### IEEE P802.11 Wireless LANs

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| 11be D1.0 CR for 35.3.3 | | | | |
| Date: 2021-07-12 | | | | |
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Abstract

This submission proposes resolutions for the following CIDs:

6183, 5155, 4250, 5142, 5192, 5209, 5238, 5449, 6537, 6538, 6617, 7454, 7668, 7721, 7882, 8229, 8332,

5602, 8227, 8228, 8230, 7849, 5658, 5969, 6185,

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Editorial revision.
* Rev 2: Change based on the discussion in the teleconference.
* Rev 3: Revision for the remaining 8 CIDs based on the received comments. Changes are highlighted in green.

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 D1.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D1.0 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** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| Start of “if statement” related CIDs | | | | | | |
| 4250 | Alfred Asterjadhi | 35.3.3 | 250.53 | "If then" statement with condition being true. Replace the two paragraphs with "Each STA affiliated with an MLD shall have a different MAC address". | As in comment. | Accepted - |
| 5155 | GEORGE CHERIAN | 35.3.3 | 250.50 | "The MAC address of each AP affiliated with an AP MLD shall be different from each other.  If each AP affiliated with an AP MLD has a different MAC address, then when a non-AP MLD is associated with such an AP MLD, each non-AP STA affiliated with the non-AP MLD shall have a different MAC address."  The first condition already makes the MAC address requirement unique for each AP. So, the second sentence can be reduced to: "Each non-AP STA affiliated with the non-AP MLD shall have a different MAC address" | As in the comment | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 5142 | Geonjung Ko | 35.3.3 | 250.53 | The condition "If each AP ~ has a different MAC address," is redundant due to the preceding sentence "The MAC address of each AP affiliated with an AP MLD shall be different from each other." | Remove the condition. | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 5192 | Guogang Huang | 35.3.3 | 250.53 | (#2374)If each AP affiliated with an AP MLD has a different MAC address, then when a non-AP MLD is associated with such an AP MLD, each non-AP STA affiliated with the non-AP MLD shall have a different MAC address. This sentence doesn't make sense | Remove this condition "(#2374)If each AP affiliated with an AP MLD has a different MAC address, then" | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 5209 | Huizhao Wang | 35.3.3 | 259.52 | Since each APs in an AP MLD shall have different MAC addresses, then the non-AP STAs shall have different MAC addresses. Is there any case that non-AP STAs can share a single MAC address? | Please add the use case of non-AP STAs may share a single MAC address, and they will operate in the spec text. If none of the use case exists, then please change the current text to indicate non-AP STAs shall have the different MAC addresses. | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 5238 | Ilya Levitsky | 35.3.3 | 250.53 | The MAC address of each AP affiliated with an AP MLD shall be different from each other. Hence, the condition of the next sentence include shall always be true. | The sentence should be changed either to clarify the "a different MAC address" or remove the always-true condition: "When a non-AP MLD is associated with an AP MLD, each non-AP STA affiliated with the non-AP MLD shall have a different MAC address." | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 5449 | Jian Yu | 35.3.3 | 250.53 | The MAC address of each AP affiliated with an AP MLD shall be different from each other. (#2374)If each AP affiliated with an AP MLD has a different MAC address, then... Remove the if condition. | as in comment | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 6183 | Michael Montemurro | 35.3.3 | 250.53 | The previous requirement indicates that affiliated APs shall have different MAC addresses. However since RSN is negotiated between MLDs and link-specific communications can be identified by the affiliated AP MAC, there is no reason for STAs affiliated with the AP MLD to have the same MAC. | Delete "If each AP affiliated with an AP MLD has a different MAC address, then when a non-AP MLD is associated with such an AP MLD, each non-AP STA affiliated with the non-AP MLD shall have a different MAC address." | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 6537 | Pascal VIGER | 35.3.3 | 250.50 | Second sentence ("The MAC address of each AP affiliated with an AP MLD shall be different from each other.") is a shall and is conflicting with third sentence assuming a possibility : "If each AP affiliated with an AP MLD has a different MAC address," | Please confirm the correct case and align the sentences accordingly. | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 6538 | Pascal VIGER | 35.3.3 | 250.50 | Sentence is unclear : "If each AP affiliated with an AP MLD has a different MAC address, then when a non-AP MLD is associated with such an AP MLD, each non-AP STA affiliated with the non-AP MLD shall have a different MAC address." Does it mean a non-AP MLD shall align the MAC addresses of its affiliated STAs according to MAC address topology (same or different per affiliated AP) of each new AP MLD it associates with ? | as in comment | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 6617 | Po-Kai Huang | 35.3.3 | 250.53 | Remove the If condition for AP MLD since APs affiliated with the AP MLD always have different MAC address. | As in comment. | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 7454 | Thomas Derham | 35.3.3 | 0.00 | It says that MAC addresses of each AP affiliated with an MLD shall be different, so the condition "If each AP affiliated..." is unnecessary and misleading since there is no alternative | Clarify | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 7668 | Wookbong Lee | 35.3.3 | 250.50 | It is confusing. Line 50 says each AP MAC address shall be different each other but line 52 says each AP may have different MAC address. Please clarify. | See comment. | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 7721 | Xiaofei Wang | 35.3.3 | 250.53 | The sentence "If each AP affiliated with an AP MLD has a different MAC address" is not necessary since it is already stated in the previous sentence. Delete this sentence | delete the sentence | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 7882 | Yongho Seok | 35.3.3 | 250.53 | "If each AP affiliated with an AP MLD has a different MAC address,..." Is it possible to have the same MAC address? No. Then, please remove it. | Remove "If each AP affiliated with an AP MLD has a different MAC address," | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 8229 | Yuxin LU | 35.3.3 Multi-link device addressing | 250.52 | The condition "If each AP affiliated with an AP MLD has a different MAC address" is confusing, since the previous paragraph says "The MAC address of each AP affiliated with an AP MLD shall be different from each other". Besides, I do not see a strong connection between the "if..." and "then..." since each non-AP STA affiliated with the non-AP MLD can be distinguished with its link ID after being associated with an AP MLD | Remove this paragraph | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| 8332 | Zhiqiang Han | 35.3.3 | 250.54 | Based on the paragraph above, this is a definite condition. Change this paragraph to "the MAC address of each non-AP STA affiliated with the non-AP MLD shall have a different MAC address." | Please clarify it | Revised -  Agree in principle with the commenter.  TGbe editor to make the changes shown in 11-21/1132r2 under all headings that include CID 4250. |
