AP. Also updated text in Annex AA**TGbe editor please implement changes as shown in doc 11-21/0255r4 tagged as 1819** |

***TGbe editor: Please note Baseline is 11be D0.4.***

11.1.3.8 Multiple BSSID procedure

11.1.3.8.1 General

***TGbe editor: Please update the following paragraph in this subclause as shown below:***

[CID 1096]

26.17.7 Co-hosted BSSID set

***TGbe editor: Please update the following paragraph in this subclause as shown below:***

[CID 1095]

***TGbe editor: Please update the title of clause 35.3.17 as shown below:***

**35.3.17 Multi-Link operation in a multiple BSSID set or co-hosted BSSID set**[CID 1095, 2292, 2540]

***TGbe editor: Please update the following paragraph in this subclause as shown below:***

[CID 1096, 2275]An AP MLD shall not have more than one affiliated AP amongst APs that are members of the same multiple BSSID set.

[CID 1095, 2292, 2540]An AP MLD shall not have more than one affiliated AP amongst APs that are members of the same co-hosted BSSID set.

[CID 1819]Each AP affiliated with an MLD shall be independently configured to operate as a transmitted or as a nontransmitted BSSID in a multiple BSSID set, or as an AP belonging to a co-hosted BSSID set, or as an AP that is not part of either a multiple BSSID set or a co-hosted BSSID set. Annex AA provides example configurations.

***TGbe editor: Please update the title of clause AA.3 as shown below:***

[CID 1095, 2292, 2540]AA.3 Example illustrating the relationship between multi-link operation and multiple BSSID set or co-hosted BSSID set

***TGbe editor: Please update the 3rd and 4th paragraph in clause AA.3 as shown below:***

[#1]The first example illustrates the case where APs on each link belong to a multiple BSSID set. Since by definition, APs affiliated with an AP MLD have the same properties (such as security), APs in a multiple BSSID set on a link are not part of the same AP MLD. Figure AA-6 (Example of APs from multiple BSSID set on all links in a multi-link setup) shows an example where APs affiliated with an MLD belong to a multiple BSSID set on their respective link. Further, APs within the same MLD may correspond to a transmitted or nontransmitted BSSID.

***TGbe editor: Figure AA-6 remains unchanged:***

[#1]Figure AA-6 (Example of APs from multiple BSSID set on all links in a multi-link setup) illustrates that APs corresponding to BSSID-x and BSSID-y are part of the multiple BSSID set on link 1 and belong to different MLDs (MLD 1 and MLD 3, respectively). On link 1, AP-y, affiliated with MLD 3, corresponds to the transmitted BSSID (depicted as BSSID-y [T]) for the multiple BSSID set on link 1. On link 2, there are three APs that are part of the same multiple BSSID set and each belongs to a different MLD. AP-q, affiliated with MLD 2, corresponds to the transmitted BSSID (depicted as BSSID-q [T]) for the multiple BSSID set on link 2. On link 3, there are three APs which are part of the same multiple BSSID set and two of the APs belongs to two different MLDs. AP-a, affiliated with MLD 1, corresponds to the transmitted BSSID (depicted as BSSID-a [T]) for the multiple BSSID set on link 3. AP-c is a not affiliated with any MLD

***TGbe editor: Please update the 5th & 6th paragraph and Figure AA.7 in clause AA.3 as shown below:***

[CID 1819, #1]The second example illustrates the case where APs affiliated with an MLD belong to a mix of a multiple BSSID set, a co-hosted BSSID set and an AP that is not a member of multiple BSSID set or a co-hosted BSSID set. Since by definition, APs affiliated with an AP MLD have same properties (such as security), APs in a co-hosted BSSID set on a link are not part of the same AP MLD. Figure AA-7 (Example of mix of multiple BSSID set, co-hosted set and standalone AP in a multi-link setup) shows an example where APs affiliated with an MLD belong to a mix of multiple BSSID set, co-hosted set or is a standalone AP on their respective link.



**Figure AA-7—Example showing a mix of multiple BSSID set, co-hosted set and an AP that is not a member of a multiple BSSID set or a co-hosted BSSID set**[CID 1819]

[CID 1819, #1]As seen from Figure AA-7 (Example of mix of multiple BSSID set, co-hosted set and standalone AP in a multi-link setup), APs corresponding to BSSID-x, BSSID-z, and BSSID-y are part of the multiple BSSID set on link 1 and belong to different MLDs (MLD 1, MLD 2, and MLD 3, respectively). On link 1, AP-y, affiliated with MLD 3, corresponds to the transmitted BSSID (depicted as BSSID-y [T]) for the multiple BSSID set on link 1. The three APs on link 2, AP-p, AP-q and AP-r, belong to the same co-hosted BSSID set and each is affiliated with a different MLD, MLD 1, MLD2 and MLD3 respectively. On link 3, there is a single AP (AP-b) that is affiliated with MLD 2.

**Discussion:**

[#2] Yunbo identified missing description in the text related to an example on inheritance for elements carried in the per-STA profile of Basic variant Multi-Link element carried in a in Multiple BSSID element.

