### IEEE P802.11Wireless LANs

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| 11be D0.3 CR for 35.3.3 |
| Date: 2021-02-21 |
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Abstract

This submission proposes resolutions for the following CIDs:

Part I:

1156, 1668, 1779, 1920, 2123, 2493, 2547, 2548, 2827, 2970, 3371

Part II:

1669, 1157, 1417, 1713, 1718, 1921, 1922, 2038, 2297, 2351, 2373, 2971, 3023

Part III:

1158, 2759, 2473, 2588,

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Aligns the texts of non-AP MLD with AP MLD based on the feedback received offline.
* Rev 2: Editorial change.

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 D0.3 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D0.3 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** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| **Part I** |
| 1156 | Alfred Asterjadhi | 128.41 | 35.3.3 | It is unclear why (and how) the ability of an AP to perform simultaneous TX/RX would have any impact to the MAC address properties. | As in comment. | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 1668 | GEORGE CHERIAN | 128.36 | 35.3.3 | "The MAC address of each AP affiliated with an AP MLD shall be different from each other unless the affiliated APs cannot perform simultaneous TX/RX operation (e.g., due to near band in-device interference), in which case the MAC address properties are TBD":Remove the TBD condition by making the requirement of unique AP MAC address common to all cases irrespective of whether it can do simultaneous Tx/Rx or not | As in the comment | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 1779 | Insun Jang | 128.42 | 35.3.3 | Based on the current agreements (including SFD) we've agreed with that a regular AP MLD shall be operates as STR except for the case of a soft AP MLD. Thus, for TBD, it would be only applied to soft AP MLD. Therefore, we need to clarify the text accoridng to that agreement. | As in the comment, we need to clarify the TBD text accoridng to the agreement that a regular AP MLD shall be operates as STR except for the case of a soft AP MLD. | Revised – Agree in principle with the commeter. We check with the person that handles the text of soft AP MLD, and we simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 1920 | Jeongki Kim | 128.41 | 35.3.3 | The MAC address of each AP affiliated with an AP MLD shall be different from each other unless the affiliated APs cannot perform simultaneous TX/RX operation. How about STR? Does each AP have the same MAC address in the STR case? Clarify it. It looks good that each AP in an AP MLD has different MAC address regardless of STR or NSTR operation. | Remove the following text in the indicated sentence. "unless the affiliated APs cannot perform simultaneous TX/RX operation (e.g., due to near band in-device interference), in which case the MAC address properties are TBD." | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 2123 | Laurent Cariou | 0.00 | 35.3.3 | simultaneous Tx/Rx needs to be changed with language used elsewhere in the spec (NSTR) | as in comment | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 2493 | Po-Kai Huang | 128.44 | 35.3.3 | MAC address of the AP MLD should be different to avoid confusion of discovery. Even in the case of soft AP MLD, the same consideration applies, and we do not need to define additonal discovery procedure. | Remove the "unless" description with the TBD. | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 2547 | Robert Stacey | 128.46 | 35.3.3 | Which side has to adapt to the other? If the AP has different MAC addresses, is the non-AP STA required to use different MAC addresses even if it is EMLSR? | Keep it simple; require different MAC addresses for each AP in an AP MLD. | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 2548 | Robert Stacey | 128.41 | 35.3.3 | It is not clear why MAC adress assignment is dependent on a dynamic condition (near band in-device interference). If the AP MLD is capable of STR and needs different MAC addresses on different channels under some conditions, then require it under all conditions. | Keep it simply; require different MAC addresses for each AP in an AP MLD. | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 2827 | Srinivas Kandala | 128.41 | 35.3.3 | Why should the address properties any different when the simultaneous TX/RX is not possible by the affiliated APs? | Clarify or delete everything from "unless the affiliated APs .." to the end of the paragraph | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 2970 | Tomoko Adachi | 128.41 | 35.3.3 | "the affiliated APs cannot perform simultaneous TX/RX operation (e.g., due to near band in-device interference)" It can be rewritten as "the affiliated APs are NSTR." by defining NSTR and STR in 3.2 (there's a NSTR link pair definition in 3.2 but not for the NSTR) while transplanting the e.g. part to NSTR definition in 3.2. | As in comment. | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| 3371 | Zhiqiang Han | 128.43 | 35.3.3 | (1) what is the meaning of simultaneous TX/RX operation. It's better to use STR operation.(2)AP can perform simultaneous TX/RX operation all the time. When the AP cannot perform simultaneous TX/RXoperation? | Please clarify it. | Revised – Agree in principle with the commeter. We simply remove the TBD and have a simple rule for every AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 |
| **Part II** |
| 1669 | GEORGE CHERIAN | 128.46 | 35.3.3 | "If each AP affiliated with an AP MLD has different MAC addresses, then when a non-AP MLD is associated with the AP MLD, each non-AP STA affiliated with the non-AP MLD shall have different MAC addresses"Remove the "if ..."condition in this sentence. Suggest to modify as: "Each non-AP STA affiliated with the non-AP MLD shall have unique MAC addresses" | As in the comment | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 1157 | Alfred Asterjadhi | 128.47 | 35.3.3 | MAC addresses are not something that the STA has depending on the MLD that it intends to associate. I.e., why the number of MAC addresses that a non-AP MLD depends on those of the AP MLD that it intends to associate? Perhaps the intention is to say "exposes"? | As in comment. | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 1417 | Chien-Fang Hsu | 128.46 | 35.3.3 | The limitiation to make STAs affliated to a non-AP MLD have different MAC addresses does not provide benefits but increase cost. | Remove the MAC address limitation on the non-AP MLD side | Revised – We clarifty the intention for non-AP MLD to use different MAC address as follows. Assume that AP MLD uses different MAC addresses, and non-AP MLD uses same MAC addresses. When encrypted management frame is sent from non-AP MLD to AP MLD, the nonce will be the same, but the message will be different due to different AAD. This violates the security requirement of having different nonce for different messages. As a result, the MAC addresses of different non-AP MLD has to be different. