IEEE P802.11
Wireless LANs

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| CC36 Resolution for CIDs related to Multiple BSSID (Part 1) |
| Date: December 2, 2021 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Abhishek Patil | Qualcomm Inc |  |  | appatil@qti.qualcomm.com |
| Gaurang Naik |  |  |  |
| George Cherian |  |  |  |
| Alfred Asterjadhi |  |  |  |
| Duncan Ho |  |  |  |
| Yanjun Sun |  |  |  |
| Abdel Karim |  |  |  |
|  |  |  |  |  |
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 Abstract

This submission proposes resolutions for following 6 CID received for TGbe CC36: 4203 4205 8252 8253 4010 4083

**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 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.***

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| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| 4203 | Alfred Asterjadhi | 35.3.18.1 | 284.48 | Use neither nor, reads better. | As in comment. | **Revised**Agree with the commenter. The cited text was revised as suggested by the commenter.**TGbe editor, please incorporate changes as shown in doc 11-21/1184r0 tagged as CID 4203** |
| 4205 | Alfred Asterjadhi | 35.3.18.1 | 284.60 | Since this is optional (may include) is there some other way for a non-AP STA to understand whether that nonTx BSSID is part of an AP MLD? Please clarify | As in comment. | **Revised**The cited sentence was updated as a resolution to CID 3212 (in doc 11-21/254 during CC34). However, there was an error in incorporating the change and did not appear in D1.0. The issue was fixed in subsequent releases of the draft (D1.01 and later). The resolution to CID 3212 address this comment.**TGbe editor, no changes are needed to address this CID.** |
| 8252 | Yuxin LU | Annex AA.2 | 633.48 | Suggest to add "in power save mode" following "when it wakes" for completeness | Change this sentence to "The links shown in the figures are operating on different channels." | **Revised**The cited sentence and the paragraph containing the sentence was revised to clarify the operation at the AP side and how it can aid power-save operation at an associated non-AP STA.**TGbe editor, please incorporate changes as shown in doc 11-21/1184r0 tagged as CID 8252** |
| 8253 | Yuxin LU | Annex AA.3 | 633.65 | "operating on different channels" is more of a requirement rather than assumption, since MLD1 operates on all the three links as shown in Figure AA-6 | Change this sentence to "The links shown in the figures are operating on different channels." | **Revised**Agree with the comment. The contents and the figure under AA.3 are updated to clarify that the multiple BSSID set operate on a particular channel and that each AP affiliated with an AP MLD operating on the same channel has its own link. **TGbe editor, please incorporate changes as shown in doc 11-21/1184r0 tagged as CID 8253** |
| 4010 | Abhishek Patil | 9.4.2.45 | 121.52 | Multi-Link Traffic element will be common to all the BSSIDs in the multiple BSSID set and hence won't be carried in the nonTxBSSID profile(s). | Add Multi-Link Traffic element to the list of elements in the bullet. | **Revised**Agree with the comment. Added Multi-Link Traffic element to the list of elements in clause 9.4.2.45 that are applicable to all the BSSIDs in the multiple BSSID set.**TGbe editor, please incorporate changes as shown in doc 11-21/1184r0 tagged as CID 4010** |
| 4083 | Abhishek Patil | 35.3.18 | 284.40 | Details on multi-link traffic indication when one or more AP in the multiple BSSID set supports TID-mapping are missing. | As in comment | **Revised**Agree with the comment. Updated the contents of clause 35.3.11.4 to cover the case where one or more AP belonging to the multiple BSSID set needs to provide traffic indication for an associated non-AP MLD that has negotiated non-default TID-to-link mapping with its associated AP MLD.**TGbe editor, please incorporate changes as shown in doc 11-21/1184r0 tagged as CID 4083** |

***TGbe editor: The baseline for this document is 11be D1.3.***

* + 1. **Multi-link operation in a multiple BSSID set or co-hosted BSSID set**

**35.3.19.1 General**

***TGbe editor: Please update the 4th paragraph in this subclause as shown below:***

Each AP affiliated with an AP 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 neither a member of a multiple BSSID set nor a member of a co-hosted BSSID set. Annex AA provides example configurations.[4203]

### AA.2 Examples illustrating the relationship between profile periodicity and DTIM interval

***TGbe editor: Please update the contents of this subclause as shown below:***

[8252]***Move the following content from subclause AA.1 as the first paragraph of this (AA.2) subclause and apply changes as shown below:***

[8252]The examples provide guidance on how an AP might organize the inclusion of nontransmitted BSSID profiles in its Beacon frames if it cannot fit all the profiles in a single Beacon frame (i.e., it advertises partial list of profiles). By having the DTIM interval for a nontransmitted BSSID be a multiple of the profile periodicity, the profile for that BSSID would always appear in its DTIM beacon. This helps an associated non-AP STA save power by not having to wake-up from doze state for listening to beacons other than the DTIM beacon to receive any updates to its associated profile.