***TGbe editor: Please update the following text in clause 35.3.17.x as shown below (baseline text from approved doc 11-21/254r5):***

**35.3.17.x Inheritance in the per-STA profile of Basic variant Multi-Link element for an AP in a multiple BSSID set**

When Basic variant Multi-Link element is carried in a Nontransmitted BSSID Profile subelement … ***TGbe editor, the rest of the contents of this paragraph remain unchanged.***

[#2]Figure 35-yy (Example of inheritance in a complete per-STA profile for a Multiple BSSID scenario) illustrates inheritance when a per-STA profile carries complete information in a Basic variant Multi-Link element that is contained in a Nontransmitted BSSID Profile of a Multiple BSSID element. The example shows a Management frame transmitted by a transmitted BSSID. The Management frame carries several elements with their corresponding element IDs shown in parenthesis. The frame also carries a Multiple BSSID element which includes profile for nontransmitted BSSID N. The Nontransmitted BSSID Profile contains a Basic variant Multi-Link element carrying complete profile for AP x. The BSSID N is inheriting elements with ID B, C and E. Elements with ID D and ID F are specific to BSSID N and appear in its nontransmitted BSSID profile. Furthermore, BSSID N does not inherit element with ID A and the ID is listed in the Non-Inheritance element. Since the value of element F for BSSID N is not the same as that advertised by the transmitted BSSID, the element is carried in the profile for BSSID N. An element with ID Y is specific to the BSSID N and is included in its profile. AP x inherits elements with ID D and F directly from the BSSID N and element with ID C indirectly from the transmitted BSSID (via the BSSID N’s inheritance). AP x does not inherit element A (same as nontransmitted BSSID). The elements with ID B and Y are specific to AP x and appear in its profile. Furthermore, AP x does not inherit element E from the transmitted BSSID and the ID is listed in the Non-Inheritance element present in its profile.

**Discussion:**

[#3] Liwen expressed the need to signal the Max BSSID Indicator value when a reported AP belongs to a multiple BSSID set. When the reported AP is a member of a multiple BSSID set, the non-AP MLD must be provided with the MaxBSSID Indicator value so that it can identify all the BSSIDs on the reported link that are part of the multiple BSSID set. This helps the non-AP MLD perform intra-BSS operations such as intra-BSS ps, intra-BSS NAV and not do SR on top of an intra-BSS PPDU.

[#3]

***TGbe editor: Please make the following change to the figure and text in clause 9.4.2.295.b as shown below (baseline text from approved doc 11-21/254r5):***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B3 | B4 | B5 | B6 | B7 | B8 | B9 15 |
| Link ID | Complete Profile | MAC Address Present | Beacon Interval Present | DTIM Info Present | MaxBSSID Indicator Present | Reserved |
| Bits: |  | 4 |  | 1 | 1 | 1 | 1 | 1 | 7 |

### Figure 9-788ej—STA Control field format

***TGbe editor: Please insert the following paragraph after the paragraph starting: “The DTIM Info Present subfield indicates the presence of …” as follows:***

The MaxBSSID Indicator Present subfield indicates the presence of the MaxBSSID Indicator subfield in the STA Info field and is set to 1 if the MaxBSSID Indicator subfield is present in the STA Info field; otherwise set to 0. A non-AP STA sets the MaxBSSID Indicator Present subfield to 0 in transmitted Basic variant Multi-Link element. An AP sets this subfield to 1 when the element carries complete profile and the reported AP is a member of a multiple BSSID set.

***TGbe editor: update the following paragraph (added by doc 11-21/254r5) as follows:***

The Beacon Interval subfield of the STA Info field is defined in 9.4.1.3 (Beacon Interval field) and carries the value of Beacon Interval for the reported AP.

***TGbe editor: update the following paragraph (added by doc 11-21/254r5) as follows:***

The DTIM Count field and the DTIM Period field are defined in 9.4.2.5 (TIM element) and carries the value of DTIM Count and DTIM Period, respectively, for the reported AP.

***TGbe editor: insert the following (new) paragraph after the paragraph starting “The DTIM Count field and the DTIM Period field are …” as follows:***

The MaxBSSID Indicator subfield is defined in 9.4.2.45 (Multiple BSSID element) and carries the same value as the MaxBSSID Indicator field of the Multiple BSSID element transmitted by the AP corresponding to the transmitted BSSID on the reported link.

**Discussion:**

[#4] Clause 35.5.3 makes an incorrect reference to a capability bit in EHT Capabilities element. The bit is carried in the HE Capabilities element

**35.5.3 Rules for EHT sounding protocol sequences**

***TGbe editor: Please update the following paragraph as shown below:***

[#4]An EHT AP with dot11MultiBSSIDImplemented equal to true shall not send an EHT NDP Announcement frame with the TA field set to the transmitted BSSID to a non-AP STA that is associated with an AP corresponding to a nontranmitted BSSID in the multiple BSSID set unless the AP has received from the non-AP STA an HE Capabilities element with the Rx Control Frame To MultiBSS subfield in the HE MAC Capabilities Information field equal to 1.