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 1713 | Guogang Huang | 128.46 | 35.3.3 | If a single-radio non-AP MLD requests to set up two links, then are different MAC addresses used for each link? Please add the text to clarify this question. | as in comment | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 1718 | Hanqing Lou | 128.46 | 35.3.3 | Based on current text, it is not clear if a single radio non-AP MLD associate with different APs in an AP MLD in different time slot should have different MAC addresses on different links. | Need clearifications | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 1921 | Jeongki Kim | 128.47 | 35.3.3 | Can each non-AP STA affiliated with the non-AP MLD have the same MAC addresses? If no, simplify the text by removing the conditions. | Replace the text with the following text."Each non-AP STA affiliated with the non-AP MLD shall have different MAC addresses" | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 1922 | Jeongki Kim | 128.47 | 35.3.3 | If each AP affiliated with an AP MLD has different MAC addresses, then when a non-AP MLD is associated with the AP MLD, each non-AP STA affiliated with the non-AP MLD shall have different MAC addresses.When does each AP has the same MAC address? In that case, can each non-AP STA affiliated with the non-AP MLD have the same MAC addresses? If no, simplify the text by removing the conditions. | Replace the text with the following text."Each non-AP STA affiliated with the non-AP MLD shall have different MAC addresses" | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 2038 | John Wullert | 128.47 | 35.3.3 | Treatment of MAC addresses is not the same for AP MLD and non-AP MLD. In particular, MAC address properties for NSTR AP MLDs are TBD, while there is no such exception for NSTR non-AP MLDs | Add text to indicate that MAC address properties for NSTR non-AP MLDs is TBD | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 2297 | Michael Montemurro | 128.46 | 35.3.3 | This should not be a requirements for a STA affiliated with a non-AP MLD since the MAC address of the AP affiliated with the non-AP MLD is different and links are based on link pairs of MAC addresses. | At cited location, delete"each non-AP STA affiliated with the non-AP MLD shall have different MAC addresses" | Revised – We clarifty the intention for non-AP MLD to use different MAC address as follows. Assume that AP MLD uses different MAC addresses, and non-AP MLD uses same MAC addresses. When encrypted management frame is sent from non-AP MLD to AP MLD, the nonce will be the same, but the message will be different due to different AAD. This violates the security requirement of having different nonce for different messages. As a result, the MAC addresses of different non-AP MLD has to be different. Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 2351 | Morteza Mehrnoush | 128.44 | 35.3.3 | the MAC address is TBD for APs in non-str TX/RX AP MLD; how about the MAC addresses for non-str TX/RX non-AP MLD that is associated with non-str TX/RX AP MLD? | Add a paragraph to mention that the MAC address is TBD for non-str TX/RX non-AP MLD. | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 2373 | Muhammad Kumail Haider | 128.37 | 35.3.3 | Comment for future development: I think here for consistency, we should have different MAC addresses for each AP of AP MLD and each STA of non-AP MLD. Otherwise we may have a scenario where an NSTR non-AP MLD may have to use different addresses for its STAs when associating with NSTR AP and same addresses otherwise. | Recording a comment, no change to draft text | Revised – Agree in principle with the commeter. We have clarified that in all cases, each AP affiliated with the AP MLD has different MAC addresses and each non-AP STA affiliated with the non-AP MLD has different MAC addresses.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1156 and CID 1669 |
| 2971 | Tomoko Adachi | 128.46 | 35.3.3 | How the MAC addresses are set at the non-AP MLD when the APs affiliated with an AP MLD have the same MAC address needs to be clarified. | As in comment. | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| 3023 | Xiaofei Wang | 128.46 | 35.3.3 | MAC addresses are typically assigned to a device, its configuration should not depend on the configurations of AP MLD. | Please clarify whether the MAC addresses of a non-AP MLD will depend on the AP MLD. | Revised – Agree in principle with the commeter. We remove the “if” condition based on AP MLD. We also rewrite the sentence to align with the description of AP MLD.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1669 |
| **Part III** |
| 1158 | Alfred Asterjadhi | 128.50 | 35.3.3 | Not all frames have a TA field. Please specify (if present). | As in comment. | Revised – Agree in principle with the commeter. We simply add “if present” as suggested by the commenter. TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1158 |
| 2759 | Sharan Naribole | 128.39 | 35.3.3 | Not clear if AP MLD MAC Address is selected from one of its enabled links MAC addresses or is independent | AP MLD MAC Address determination needs to be clearly defined | Revised – Agree in principle with the commeter. We add a note to clarify that it is independent.TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 2759 |
| 2473 | Payam Torab Jahromi | 128.39 | 35.3.3 | What does "singly" mean? Clarify if the MLD address must be universally administered (UAA) or locally administered addresses also work. Same question for MAC addresses of each STA affiliated with the MLD. |   | Revised – We clarify that the word singly is chosen based on the current description of MAC address of a STA shown below.*station (STA): A logical entity that is a singly addressable instance of a medium access control (MAC) andphysical layer (PHY) interface to the wireless medium (WM).*TGbe editor does not make any change to the draft.  |
| 2588 | Rojan Chitrakar | 128.39 | 35.3.3 | "An MLD has an MLD MAC address that singly identifies the MLD."I believe the intention is to say the MLD MAC Address identifies the MLD to the DS or to another MLD; but in WM the MLD may be identified differently by a legacy STA or even an EHT STA, e.g. by the AP/STA MAC Address of each link; a legacy STA will only identify an associated AP by the BSSID; it will not be aware of the MLD MAC Address of AP MLD. | Rephrase as: "An MLD has an MLD MAC address that singly identifies the MLD to the DS or to another MLD." | Revised – We clarify that the word singly is chosen based on the current description of MAC address of a STA shown below.*station (STA): A logical entity that is a singly addressable instance of a medium access control (MAC) andphysical layer (PHY) interface to the wireless medium (WM).*TGbe editor does not make any change to the draft.  |
| 1670 | GEORGE CHERIAN | 0.00 | 35.3.3 | Please define how A3/A4 are set when a device is operating as MLD | As in the comment | Revised – We clarify that the setting for a data frame is based on Table 9-30. TGbe editor to make the changes shown in 11-21/0296r2 under all headings that include CID 1670 |