**AA.3 Example illustrating the relationship between multi-link operation and multiple BSSID set or co-hosted BSSID set**

***TGbe editor: Please update the contents of this subclause (including Figures) as shown below:***

[8253]Each AP affiliated an AP MLD can correspond to a transmitted or a nontransmitted BSSID in a multiple BSSID set, or to an AP belonging to a co-hosted BSSID set, or to an AP that is not part of either a multiple BSSID set or a co-hosted BSSID set.

[8253][8253]The first example illustrates the case where APs on each channel belong to a multiple BSSID set. APs affiliated with the same AP MLD have the same properties (such as security, SSID etc) while APs within the same multiple BSSID set have different properties (e.g., security, SSID etc). Therefore, APs belonging to the same multiple BSSID set on a channel are not affiliated with the same AP MLD. Figure AA-6 (Example of affiliated APs from different multiple BSSID sets) shows an example where APs affiliated with an MLD belong to a multiple BSSID set on their respective channel. Further, APs within the same MLD may correspond to a transmitted or nontransmitted BSSID.



[8253]**Figure AA-6—Example of affiliated APs from different multiple BSSID sets**

[8253]Figure AA-6 (Example of affiliated APs from different multiple BSSID sets) illustrates that APs corresponding to BSSID-x and BSSID-y are part of a multiple BSSID set on channel 1 and are affiliated with different MLDs (MLD 1 and MLD 3, respectively). On channel 1, AP-y, affiliated with MLD 3, corresponds to the transmitted BSSID (depicted as BSSID-y [T]) for the multiple BSSID set on channel 1. On channel 2, there are three APs that are part of the same multiple BSSID set and each is affiliated with 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 channel 2. On channel 3, there are three APs which are part of the same multiple BSSID set and two of the APs are affiliated with 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 channel 3. AP-c is a not affiliated with any MLD. Each MLD independently assigns a Link ID to its affiliated APs (shown as “(Link n)” in the example).

[8253]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 is an AP that is neither a member of multiple BSSID set nor a member of a co-hosted BSSID set. APs affiliated with the same AP MLD have same properties (such as security, SSID etc) while APs within the same multiple BSSID set or within the same a cohosted BSSID set have different properties (e.g., security, SSID etc). Therefore, APs belonging to the same co-hosted BSSID set on a channel are not part of the same AP MLD and APs belonging to the same multiple BSSID set on a channel are not affiliated with the same AP MLD. Figure AA-7 (Example of affiliated APs belonging to a multiple BSSID set, a co-hosted BSSID set and neither) shows an example where APs affiliated with an MLD belong to a mix of multiple BSSID set, co-hosted set and neither a member of multiple BSSID set nor a member of a co-hosted BSSID set.



[8253]**Figure AA-7—Example of affiliated APs belonging to a multiple BSSID set, a co-hosted BSSID set and neither**

[8253]As seen from [Figure AA-7 (Example of affiliated APs belonging to a multiple BSSID set, a co-hosted BSSID set](#bookmark1) [neither)](#bookmark1), APs corresponding to BSSID-x, BSSID-z, and BSSID-y are part of the multiple BSSID set on channel 1 and are affiliated with different MLDs (MLD 1, MLD 2, and MLD 3, respectively). On channel 1, AP-y, affiliated with MLD 3, corresponds to the transmitted BSSID (depicted as BSSID-y [T]) for the multiple BSSID set on channel 1. The three APs on channel 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, MLD 2, and MLD 3, respectively. On channel 3, there is a single AP (AP-b) that is affiliated with MLD 2. Each MLD independently assigns a Link ID to its affiliated APs (shown as “(Link n)” in the example).

**9.4.2.45 Multiple BSSID element**

***TGbe editor: Please update the contents of this subclause as shown below:***

— The Timestamp and Beacon Interval fields, TIM, DSSS Parameter Set, IBSS Parameter Set, Country, Channel Switch Announcement, Extended Channel Switch Announcement, Wide Band- width Channel Switch, Transmit Power Envelope, Supported Operating Classes, IBSS DFS, ERP Information, HT Capabilities, HT Operation, VHT Capabilities, and VHT Operation, S1G Beacon Compatibility, Short Beacon Interval, S1G Capabilities, ~~and~~ S1G Operation, HE Capabilities, HE 6 GHz Band Capabilities, HE Operation, BSS Color Change Announcement, ~~and~~ Spatial Reuse Parameter Set, [4010]Multi-Link Traffic, EHT Capabilities, and EHT Operation 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.