| End of “if statement” related CIDs | | | | | | |
| 5602 | John Wullert | 35.3.3 | 250.53 | Sentence begins with a conditional ("An AP affiliated with an AP MLD, in (Re)Association Response frame it transmits...") that, according to the requirement in the previous sentence, can only be true. Thus the phrase is misleading. | Remove the phrase "An AP affiliated with an AP MLD, in (Re)Association Response frame it transmits". | Rejected –  The described sentence is not in 35.3.3. |
| 8227 | Yuxin LU | 35.3.3 Multi-link device addressing | 251.02 | In the sentence, "corresponding to that link", "that link" was not mentioned before this place, and so it is not clear which link "that link" refers to. | Define/explain which link is "that link" | Revised –  Agree in principle with the commenter. We add edirotial revision to address the comment.  TGbe editor to make the changes shown in 11-21/1132r3 under all headings that include CID 8227. |
| 8228 | Yuxin LU | 35.3.3 Multi-link device addressing | 251.09 | In the sentence, "corresponding to that link", "that link" was not mentioned before this place, and so it is not clear which link "that link" refers to. | Define/explain which link is "that link" | Revised –  Agree in principle with the commenter. We add edirotial revision to address the comment.  TGbe editor to make the changes shown in 11-21/1132r3 under all headings that include CID 8228. |
| 8230 | Yuxin LU | 35.3.3 Multi-link device addressing | 250.61 | "transmitting STA affiliated with the MLD corresponding to that link", where "that link" is not mentioned before this place, so it is not clear which link "that link" refers to | Change "that link" to "the transmitting link" | Revised –  Agree in principle with the commenter. We add edirotial revision to address the comment for individual addressed frame since a link  TGbe editor to make the changes shown in 11-21/1132r3 under all headings that include CID 8230. |
| 7849 | Yonggang Fang | 35.3.3 | 251.01 | This paragraph only describes MAC Address 1 (RA) for individually addressed frame, but not describes the group addressed or broadcast addressed frames. | Please add the description of RA for group addressed or broadcast addressed frames. | Revised –  Agree in principle with the commenter. The RA for a group addressed frame will just be the corresponding group address.  TGbe editor to make the changes shown in 11-21/1132r3 under all headings that include CID 7849. |
| 5658 | Joseph Levy | 35.3.3 | 250.53 | The amendment specifies that "The MAC address of each AP affiliated with an AP MLD shall be different from each other." Why is this necessary? Each "AP affiliated with an AP MLD" will be operating on a unique channel, the affiliated STA receiving the transmitted MPDU will not care what MAC addressed is used on the channel or on other channels. All that matters is that the MAC address is associated with the AP affiliated with the AP MLD. This restriction simply disallows the non-AP MLD to use simple address filtering of signally addressed frames, requiring a complex method to provide the MLD MAC address, and the ability to recognize that the MAC address used must be substituted by the MLD MAC address before decryption of the MDSU can begin. This seems unnecessary and needlessly increases the complexity of the MLD AP and the non-AP MLD for no added functionality. Note: legacy STAs can be informed that transmissions using the MLD MAC address are from the "same AP" to avoid confusion by defining the MLD AP MAC address as a member of a Multiple BSSID set of the legacy AP. | Require all the APs affiliated with an AP MLD to transmit all individually address MPDUs to non-AP MLDs to use the MLD MAC address in address 2. Also require all STAs affiliated with a non-AP MLD to use the AP MLD MAC address in address 1 of all individually address MPDUs intended for the AP MLD. | Rejected –  Different MAC addresses are agreed in the MLD framework.  This is important on the AP MLD side for legacy discovery compatibility. Specifically, if two APs of the AP MLD in different band uses same MAC address, say AP1 in 2.4 GHz, and AP2 in 5 GHz. A legacy STA that discovers AP1 in 2.4 GHz band, then discovers AP2 in 5 GHz may not understand that these are two different APs and could interpret it as channel switch and just keep one record.  Using the address of the corresponding STA of a link aligns with the baseline MAC address setting in the MAC header. |
| 5969 | Liwen Chu | 35.3.3 | 250.38 | change "...singly identifies the MLD." to "..."niquely identifies the MLD. | As in comment | Rejected –  We note that “singly” is used because the same term is used in the description of STA address. We use the same description that aligns with the baseline behavior.  ***station (STA):*** *A logical entity that is a singly addressable instance of a medium access control (MAC) and physical layer (PHY) interface to the wireless medium (WM).* |
| 6185 | Michael Montemurro | 35.3.3 | 251.06 | According to table 9-30 states that the A3 address is set to the SA, DA, or BSSID in the case of A-MSDU. The frame is actually encapsulated at the AP MLD or non-AP MLD, so the address would be the MLD MAC address. Also the value for A3 is actually dependent on the ToDS and FromDS bits. | Change "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." to "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 is depending on the settings of the ToDS and FromDS bits and shall be set based on Table 9-30 (Address field contents), where the BSSID is the MAC address of the AP MLD." | Revised –  We add the description “and the settings of the To DS and From DS bits” to clarify that table has multiple cases for the setting.  We do not change BSSID to MLD MAC address so that most of the baseline setting is preseverd. Potentially, only SA/DA needs to be changed for MLD MAC address  TGbe editor to make the changes shown in 11-21/1132r3 under all headings that include CID 6185. |