**Discussion:** *None.*

**Propose:**

*TGbe editor: Change 35.3.3 Multi-link device addressing as follows (track change on):*

35.3.3 Multi-link device addressing

An MLD has an MLD MAC address that singly identifies the MLD.

The MAC address of each AP affiliated with an AP MLD shall be different from each other. (#1156)

The MAC address of each non-AP STA affiliated with a non-AP MLD shall be different from each other. (#1669)

NOTE – The MLD MAC addres of an MLD might be the same as the MAC address of one affiliated STA or different from the MAC address of any affiliated STA. (#2759)

The value of the Address 2 (TA) field (if present) in the MAC header of a frame sent over-the-air shall be the MAC address of the transmitting STA affiliated with the MLD corresponding to that link except the         Individual/Group bit, which is set to 1 when the TA field value is a bandwidth signaling TA and set to 0 otherwise.(#1158)

The value of the Address 1 (RA) field in the MAC header of an individually addressed frame sent          over-the-air shall be the MAC address of the receiving STA affiliated with the MLD corresponding to that link.

The value of the Address 3 field and the Address 4 field (if present) in the MAC header of a data frame sent over-the-air by a transmitting STA affiliated with the MLD shall be set based on Table 9-30 (Address field contents), where the BSSID is the MAC address of the AP affiliated with the AP MLD corresponding to that link.(#1670)