### Traffic indication

***TGbe editor: Please update the 8th paragraph (including the splitting) in this subclause as shown below:***

[4083]An AP affiliated with an AP MLD that is not in a multiple BSSID set shall include the Multi-Link Traffic element (see 9.4.2.315 (Multi-Link Traffic element)) in a Beacon frame it transmits if at least one of the associated non-AP MLD has successfully negotiated a TID-to-link mapping (see [35.3.6.1.3 (Negotiation of TID-to-link mapping)](https://qualcomm-my.sharepoint.com/personal/appatil_qti_qualcomm_com/Documents/TechMaterial/802.11be/11beSpec/D1.0/Draft%20P802.11be_D1.3%20-%20Word/TGbe_Cl_35.doc#bookmark26)) with the AP MLD and the AP MLD has buffered BU(s) for the non-AP MLD.

[4083]An AP corresponding to the transmitted BSSID in a multiple BSSID set shall include the Multi-Link Traffic element in a Beacon frame it transmits if at least one non-AP MLD, which is associated with any AP MLD that has an affiliated AP belonging to the same multiple BSSID, has successfully negotiated a TID-to-link mapping with its associated AP MLD and that AP MLD has buffered BU(s) for the non-AP MLD.

NOTE – When the Multi-Link Traffic element is included in a Beacon frame transmitted by an AP corresponding to a transmitted BSSID in a multiple BSSID set, the Bitmap Size subfield is set to a value that indicates the largest number of links amongst the AP MLDs with which the APs belonging to the multiple BSSID set are affiliated with and have buffered traffic for at least one of their associated non-AP MLDs.

[4083]The Multi-Link Traffic element includes Per-Link Traffic Indication Bitmap subfield(s) that corresponds to the AID(s) of the non-AP MLD(s), starting from the bit position *k* of the Partial Virtual Bitmap field of the TIM element, in the Per-Link Traffic Indication Bitmap List field. The AID Offset subfield of the Multi-Link Traffic Control field of the Multi-Link Traffic element contains the value *k*. The order of the Per-Link Traffic Indication Bitmap subfield(s) follows the order of the bits that are set to 1 in the Partial Virtual Bitmap subfield of the TIM element that corresponds to the AID(s) of the non-AP MLD(s).

[4083]If a non-AP MLD has successfully negotiated a TID-to-link mapping with an AP MLD with a nondefault mapping, the bit position *i* of the Per-Link Traffic Indication Bitmap subfield that corresponds to the link with the link ID equals to *i* on which a STA of the non-AP MLD is operating shall be set to 1 if the AP MLD has buffered BU(s) with TID(s) that are mapped to that link or MMPDU(s) for that non-AP MLD, otherwise the bit shall be set to 0.

[4083]If a non-AP MLD is in the default mapping mode (see [35.3.6.1.2 (Default mapping](https://qualcomm-my.sharepoint.com/personal/appatil_qti_qualcomm_com/Documents/TechMaterial/802.11be/11beSpec/D1.0/Draft%20P802.11be_D1.3%20-%20Word/TGbe_Cl_35.doc#bookmark25) [mode)](https://qualcomm-my.sharepoint.com/personal/appatil_qti_qualcomm_com/Documents/TechMaterial/802.11be/11beSpec/D1.0/Draft%20P802.11be_D1.3%20-%20Word/TGbe_Cl_35.doc#bookmark25)), the bit position *i* of the Per-Link Traffic Indication Bitmap subfield that corresponds to the link with the link ID equal to i on which a STA affiliated with the non-AP MLD is operating may be set to 1 to indicate to the non-AP MLD a link on which buffered BU(s) should be retrieved.

[4083]An example of the construction of the Multi-Link Traffic element is shown in [Figure 35-11 (Example of Multi-Link Traffic](https://qualcomm-my.sharepoint.com/personal/appatil_qti_qualcomm_com/Documents/TechMaterial/802.11be/11beSpec/D1.0/Draft%20P802.11be_D1.3%20-%20Word/TGbe_Cl_35.doc#bookmark38) [element construction)](https://qualcomm-my.sharepoint.com/personal/appatil_qti_qualcomm_com/Documents/TechMaterial/802.11be/11beSpec/D1.0/Draft%20P802.11be_D1.3%20-%20Word/TGbe_Cl_35.doc#bookmark38).