**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.

(#4250)

(#2374) Each STA affiliated with an MLD shall have a different MAC address.(#4250)

(#2759)NOTE—The MLD MAC address 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.

For an individually addressed frame sent on a link between two MLDs, the following applies: (#8227)

(#1158)- the value of the Address 2 (TA) field (if present) in the MAC header of the frame shall be the MAC address of the transmitting STA affiliated with the MLD corresponding to that link except for(#2474) the Individual/Group bit, which is set to 1 when the TA field value is a bandwidth signaling TA and set to 0 otherwise.(#8230)

* the value of the Address 1 (RA) field in the MAC header of the frame shall be the MAC address of the receiving STA affiliated with the MLD corresponding to that link.(#8227)
* (#1670)the value of the Address 3 field and the Address 4 field (if present) in the MAC header of a data frame shall be set based on Table 9- 30 (Address field contents) and the settings of the To DS and From DS bits(#6185), where the BSSID is the MAC address of the AP affiliated with the AP MLD corresponding to that link.(#8228)

For a group addressed frame sent by an STA affiliated with the MLD, the value of the Address 1 field, the Address2 field, the Address 3 field (if present), and the Address 4 field (if present) in the MAC header of the frame shall be set as defined in 9.3.1 (Control frames), 9.3.2 (Data frames), and 9.3.3 ((PV0) Management frames) if allowed, where the BSSID is the following:

* if the STA is an AP, then the BSSID is the MAC address of the AP
* if the STA is a non-AP STA affiliated with the non-AP MLD, then the BSSID is the MAC address of the AP affiliated with the AP MLD, where the AP is the AP affiliated with the AP MLD that has a link setup with the non-AP STA affiliated with the non-AP MLD. (#7849)